Draft Supplemental Environmental Impact Report for Metro Gold Line Foothill Extension

Azusa to Montclair (SCH No. 2010121069)

March 2019

Evaluating Phased Construction and Operation of the Project - APU/Citrus College Station to La Verne Station or Pomona Station and a Relocated Parking Facility at the Pomona Station.

Foothill Gold Line

Metro Gold Line Foothill Extension Construction Authority

Supplemental Environmental Impact Report

Lead Agency: Metro Gold Line Foothill Extension Construction Authority

State Clearinghouse No.: 2010121069

Title of Proposed Project: Metro Gold Line Foothill Extension Project Phase 2B (Azusa to Montclair)

Abstract

The Metro Gold Line Foothill Extension Construction Authority proposes to modify the existing approved Project (2013 FEIR as addended) to construct and operate the Project in four construction phases, rather than two phases, incorporating a parking facility design refinement (moving the facility from the north to the south side of the tracks) near the Pomona Station and implementing a new mitigation measure that would widen White Avenue (between 1st Street and 6th Street) near the La Verne Station. New traffic, safety and security and visual impacts have been identified. With mitigation implementation no new or more severe significant impacts from safety and security or visual would result as part of this Project. One new significant unmitigable traffic impact (Intersection of Glendora Ave/Route 66) has been identified. as part of this Supplemental Environmental Impact Report (SEIR). Comments on this SEIR must be received by May 6, 2019.

Additional written comments and/or questions concerning this document should be directed to the following:

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Table of Contents

Appendices

Tables

Figures

Acronyms and Abbreviations

2013 FEIR	*Final Environmental Impact Report for the Azusa to Montclair segment – Phase 2B of the Metro Gold Line Foothill Extension*
$\mu g/m^3$	microgram(s) per cubic meters
AB	Assembly Bill
ADA	Americans with Disabilities Act of 1990
APN	assessor parcel number
Authority	Metro Gold Line Foothill Extension Construction Authority
Authority Board	Authority Board of Directors
bgs	below ground surface
BMP	best management practice
Btu	British thermal units
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
California Register	California Register of Historical Resources
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CBC	California Building Code
CCR	California Code of Regulations
CCTV	closed-circuit television
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CGS	California Geological Survey
cm	centimeter(s)
CO	carbon monoxide
CO Protocol	Carbon Monoxide Protocol
CO_2	carbon dioxide
CO2e	CO_2 equivalent
Construction Authority	Metro Gold Line Foothill Extension Construction Authority
CPTED	Crime Prevention Through Environmental Design
CPUC	California Public Utilities Commission
dBA	A-weighted decibels
EIR	Environmental Impact Report
EMFAC	Emission Factors
EO	Executive Order
EPA	U.S. Environmental Protection Agency

FAST Act	Fixing America's Surface Transportation Act
FEIR	Final Environmental Impact Report
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FLM	first/last mile
FR	*Federal Register*
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
FTA Guidance Manual	*Transit Noise and Vibration Impact Assessment*
FTIP	Federal Transportation Improvement Program
g	Earth's constant gravitation acceleration
GHG	greenhouse gas
GO	General Orders
Gold Line	Metro Gold Line
H_2S	Hydrogen Sulfide
HCM	Highway Capacity Manual
hr	hour
ID	identification
IGP	Industrial General Permit
in/s	inch(es) per second
LA Metro	Los Angeles County Metropolitan Transportation Authority
LAPD	Los Angeles Police Department
LARWQCB	Los Angeles Regional Water Quality Control Board
LASD	Los Angeles County Sheriff's Department
LBPD	Long Beach Police Department
lbs/day	pounds per day
Ldn	day-night average sound level
LOS	Level of Service
LRT	light rail transit
LRTP	Long Range Transportation Plan
m	meter(s)
M	magnitude
m/s	meter(s) per second
MATES	Multiple Air Toxics Exposure
Metro	Los Angeles County Metropolitan Transportation Authority
MPO	Metropolitan Planning Organization
MRDC	Metro Rail Design Criteria

MS4	municipal separate storm sewer system
MSAT	Mobile Source Air Toxics
MUTCD	*California Manual of Uniform Traffic Control Devices*
N/A	not applicable
NAAQS	National Ambient Air Quality Standards
NAHC	California Native American Heritage Commission
National Register	National Register of Historic Places
NB	northbound
NEPA	National Environmental Policy Act
NHTSA	National Highway Traffic Safety Administration
NM	not monitored
NO_2	nitrogen dioxide
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
NSWD	nonstormwater discharge
OPR	Office of Planning and Research
OSHA	Occupational Safety and Health Administration
PGA	peak ground acceleration
$PM_{2.5}$	particulate matter less than 2.5 micrometers in aerodynamic diameter
PM_{10}	particulate matter less than 10 micrometers in aerodynamic diameter
ppm	parts per million (by volume)
PPV	part(s) per volume
PRC	California Public Resources Code
Project	Azusa to Montclair – Phase 2B project
RPS	Renewables Portfolio Standard
RTP	Regional Transportation Plan
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
RWQCB	regional water quality control board
SARWQCB	Santa Ana Regional Water Quality Control Board
SB	Senate Bill
SB	southbound
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCRRA	Southern California Regional Rail Authority
SCS	Sustainable Communities Strategy
SEIR	Supplemental Environmental Impact Report
SEL_{ref}	reference sound equivalent level

SFR	single-family residence
SIP	State Implementation Plan
SLF	Sacred Lands File
SO_2	sulfur dioxide
SR	state route
SSMP	Safety and Security Management Plan
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	Toxic Air Contaminant
TBD	to be determined
TCR	tribal cultural resource
TMDL	total maximum daily load
TMP	Traffic Management Plan
TNM	Traffic Noise Model
TSA	Transportation Security Administration
UFC	Uniform Fire Code
U.S.	United States
U.S.C.	United States Code
USDOT	U.S. Department of Transportation
USGS	U.S. Geological Survey
VdB	vibration velocity levels in decibels
VMT	vehicle miles traveled
VOC	volatile organic compound

Summary

S.1 Introduction

The Metro Gold Line light rail transit system currently extends from Los Angeles to Azusa and serves the cities and communities along the alignment corridor. The Metro Gold Line Foothill Extension is a phased project that will ultimately extend the existing Metro Gold Line by 24 miles to the east, from the City of Pasadena to the City of Montclair. The Metro Gold Line Foothill Extension Construction Authority (Authority) evaluated the Gold Line in two phases: a first phase of 11.5 miles from Pasadena to Azusa (the Pasadena to Azusa Extension – Phase 2A), and a second phase of 12.3 miles between Azusa and Montclair (Azusa to Montclair Extension – Phase 2B). Phase 2A was completed in 2015 and is in operation. In 2013, the Authority certified a Final Environmental Impact Report (2013 FEIR) for the Azusa to Montclair Extension – Phase 2B project. Construction of Phase 2B (the "Project") began in December 2017. Following the certification of the 2013 FEIR, the Authority identified a number of refinements to the Project. The Authority has since approved four addenda to the 2013 FEIR.

The Authority has prepared this Supplemental Environmental Impact Report (SEIR) in response to the need for revisions to the 2013 FEIR and as a result of proposed Project Modifications. This SEIR evaluates the environmental effects of the Project Modifications approved by the Authority and described in the 2013 FEIR and addenda (but not including Modifications No. 6 and No. 7 as described in Addendum No. 4). This SEIR is intended to provide information to the public; the Authority Board; and local, responsible and trustee agencies regarding the potential significant environmental impacts of the Project Modifications and to identify measures to reduce or eliminate any significant impacts.

The Authority is the lead agency for this SEIR. This SEIR will be used by the Authority and other responsible agencies to provide the information necessary for an environmental review of discretionary actions regarding the Project Modifications, including the issuance or granting of permits, related to the construction and operation of the Project.

S.2 Project Modifications

The Project approved by the Authority extends the Metro Gold Line alignment 12.3 miles east, from just east of Azusa-Citrus Station to the City of Montclair Transcenter and includes 6 new stations in the cities of Glendora, San Dimas, La Verne, Pomona, Claremont, and Montclair. The Project Modifications do not alter the scope of the Project as approved by the Authority. The Project Modifications include phasing construction and operation of the Project, a design refinement, and a new traffic mitigation measure.

The Authority proposes to construct and operate the Project in four construction phases, rather than the two phases approved as part of Addendum No.2. The first phase of construction would include 8.2 miles of the alignment through Los Angeles County, from Azusa-Citrus Station to La Verne Station. The second phase would include 0.8 mile of alignment from La Verne Station to Pomona Station. The third phase would include 2.2 miles of the alignment from Pomona Station to Claremont Station. The fourth phase would include 1.0 mile of the alignment from Claremont Station to Montclair Station in San Bernardino County. This proposed four-phased construction would occur across a range of timelines and result in La Verne Station (2019 to 2024), Pomona Station (2019 to 2025, subject to availability of funding from Metro), and Claremont Station (2021 to 2028, subject to availability from Metro) operating as temporary end-of-line (terminus) stations.

As part of the Project Modifications, the Authority also proposes a design refinement that would involve relocating the north side Pomona Station parking facility to an existing parcel on the south side of the station. The Project Modifications would also include a new traffic mitigation measure that will widen White Avenue from existing at-grade railroad crossing north to the intersection with 6th Avenue. The analysis conducted and resulting impacts necessitating this new mitigation measure is provided in Chapter 2 – Transportation.

All other design features of the Project would remain the same as described in the 2013 FEIR and the four subsequent addenda (with the exception of Modification No. 6 and Modification No. 7 in Addendum No. 4)

S.3 Transportation

The SEIR, Chapter 2 - Transportation evaluates the potential impacts of the Project Modifications against two baselines: (1) the 2035 build conditions identified in the 2013 FEIR (the “Approved Project Baseline”), and (2) the 2018 existing conditions (the “Existing Conditions Baseline”). In this manner, the SEIR discloses and evaluates the extent to which the Project Modifications would change transportation impacts as compared to the Project previously approved by the Authority, and as compared to existing conditions.

Employing the Existing Conditions Baseline, the SEIR also discloses and evaluates the extent to which the Project, including the Proposed Modifications, would affect transportation conditions existing in the Project area prior to the construction of the Project improvements. Additionally, the SEIR evaluates the transportation impacts of the Project against the Approved Project Baseline using a methodology similar to the methodology for evaluating transportation impacts in the 2013 FEIR and addenda. The 2013 FEIR methodology reflected the standard practice in the traffic engineering profession at the time. The evaluation included a comparison of the Project Modifications to a No Build scenario, again consistent with standard practice for traffic engineering.

In addition, and subsequent to the certification of the 2013 FEIR, legislative amendments to CEQA (Public Resources Code, § 21099) were adopted (December 2018) directing the Office of Planning and Research to develop and adopt amendments using alternative measures of measuring transportation impacts. A new section of the CEQA Guidelines (CEQA Guidelines, § 15064.3) was adopted stating that the use of LOS and similar measurements of traffic delay “will no longer be considered to be an environmental impact under CEQA” However, these adopted amendments also authorized lead agencies to “elect to be governed by the provisions of this section immediately” and applied the new measure of transportation impacts required to apply statewide beginning on July 1, 2020.

The adopted amendments determined that, in general, transportation impacts are best evaluated by using vehicle miles traveled (VMT). Guidelines Section 15064.3 also notes that lead agencies should presume that projects that reduce VMT, such as pedestrian, bicycle, and transit projects, would have a less than significant impact. Those amendments also determined that “Lead agencies have the discretion to choose the most appropriate methodology to analyze a project’s vehicle miles traveled”

Based on the methods summarized above, detail evaluation on regional forecasting, study area determination, traffic operations analysis, and VMT analysis were conducted. Detailed discussions on the methodology used is provided in the introduction to Chapter 2, Transportation, as well as in Section 2.1 Methodology.

S.3.1 Regional Forecasting

Metro’s “Measure R” regional travel demand model was applied for this study’s forecasting analysis. This model represents all Measure R projects anticipated to be operational by the year 2035, as well as other projects included in the approved RTP/SCS and is the same one used in the 2013 FEIR. A more detailed discussion of the Measure R model is provided in Section 2.1.1.

For the analysis of the Project Modifications, the terminus of the Project was modified in the model from Montclair to La Verne (for Phase 1) and from Montclair to Pomona (for Phase 2). Ridership forecasts with the La Verne and Pomona stations as the termini were compared with the Claremont and Montclair stations as the termini. The Project Modifications would change the ridership levels at each of the six Project stations by constructing and operating the Project in four phases, instead of two phases as evaluated in the 2013 FEIR and addenda. Changes to ridership levels due to the Project Modifications would affect traffic volumes and parking demands near the Project stations. In turn, intersection operations would be affected in the vicinity of these stations.

S.3.2 Study Area Determinations

The model output for the Project Modification, Phases 1 and 2 indicated there would be measurable changes in automobile trips at the Glendora, San Dimas, La Verne, and Pomona stations. To assess potential impacts, a set of 74 intersections was identified for evaluation (see Section 2.1.2, Table 2-1). The starting point was the set of intersections originally identified in the 2013 FEIR and addenda. Additional intersections were identified, because focused traffic studies were conducted after the 2013 FEIR on new intersections. Of the 97 intersections noted, 74 were included in the 2013 FEIR, 1 intersection was split into 2, and 22 new intersections were added. Additionally, and subsequent to the 2013 FEIR and addenda, several independent traffic studies (Appendix C – Traffic Analysis Technical Summary) were conducted to inform the engineering process and address questions and concerns from the affected cities and CPUC. These studies identified specific improvements (see Section 2.1.2) that are included as part of the Project Modifications to improve traffic operations and pedestrian/vehicular safety.

S.3.3 Traffic Operations Analysis

For traffic operations analysis, a three-pronged approach was conducted for the Project Modifications: (1) an assessment of the potential for impacts under both the Los Angeles County thresholds (for all intersections), (2) thresholds adopted by the City of Pomona (for intersections in Pomona), and (3) VMT analysis (described in Section 2.1.4). Using all three measures allowed for a comprehensive assessment of potential impacts to ensure that compliance with these thresholds means that the project's impacts are less than significant (per CEQA Guidelines § 15064(b)(2)). Multiple scenarios were analyzed to assess the potential impact of traffic operations:

- Existing Conditions (2010) analysis from the 2013 FEIR was retained.
- The 2035 No Build scenario was updated.
- The 2035 Build scenario, for the Project Modifications, was divided into Phase 1 and Phase 2. Traffic forecasts were updated to reflect the changing travel patterns at the study intersections with the temporary terminus of the Gold Line at the La Verne Station (Phase 1) and the Pomona Station (Phase 2).
- 2035 Approved Project scenarios, with termini at Claremont and Montclair, per the 2013 FEIR and Addendum No. 2, were assessed.

Section 2.1.3 provides a detail discussion on the multi-pronged approach employed for traffic operations analysis.

S.3.4 Vehicle Miles Traveled

Consistent with the earlier discussion, CEQA Guidelines now provide for the use of VMT to evaluate the transportation impacts of transit projects. Section 15064.3(c) states that "a lead agency may elect to be governed by the provisions of this section immediately. Beginning on July 1, 2020, the provisions of this section shall apply statewide."

Based on the new CEQA Guidelines, the presumption of a less-than-significant impact suggests that detailed VMT analysis is not required for the Project Modifications. However, to confirm that assumption, the Measure R travel demand model was used to assess whether the Project Modifications would reduce VMT. That assessment was conducted on a regional level, for both Phase 1 and Phase 2. It is appropriate to assess VMT at a regional level to assess the extent to which the Project Modifications would reduce or increase regional travel and thus VMT. VMT was also evaluated for the study area, using a 2-mile buffer around the proposed Gold Line stations, see Section 2.1.4, Figure 2-1. The focused VMT analysis captured the effects of travel changes specific to the affected area

S.3.5 Impact Analysis Results

Regional Forecasting - The regional forecasting analysis for traffic demand, including changes in ridership, automobile access and parking demand indicated a range of both increases and decreases depending on station location and the corresponding Project Modifications applied to Phase 1 and Phase 2. Section 2.2.1 – Traffic Demand and Tables 2-3, 2-4, 2-5, and 2-6 provide detailed discussions and comparative data across these three topics. The identified changes from a regional forecasting perspective do not represent new impacts.

Traffic Operations – As described above the traffic operations analysis included a multi-pronged evaluation approach. LOS was analyzed at each study area intersection for the Project Modifications (Phase 1 and Phase 2). Intersection geometrics and signal phasing were updated to reflect the latest field conditions and assumed to be the same in the Existing Conditions and 2035 No Build scenarios. Then, updates were made to reflect the traffic volume and geometric changes associated with the Project Modifications. Detailed tabular information is provided in Section 2.3.1, Tables 2-7 and 2-8. Based on this analysis a comparison of the delay and LOS for these intersections against the results for the 2013 FEIR Approved Project and Existing Conditions was conducted (see Section 2.3.1, Table 2-9). The LOS in the 2035 peak period for the Project Modifications is worse than Existing Conditions for all intersections.

Using the Los Angeles County thresholds in the 2035 scenario, the intersection operating conditions with the Project Modifications were compared with the No Build scenario to identify potential impacts. Section 2.3.2 Tables 2-10 and 2-11 provide summaries of AM and PM peak hour conditions for the Project Modifications (Phase 1 and Phase 2) and No Build scenarios. From this analysis at total of 5 intersections were identified as potentially impacted with the Project Modifications, including:

- Towne Avenue/Arrow Highway (AM peak hour / Phase 2)
- Glendora Avenue/Route 66 (PM peak hour / Phase 1 and Phase 2)
- E Street/Second Street (PM peak hour / Phase 1)
- White Avenue/Second Street (PM peak hour / Phase 1 and Phase 2)
- White Avenue/First Street (PM peak hour / Phase 1 and Phase 2)

In addition, using the City of Pomona traffic analysis methodology, the impact criteria for the intersection of Garey Avenue/Arrow Highway would not be met or exceeded because it would still operate at LOS D or better. Of the intersections identified as potential impacts, only two intersections (White Avenue/Second Street and White Avenue/First Street, were also identified as potential impacts in the 2013 FEIR.

This 2035 evaluation also indicated three intersections in where impacts and mitigation measures were identified in the 2013 FEIR, but will no longer be needed with the Project Modifications for any phase.

- Garey Avenue/Bonita Avenue
- Towne Avenue/Bonita Avenue
- Towne Avenue/Towne Center Drive

These intersections no longer have impacts because of the changes in travel patterns associated with the location of the Pomona Station parking facility south of the Metrolink tracks.

VMT Analysis – The Project Modifications would reduce VMT during both Phase 1 and Phase 2. Those reductions are associated with the shift in mode from automobile to transit trips with the increased Gold Line service. Based on these reductions, there would be no new or more severe significant impacts to VMT.

S.3.6 Transportation Mitigation Recommendations and Measures

The following mitigation strategies and other recommendations for addressing the impacts identified included consideration of the options described in Section 2.3.3. For the five intersections with identified impacts the following mitigation measure were evaluated and the resulting level of impact determined.

Glendora Avenue/Route 66 - The proposed mitigation measure was to add a second left-turn lane for eastbound Route 66. The improvement in LOS was negligible (resulting in a decrease of less than 1 second in delay for Phase 1 and Phase 2), and the impact (PM Peak only) remained after mitigation. Therefore, the significant impact cannot be addressed with any feasible mitigation measures. There are no identified mitigation measures that add capacity to reduce delay, without substantial right-of-way acquisitions that will in turn have secondary impacts related to the loss of these properties and the associated economic effects. Therefore, the Project Modifications would introduce a new unmitigable significant impact at this intersection during the PM peak period.

E Street/Second Street – The need to evaluation recommended mitigation measures was not necessary for this intersection since the delay with the Project Modifications would be lower (by 0.1 second) than the delay with the Approved Project. For that reason, no mitigation measures were identified.

White Avenue/Second Street – The widening of White Avenue between First Street and Sixth Street was evaluated. The mitigation is projected to improve intersection operations to LOS C (17.2 seconds in delay for Phase 1 and 16.6 seconds for Phase 2) during the PM peak hour. This improvement will allow the intersection to operate better than the 2035 No Build scenario and is therefore a feasible mitigation for the identified significant impact. Therefore, the Project Modifications, after mitigation, would not introduce a new or more severe significant impact.

- **LTR-9**: Widen White Avenue to include two lanes in both the northbound and southbound directions, a dedicated median turn lane, and curbs, gutters, and sidewalks.

White Avenue/First Street – The widening of White Avenue between First Street and Sixth Street was also evaluated for this intersection. The mitigation is projected to improve intersection operations to LOS C (18.1 seconds in delay for Phase 1 and 17.4 seconds for Phase 2) during the PM peak hour. This improvement will allow the intersection to operate better than the 2035 No Build scenario and is therefore a feasible mitigation for the identified significant impact. Therefore, the Project Modifications, after mitigation, would not introduce a new or more severe significant impact.

Towne Avenue/Arrow Highway – A mitigation measure was identified to address the impacts, specifically the addition of one northbound left-turn lane and a storage length extension from 100 feet to 175 feet. Roadway widening near the intersection will be needed to accommodate the improved lane configuration. A detailed engineering assessment is required to determine the feasibility of this potential mitigation.

- **LTR-10 (new):** Add one northbound left-turn lane and lengthen the storage from 100 feet to 175 feet.

S.4 Environmental Impacts

This SEIR evaluates the potential environmental impacts of the Project Modifications compared to existing conditions and the impacts of the Project as evaluated in the 2013 FEIR with addenda. The evaluations also included consideration of possible ways to minimize or mitigate new or more severe significant impacts. Detailed discussions of the regulatory setting, existing conditions, environmental impacts (including evaluation methodology, impact criteria, short-term construction impacts, long-term impacts, and cumulative impacts), mitigation measures, and the level of impact after mitigation for environmental resources are included in this SEIR.

Impacts on each environmental resource are analyzed according to (1) the proposed four-phase construction and operation with interim station termini conditions associated with each phase, (2) the proposed parking facility design refinement at Pomona Station, and (3) the new mitigation measure (LTR-9) involving widening White Avenue in the City of La Verne. The study area for the construction and operation phasing focuses on the interim termini stations. The study area for the design refinement and mitigation measure is exclusive to the areas where those changes are proposed, the cities of Pomona and La Verne, respectively. Table S-1 presents a summary of impacts for each resource.

S.4.1 Short-term Impacts and Mitigation Measures

Short-term impacts were analyzed for all resources, including transportation, air quality, climate change, communities/population/housing, cultural resources, energy, geologic hazards, land use and planning, noise and vibration, safety and security, visual quality, water resources, growth-inducing impacts, and irreversible and irretrievable commitments of resources. No new or more significant short-term impacts, as compared to the 2013 FEIR and four addenda, are expected to occur as a result of the Project Modifications.

Short-term mitigation measures were also reviewed for all resources analyzed. All short-term mitigation measures for construction will be the same as presented in the 2013 FEIR. No new short-term mitigation measures were identified as a result of the Project Modifications.

S.4.2 Long-term Impacts and Mitigation Measures

Long-term impacts were also analyzed for all resources, including transportation, air quality, climate change, communities/population/housing, cultural resources, energy, geologic hazards, land use and planning, noise and vibration, safety and security, visual quality, water resources, growth-inducing impacts, and irreversible and irretrievable commitments of resources. No new impacts were identified, except for traffic and transportation, safety and security, and visual quality. New mitigation measures will be implemented to reduce the severity of the impacts to a less than significant level, except for the unmitigable significant impact at the Glendora Avenue/Route 66 intersection.

Long-term mitigation measures were identified for all resources analyzed. Long-term mitigation measures will be the same as presented in the 2013 FEIR and include the new mitigation measures presented below.

Safety and Security

- **SS-4**: Widen the existing sidewalk between the proposed parking facility at the Pomona Station and the existing at-grade crossing over the Metrolink tracks from 4 feet to 8 feet to properly accommodate the higher ridership demands projected as a result of the Pomona Station being a terminus station under Phase 2.
- **SS-5**: Install large, easily visible station identifiers for both the Metrolink Pomona North Station and the Proposed Project’s Pomona Station. The station identifiers shall stand out visually in a busy urban environment and be distinguishable from the parking facility to differentiate between the Metrolink station and Metro’s Pomona Station. Kiosks shall be placed near each station identifier that provide information and wayfinding such as station maps, system maps, real-time train arrival data, and fare information.

Visual Quality

- **V-7**: To further reduce light spillover and increase privacy for adjacent residential parcels, the south-facing façade of the Pomona Station parking facility shall be solid, with no openings or windows, to the extent feasible.

Table S-1. Summary of Impacts

Resource	Short-term Impacts	Long-term Impacts	Level of Impact after Mitigation
Air Quality	No new or more severe significant impacts, with implementation of 2013 FEIR mitigation measures CN-1 – CN-19, no new mitigation measures	No new or more severe significant impacts	Short-term construction impacts remain significant as presented in the 2013 FEIR. Long-term impacts would be less than significant
Climate Change	No new or more severe significant impacts	No new or more severe significant impacts	Less than significant
Communities, Population and Housing	No new or more severe significant impacts, with implementation of 2013 FEIR mitigation measures S-1 to S-5, no new mitigation measures	Three minor partial acquisitions (White Avenue widening). One full property acquisition (Pomona Station parking facility relocation). No new or more severe significant impacts with implementation California Relocation Assistance Act consistent with the 2013 FEIR	Less than significant with 2013 FEIR mitigations incorporated
Cultural Resources	No new or more severe significant impacts, with implementation of 2013 FEIR mitigations measures CR-1 and CR-2, no new mitigation measures	No new or more severe significant impacts	Less than significant with 2013 FEIR mitigations incorporated
Energy	No new or more severe significant impacts, with implementation of 2013 FEIR mitigation measures CON-9 to CON-19, no new mitigation measures	No new or more significant impacts	Less than significant with 2013 FEIR mitigations incorporated
Geologic Hazards	No new or more severe significant impacts, with regulatory compliance, no new mitigation measures	No new or more significant impacts, with regulatory compliance	Less than significant

Table S-1. Summary of Impacts

Resource	Short-term Impacts	Long-term Impacts	Level of Impact after Mitigation
Land Use and Planning	No new or more severe significant impacts	No new or more significant impacts	Less than significant
Noise and Vibration	No new or severe impacts with implementation of 2013 FEIR mitigation measures N-1 and N-2, no new mitigation measures	No new or more severe impacts with implementation of 2013 FEIR mitigation measure N-3, N-4 and N-5	Less than significant with 2013 FEIR mitigations incorporated
Safety and Security	No new or more severe significant impacts with implementation of 2013 FEIR mitigation measures SS-1 and SS-2, no new mitigation measures	No new or more severe significant impacts with implementation of 2013 FEIR and new mitigation measures SS-3, SS-4 (new), and SS-5 (new)	Less than significant with 2013 FEIR and new mitigations incorporated
Visual Quality	No new or more severe significant impacts, with implementation of 2013 FEIR mitigation measures VIS-1 to VIS-3.	No new or more severe significant impacts with implementation of 2013 FEIR and new mitigation measures VIS-4, VIS-5, VIS-6, and VIS-7 (new)	Less than significant with 2013 FEIR and new mitigations incorporated
Water Resources	No new or more severe significant impacts	No new or more severe significant impacts	Less than significant

S.5 Public and Agency Involvement

Throughout the environmental review process, the Authority has actively engaged the public and agency representatives through a number of methods, including a public scoping meeting (held December 10, 2018) and by a comprehensive dissemination of Project information and updates to community members and stakeholders. The distribution of this Project information included both formal and informal noticing via distributions from the State Clearinghouse, along with direct mail, email, online updates, e-news, social media, and media advisory and earned media.

The Authority hosted the scoping meeting in an open house format, allowing attendees to arrive any time between 5:30 and 7:30 pm, engage the project team, and review project-related materials (fact sheet and display boards). The scoping meeting attendees were encouraged to ask questions and provide comments. Over 80 attendees signed in at the meeting and formal comments were accepted via written comment cards at the meeting, verbally to a court reporter, or through written comments provided via mail or through the standard U.S. postal service. The Authority filed a Notice of Preparation (NOP) for the Draft SEIR with the State Clearinghouse on December 7, 2018. The Authority notified the public and local agencies via mail announcements, newspaper notices, and an update notice on the Project website. During the scoping process, the public was encouraged to provide comments on potential environmental impacts that should be studied in the SEIR. A public scoping meeting was held at La Verne Community Center and provided an opportunity for the public to provide comments regarding the Project Modifications and the scope of the SEIR.

In concert with filing the NOP, hosting the scoping meeting, and the other noticing efforts, the Authority coordinated with the six corridor cities and their respective chambers of commerce to ensure the local agencies, businesses, and residential communities were well informed of the upcoming and proposed Project Modifications.

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Introduction

Background

The Metro Gold Line Foothill Extension Construction Authority (Authority) is an independent transportation planning, design, and construction agency created in 1998 by the California State Legislature to design, contract, and construction the Los Angeles to Pasadena Metro Gold Line (Gold Line) (formerly the Pasadena Blue Line). The Authority is responsible for designing and constructing the Metro Gold Line Foothill Extension project. Los Angeles County Metropolitan Transportation Authority (Metro) maintains certain oversight responsibilities regarding the design and construction in conjunction with the Authority and will operate the Gold Line.

The Authority evaluated the Gold Line in two phases: a first phase of 11.5 miles from Pasadena to Azusa (the Pasadena to Azusa Extension – Phase 2A), and a second phase of 12.3 miles between Azusa and Montclair (Azusa to Montclair Extension – Phase 2B). Phase 2A was completed in 2015 and is in operation. In 2013, the Authority certified a Final Environmental Impact Report (2013 FEIR) for the Azusa to Montclair – Phase 2B project (Figure 1). Construction of Phase 2B began in December 2017. The Phase 2B project is referred to herein as the "Project."

Following the certification of the 2013 FEIR, the Authority identified a number of refinements to the Project. The Authority initially approved four addenda to the 2013 FEIR:

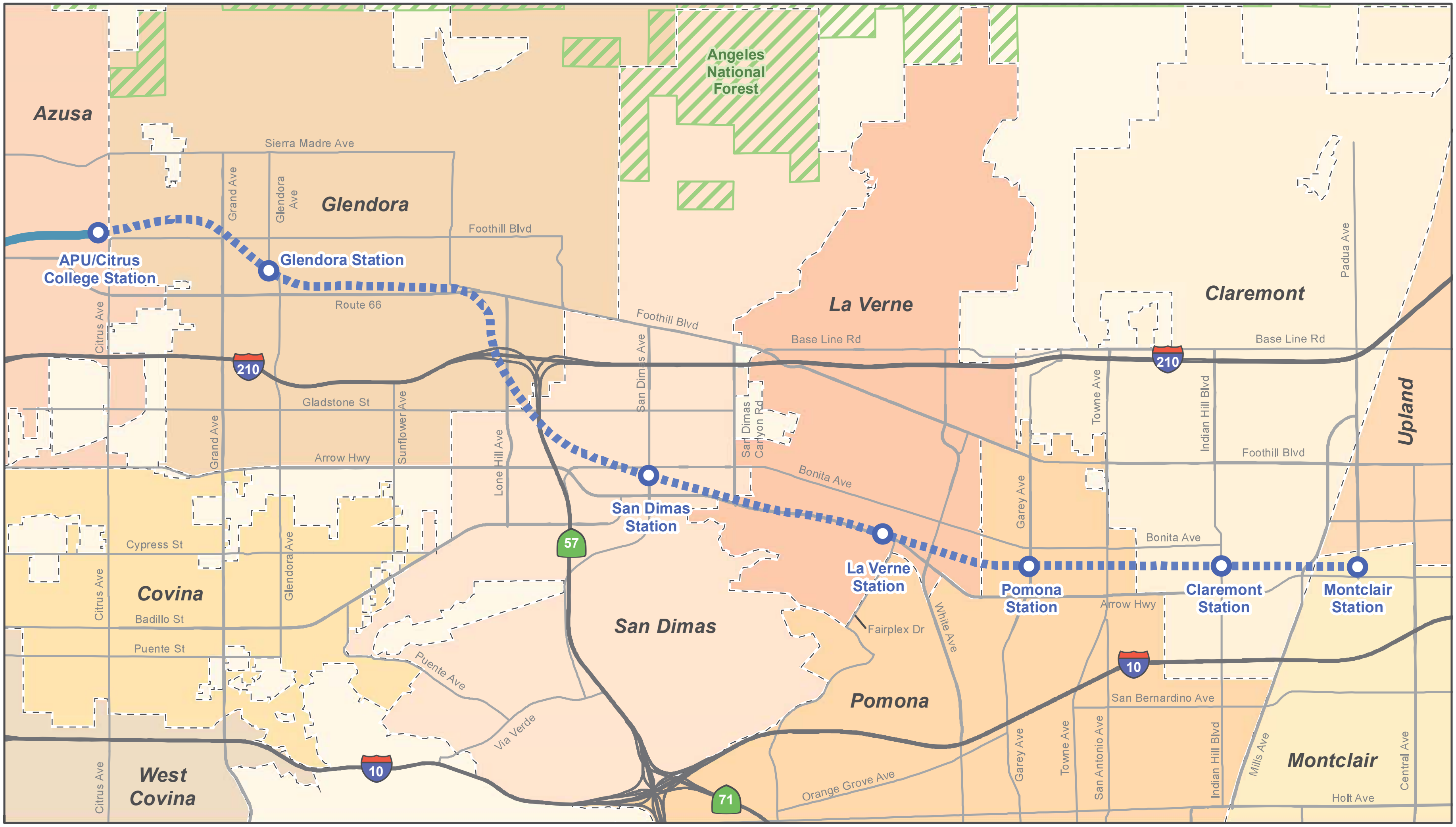
- **Addendum No. 1** to the 2013 FEIR addressed project refinements associated with grade separation of Garey Avenue in Pomona and was adopted by the Authority's Board of Directors (Authority Board) in May 2014.
- **Addendum No. 2** to the 2013 FEIR addressed project refinements associated with construction of the project in two phases and minor technical changes to the engineering design and was adopted by the Authority Board in December 2014.
- **Addendum No. 3** to the 2013 FEIR addressed minor design changes to the project and was adopted by the Authority Board in March 2016.
- **Addendum No. 4** to the 2013 FEIR addressed minor design changes to the project and was adopted by the Authority Board in May 2018.

The Authority subsequently deleted Modification No. 6 in Addendum No. 4 (a refinement of the parking structure at the San Dimas Station in the City of San Dimas), and Modification No. 7 (a refinement of the Towne Avenue flyover structure in the City of Pomona) in Addendum No. 4 from the list of refinements included in the Project.

Purpose of the Supplemental Environmental Impact Report

The Authority prepared this Supplemental Environmental Impact Report (SEIR) to evaluate proposed changes to the phasing of construction and operation of the Project, along with a design refinement and a new traffic/transportation mitigation measure, which include modifications to the parking at the Pomona station and the widening of White Avenue in La Verne, respectively. The Authority previously approved the construction and operation of the Project in two phases. As a result of increases in the estimated construction cost of the Project, the Authority is now proposing to construct and operate the Project in four phases.

> ***Azusa to Montclair Project Definitions***
>
> **Project.** The Phase 2B extension of the Gold Line from Azusa to Montclair. The Project includes project elements described in the 2013 FEIR and the addenda to the 2013 FEIR that were approved by the Authority Board.
>
> **Project Modifications.** The proposed modifications to the Project, including the revised construction and operational phasing, a design refinement (relocation of the Pomona Station parking facility) and a new traffic mitigation (widening of White Avenue).



Legend

Existing Metro Gold Line

Metro Gold Line Phase 2B

Metro Gold Line Phase 2B Station

0 1 2

Miles

Figure 1
Regional Vicinity
Metro Gold Line Phase 2B –
Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

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This SEIR evaluates the environmental effects of the proposed modifications to the Project approved by the Authority and described in the 2013 FEIR and the addenda (but not including Modifications No. 6 and No. 7 described in Addendum No. 4). The modifications described in this SEIR are called the "Project Modifications" herein. Like the 2013 FEIR and addenda, the SEIR is intended to provide information to the public, the Authority Board, and responsible and trustee agencies regarding the potential significant environmental impacts of the Project Modifications and to identify measures to reduce or eliminate any significant impacts.

Legal Requirements

This SEIR for the Gold Line Foothill Extension from Azusa to Montclair Project has been prepared in accordance with the California Environmental Quality Act (CEQA) (Public Resources Code, Section 21000 et seq.) and the Guidelines for Implementation of the California Environmental Quality Act (California Code of Regulations [CCR], Title 14, Section 15000 et seq.).

California Public Resources Code (PRC) Section 21166 states that once an environmental impact report (EIR) has been prepared for a project, no subsequent or supplemental EIR is to be prepared unless one of the following circumstances occurs:

a) Substantial changes are proposed in the project that will require major revision to the environmental impact report.

b) Substantial changes have occurred with respect to the circumstances under which the project is being undertaken, which will require major revisions to the environmental impact report.

c) New information, which was not known and could not have been known at the time of the environmental impact report was certified as completed, has become available.

This SEIR has been prepared due to the need for revisions to the 2013 FEIR as a result of the Project Modifications. The SEIR compares the potential effects of the Project Modifications to the effects of the Project evaluated in the 2013 FEIR and approved by the Authority Board.

Draft Supplemental Environmental Impact Report

The Authority filed a Notice of Preparation (NOP) for the Draft SEIR on December 7, 2018, in accordance with CEQA Guidelines, Sections 15082(a) and 15375 (see Appendix A – Notice of Preparation and Appendix B – Scoping Materials Summary Report). The NOP began the scoping process for the project. The Authority notified the public and local agencies of the Authority's decision to prepare the SEIR via robust outreach activities. Scoping meeting notices, mail announcements, newspaper notices, an updated notice on the project website (https://foothillgoldline.org/), e-news, media advisory, and earned media.

During the scoping process, the public was encouraged to provide comments on potential environmental impacts that should be studied in the SEIR. The public scoping meeting for the project was held on December 10, 2018, from 5:30 PM to 7:30 PM at La Verne Community Center (3680 D Street, La Verne, California 91750). The scoping meeting provided an opportunity for the public to provide comments regarding the Project Modifications and the scope of the SEIR (see Appendix A). More than 80 members of the public attended the scoping meeting. The scoping meeting informational stations displayed environmental topics of concern, construction phases, and potential impacts of the Project Modifications. The Authority provided the public with an opportunity to provide in-person oral and written comments at the scoping meeting. Written comments were also received via mail and email. The Authority received a total of 30 comment submittals during the scoping period. Comments came from six regulatory agencies, five cities, and thirteen members of the public. Agency letters responding to the NOP were received from the California Native American Heritage Commission, California Public Utilities Commission (CPUC), Southern California Regional Rail Authority (SCRRA)/Metrolink, California Department of Toxic

Substances Control, Caltrans, San Bernardino County Transportation Authority, City of La Verne, City of Glendora, City of Pomona, City of Montclair, and City of San Dimas. Each entity provided comments consistent with its regulatory role and responsibility. The comments submitted to the Authority during the scoping process informed the scope and content of this SEIR. Please refer to Section 4.0 for more information regarding the Authority's scoping efforts.

The Project Modifications

The Project approved by the Authority extends the Metro Gold Line alignment 12.3 miles east, from just east of the Azusa-Citrus Station to the City of Montclair Transcenter and includes six new stations in the cities of Glendora, San Dimas, La Verne, Pomona, Claremont, and Montclair. The Project Modifications do not alter the scope of the Project as approved by the Authority.

The Project Modifications include the phasing of construction and operation of the Project design refinement, and a new traffic mitigation measure. The Authority proposes to construct and operate the Project in four construction phases, rather than two phases (see Section 1.1.2.1 for details). Project Modifications also include a design refinement in the vicinity of the Pomona Station and a new mitigation measure that involves the widening of White Avenue near the La Verne Station. The proposed Pomona Station design refinement is a location change to the new Pomona Station parking facility to relocate the parking structure from the approved north side of the station to the south side of the station. The new traffic mitigation measure refers to the widening of White Avenue in the City of La Verne, just north of the new La Verne Station (see Section 1.1.2.2 and Section 2.3.3.3 for more detailed information).

Scope of Environmental Analysis in the Supplemental Environmental Impact Report

This Draft SEIR evaluates the potential environmental effects of the Project Modifications in comparison to the effects of the Project as approved by the Authority, and also in comparison to existing conditions. The study area for the environmental analysis has been defined in two distinct ways:

- The study area for the four construction phases focuses on the interim termini stations and the potential for corresponding traffic impacts.
- The study area for the design refinement and new mitigation measure is exclusive to the geographic limits of the areas where the refinement and mitigation measure are proposed.

The SEIR discusses the following environmental issue areas in detail as they relate to the Project Modifications:

- Transportation
- Air quality
- Climate Change
- Communities, population, and housing, including acquisitions and displacements
- Cultural resources
- Energy
- Geologic hazards
- Land use and planning
- Noise and vibration
- Safety and security
- Visual resources
- Water resources
- Growth-inducing impacts
- Irreversible and irretrievable commitments of resources

A preliminary evaluation was conducted during the scoping of the SEIR, and the following environmental issue areas were determined to have no potential for significant impacts associated with the Project Modifications. Therefore, they are not discussed in this SEIR. Those issue areas are:

- Biological Resources/Ecosystems
- Community Facilities and Parklands
- Hazardous Waste and Materials
- Irreversible and Irretrievable Commitments of Resources
- Anticipated Permits and Approvals

Intended Use of the Supplemental Environmental Impact Report

This SEIR will be used by the Authority and other responsible agencies to provide the information necessary for an environmental review of discretionary actions regarding the Project Modifications, including the issuance or granting of permits, related to the construction and operation of the Project.

Lead Agency

The Authority is the Lead Agency for this SEIR.

Contact Person

The primary contact person regarding information presented in this SEIR is Ms. Lisa Levy Buch, the Authority's Chief Communication Officer. Ms. Levy Buch can be reached by telephone at (626) 471-9050, by email at llevybuch@foothillextension.org, or by mail at:

Metro Gold Line Foothill Extension Construction Authority
406 E. Huntington Drive, Suite 202
Monrovia, CA 91016-3633

Organization of Supplemental Environmental Impact Report

- Chapter 1 provides a description of the Project as approved by the Authority, and describes the baseline used in the SEIR to evaluate the potential significant effects of the Project Modifications.
- Chapter 2 analyzes the potential transportation effects of the Project Modifications.
- Chapter 3 analyzes the potential effects of the Project Modifications on environmental resources.
- Chapter 4 describes the public outreach and agency coordination conducted during the preparation of this document.
- Chapter 5 provides a list of the agencies and persons consulted during the preparation of this document.
- Chapter 6 provides a list of the preparers of this SEIR.

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1. Project Description

1.1 Existing and Operational Gold Line System

The Metro Gold Line light rail transit (LRT) system currently extends from Los Angeles to Azusa, California, serving cities and communities along the alignment corridor. It is a dual-track system with overhead catenary lines for power. Each of the 19 stations includes parking facilities (surface lots and/or structures) for riders arriving by car. The light rail track is mostly at-grade and is generally within the existing Authority right-of-way in a corridor that is shared with Metrolink and BNSF Railways railroad tracks.

1.2 Azusa to Montclair Extension – Phase 2B Project

The Authority approved Phase 2B of the Gold Line system in 2013 to extend the Gold Line from Azusa to Montclair. After the 2013 approval, the Authority decided to construct and operate the Azusa to Montclair portion of the Gold Line system in two phases: Phase 1 from Azusa to Claremont, and Phase 2 from Claremont to Montclair. Construction commenced on Phase 1 in December 2017.

1.2.1 The 2013 FEIR Project with Addenda

The 2013 FEIR Project with the modifications evaluated in the four addenda and included in the Project by the Authority is a 12.3-mile extension of the Metro Gold Line LRT alignment to the east, with service from the Azusa-Citrus Station to the Montclair Transcenter. It includes the analyzed and approved stations in Glendora, San Dimas, La Verne, Pomona, Claremont, and Montclair.

As evaluated in the 2013 FEIR, the anticipated travel time would be approximately 18 minutes between Azusa-Citrus Station and Montclair Station. It is anticipated that trains would operate with 10-minute headways during peak periods and 20-minute headways during off-peak periods and would have a projected ridership of approximately 17,800 passengers per day. The projected passenger daily boardings at each proposed station in 2035 are as follows: (updated passenger boardings are shown in Chapter 2, Transportation)

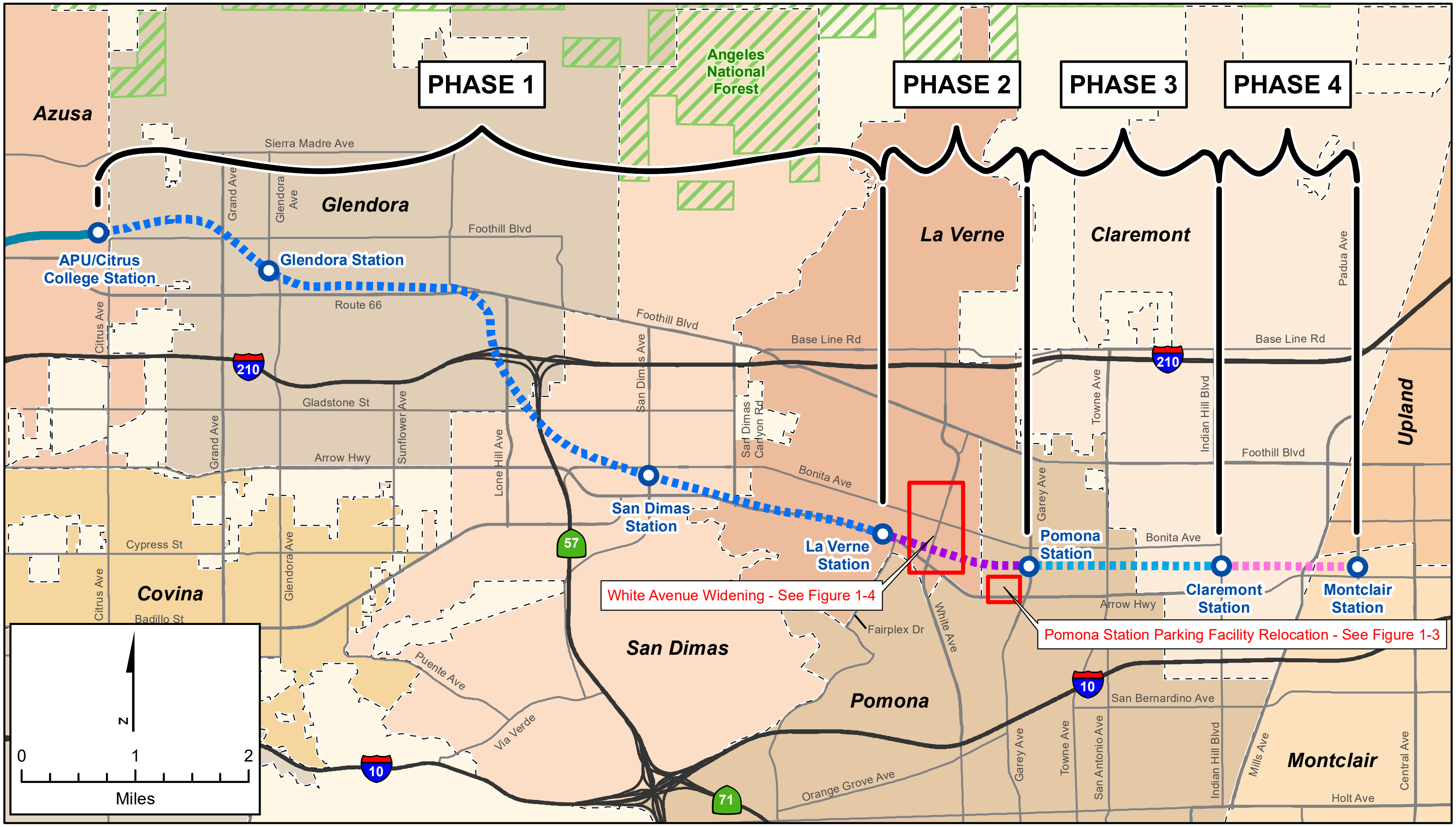
- Glendora Station – 1,850
- San Dimas Station – 1,800
- La Verne Station – 1,850
- Pomona Station – 3,000
- Claremont Station – 2,850
- Montclair Station – 6,450

1.2.2 Project Modifications

The Authority proposes to modify the phasing of the construction and operation of the Project and to also implement a design refinement and new traffic mitigation measure to the Project. The Project elements, including alignment, stations, grade crossings, and parking, would be the same as presented in the 2013 FEIR (with addenda), except where the operational and minor design refinement, and mitigation measure are proposed. All other features of the Project would remain the same as described in the 2013 FEIR (with addenda). This SEIR evaluates the potential impacts of the Project Modifications identified below.

1.2.2.1 Proposed Changes to Construction and Operation Phasing

The Authority proposes to construct and operate the Project in four construction phases as shown in Figure 1-1, rather than two phases as shown in Figure 1-2. The first phase of construction would include 8.2 miles of the alignment through Los Angeles County, from the Azusa-Citrus station to the La Verne Station. The second construction and operation phase would include a 0.8-mile segment of the alignment from the La Verne Station to the Pomona Station.



Legend

- Existing Metro Gold Line
- Metro Gold Line Phase 2B Station
- Phase 1 – La Verne – 2019 to 2024
- Phase 2 – Pomona – 2019 to 2025 subject to availability of funding from Metro
- Phase 3 – Claremont – 2021 to 2028 subject to availability of funding from Metro
- Phase 4 – Montclair – 2021 to 2028 subject to availability of funding from SBCTA for the portion from Claremont to Montclair

Figure 1-1
Supplemental EIR Project Phasing
Metro Gold Line Phase 2B –
Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

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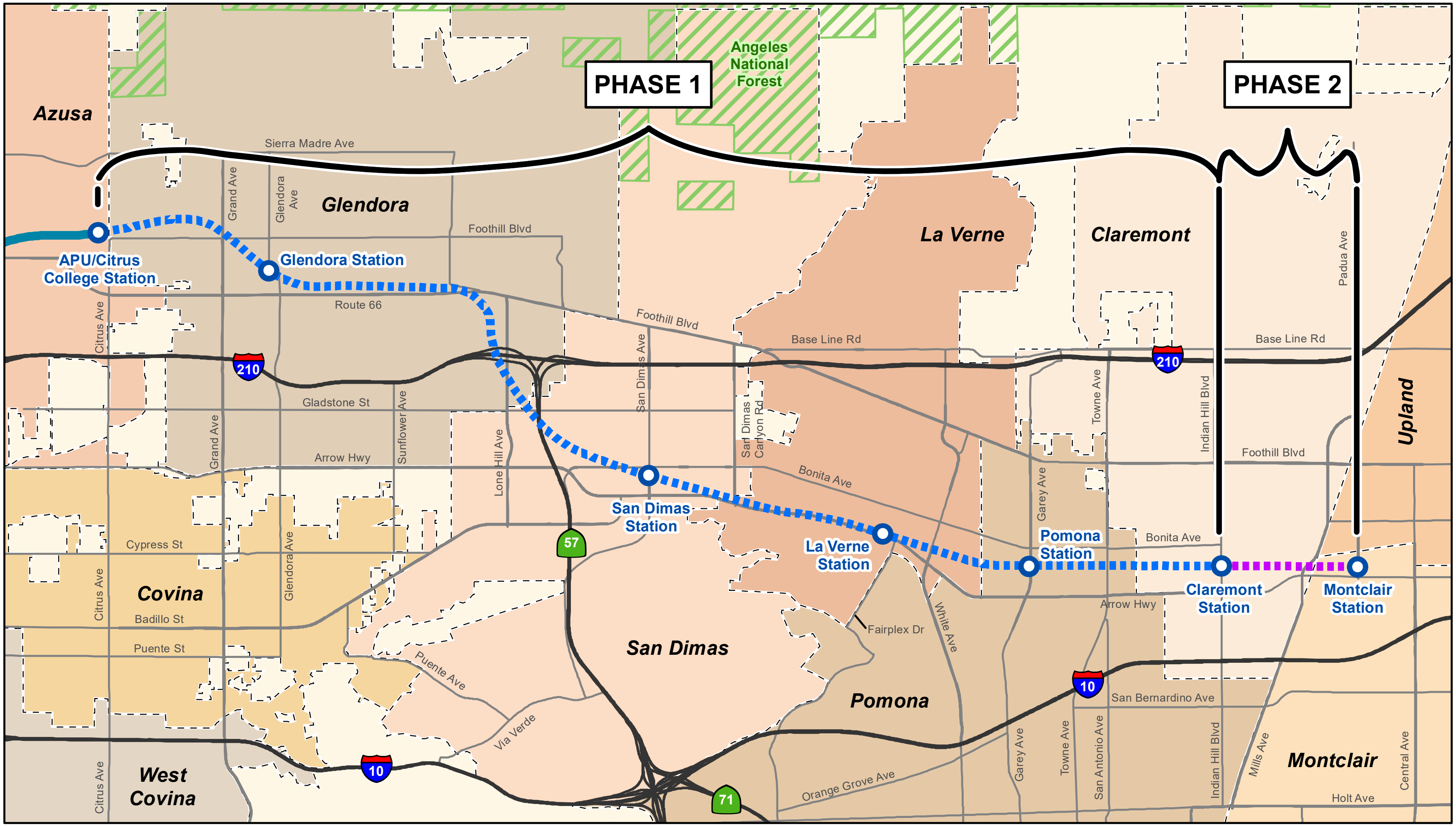

Legend

- Existing Metro Gold Line
- Metro Gold Line Phase 2B Station
- Phase 1
- Phase 2

N

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Miles

Figure 1-2
2013 FEIR Project Phasing
Metro Gold Line Phase 2B –
Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

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The third construction and operation phase include 2.2 miles of the alignment from the Pomona Station to the Claremont Station, and the fourth construction and operation phase includes 1.0 mile of the alignment from the Claremont Station to the Montclair Station in San Bernardino County. The four-phased construction would occur across a range of timelines and result in the La Verne Station (construction to range from 2019 to 2024), Pomona Station (construction to range from 2019 to 2025, subject to availability of funding from Metro), and Claremont Station (construction to range from 2021 to 2029, subject to availability of funding from Metro) operating as temporary end-of-line (terminus) stations during the first, second, and third construction phases, respectively.

The proposed design and construction phasing are necessary to match with the estimated delivery of construction funding and provides the Authority the flexibility to build and operate the Project in phases as funding becomes available. The total estimated Project cost as of November 2018 is approximately $2.1 billion. The Authority has a variety of potential funding sources to complete construction of the Project. These sources include the Los Angeles County (Measure M and Measure R funds), State of California Transit and Intercity Rail Capital Program funds, San Bernardino County Transportation Authority funds, farebox revenues, and other funds. The potential sources of funding are discussed in greater detail in Section 1.2.2.2.

1.2.2.2 History and Sources of Funding and Public Support for Completion of the Gold Line

History of Funding and Construction of the Metro Rail System and the Gold Line

Planning for the Metro Gold Line has been underway in the County of Los Angeles for decades as part of the Los Angeles County Metropolitan Transportation Authority (LA Metro) rail transit program. Since the late 1980s, six rail lines have been funded and constructed, including two subway lines (the Red and Purple lines) and four light rail lines (the Blue, Green, Gold and Expo lines) serving 98 miles and 93 stations altogether. In 2018, the county rail system averaged more than 344,000 daily weekday boardings.

LA Metro is currently underway to build four additional rail lines or rail extensions (including the Project), as they also repair and maintain their transit assets to keep them in good working condition for the next generation of Metro riders.

Construction of the initial six rail lines in the county had a construction cost of $12.4 billion. https://www.metro.net/news/facts-glance. The construction and operation of the Metro Rail system has been funded by a wide variety of sources including a series of dedicated sales taxes (Propositions A and C, and Measures R and M) enacted by the voters of Los Angeles County; state and federal gas tax revenues; and state and federal appropriations, grants, and other revenue sources.

The initial segment of the Gold Line from Union Station in Downtown Los Angeles to East Pasadena was fully funded by Los Angeles County's Propositions A and C. Propositions A and C increased the sales tax in Los Angeles County dedicated to transportation improvements in 1980 and 1990 respectively. In 1982, the California Supreme Court upheld the constitutionality of Proposition A. Los Angeles County Transportation Commission v. Richmond (1982) 31 Cal.3d 197.

Design of the first Gold Line project from Union Station to Pasadena was completed in the 1990s; and after the State Legislature created the Construction Authority in 1998, the agency successfully completed construction of that first segment on time and under budget. Following the successful completion of the first segment of the Gold Line in 2003, cities east of Pasadena came together to support extending the light rail system further east along the foothills of the San Gabriel Valley to the Los Angeles County Line in Claremont and then later to Montclair in San Bernardino County.

The construction of a 24-mile extension from Pasadena to Montclair, called the Foothill Extension, was estimated to cost approximately $2 billion and would be a partnership between Los Angeles and San Bernardino Counties (as the system would cross county boundaries for the first time).

In 2008, the LA Metro Board of Directors included the Los Angeles County portion of the Foothill Extension Project (Pasadena to Claremont) for funding in the Expenditure Plan for the Measure R half-cent sales tax, which was overwhelmingly approved by voters in November of that year. The amount of funding included in the expenditure plan fully funded the western half of the project from Pasadena to Azusa, with nearly $100 million remaining to support completion of the Project to Claremont. The project from Pasadena to Azusa was completed in 2015, on time and on budget.

On October 22, 2009 the LA Metro board unanimously approved the Long-Range Transportation Plan Regional Rationality and Equity motion, making the Foothill Extension to Claremont a first-priority project for new funding to close the funding gap.

In 2016, when LA Metro was developing the Expenditure Plan for the Measure M half-cent sales tax, the Foothill Extension to Claremont was once again included for funding. Measure M overwhelming passed in November 2016 and the Foothill Extension to Claremont was the first rail project in the county to break ground. However, in 2018, the Construction Authority estimated that the cost to complete the Project to Montclair would exceed the secured funding by $340 million. When the current funding shortfall was identified in late 2018, the Metro board for the third time committed to completing the project to Claremont as a top priority. Since then, the project to Claremont has been included in LA Metro's vision of 28 projects to be completed by the 2028 Olympic and Paralympic Games.

The extension to Montclair has been included in San Bernardino County's Measure I half-cent sales tax since voters approved its renewal in November 2004. The San Bernardino County Transportation Authority board of directors (then called the San Bernardino Associated Governments) reconfirmed their commitment to the project in February 2014 when the board voted to equally prioritize the Gold Line with the two other Measure I-funded rail priorities in the county; making clear that the Gold Line to Montclair is a priority for the agency.

Funding to Complete the Gold Line

As of February 2019, the estimated cost to complete the six-station Project from Glendora to Montclair is $2.1 billion; leaving an estimated unfunded shortfall of $340 million - $430 million to complete the Project to Montclair. Nearly all the estimated shortfall is for the portion of the Project within Los Angeles County; about 7% is estimated for the San Bernardino County portion.

The Construction Authority has developed the design-build contract to allow two years following issuance of a Notice to Proceed to secure the additional funding needed and to build the Project to Montclair within a singular contract. The Construction Authority has begun discussions about potential funding sources to fill the funding shortfall within that two-year timeframe. Procuring the extension to Montclair as a separate contract could extend the two-year fundraising timeframe to three years while retaining the same construction completion date of 2028, but with unknown cost implications.

Potential Local Funding

LA Metro is a key partner to the project. With an annual budget of $6.6 billion, plus bonding capacity of $14 billion, LA Metro has demonstrated its commitment to the project as a top funding priority. As described above, the LA Metro board has formally committed to seeing the Foothill Extension built through to Claremont and Montclair on three separate occasions over the last few years, including in December 2018, and February 2019 when they committed an additional $97 million to ensure the Foothill Extension can reach the Pomona Station as part of the current base contract.

The LA Metro board has also included the Foothill Extension to Claremont as one of 28 projects they want to have completed before the 2028 Olympic and Paralympic Games in Los Angeles; and they are underway on development of a finance plan to fully fund that program though local, state and federal funds.

LA Metro has bonded against Propositions A and C and Measure R revenues; but has not as of this date bonded against Measure M tax revenues. As of now, LA Metro has an estimated $6.7 billion of available yield over the next ten years without changing the agency's debt policy and without bonding against Measure M revenues (up to $10.8 billion more if they issue additional debt, including new debt against Measure M revenues).

Additionally, Measure M identified $199 million in unencumbered "Subregional Equity Funds" for the San Gabriel Valley Subregion. Those funds have not been earmarked for any specific project and are potentially available to help fund a portion of the shortfall for the Foothill Extension. The Foothill Extension was identified as a core priority for the San Gabriel Valley Subregion within the Mobility Matrix created for Measure M, and the Council of Governments were aware they under-funded the project at the time they developed the Matrix.

The San Gabriel Valley Subregion also has nearly $700 million in Measure M funding set aside within the "Subregional Multi-Year Program" funding category ($54 million allocated for the first 10 years, and $650 million more in the decades between 2028 to 2057). As stated above, no Measure M funds have been bonded against, so it is possible that these funds could be made available sooner if LA Metro chooses to move forward with bonding against future proceeds from the permanent sales tax.

Finally, LA Metro uses revenue from toll lanes to fund transportation improvements within the corridor surrounding those lanes. As the I-10 Toll Lanes extend further east in the coming years, they will reach a point where their impact area will include the Foothill Extension corridor. Metro has identified close to $800 million in future toll revenues (and debt financing of that revenue) within the next 10 years alone that would be available. San Bernardino County is also building Toll Lanes along the I-10 Freeway, that will directly pass through Montclair and stop at the county boundary in Claremont. Revenues from that stretch could also be available to support the construction costs within San Bernardino County.

Potential State and Federal Funds

Over the last 10 years, LA Metro has successfully utilized the county's four dedicated sales tax measures (Propositions A and C, and Measures R and M) to leverage tens of billions of dollars in state and federal grants. These grants are being used to fund several of the Twenty-Eight by 2028 projects.

LA Metro anticipates the county's share of the two major state funds – SB1 and the Cap and Trade program – for the next 10 years alone will bring in around $4 billion for Los Angeles County; and only about half of those funds have been earmarked for use, leaving a potential of $2 billion available for Project construction costs.

Metro has also proposed creation of a White House Task Force for the 2028 Olympic and Paralympic Games to raise federal funding to support transit and highway infrastructure projects. In the three most recent Olympics to take place in the United States, similar task forces have raised $1.4 billion for transportation improvements. LA Metro has identified the potential for as much as $2 billion of new federal funding could realistically come from this effort in advance of the 2028 Games.

While the funding opportunities discussed above are the most likely sources to fill the shortfall for completion of the Project to Montclair within the next few years, LA Metro is also in the beginning stages of researching the potential for new revenue sources within the county that could generate tens of billions of dollars in the future. These potential sources include congestion pricing, Vehicle Miles Travelled fees, and fees on shared mobility devices and Transportation Network Companies/Mobile Service Providers. LA Metro staff has stated that these new potential policies could be used to bring more transit services on line, and to make transit low-cost or free for users. Studies are getting started now to understand the potential for these policies to support reduced congestion and to raise new revenues to expand transit opportunities around the county.

Additionally, LA Metro has identified several other sources of funding that would generate smaller amounts of revenue (expanding advertising, for instance) or that would impact dedicated funding for local cities. These potential sources are less likely than others to bring the amount of funding needed within the timeframe or to have political support; but are being looked at to create new revenue for projects.

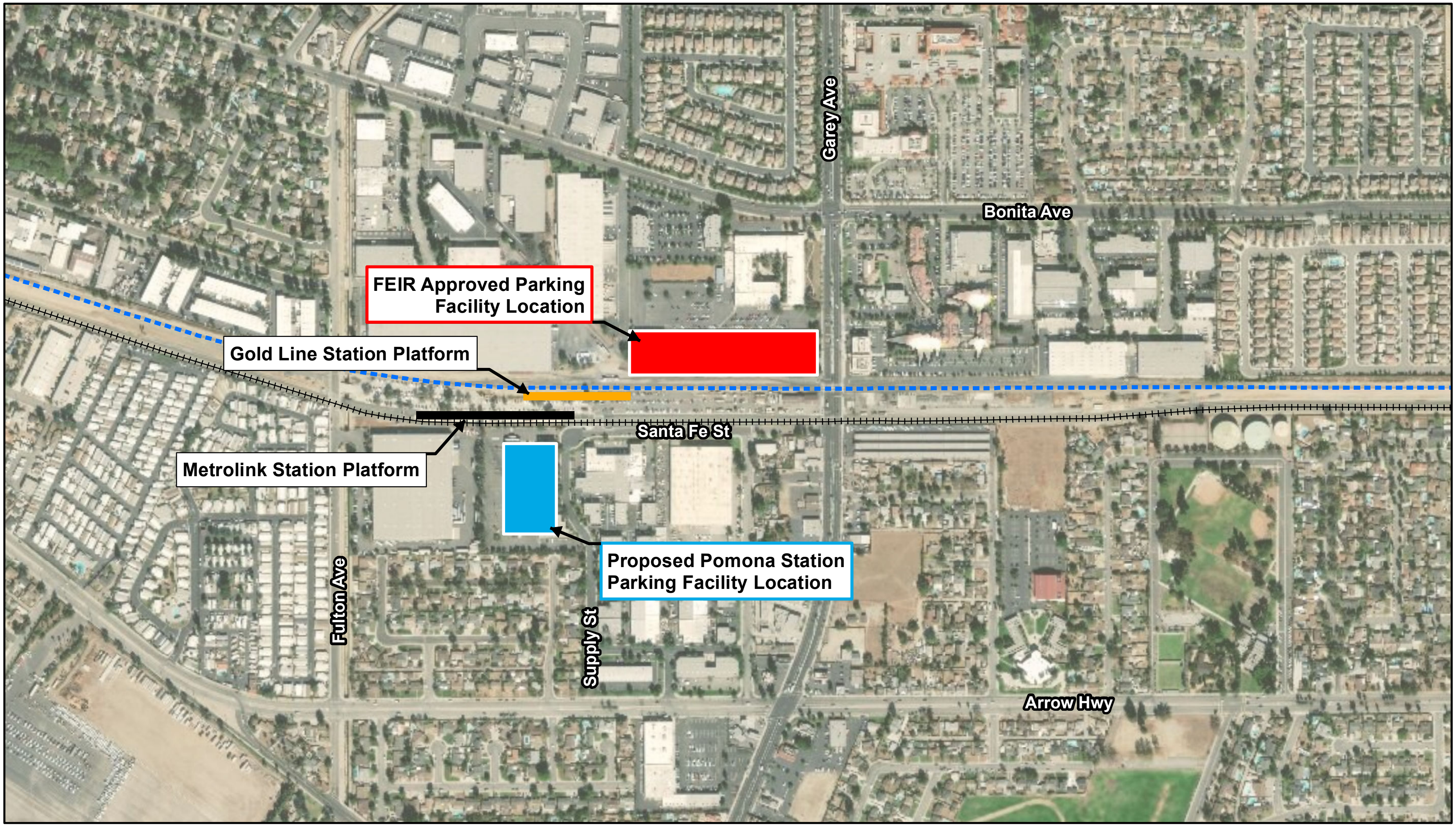
Funding Summary

It is estimated that the Construction Authority will need an additional $340 million - $430 million to complete the project to Montclair by 2028. A small portion of the potential funding sources discussed above would need to be realized to eliminate the current funding shortfall and complete the Project to Montclair by 2028 and within the planning horizon year of the Project.

1.2.2.3 Proposed Design Refinement and Mitigation Measure

The Project Modifications include a design refinement at the Pomona Station and a new mitigation measure in the vicinity of the La Verne Station:

- **Pomona Station Refinement: Location change to the Pomona Station parking facility**. The Authority proposes to relocate the parking structure from the approved site on the north side of the station to the south side of the station (Figure 1-3). The Authority deemed the development of the northern parking structure infeasible due to operational conflicts with an existing warehousing and distribution facility located at 280 West Bonita Avenue. The operational conflicts were associated with the warehouse facilities' large trucks and the corresponding shipping and receiving movements of those trucks. The ongoing truck arrivals and departures taking place adjacent to and extending out into the same internal access road to Bonita Avenue that would also be used by light rail commuters accessing the originally proposed station parking facility would have created a significant operational conflict. The total number of parking spaces would be 1,000, the same as in the approved Project, to match the projected demand for 2035. The existing Metrolink parking lot at Pomona North Station contains 345 available spaces. That number of parking space at the Pomona North Station Metrolink lot would be reduced by 85 spaces for Gold Line construction, resulting in 260 spaces in the existing Metrolink lot. Therefore, the construction of 740 additional spaces would be required. The additional spaces would be provided within a shared Gold Line/Metrolink parking facility just south of the existing Metrolink station platform and at the end of the Santa Fe Street cul-de-sac. The proposed southern parking facility would have the primary access via Magnolia Street and Pine Street to Santa Fe Street and would include a bus pull-out and a kiss-and-ride drop-off loop. The Pomona Station platforms would be separated from the new parking facility by the Metrolink Pomona North Station and the Metrolink parking lot. Access between the new station platforms and the parking facility would be by a pedestrian crosswalk across the Metrolink parking lot and a designated at-grade pedestrian crossing with gates across the Metrolink tracks.
- **White Avenue Mitigation Measure: Widening of White Avenue in the city of La Verne** (Figure 1-4). The proposed widening would be from the current Metrolink railroad crossing extending north to the intersection with 6th Street. White Avenue at the existing railroad crossing is striped for two lanes in both the northbound and southbound directions, with the northbound direction tapering to a single lane approach to 1st Street. From this point north, White Avenue is striped for a single lane in both the north- and southbound directions with a dedicated median turn lane, and with paved shoulders where no street parking is allowed. This new traffic mitigation measure is based on post-2013 FEIR traffic analysis and advanced design (Chapter 2, Transportation) and builds on the 2013 FEIR and Addendum No.2. This new mitigation measure has been identified as LTR-9, consistent with and in addition to the mitigation measures (LTR-1 through LTR-8) presented in the 2013 FEIR. This improvement will address the additional traffic impacts identified by including two lanes in both the northbound and southbound directions, a dedicated median turn lane, and curbs, gutters, and sidewalks, all within the existing publicly owned roadway right-of-way except for three triangles of private property at Bonita Avenue, 1st Street, and the existing at-grade railroad crossing shown in Figure 1-4. Minor property easements may also be required and would be determined during final design. This configuration would match up with the existing roadway cross-section of White Avenue



Legend

- Metro Gold Line Phase 2B
- Metrolink
- Metrolink Station Platform
- Gold Line Station Platform
- FEIR Approved Parking Facility Location
- Proposed Pomona Station Parking Facility Location

N

0 500 1,000

Feet

Basemap Source: ESRI World Imagery

Figure 1-3
Proposed Pomona Station
Parking Facility Location
Metro Gold Line Phase 2B –
Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

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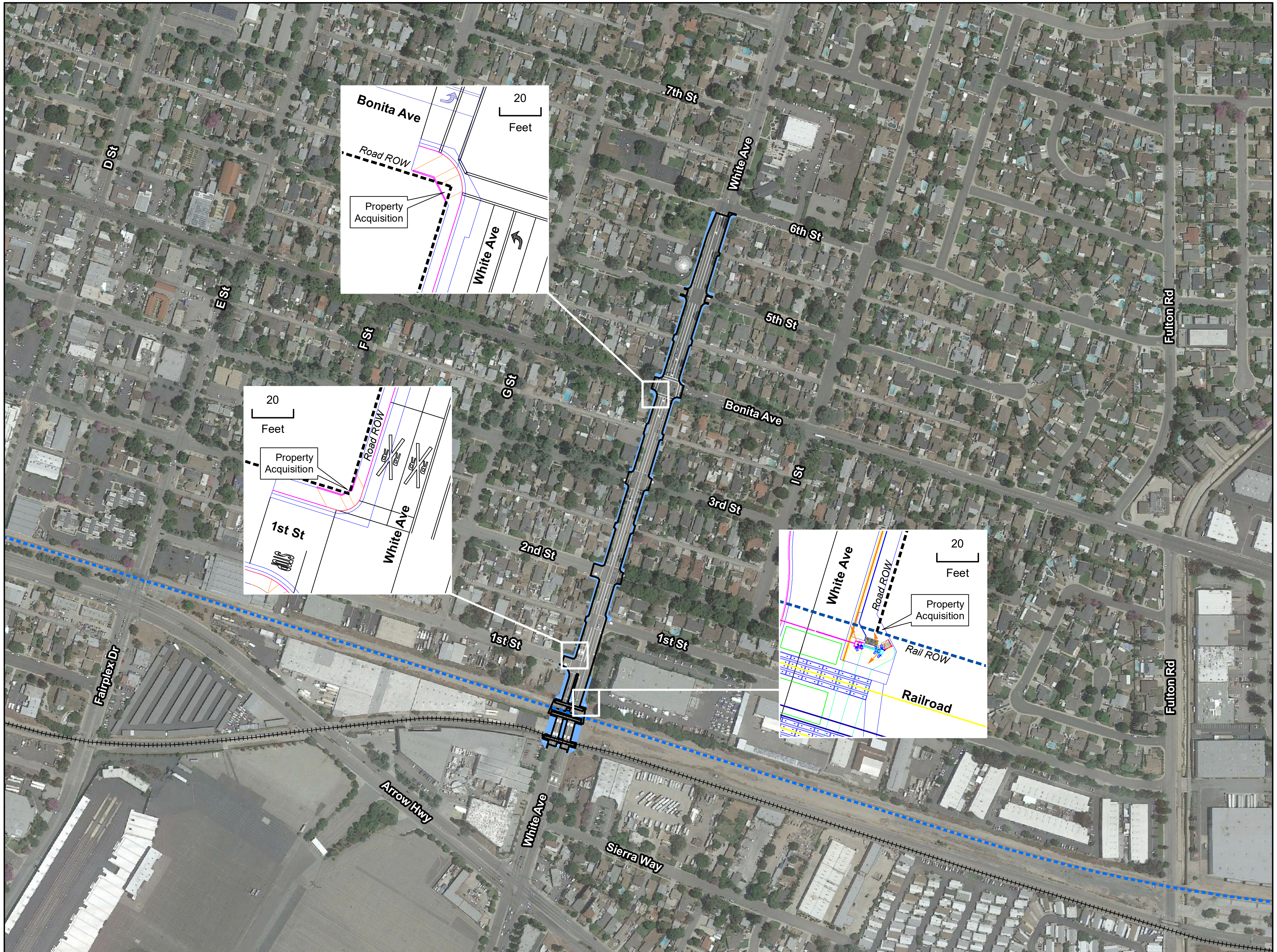

Legend

Metro Gold Line Phase 2B

Metrolink

Proposed Widened White Avenue - Roadway Boundary

Proposed Curbs, Driveways, Gutters, Sidewalks

Basemap Source: Google Earth Pro

0 400 800

Feet

Figure 1-4
Proposed Widening of White Avenue in La Verne
Property Acquisitions
Metro Gold Line Phase 2B –
Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

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north of 6th Street and south of the railroad tracks. The proposed mitigation measure elements south of the railroad tracks would involve restriping to match the proposed widened roadway to the north.

All other design features of the Project would remain the same as described in the 2013 FEIR and the four subsequent addenda (with the exception of Modification No. 6 and Modification No.7 in Addendum No. 4).

This SEIR evaluates the potential new or more significant environmental impacts of the Project Modifications as compared to the Project impacts disclosed in the 2013 FEIR (as modified by the addenda), and as compared with existing conditions.

1.2.2.4 Construction Methods

Construction methods for the Project Modifications would be consistent with approved construction methods outlined in the 2013 FEIR (Section 1.4). Major project elements include:

- Demolition and reconstruction of existing structures
- Roadway improvements
- Relocation of the existing freight tracks within the existing right-of-way
- Construction of new bridges and the renovation/widening of existing bridges
- Construction of at-grade trackwork and stations
- Construction of pedestrian accessways in and around the stations
- Installation of specialty system work, such as overhead contact electrification systems and communications and signaling systems
- Construction of traction power supply substation facilities
- Construction of parking structures
- Construction of sound walls

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2. Transportation

The Project Modifications would change the ridership levels at each of the six Project stations by constructing and operating the Project in four phases, instead of two phases as evaluated in the 2013 FEIR and addenda. Changes to ridership levels due to the Project Modifications (specifically the proposed operations of the La Verne and Pomona stations as the Phase 1 and Phase 2 interim termini) would affect traffic volumes and parking demands near the Project stations. In turn, intersection operations would be affected in the vicinity of these stations.

The SEIR evaluates the traffic impacts of the Project Modifications against two baselines: (1) the 2035 build conditions identified in the 2013 FEIR (the "Approved Project Baseline"), and (2) the 2018 existing conditions (the "Existing Conditions Baseline"). In this manner, the SEIR discloses and evaluates the extent to which the Project Modifications would change transportation impacts as compared to the Project previously approved by the Authority, and as compared to existing conditions. The transportation impacts of the approved project (2013 FEIR, Addendum No. 2) with the interim terminus at Claremont (Phase 3) and at Montclair (Phase 4) were evaluated previously and separately from the Project Modification impacts of the terminus at La Verne (Phase 1) and Pomona (Phase 2)The Project Modifications also include a revised location for the Pomona Station parking structure. This chapter also evaluates the impacts of the new transportation mitigation measures identified.

Employing the Existing Conditions Baseline, the SEIR also discloses and evaluates the extent to which the Project, including the Proposed Modifications, would affect transportation conditions existing in the Project area prior to the construction of the Project improvements.

The SEIR evaluates the transportation impacts of the Project against the Approved Project Baseline using a methodology similar to the methodology for evaluating transportation impacts in the 2013 FEIR and addenda. The 2013 FEIR methodology reflected the standard practice in the traffic engineering profession at the time, and that was also employed in many CEQA documents. Under this methodology, CEQA documents evaluate the impacts of projects on traffic flows using Level of Service (LOS) based on traffic delay. The evaluation includes a comparison of the Project Modifications to a No Build scenario, again consistent with standard practice for traffic engineering.

Subsequent to the certification of the 2013 FEIR, the California Legislature adopted amendments to CEQA (Public Resources Code, § 21099) directing the Office of Planning and Research to develop and adopt amendments to the CEQA Guidelines using alternative measures of measuring transportation impacts. In December 2018, the Resources Agency of the State of California adopted a new section of the CEQA Guidelines (CEQA Guidelines, § 15064.3) that the use of LOS and similar measurements of traffic delay "will no longer be considered to be an environmental impact under CEQA" (California Natural Resources Agency, Final Statement of Reasons for Regulatory Action, Amendments to the State CEQA Guidelines, OAL Notice File No. Z-2018-0116-12, p. 15 ["Final Statement of Reasons"])). However, the Resources Agency authorized lead agencies to "elect to be governed by the provisions of this section immediately" and applied the new measure of transportation impacts required by Section 15064.4 to apply statewide beginning on July 1, 2020.

The Resources Agency determined that, in general, transportation impacts are best evaluated by using vehicle miles traveled (VMT). Guidelines Section 15064.3 also notes that lead agencies should presume that projects that reduce VMT, such as pedestrian, bicycle, and transit projects, would have a less than significant impact. The Resources Agency also determined "Lead agencies have the discretion to choose the most appropriate methodology to analyze a project's vehicle miles traveled"

The changes to the CEQA Guidelines in Section 15064.3 reflect statewide legislative policies and mandates establishing a goal of large reductions in greenhouse gas (GHG) emissions by 2050, and reductions in the state's contributions to climate change. The California Air Resources Board (CARB) implemented the climate change legislation by adopting a regulatory strategy known as the Scoping Plan that seeks large reductions in vehicle miles traveled by, among other actions, encouraging transit alternatives to the private automobile, and encouraging infill development in areas served by public transit. Other legislation (Senate Bill [SB] 375) directed CARB to adopt regional targets for reducing GHG emissions applicable to the transportation sector in the major metropolitan regions in the state. The 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) adopted by the Southern California Association of Governments (SCAG) meets the CARB GHG emissions reductions targets. The Project, and other transit projects in the region, are key elements of the regional strategy to reduce VMT and achieve the state's GHG emission reduction goals.

The 2016 RTP/SCS estimates a 7.4 percent reduction in daily per capita VMT in 2040. In Los Angeles County, the reduction is 8.9 percent (SCAG, 2016). The RTP/SCS focuses on transportation investments (particularly in transit) and land use strategies to reduce VMT, so it is important that individual projects support those efforts.

2.1 Methodology

This section describes the methodology for forecasting, study area determination, traffic analysis, and VMT analysis. Results of the application of the methodology are applied in the subsequent subsections. Detailed assumptions and analyses are provided in Appendix C, Traffic Analysis Technical Summary (Jacobs, 2019).

2.1.1 Regional Forecasting

Metro's "Measure R" regional travel demand model was applied for this study's forecasting analysis. The Federal Transit Agency (FTA) reviewed the model (the Corridors Base Model, called CBM09) in September 2009 and encouraged Metro to move forward with forecasts for the projects in the Los Angeles region, concurring that the model was ready for forecasting. This model represents all Measure R projects anticipated to be operational by the year 2035, as well as other projects included in the approved RTP/SCS and is the same one used in the 2013 FEIR. The Measure R travel demand model demographic data was updated in 2013 subsequent to the certification of the 2013 FEIR. This updated version of the model was used to prepare ridership forecasts for the Project Modifications. For the analysis of the Project Modifications, the model was applied again to determine the forecasts for the Phase 1 and 2 analyses described here.

The Measure R travel demand model, like nearly all transit forecasting models, uses official socioeconomic projections for the region adopted by the applicable Metropolitan Planning Organization (here, SCAG) and the transportation network (i.e., roads, highways, bus, and rail transit) described in the approved RTP to develop estimates of the amount of travel (i.e., trips) occurring between different locations in the area, the market share of each transportation mode, and the routing of these trips over the highway and transit networks. The model projects trips by mode (i.e., auto, bus, and rail) and by facility including usage of individual transit routes or station (ridership).

For the analysis of the Project Modifications, the terminus of the Metro Gold Line Foothill Extension was modified in the model from Montclair to La Verne (for Phase 1) and from Montclair to Pomona (for Phase 2). Ridership forecasts with the La Verne and Pomona stations as the termini were compared with the Claremont and Montclair stations as the termini.

2.1.2 Project Modifications Study Area Determination

The project location and study area are illustrated in Chapter 1 – Introduction on Figure 1-1**.** The model output for Phases 1 and 2 indicated there would be measurable changes in automobile trips at the Glendora, San Dimas, La Verne, and Pomona stations. To assess potential impacts for the Project Modifications, a set of 74 intersections was identified for evaluation. These intersections are listed in Table 2-1. The starting point was the set of intersections originally identified in the 2013 FEIR and addenda. Additional intersections were identified, because focused traffic studies were conducted after the 2013 FEIR on new intersections. Of the 97 intersections noted, 74 were included in the 2013 FEIR, 1 intersection was split into 2, and 22 new intersections were added.

Table 2-1. Project Modifications Study Area Intersections

ID	Study Area Intersection
1	Barranca Ave/Bennett Ave
2	Barranca Ave/Foothill Blvd
3	Grand Ave/Foothill Blvd
4	Vermont Ave E/Ada Ave
5	Vermont Ave/Route 66
6	Vermont Ave/Foothill Blvd
7	Vermont Ave W/Ada Ave
8	Glendora Ave/Foothill Blvd
9	Glendora Ave/Ada Ave
10	Glendora Ave/Route 66
11	Pasadena Ave/Lemon Ave
12	Pasadena Ave/Route 66
13	Glenwood Ave/Lemon Ave
14	Glenwood Ave/Route 66
15	Elwood Ave/Lemon Ave
16	Elwood Ave/Route 66
17	Lorraine Ave/Lemon Ave
18	Lorraine Ave/Route 66
19	Lone Hill Ave/Auto Centre Dr
20	Barranca Ave/Sierra Madre Ave
21	Glendora Ave/Sierra Madre Ave
22	Lone Hill Ave/Glendora Marketplace
101	Barranca Ave/Elderberry Dr
102	Grand Ave/Ada Ave
103	Grand Ave/Route 66
104	Vermont Ave/Carroll Ave
105	Glendora Ave/Carroll Ave
106	Glendora Ave/Avalon Apartments
107	Glendora Ave/Walnut Ave
108	Walnut Ave/Vista Bonita Ave
109	Glenwood Ave/Foothill Blvd
110	Elwood Ave/Foothill Blvd

Table 2-1. Project Modifications Study Area Intersections

ID	Study Area Intersection
23	Lone Hill Ave/Gladstone St
24	SR 57 SB/Arrow Highway
25	SR 57 NB/Arrow Highway and Bonita Ave
26	Eucla Ave/Fifth St
27	Eucla Ave/Second St
28	Eucla Ave/Bonita Ave
29	Eucla Ave/Arrow Highway
30	Acacia St/Fifth St
31	Acacia St/Second St
32	Acacia St/Bonita Ave
33	Cataract Ave/Second St
34	Cataract Ave/Bonita Ave
35	Monte Vista Ave/Second St
36	Monte Vista Ave/Bonita Ave
37	San Dimas Ave/Second St
38	San Dimas Ave/Bonita Ave
39	San Dimas Ave/Arrow Highway
40	Walnut Ave/Bonita Ave
41	Walnut Ave/Arrow Highway
42	San Dimas Canyon Road/Bonita Ave
43	San Dimas Canyon Road/Arrow Highway
201	San Dimas Ave/First St (PM peak hour analysis only)
202	San Dimas Ave/Railway St (PM peak hour analysis only)
203	San Dimas Ave/Commercial St (PM peak hour analysis only)
44	Wheeler Ave/Third St
45	Arrow Highway/Wheeler Ave
46	A St/Third St
47	A St/First St
48	Arrow Highway/A St
49	D St/Third St
50	D St/First St
51	D St/Arrow Highway
52	E St/Third St

Table 2-1. Project Modifications Study Area Intersections

ID	Study Area Intersection
53	E St/Second St
54	E St/First St
55	Fairplex Dr/E St/Arrow Highway
56	White Ave/Third St
57	White Ave/Second St
58	White Ave/First St
59	White Ave/Sierra Wy
60	White Ave/Arrow Highway
61	D St/Bonita Ave
62	White Ave/Foothill Blvd
63	White Ave/Bonita Ave
64	La Verne Ave/Arrow Highway
65	White Ave/McKinley Ave
66A	N. Fulton Road/Bonita Ave
66B	S. Fulton Road/Bonita Ave
67	Fulton Road/Arrow Highway
68	Garey Ave/Bonita Ave
69	Garey Ave/Santa Fe St
70	Garey Ave/Arrow Highway
71	Towne Ave/Bonita Ave
72	Towne Ave/Towne Center Dr
73	Towne Ave/Arrow Highway
74	Garey Ave/Harrison Ave
1001	S. Fulton Road/Metrolink W. Driveway
1002	Santa Fe St/Metrolink S. Driveway
1003	Bonita Ave/Jacaranda Wy
1004	Arrow Highway/Pine St
1005	Garey Ave/St B
1006	St A/Bonita Ave
1007	Garey Ave/Grevilia St
1008	Pine St/Grevilia St
1009	Arrow Highway/Amberson St

Table 2-1. Project Modifications Study Area Intersections

ID	Study Area Intersection

Note: The numbering system of the Transportation Technical Report for Draft EIR (2012) was used to maintain consistency. The added intersections have an assigned number greater than 100.

NB = northbound

SB = southbound

SR = State Route

Subsequent to the 2013 FEIR and addenda, several independent traffic studies were conducted to inform the engineering process and address questions and concerns from the affected cities and CPUC. These included the following:

- *Memorandum: Task R: Metro Gold Line Foothill Extension – Ada Avenue Circulation Analysis* (AECOM, 2016a)
- *Memorandum: Task Q: Metro Gold Line Foothill Extension – CPUC Application Support Lone Hill Avenue (City of Glendora)* (AECOM, 2016b)
- *Technical Memorandum: Metro Gold Line Foothill Extension —Elwood and Glenwood (at Foothill Boulevard) Signal Warrant Analysis* (CH2M, 2017a)
- *Technical Memorandum: Metro Gold Line Foothill Extension —Microsimulation Traffic Analysis of Bonita/Cataract Intersection* (CH2M, 2017b)
- *Technical Memorandum: Metro Gold Line Foothill Extension — Glendora Avenue Grade Crossing Queuing Analysis* (CH2M, 2017c)
- *Technical Memorandum: Metro Gold Line Foothill Extension — Barranca Avenue At-Grade Crossing Queuing Analysis* (CH2M, 2017d)
- *Technical Memorandum: Metro Gold Line Foothill Extension —Traffic Analysis of Bonita Avenue and San Dimas Avenue* (CH2M, 2018a)
- *Metro Gold Line Extension – Pomona Station (South) Traffic Feasibility Study* (CH2M, 2018b)
- Application of the Metro Gold Line Foothill Extension Construction Authority for an order authorizing construction of two light rail tracks and one SCRRA track and one freight track at White Avenue highway-rail crossing in the City of La Verne in Los Angeles County, California (Authority, 2018)

These studies identified specific improvements that are included as part of the Project Modifications to improve traffic operations and pedestrian/vehicular safety.

The specific improvements are as follows:

- Intersection 38 (Bonita Avenue/San Dimas Avenue): add a northbound through lane.
- Intersection 39 (Arrow Highway/San Dimas Avenue): add a northbound through lane.
- Intersection 51 (D Street/Arrow Highway): add a westbound right-turn lane.
- Intersection 55 (E. Street/Fairplex Drive/Arrow Highway): add 185-foot dual northbound left-turn lanes, a northbound through lane with a second receiving lane, and a 180-foot westbound right-turn lane.
- Intersection 60 (White Avenue/Arrow Highway): add 225-foot dual northbound left-turn lanes and a 230-foot eastbound right-turn lane.
- Intersection 64 (La Verne Avenue/Arrow Highway): signalize the intersection.

- Intersection 67 (Fulton Road/Arrow Highway): restrict the northbound left turn and westbound left turn.
- Intersection 72 (Towne Avenue/Towne Center Drive): restrict the westbound left turns during peak hours.
- Intersection 110 (Elwood Avenue/Foothill Boulevard): signalize the intersection.
- Intersection 201 (First Street/San Dimas Avenue): add a northbound through lane.
- Intersection 202 (Railway Street/San Dimas Avenue): add a northbound through lane.
- Intersection 203 (Commercial Street/San Dimas Avenue): add a northbound through lane and signalize the intersection.
- Intersection 1007 (Garey Avenue/Grevilia Street): signalize the intersection.
- Intersection 1009 (Arrow Highway/Amberson Street): signalize the intersection.

2.1.3 Traffic Operations Analysis

Traffic operations analysis was performed using the same methodology used in the 2013 FEIR and addenda. Signalized intersection delay and LOS were based on the overall intersection average delay. For unsignalized all-way, stop-controlled intersections, the overall intersection delay and LOS was reported. For unsignalized one-way or two-way stop-controlled intersections, the delay and LOS for the worst approach was reported. LOS and delay were calculated using the Highway Capacity Manual (HCM) 2000 report outputs from Synchro (using the most recent release of the software, version 10). At some intersections, limitations of the HCM 2000 methodology were encountered. For those intersections, HCM 2010 methodologies were used for reporting.

The 2013 FEIR and addenda used Los Angeles County thresholds which uses numerical impact thresholds to evaluate impacts of a project as compared to the future No Build condition, for determining the impacts of the Project Modifications. The methodology is based on the *Los Angeles County Traffic Impact Study Guidelines* (County of Los Angeles, 1997). Using that methodology, an intersection is considered to have significant impacts if the change in delay from the No Build scenario is equal to or greater than the values shown in Table 2-2.

Table 2-2. Los Angeles County Intersection Impact Thresholds

Control Type	Final LOS with Project	Increase in Delay from No Build (seconds/vehicle)
Unsignalized	C	4 or more
	D	2 or more
	E/F	1.5 or more
Signalized	C	6 or more
	D	4 or more
	E/F	2.5 or more

Source: Los Angeles County, 1997

The 2013 FEIR Addendum No. 2 also uses the City of Pomona criteria. These guidelines for traffic impact analysis are based on the Pomona *Traffic Impact Study Guidelines* (City of Pomona, 2012), which describe the criteria for project impacts as follows:

- Signalized Intersections: Impact if an intersection is projected to operate at LOS D or better in the No Build scenario and degrades to LOS E or worse in the Build scenario

  - OR, intersection operating at LOS E or F in the No Build scenario has an increase in delay in the Build scenario
- Unsignalized Intersections: Impact if an intersection is projected to operate at LOS D or better in the No Build scenario and degrades to LOS E or worse in the Build scenario
  - OR, the project contributes additional traffic to an intersection operating at LOS E or F in the No Build scenario
    - AND, one or both of the following are met:
      - The project adds 10 or more trips to any approach
      - The intersection meets peak hour traffic signal warrants after the project added trips

The December 2018 revisions to the CEQA Guidelines eliminate intersection delay as a CEQA impact criterion. However, LOS is used in the SEIR to allow an "apples to apples" comparison of the traffic impacts of the Project Modifications against the traffic impacts of the approved Project. The SEIR also uses VMT to measure transportation impacts as directed by new CEQA Guidelines Section 15064.3.

Therefore, a three-pronged approach was used for the analysis conducted for the Project Modifications: (1) an assessment of the potential for impacts under both the Los Angeles County thresholds (for all intersections), (2) thresholds adopted by the City of Pomona (for intersections in Pomona), and (3) VMT analysis (described in Section 2.1.4). Using all three measures allows for a comprehensive assessment of potential impacts to ensure that compliance with these thresholds means that the project's impacts are less than significant (per CEQA Guidelines § 15064(b)(2)).

Multiple scenarios were analyzed to assess the potential impact of operations:

- Existing Conditions (2010) analysis from the 2013 FEIR was retained.
- The 2035 No Build scenario was updated.
- The 2035 Build scenario, for the Project Modifications, was divided into Phase 1 and Phase 2. Traffic forecasts were updated to reflect the changing travel patterns at the study intersections with the temporary terminus of the Gold Line at the La Verne Station (Phase 1) and the Pomona Station (Phase 2).
- 2035 Approved Project scenarios, with termini at Claremont and Montclair, per the 2013 FEIR and Addendum No. 2, were assessed.

To assess potential impacts in 2035, the intersection delay and LOS for the Project Modifications were compared to the Approved Project and No Build scenarios. 2035 is the Project planning horizon. Using the planning horizon is a reasonable and well-established in transportation planning to evaluate the impacts of new projects because it allows for consideration of changes in traffic patterns attributable to the Project or to the projected growth in employment and population is projected by SCAG to occur over time. For intersections where the increase in delay between the No Build scenario and Project Modifications met or exceeded the Los Angeles County thresholds, potential impacts were identified. Then, the delays with the Project Modifications were compared to those for the Approved Project to determine if there was an increase in delay that met or exceeded the impact criteria. If so, new mitigation measures were developed and evaluated. If there was not an increase in delay between the Approved Project and Project Modifications scenario, the mitigation measures developed for the Approved Project were reviewed to confirm they were still effective for the Project with the inclusion of the Project Modifications.

For the evaluation of the Project Modifications against Existing Conditions, intersections operating at LOS E or worse were considered as potential impacts. The General Plans in the study area that cite specific standards for LOS (Glendora, San Dimas, Claremont, and Montclair) all use LOS D as acceptable for operations.

A technical consideration is that the updates for the 2035 scenarios resulted in LOS projections that were different than the 2013 FEIR. There are four reasons for the differences in the updated analysis:

- For the 2035 No Build scenario, the traffic analysis models included updated information regarding lane geometrics and phasing of intersection signals since the completion of the 2013 FEIR. This updated No Build Baseline allowed for a more appropriate assessment of intersection impacts to reflect updated No Build conditions.
- The updated 2035 No Build scenario includes a new transit-oriented housing development north of Pomona Station. The Waterford Group is proposing an 8.44-acre development that will include 648 dwelling units, 2 parking structures, amenities, and some retail space. The Waterford Group housing development's current site plan proposed two access points. One access point (future Street A) is a proposed intersection on Bonita Avenue, immediately east of Jacaranda Street, and the other access point (future Street B) is a proposed intersection on Garey Avenue, north of the relocated freight tracks. It was assumed that the Waterford Group housing development will be completed prior to the construction of the Pomona Station parking structure. Trip generation, trip distribution, and trip assignment efforts were performed to capture the effects of this development in the surrounding study intersections in Pomona. Details on the methodology and conclusions were presented in the *Metro Gold Line Extension – Pomona Station (South) Traffic Feasibility Study* (CH2M, 2018b).
- Phase 2 (interim terminus at Pomona) traffic forecasts were updated to reflect the changes in traffic patterns (redistributed trips) due to the relocation of the Pomona Station parking structure. In the Approved Project, the parking facility was located north of the tracks, but the Project Modifications include moving the location to south of the tracks. This modification affects access and traffic patterns. Details on the methodology for trips due to the relocated parking structure were provided in the *Metro Gold Line Extension – Pomona Station (South) Traffic Feasibility Study* (CH2M, 2018b).
- The Synchro software is the calculation tool for determining LOS and delay based on intersection geometrics, signal timing, and traffic volumes. The software uses methodologies from the Transportation Research Board's HCM standard reference, developed by researchers to predict intersection delay. The Synchro software implements those methodologies and includes additional steps to improve the predicted values when estimating delay. The software goes through continuous updates to the coding and methodologies, and these updates change the results. The traffic analysis for the 2013 FEIR used version 7 of the Synchro software but the most recent release (version 10) was used for the updated analysis. Therefore, some differences in reported results are expected.

2.1.4 Vehicle-Miles Traveled Analysis

Section 15064.3 of the CEQA Guidelines now provides for the use of VMT to evaluate the transportation impacts of transit projects. Section 15064.3(c) states that "a lead agency may elect to be governed by the provisions of this section immediately. Beginning on July 1, 2020, the provisions of this section shall apply statewide."

The focus of the new guidelines is to eliminate LOS and other measures of traffic flow as a method for evaluating the significance of transportation impacts under CEQA. Instead, the guidelines now direct lead agencies to use VMT as the CEQA measure of transportation impacts. While the application of the guidelines is effective statewide in July 2020, the guidelines authorize lead agencies to use VMT as measure of transportation impacts as of December 2018.

The Governor's Office of Planning and Research issued a "Technical Advisory on Evaluating Transportation Impacts" (December 2018). It includes a specific directive that:

> *Transit and active transportation projects generally reduce VMT and therefore are presumed to cause a less-than-significant impact on transportation. This presumption may apply to all passenger rail projects, bus and bus rapid transit projects, and bicycle and pedestrian infrastructure projects. Streamlining transit and active transportation projects aligns with each of the three statutory goals*

contained in SB 743 by reducing GHG emissions, increasing multimodal transportation networks, and facilitating mixed use development.

The presumption of a less-than-significant impact suggests that detailed VMT analysis is not required for the Metro Gold Line Foothill Extension. However, to confirm that assumption, the Measure R travel demand model was used to assess whether the Project Modifications would reduce VMT. That assessment was conducted on a regional level, for both Phase 1 and Phase 2. It is appropriate to assess VMT at a regional level because the purpose of using VMT as a measure of transportation impacts is to assess the extent to which a project (or as here the Project Modifications) would reduce or increase regional travel (and thus regional GHG emissions).

VMT was also evaluated for the study area, using a 2-mile buffer around the proposed Gold Line stations, as illustrated on Figure 2-1. The focused VMT analysis captures the effects of travel changes specific to the affected area.

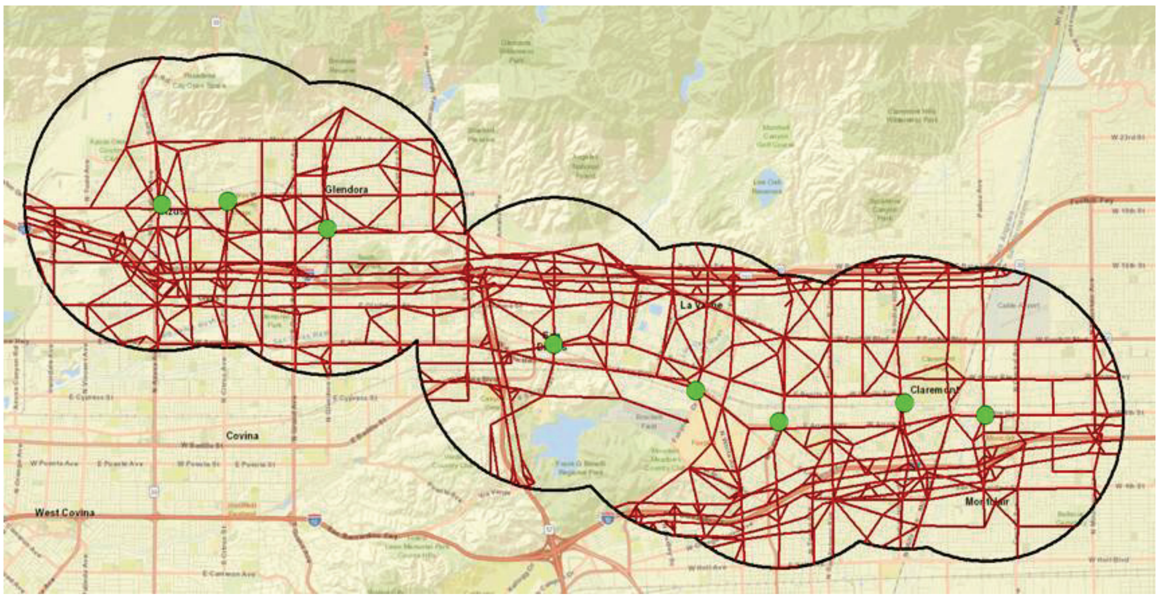

Figure 2-1. Vehicle Miles Traveled Study Area Evaluation

2.2 Regional Forecasting Results

2.2.1 Traffic Demand

Table 2-3 provides a comparison of the projected ridership at each proposed station.

Table 2-3. Project Ridership of the Approved Project and Project Modifications

Station	Projected Ridership				
	Approved Project	Project Modifications (Phase 1)	Project Modifications (Phase 2)	Phase 1 Change	Phase 2 Change
Glendora	1,860	1,990	1,860	+130	0
San Dimas	1,780	1,880	1,640	+100	-140
La Verne	1,840	2,470	2,190	+630	350
Pomona	3,010	[redacted]	5,950	[redacted]	+2,940

Source: WSP, 2018

The model delineates trips to and from the stations based on their arrival mode: walk, bus/shuttle, park-and-ride, and kiss-and-ride. For the latter two modes, Gold Line passengers would arrive at the station by automobile. Table 2-4 provides a comparison of daily automobile trips to and from each proposed station. The total daily automobile trips include the sum of park-and-ride and kiss-and-ride modes of access to the stations. For the shared station at Pomona, the automobile access would be for both Metro Gold Line and Metrolink service because they share facilities at these stations.

Table 2-4. Automobile Access of Approved Project and Project Modifications

Station	Total Automobile Trips				
	Approved Project	Project Modifications (Phase 1)	Project Modifications (Phase 2)	Phase 1 Change	Phase 2 Change
Glendora	407	504	480	97	73
San Dimas	477	603	527	126	50
La Verne	679	810	692	131	13
Pomona	1,571	[redacted]	1,294	[redacted]	-277

Source: Metro WSP, 2018

Note: Includes auto trips for both park-and-ride and kiss-and-ride modes of access for Gold Line and Metrolink

During Phase 1 (terminus at La Verne Station), the Project Modifications would add approximately 97 daily automobile trips at Glendora Station, 126 daily automobile trips at San Dimas Station, and 131 daily automobile trips at La Verne Station.

During Phase 2 (terminus at Pomona Station), the Project Modifications would result in approximately 73 more daily automobile trips at Glendora Station, 50 more daily automobile trips at San Dimas Station, 13 more daily automobile trips at La Verne Station, and a reduction in daily automobile trips of 277 at Pomona Station. The reduction in trips at Pomona Station is associated with the introduction of bus shuttle service from the Montclair and Claremont stations. This shuttle service is a change from prior assumptions and would encourage riders to shift from park-and-ride and kiss-and-ride at Pomona Station.

The daily ridership on the shuttle is 1,700 trips per day, and 1,400 trips use Pomona Station. The analysis indicated that the shuttle bus service yields a 16 percent reduction in kiss-and-ride trips.

To assess traffic operations changes, the percentage increases in auto trips due to the Project Modifications were applied to the "Project Only" volumes from the Approved Project at the intersections near the affected stations (Glendora, San Dimas, and La Verne in Phase 1, and also Pomona in Phase 2). These adjusted Project Only volumes were added to the 2035 background traffic volumes to obtain the 2035 Build Alternative peak hour volumes for the Project Modifications for both phases. More details are provided in Section 2.3.

2.2.2 Parking

The Metro travel demand model was also used to identify which stations would experience increased parking demand as a result of the Project Modifications. Tables 2-5 and 2-6 summarize the comparison between parking conditions of the Approved Project and the Project Modifications for Phase 1 and Phase 2.

Table 2-5. Parking Demand and Parking Supply of Approved Project and Project Modifications (Phase 1 Interim Terminus at La Verne Station)

Station	Approved Project			Project Modifications (Phase 1)		
	Daily Parking Demand	Parking Supply	Surplus/Deficit	Daily Parking Demand	Parking Supply	Surplus/Deficit
Glendora	317	420	+103	418	420	+2
San Dimas	382	450	+68	451	450	-1
La Verne	579	600	+21	601	600	-1
Pomona						

Source: WSP, 2018

Table 2-6. Parking Demand and Parking Supply of Approved Project and Project Modifications (Phase 2 Interim Terminus at Pomona Station)

Station	Approved Project			Project Modifications (Phase 2)		
	Daily Parking Demand	Parking Supply	Surplus/Deficit	Daily Parking Demand	Parking Supply	Surplus/Deficit
Glendora	317	420	+103	399	420	+21
San Dimas	382	450	+68	427	450	+23
La Verne	579	600	+21	573	600	+27
Pomona	1,064	1,000	-64	1,063	1,000	-63

Source: WSP, 2018

As summarized in Table 2-5, during Phase 1 of the Project Modifications, the parking demand at the Glendora, San Dimas, and La Verne stations would increase slightly from the parking demand reported in the 2013 FEIR with addenda. However, there would still be sufficient parking for riders at each station.

Table 2-6 shows similar results for Phase 2 of the Project Modifications. There would be sufficient parking for riders at the affected stations, except at Pomona Station, where the demand would exceed supply by approximately 6 percent.

2.3 Traffic Operations Analysis Results

2.3.1 Level of Service Analysis

LOS was analyzed at each study area intersection for the Project Modifications (Phase 1 and Phase 2). Intersection geometrics and signal phasing were updated to reflect the latest field conditions and assumed to be the same in the Existing Conditions and 2035 No Build scenarios. Then, updates were made to reflect the traffic volume and geometric changes associated with the Project Modifications.

Tables 2-7 and 2-8 provide summaries of the projected 2035 LOS for the Project Modifications. The 2013 FEIR with addenda (terminus to Montclair) results are included for reference.[1] Detailed LOS worksheets are provided in Appendix C.

Table 2-7. Proposed Project AM Peak Hour Intersection Level of Service Summary

Number	Intersection Name	Control	Jurisdiction	Project Modifications				FEIR Approved Project	
				Phase 1		Phase 2			
				LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]
1	Barranca Ave / Bennett Ave	S	Glendora	A	6.9	A	6.9	C	20.9
2	Barranca Ave / Foothill Blvd	S	Glendora	B	13.0	B	13.0	B	11.1
3	Grand Ave / Foothill Blvd	S	Glendora	C	30.5	C	30.5	C	29.9
4	Vermont Ave E / Ada Ave	U	Glendora	B	13.7	B	13.6	B	13.3
5	Vermont Ave / Route 66	S	Glendora	B	18.7	B	18.7	A	7.5
6	Vermont Ave / Foothill Blvd	S	Glendora	B	12.9	B	12.9	A	7.5
7	Vermont Ave W / Ada Ave	U	Glendora	B	13.3	B	13.2	B	12.3
8	Glendora Ave / Foothill Blvd	S	Glendora	C	20.4	C	20.4	C	28.1
9	Glendora Ave / Ada Ave	U	Glendora	B	12.3	B	12.3	B	12.3
10	Glendora Ave / Route 66	S	Glendora	C	31.0	C	31.0	C	22.8

[1] The 2013 FEIR results were not updated with the assumptions described in Section 2.1.2 since the impact assessments and proposed mitigations are based on the most current traffic modeling.

Table 2-7. Proposed Project AM Peak Hour Intersection Level of Service Summary

Number	Intersection Name	Control	Jurisdiction	Project Modifications				FEIR Approved Project	
				Phase 1		Phase 2			
				LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]
11	Pasadena Ave / Lemon Ave	U	Glendora	A	7.9	A	7.9	A	7.9
12	Pasadena Ave / Route 66	S	Glendora	C	22.9	C	22.9	B	12.4
13	Glenwood Ave / Lemon Ave	U	Glendora	B	10.2	B	10.2	B	10.1
14	Glenwood Ave / Route 66	S	Glendora	C	22.6	C	22.5	B	14.7
15	Elwood Ave / Lemon Ave	U	Glendora	B	10.8	B	10.8	B	10.8
16	Elwood Ave / Route 66	S	Glendora	C	21.6	C	21.6	B	15.5
17	Lorraine Ave / Lemon Ave	U	Glendora	C	19.7	C	19.7	C	19.8
18	Lorraine Ave / Route 66	S	Glendora	C	24.0	C	24.0	B	19.1
19	Lone Hill Ave / Auto Centre Dr	S	Glendora	B	19.5	B	19.5	B	15.4
20	Barranca Ave / Sierra Madre Ave	U	Glendora	C	16.3	C	16.3	C	19.8
21	Glendora Ave / Sierra Madre Ave	U	Glendora	**E**	**44.8**	**E**	**44.8**	**E**	**43.3**
22	Lone Hill Ave / Glendora Marketplace	S	Glendora	B	11.6	B	11.6	B	15.2
101	Barranca Ave / Elderberry Dr	U	Glendora	B	11.0	B	10.9		
102	Grand Ave / Ada Ave	S	Glendora	A	5.5	A	5.5		
103	Grand Ave / Route 66	S	Glendora	D	38.0	D	38.3		
104	Vermont Ave / Carroll Ave	U	Glendora	B	11.7	B	11.7		
105	Glendora Ave / Carroll Ave	U	Glendora	C	19.0	C	19.0		

Table 2-7. Proposed Project AM Peak Hour Intersection Level of Service Summary

Number	Intersection Name	Control	Jurisdiction	Project Modifications				FEIR Approved Project	
				Phase 1		Phase 2			
				LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]
106	Glendora Ave / Avalon Apartments	U	Glendora	B	11.6	B	11.6		
107	Glendora Ave / Walnut Ave	U	Glendora	B	14.9	B	14.8		
108	Walnut Ave / Vista Bonita Ave	U	Glendora	B	10.6	B	10.6		
109	Glenwood Ave / Foothill Blvd	U	Glendora	**E**	**44.4**	**E**	**44.4**		
110	Elwood Ave / Foothill Blvd	S	Glendora	A	8.8	A	8.8		
23	Lone Hill Ave / Gladstone St	S	San Dimas	C	23.3	C	23.4	B	18.6
24	SR 57 SB / Arrow Hwy	S	San Dimas	C	29.5	C	29.6	A	7.4
25	SR 57 NB / Arrow Hwy & Bonita Ave	S	San Dimas	D	47.3	D	47.5	C	27.5
26	Eucla Ave / Fifth St	U	San Dimas	A	7.8	A	7.8	A	7.4
27	Eucla Ave / Second St	U	San Dimas	A	9.9	A	9.8	A	9.8
28	Eucla Ave / Bonita Ave	S	San Dimas	B	13.1	B	13.1	A	4.8
29	Eucla Ave / Arrow Hwy	S	San Dimas	B	18.4	B	18.4	A	8.8
30	Acacia St / Fifth St	U	San Dimas	A	9.2	A	9.2	A	9.2
31	Acacia St / Second St	U	San Dimas	A	9.1	A	9.1	A	9.1
32	Acacia St / Bonita Ave	U	San Dimas	B	10.1	B	10.1	B	10.6
33	Cataract Ave / Second St	U	San Dimas	B	10.0	B	10.0	B	10.0
34	Cataract Ave / Bonita Ave[2]	U	San Dimas	B	10.1	B	10.2	A	6.1
35	Monte Vista Ave / Second St	U	San Dimas	A	9.5	A	9.5	A	9.5

Table 2-7. Proposed Project AM Peak Hour Intersection Level of Service Summary

Number	Intersection Name	Control	Jurisdiction	Project Modifications				FEIR Approved Project	
				Phase 1		Phase 2			
				LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]
36	Monte Vista Ave / Bonita Ave	U	San Dimas	**E**	**39.2**	**E**	**39.6**	C	17.7
37	San Dimas Ave / Second St	U	San Dimas	B	13.8	B	13.8	C	20.5
38	San Dimas Ave / Bonita Ave	S	San Dimas	C	29.0	C	28.8	B	12.2
39	San Dimas Ave / Arrow Hwy	S	San Dimas	D	36.5	C	34.6	C	34.1
40	Walnut Ave / Bonita Ave	S	San Dimas	B	12.1	B	12.1	A	6.8
41	Walnut Ave / Arrow Hwy	S	San Dimas	C	21.7	C	21.7	B	13.5
42	San Dimas Canyon Rd / Bonita Ave	S	San Dimas	C	26.8	C	26.8	A	7.3
43	San Dimas Canyon Rd / Arrow Hwy	S	San Dimas	B	19.8	B	19.8	C	27.6
201	San Dimas Ave / First St	U	San Dimas						
202	San Dimas Ave / Railway St	U	San Dimas						
203	San Dimas Ave / Commercial St	U	San Dimas						
44	Wheeler Avenue & Third St	U	La Verne	C	18.2	C	18.2	C	16.7
45	Arrow Highway & Wheeler Avenue	S	La Verne	C	20.5	C	20.2	D	50.6
46	A St & Third St	U	La Verne	B	10.5	B	10.4	B	10.4
47	A St & First St	U	La Verne	A	9.6	A	9.5	A	9.5
48	Arrow Highway & A St	U	La Verne	B	10.1	A	5.2	A	9.8
49	D St & Third St	U	La Verne	B	10.4	B	10.2	B	10.2
50	D St & First St	U	La Verne	B	10.0	A	9.9	A	9.9

Table 2-7. Proposed Project AM Peak Hour Intersection Level of Service Summary

Number	Intersection Name	Control	Jurisdiction	Project Modifications				FEIR Approved Project	
				Phase 1		Phase 2			
				LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]
51	D St & Arrow Highway	S	La Verne	B	17.8	B	19.4	C	22.2
52	E St & Third St	U	La Verne	B	10.8	B	10.7	B	10.6
53	E St & Second St	U	La Verne	B	11.1	B	10.9	C	15.6
54	E St & First St	U	La Verne	B	14.1	B	13.7	B	13.6
55	Fairplex Dr/E St & Arrow Highway	S	La Verne	C	24.1	C	26.1	C	27.3
56	White Ave & Third St	U	La Verne	C	17.7	C	17.2	**E**	**39.8**
57	White Ave & Second St	U	La Verne	C	16.4	C	16.1	D	28.0
58	White Ave & First St	U	La Verne	C	16.4	C	16.3	D	33.1
59	White Ave & Sierra Wy	U	La Verne	B	14.7	B	14.1	B	14.8
60	White Ave & Arrow Highway	S	La Verne	C	28.3	C	28.3	C	31.9
61	D St & Bonita Ave	S	La Verne	C	20.3	C	20.5	A	8.2
62	White Ave & Foothill Blvd	S	La Verne	C	28.1	C	28.1	C	29.4
63	White Ave & Bonita Ave	S	La Verne	C	28.4	C	27.9	B	14.3
64	La Verne Ave & Arrow Highway	S	La Verne	B	11.5	B	11.4	**F**	**141.3**
65	White Ave & McKinley Ave	S	La Verne	B	17.1	B	17.1	B	10.8
66A	N. Fulton Rd / Bonita Ave	U	Pomona			B	13.4	D	29.4
66B	S. Fulton Rd / Bonita Ave	U	Pomona			B	11.9		
67	Fulton Rd / Arrow Hwy	U	Pomona			C	17.3	D	27.4
68	Garey Ave / Bonita Ave	S	Pomona			C	24.2	C	32.6

Table 2-7. Proposed Project AM Peak Hour Intersection Level of Service Summary

Number	Intersection Name	Control	Jurisdiction	Project Modifications				FEIR Approved Project	
				Phase 1		Phase 2			
				LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]
69	Garey Ave / Santa Fe St	U	Pomona			B	10.3	A	9.4
70	Garey Ave / Arrow Hwy	S	Pomona			D	35.5	C	29.9
71	Towne Ave / Bonita Ave	S	Pomona			A	9.8	B	18.5
72	Towne Ave / Towne Center Dr	U	Pomona			A	9.3	D	28.7
73	Towne Ave / Arrow Hwy	S	Pomona			**E**	**56.8**	D	45.8
74	Garey Ave / Harrison Ave	S	Pomona			A	9.1	A	7.9
1001	S. Fulton Rd & Metrolink W Driveway	U	Pomona			A	8.9		
1002	Santa Fe St & Metrolink S Driveway	U	Pomona			B	13.3		
1003	Bonita Ave & Jacaranda Wy	U	Pomona			C	18.6		
1004	Arrow Highway & Pine St[2]	U	Pomona			B	13.7		
1005	Garey Ave & St B	U	Pomona			B	11.9		
1006	St A & Bonita Ave	U	Pomona			C	15.5		
1007	Garey Ave & Grevilia St.	S	Pomona			C	24.2		
1008	Pine St & Grevilia St.	U	Pomona			B	11.5		
1009	Arrow Hwy & Amberson St.	S	Pomona			A	4.8		

Notes:

[1]Delay is reported in seconds per vehicle using HCM 2000 methodologies for signalized and unsignalized intersections.

[2]HCM 2010 methodology was applied due to HCM 2000 limitations with intersection geometry.

Shaded cells in the last six columns are intersections that were not analyzed for the Approved Project. Also, Intersections 201 to 203 were not evaluated for the AM peak period in any technical studies. Other shaded cells are intersections in Pomona that are not applicable for Phase 1.

S = Signalized / U = Unsignalized

Table 2-8. Proposed Project PM Peak Hour Intersection Level of Service Summary

Number	Intersection Name	Control	Jurisdiction	Project Modifications				FEIR Approved Project	
				Phase 1		Phase 2			
				LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]
1	Barranca Ave / Bennett Ave	S	Glendora	A	3.9	A	3.9	B	12.4
2	Barranca Ave / Foothill Blvd	S	Glendora	B	11.3	B	11.3	A	8.4
3	Grand Ave / Foothill Blvd	S	Glendora	C	30.3	C	30.3	C	28.5
4	Vermont Ave E / Ada Ave	U	Glendora	C	15.8	C	15.7	C	15.3
5	Vermont Ave / Route 66	S	Glendora	B	18.6	B	18.6	A	9.1
6	Vermont Ave / Foothill Blvd	S	Glendora	B	14.4	B	14.4	A	7.7
7	Vermont Ave W / Ada Ave	U	Glendora	B	14.0	B	13.9	B	13.2
8	Glendora Ave / Foothill Blvd	S	Glendora	C	21.9	C	21.9	C	28.1
9	Glendora Ave / Ada Ave	U	Glendora	C	15.4	C	15.4	C	15.3
10	Glendora Ave / Route 66	S	Glendora	D	50.4	D	49.6	C	32.4
11	Pasadena Ave / Lemon Ave	U	Glendora	A	7.8	A	7.8	A	7.8
12	Pasadena Ave / Route 66	S	Glendora	B	17.5	B	17.4	B	11.2
13	Glenwood Ave / Lemon Ave	U	Glendora	B	11.3	B	11.3	B	11.3
14	Glenwood Ave / Route 66	S	Glendora	C	20.5	C	20.6	B	13.0
15	Elwood Ave / Lemon Ave	U	Glendora	B	11.0	B	11.0	B	11.0
16	Elwood Ave / Route 66	S	Glendora	C	20.4	C	20.4	B	18.1
17	Lorraine Ave / Lemon Ave	U	Glendora	B	13.7	B	13.7	B	13.7
18	Lorraine Ave / Route 66	S	Glendora	C	23.7	C	23.7	B	11.6

Table 2-8. Proposed Project PM Peak Hour Intersection Level of Service Summary

Number	Intersection Name	Control	Jurisdiction	Project Modifications				FEIR Approved Project	
				Phase 1		Phase 2			
				LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]
19	Lone Hill Ave / Auto Centre Dr	S	Glendora	C	29.3	C	29.4	C	22.7
20	Barranca Ave / Sierra Madre Ave	U	Glendora	B	13.8	B	13.8	C	15.5
21	Glendora Ave / Sierra Madre Ave	U	Glendora	B	14.3	B	14.3	B	14.2
22	Lone Hill Ave / Glendora Marketplace	S	Glendora	B	18.0	B	18.0	C	23.1
101	Barranca Ave / Elderberry Dr	U	Glendora	B	10.3	B	10.3		
102	Grand Ave / Ada Ave	S	Glendora	A	7.3	A	7.1		
103	Grand Ave / Route 66	S	Glendora	D	37.6	D	37.7		
104	Vermont Ave / Carroll Ave	U	Glendora	B	13.8	B	13.8		
105	Glendora Ave / Carroll Ave	U	Glendora	D	25.5	D	25.5		
106	Glendora Ave / Avalon Apartments	U	Glendora	B	11.8	B	11.8		
107	Glendora Ave / Walnut Ave	U	Glendora	C	20.9	C	20.9		
108	Walnut Ave / Vista Bonita Ave	U	Glendora	B	11.3	B	11.3		
109	Glenwood Ave / Foothill Blvd	U	Glendora	D	32.6	D	32.6		
110	Elwood Ave / Foothill Blvd	S	Glendora	A	7.8	A	7.8		
23	Lone Hill Ave / Gladstone St	S	San Dimas	C	28.5	C	28.5	C	25.5
24	SR 57 SB / Arrow Hwy	S	San Dimas	**E**	**76.9**	**E**	**77.7**	B	19.4
25	SR 57 NB / Arrow Hwy & Bonita Ave	S	San Dimas	**F**	**93.5**	**F**	**94.3**	C	29.1

Table 2-8. Proposed Project PM Peak Hour Intersection Level of Service Summary

Number	Intersection Name	Control	Jurisdiction	Project Modifications				FEIR Approved Project	
				Phase 1		Phase 2			
				LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]
26	Eucla Ave / Fifth St	U	San Dimas	A	8.0	A	8.0	A	7.4
27	Eucla Ave / Second St	U	San Dimas	B	10.7	B	10.6	B	10.5
28	Eucla Ave / Bonita Ave	S	San Dimas	B	12.9	B	12.9	A	8.0
29	Eucla Ave / Arrow Hwy	S	San Dimas	C	20.9	C	20.9	B	11.7
30	Acacia St / Fifth St	U	San Dimas	A	9.3	A	9.3	A	9.3
31	Acacia St / Second St	U	San Dimas	A	9.1	A	9.1	A	9.1
32	Acacia St / Bonita Ave	U	San Dimas	B	13.2	B	13.2	C	24.4
33	Cataract Ave / Second St	U	San Dimas	B	10.4	B	10.3	B	10.3
34	Cataract Ave / Bonita Ave[2]	U	San Dimas	B	11.6	B	11.6	A	5.2
35	Monte Vista Ave / Second St	U	San Dimas	A	9.9	A	9.9	A	9.9
36	Monte Vista Ave / Bonita Ave	U	San Dimas	**F**	**134.3**	**F**	**134.3**	**E**	**47.9**
37	San Dimas Ave / Second St	U	San Dimas	C	17.3	C	17.2	**E**	**38.2**
38	San Dimas Ave / Bonita Ave	S	San Dimas	C	34.4	C	34.8	B	19.2
39	San Dimas Ave / Arrow Hwy	S	San Dimas	D	40.6	D	41.5	D	48.3
40	Walnut Ave / Bonita Ave	S	San Dimas	B	15.5	B	15.5	B	14.4
41	Walnut Ave / Arrow Hwy	S	San Dimas	C	21.5	C	20.8	B	12.9
42	San Dimas Canyon Rd / Bonita Ave	S	San Dimas	C	28.3	C	28.3	A	9.0
43	San Dimas Canyon Rd / Arrow Hwy	S	San Dimas	C	23.0	C	23.0	C	28.1

Table 2-8. Proposed Project PM Peak Hour Intersection Level of Service Summary

Number	Intersection Name	Control	Jurisdiction	Project Modifications				FEIR Approved Project	
				Phase 1		Phase 2			
				LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]
201	San Dimas Ave / First St	U	San Dimas	C	18.0	C	18.1		
202	San Dimas Ave / Railway St	U	San Dimas	A	3.6	A	3.6		
203	San Dimas Ave / Commercial St	U	San Dimas	A	9.0	A	9.0		
44	Wheeler Ave & Third St	U	La Verne	C	17.6	C	17.6	C	15.7
45	Arrow Highway & Wheeler Ave	S	La Verne	B	19.1	B	19.1	D	37.8
46	A St & Third St	U	La Verne	B	10.9	B	10.8	B	10.8
47	A St & First St	U	La Verne	B	10.1	B	10.1	B	10.0
48	Arrow Highway & A St	U	La Verne	A	4.7	A	4.7	D	39.9
49	D St & Third St	U	La Verne	C	15.8	C	15.5	C	15.4
50	D St & First St	U	La Verne	B	12.8	B	12.5	B	12.7
51	D St & Arrow Highway	S	La Verne	B	18.3	B	18.3	C	30.4
52	E St & Third St	U	La Verne	B	10.4	B	10.6	C	16.0
53	E St & Second St	U	La Verne	C	16.8	C	16.0	C	16.9
54	E St & First St	U	La Verne	B	12.9	B	12.7	B	13.7
55	Fairplex Dr/E St & Arrow Highway	S	La Verne	C	31.2	C	32.6	C	33.3
56	White Ave & Third St	U	La Verne	C	23.2	C	22.9	**F**	**95.9**
57	White Ave & Second St	U	La Verne	C	24.9	C	23.9	**F**	**121.4**
58	White Ave & First St	U	La Verne	D	30.3	D	28.4	**F**	**142.2**
59	White Ave & Sierra Wy	U	La Verne	C	18.4	C	18.2	C	19.6
60	White Ave & Arrow Highway	S	La Verne	C	34.0	C	31.4	C	31.7
61	D St & Bonita Ave	S	La Verne	B	19.3	B	18.2	B	10.8

Table 2-8. Proposed Project PM Peak Hour Intersection Level of Service Summary

Number	Intersection Name	Control	Jurisdiction	Project Modifications				FEIR Approved Project	
				Phase 1		Phase 2			
				LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]
62	White Ave & Foothill Blvd	S	La Verne	D	37.4	D	38.8	D	39.6
63	White Ave & Bonita Ave	S	La Verne	D	35.4	D	35.1	B	17.9
64	La Verne Ave & Arrow Highway	S	La Verne	B	10.4	B	10.3	**F**	**652.8**
65	White Ave & McKinley Ave	S	La Verne	B	17.8	B	19.1	B	14.1
66A	N. Fulton Rd / Bonita Ave	U	Pomona			C	18.7	**F**	**137.4**
66B	S. Fulton Rd / Bonita Ave	U	Pomona			B	14.2		
67	Fulton Rd / Arrow Hwy	U	Pomona			D	27.1	**E**	**44.5**
68	Garey Ave / Bonita Ave	S	Pomona			C	26.9	B	18.5
69	Garey Ave / Santa Fe St	U	Pomona			B	10.5	B	13.2
70	Garey Ave / Arrow Hwy	S	Pomona			D	44.0	C	34.5
71	Towne Ave / Bonita Ave	S	Pomona			B	13.0	B	15.6
72	Towne Ave / Towne Center Dr	U	Pomona			A	9.6	**E**	**49.0**
73	Towne Ave / Arrow Hwy	S	Pomona			D	46.1	D	46.7
74	Garey Ave / Harrison Ave	S	Pomona			A	6.5	A	5.9
1001	S. Fulton Rd & Metrolink W Driveway	U	Pomona			A	9.0		
1002	Santa Fe St & Metrolink S Driveway	U	Pomona			B	12.0		
1003	Bonita Ave & Jacaranda Wy	U	Pomona			C	18.1		
1004	Arrow Highway & Pine St[2]	U	Pomona			B	11.4		

Table 2-8. Proposed Project PM Peak Hour Intersection Level of Service Summary

Number	Intersection Name	Control	Jurisdiction	Project Modifications				FEIR Approved Project	
				Phase 1		Phase 2			
				LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]
1005	Garey Ave & St B	U	Pomona			B	14.6		
1006	St A & Bonita Ave	U	Pomona			C	18.8		
1007	Garey Ave & Grevilia St.	S	Pomona			B	10.8		
1008	Pine St & Grevilia St.	U	Pomona			B	12.8		
1009	Arrow Hwy & Amberson St.	S	Pomona			A	7.0		

Notes:

[1]Delay is reported in seconds per vehicle using HCM 2000 methodologies for signalized and unsignalized intersections.

[2]HCM 2010 methodology was applied due to HCM 2000 limitations with intersection geometry.

Shaded cells in the last six columns are intersections that were not analyzed for the Approved Project. Also, Intersections 201 to 203 were not evaluated for the AM peak period in any technical studies. Other shaded cells are intersections in Pomona that are not applicable for Phase 1.

S = Signalized / U = Unsignalized

As summarized in Table 2-7, all intersections are projected to operate at an acceptable LOS (D or better) in the AM peak hour with the Project Modifications, with the exception of the following:

- Glendora Avenue/Sierra Madre Avenue (LOS E in Phase 1 and Phase 2)
- Glenwood Avenue/Foothill Boulevard (LOS E in Phase 1 and Phase 2)
- Monte Vista Avenue/Bonita Avenue (LOS E in Phase 1 and Phase 2)
- Towne Avenue/Arrow Highway (LOS E in Phase 2)

As summarized in Table 2-8, all intersections are projected to operate at acceptable LOS (D or better) in the PM peak hour with the Project Modifications, with the exception of the following:

- State Route (SR) 57 Southbound (SB)/Arrow Highway (LOS E in Phase 1 and Phase 2)
- SR 57 Northbound (NB)/Arrow Highway and Bonita Avenue (LOS F in Phase 1 and Phase 2)
- Monte Vista Avenue/Bonita Avenue (LOS F in Phase 1 and Phase 2)

These intersections are shown on Figure 2-2.

Table 2-9 provides a comparison of the delay and LOS for these intersections against the results for the 2013 FEIR Approved Project and Existing Conditions. The intersections where the LOS in the 2035 peak period for the Project Modifications are worse than the 2013 FEIR Approved Project are shown as shaded cells. The LOS in the 2035 peak period for the Project Modifications is worse than Existing Conditions for all intersections.

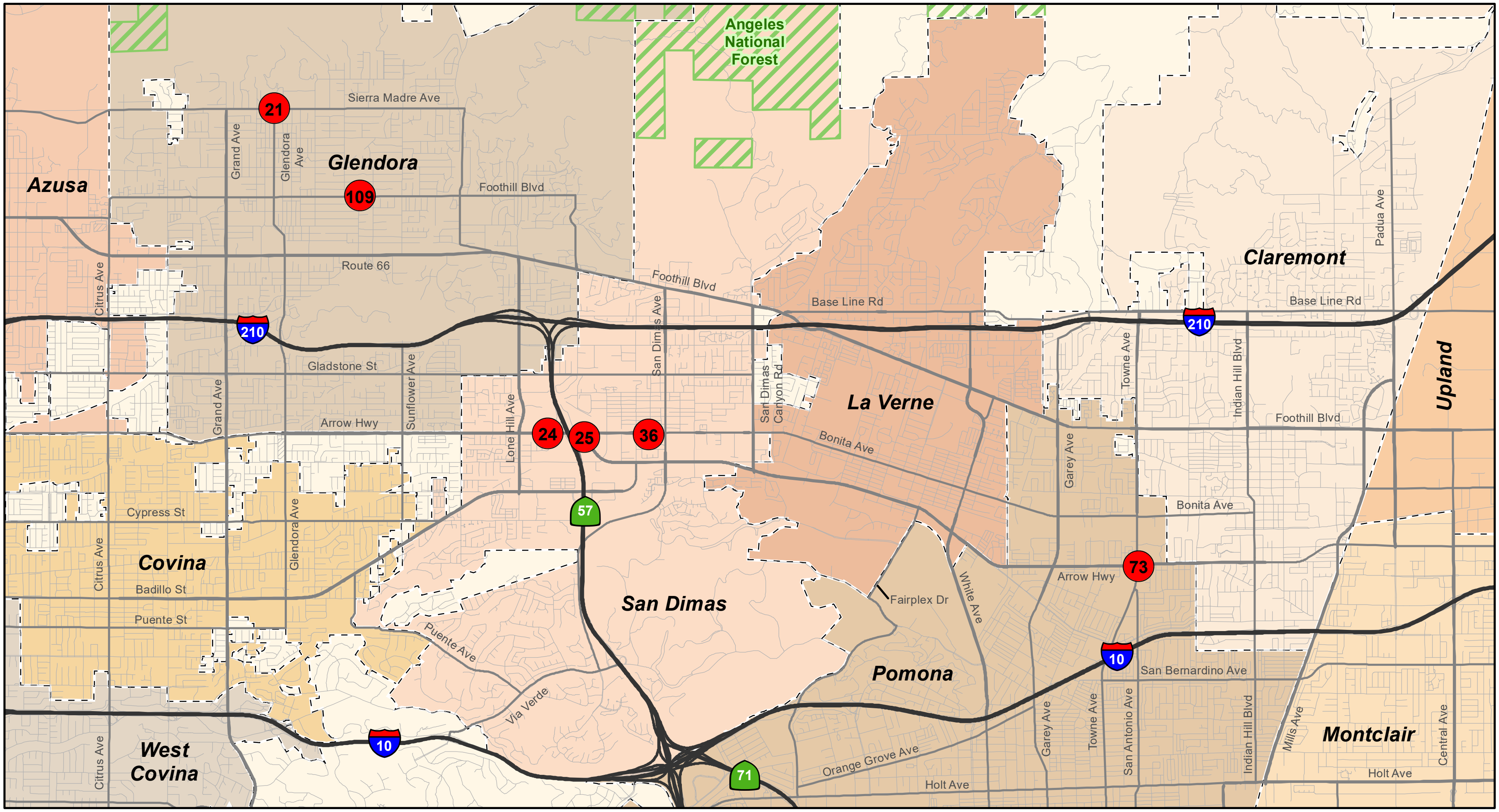

Figure 2-2
Project Modifications Intersections Operating at LOS E or Worse
Metro Gold Line Phase 2B –
Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

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Table 2-9. Intersections Operating at Level of Service E or Worse

Intersection	Jurisdiction	2035 Peak	Phase 1 (seconds/ vehicle)/ LOS	Phase 2 (seconds/ vehicle)/ LOS	2013 FEIR Approved Project (seconds/ vehicle)/ LOS	Existing Conditions (seconds/ vehicle)/ LOS
Glendora Ave/Sierra Madre Ave	Glendora	AM	44.8/E	44.8/E	43.3/E	23.8/C
Glenwood Avenue/Foothill Blvd	Glendora	AM	44.4/E	44.4/E	N/A	**29.4/D**
SR 57 SB/Arrow Highway	San Dimas	PM	76.9/E	77.7/E	19.4/B	9.5/A
SR 57 NB/Arrow Highway and Bonita Ave	San Dimas	PM	93.5/F	94.3/F	25.5/C	19.9/B
Monte Vista Ave/Bonita Ave	San Dimas	AM	39.2/E	39.6/E	17.7/C	15.4/C
		PM	134.3/F	134.3/F	47.9/E	39.7/E
Towne Ave/Arrow Highway	Pomona	AM	[redacted]	56.8/F	45.8/D	34.9/C

Note:

N/A = not analyzed for the 2013 FEIR Approved Project

2.3.2 Impact Analysis

2.3.2.1 2035 Evaluation

Using the Los Angeles County thresholds, the intersection operating conditions with the Project Modifications were compared with the No Build scenario to identify locations with potential impacts. Tables 2-10 and 2-11 provide summaries of AM and PM peak hour conditions for the Project Modifications (Phase 1 and Phase 2) and No Build scenarios. Intersections where a significant impact was identified in the 2013 FEIR are noted in the last two columns.

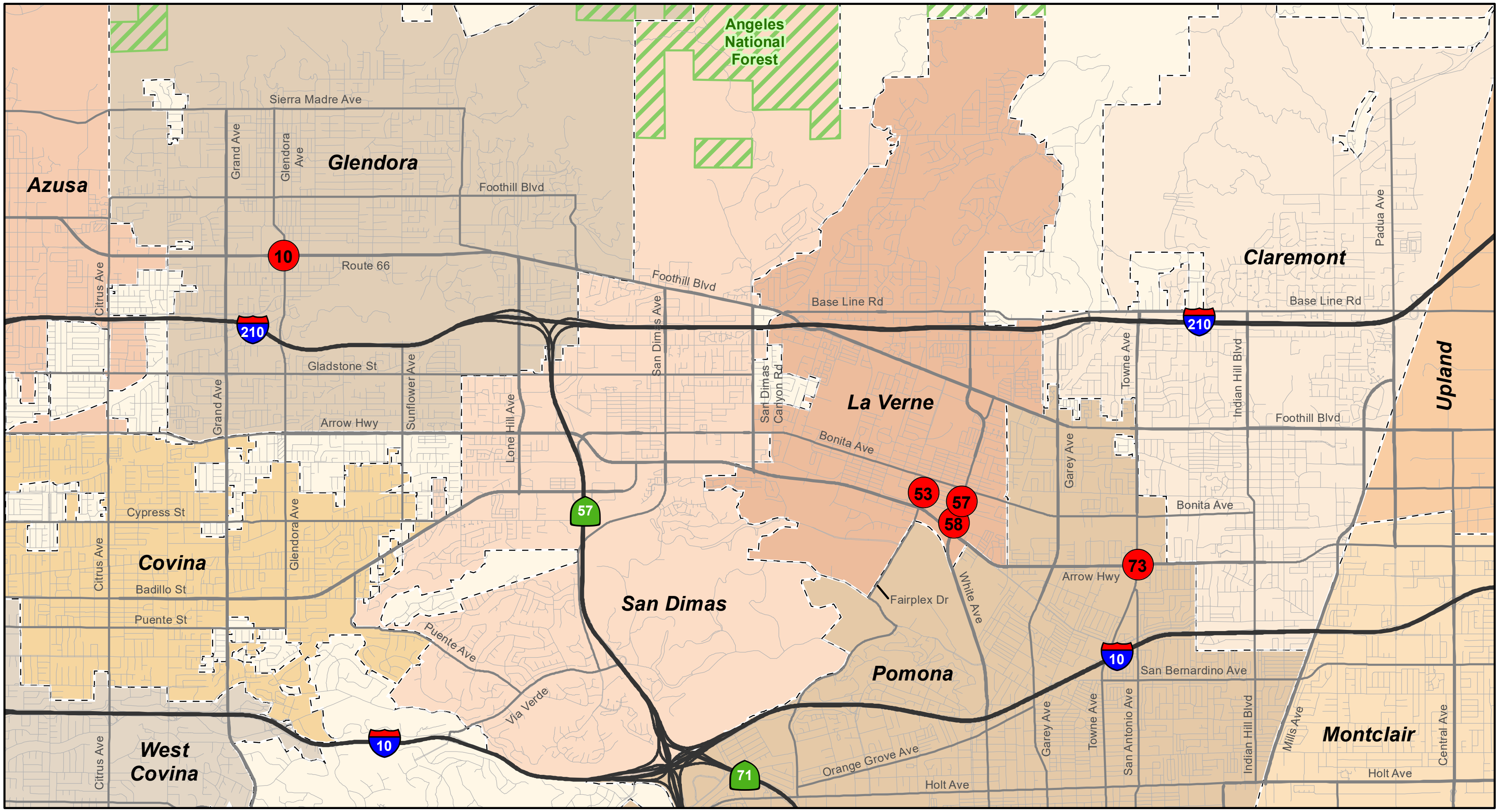
As summarized in Table 2-10, one intersection was identified as a potential impact with the Project Modifications in the AM peak hour:

- Intersection 73 - Towne Avenue/Arrow Highway (Phase 2)

As summarized in Table 2-11, the following intersections were identified as potential impacts with the Project Modifications in the PM peak hour:

- Intersection 10 - Glendora Avenue/Route 66 (Phase 1 and Phase 2)
- Intersection 53 - E Street/Second Street (Phase 1)
- Intersection 57 - White Avenue/Second Street (Phase 1 and Phase 2)
- Intersection 58 - White Avenue/First Street (Phase 1 and Phase 2)

These intersections are illustrated on Figure 2-3.



No.	Intersection	Phase 1 AM	Phase 1 PM	Phase 2 AM	Phase 2 PM
10	Glendora Ave / Route 66		X		X
53	E St / Second St		X		
57	White Ave / Second St		X		X
58	White Ave / First St		X		X
73	Towne Ave / Arrow Hwy			X	

X Project Modifications Intersection Impact

N

0 1 2

Miles

Figure 2-3

Project Modifications Intersection Impacts

Metro Gold Line Phase 2B –

Azusa to Montclair Segment

Los Angeles County, California

San Bernardino County, California

JACOBS

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In addition, Intersection 70 (Garey Avenue/Arrow Highway) meets the Los Angeles County impact criteria. However, using the City of Pomona traffic analysis methodology, the impact criteria would not be met or exceeded because it would still operate at LOS D or better (acceptable by the City of Pomona's guidelines) (City of Pomona, 2012).

Of the intersections identified as potential impacts, only two intersections (White Avenue/Second Street and White Avenue/First Street, both in the PM peak hour) were also identified as potential impacts in the 2013 FEIR.

Potential mitigation strategies and the changes to operations after mitigation are discussed in the Sections 2.3.3 and 2.3.4.

The 2035 evaluation also indicated three intersections in Pomona where impacts and mitigation measures were identified in the 2013 FEIR, but will no longer be needed with the Project Modifications (for Phase 1, Phase 2, or with the termini at Claremont or Montclair):

- Intersection 68 – Garey Avenue/Bonita Avenue
- Intersection 71 – Towne Avenue/Bonita Avenue
- Intersection 72 – Towne Avenue/Towne Center Drive

These intersections no longer have impacts because of the changes in travel patterns associated with the location of the Pomona Station parking facility south of the Metrolink tracks. The new location for the parking facility results in more trips to the south and west, away from the three intersections listed above. Therefore, mitigation measures to improve these intersections will no longer be required.

Table 2-10. AM Peak Hour Intersection Impacts Summary

Number	Intersection Name	Control	Jurisdiction	No Build[1]		Project Modifications Phase 1		Project Modifications Phase 2		Project Modifications Change in Delay vs. No Build		Project Modifications Significant Impact (vs. No Build)[3]		Project Modifications Change in Delay vs. Approved Project		Project Modifications Significant Impact (vs. Approved Project)[3]		FEIR Significant Impact (vs. No Build)[3]	FEIR Significant Impact After Mitigation
				LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2		
1	Barranca Ave / Bennett Ave	S	Glendora	A	6.9	A	6.9	A	6.9	0.0	0.0	NO	NO	-14.0	-14.0	NO	NO	NO	NO
2	Barranca Ave / Foothill Blvd	S	Glendora	B	13.5	B	13.0	B	13.0	-0.5	-0.5	NO	NO	1.9	1.9	NO	NO	NO	NO
3	Grand Ave / Foothill Blvd	S	Glendora	C	31.1	C	30.5	C	30.5	-0.6	-0.6	NO	NO	0.6	0.6	NO	NO	NO	NO
4	Vermont Ave E / Ada Ave	U	Glendora	B	11.8	B	13.7	B	13.6	1.9	1.8	NO	NO	0.4	0.3	NO	NO	NO	NO
5	Vermont Ave / Route 66	S	Glendora	**E**	**58.2**	B	18.7	B	18.7	-39.5	-39.5	NO	NO	11.2	11.2	NO	NO	NO	NO
6	Vermont Ave / Foothill Blvd	S	Glendora	B	12.2	B	12.9	B	12.9	0.7	0.7	NO	NO	5.4	5.4	NO	NO	NO	NO
7	Vermont Ave W / Ada Ave	U	Glendora	B	11.6	B	13.3	B	13.2	1.7	1.6	NO	NO	1.0	0.9	NO	NO	NO	NO
8	Glendora Ave / Foothill Blvd	S	Glendora	C	20.5	C	20.4	C	20.4	-0.1	-0.1	NO	NO	-7.7	-7.7	NO	NO	NO	NO
9	Glendora Ave / Ada Ave	U	Glendora	B	12.2	B	12.3	B	12.3	0.1	0.1	NO	NO	0.0	0.0	NO	NO	NO	NO
10	Glendora Ave / Route 66	S	Glendora	C	32.3	C	31.0	C	31.0	-1.3	-1.3	NO	NO	8.2	8.2	***YES***	***YES***	NO	NO
11	Pasadena Ave / Lemon Ave	U	Glendora	A	7.9	A	7.9	A	7.9	0.0	0.0	NO	NO	0.0	0.0	NO	NO	NO	NO
12	Pasadena Ave / Route 66	S	Glendora	C	23.5	C	22.9	C	22.9	-0.6	-0.6	NO	NO	10.5	10.5	***YES***	***YES***	NO	NO
13	Glenwood Ave / Lemon Ave	U	Glendora	B	10.0	B	10.2	B	10.2	0.2	0.2	NO	NO	0.1	0.1	NO	NO	NO	NO
14	Glenwood Ave / Route 66	S	Glendora	C	21.4	C	22.6	C	22.5	1.2	1.1	NO	NO	7.9	7.8	***YES***	***YES***	NO	NO
15	Elwood Ave / Lemon Ave	U	Glendora	B	10.7	B	10.8	B	10.8	0.1	0.1	NO	NO	0.0	0.0	NO	NO	NO	NO
16	Elwood Ave / Route 66	S	Glendora	C	21.2	C	21.6	C	21.6	0.4	0.4	NO	NO	6.1	6.1	***YES***	***YES***	NO	NO
17	Lorraine Ave / Lemon Ave	U	Glendora	C	20.0	C	19.7	C	19.7	-0.3	-0.3	NO	NO	-0.1	-0.1	NO	NO	NO	NO
18	Lorraine Ave / Route 66	S	Glendora	C	24.1	C	24.0	C	24.0	-0.1	-0.1	NO	NO	4.9	4.9	NO	NO	NO	NO
19	Lone Hill Ave / Auto Centre Dr	S	Glendora	B	20.0	B	19.5	B	19.5	-0.5	-0.5	NO	NO	4.1	4.1	NO	NO	NO	NO
20	Barranca Ave / Sierra Madre Ave	U	Glendora	C	16.5	C	16.3	C	16.3	-0.2	-0.2	NO	NO	-3.5	-3.5	NO	NO	NO	NO
21	Glendora Ave / Sierra Madre Ave	U	Glendora	**E**	**49.2**	**E**	**44.8**	**E**	**44.8**	-4.4	-4.4	NO	NO	1.5	1.5	***YES***	***YES***	NO	NO
22	Lone Hill Ave / Glendora Marketplace	S	Glendora	B	12.0	B	11.6	B	11.6	-0.4	-0.4	NO	NO	-3.6	-3.6	NO	NO	NO	NO
101	Barranca Ave / Elderberry Dr	U	Glendora	B	10.9	B	11.0	B	10.9	0.1	0.0	NO	NO						
102	Grand Ave / Ada Ave	S	Glendora	A	5.4	A	5.5	A	5.5	0.1	0.1	NO	NO						
103	Grand Ave / Route 66	S	Glendora	D	42.4	D	38.0	D	38.3	-4.4	-4.1	NO	NO						
104	Vermont Ave / Carroll Ave	U	Glendora	B	11.1	B	11.7	B	11.7	0.6	0.6	NO	NO						
105	Glendora Ave / Carroll Ave	U	Glendora	C	19.0	C	19.0	C	19.0	0.0	0.0	NO	NO						
106	Glendora Ave / Avalon Apartments	U	Glendora	B	10.7	B	11.6	B	11.6	0.9	0.9	NO	NO						

Table 2-10. AM Peak Hour Intersection Impacts Summary

Number	Intersection Name	Control	Jurisdiction	No Build[1]		Project Modifications Phase 1		Project Modifications Phase 2		Project Modifications Change in Delay vs. No Build		Project Modifications Significant Impact (vs. No Build)[3]		Project Modifications Change in Delay vs. Approved Project		Project Modifications Significant Impact (vs. Approved Project)[3]		FEIR Significant Impact (vs. No Build)[3]	FEIR Significant Impact After Mitigation
				LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2		
107	Glendora Ave / Walnut Ave	U	Glendora	C	14.6	B	14.9	B	14.8	0.3	0.2	NO	NO						
108	Walnut Ave / Vista Bonita Ave	U	Glendora	B	10.5	B	10.6	B	10.6	0.1	0.1	NO	NO						
109	Glenwood Ave / Foothill Blvd	U	Glendora	**F**	**51.1**	**E**	**44.4**	**E**	**44.4**	-6.7	-6.7	NO	NO						
110	Elwood Ave / Foothill Blvd	S	Glendora	**F**	**190.0**	A	8.8	A	8.8	-181.2	-181.2	NO	NO						
23	Lone Hill Ave / Gladstone St	S	San Dimas	C	24.0	C	23.3	C	23.4	-0.7	-0.6	NO	NO	4.7	4.8	NO	NO	NO	NO
24	SR 57 SB / Arrow Hwy	S	San Dimas	C	29.9	C	29.5	C	29.6	-0.4	-0.3	NO	NO	22.1	22.2	***YES***	***YES***	NO	NO
25	SR 57 NB / Arrow Hwy & Bonita Ave	S	San Dimas	D	49.6	D	47.3	D	47.5	-2.3	-2.1	NO	NO	19.8	20.0	***YES***	***YES***	NO	NO
26	Eucla Ave / Fifth St	U	San Dimas	A	7.8	A	7.8	A	7.8	0.0	0.0	NO	NO	0.4	0.4	NO	NO	NO	NO
27	Eucla Ave / Second St	U	San Dimas	A	9.7	A	9.9	A	9.8	0.2	0.1	NO	NO	0.1	0.0	NO	NO	NO	NO
28	Eucla Ave / Bonita Ave	S	San Dimas	B	13.1	B	13.1	B	13.1	0.0	0.0	NO	NO	8.3	8.3	NO	NO	NO	NO
29	Eucla Ave / Arrow Hwy	S	San Dimas	B	17.9	B	18.4	B	18.4	0.5	0.5	NO	NO	9.6	9.6	NO	NO	NO	NO
30	Acacia St / Fifth St	U	San Dimas	A	9.2	A	9.2	A	9.2	0.0	0.0	NO	NO	0.0	0.0	NO	NO	NO	NO
31	Acacia St / Second St	U	San Dimas	A	9.1	A	9.1	A	9.1	0.0	0.0	NO	NO	0.0	0.0	NO	NO	NO	NO
32	Acacia St / Bonita Ave	U	San Dimas	B	10.2	B	10.1	B	10.1	-0.1	-0.1	NO	NO	-0.5	-0.5	NO	NO	NO	NO
33	Cataract Ave / Second St	U	San Dimas	A	9.9	B	10.0	B	10.0	0.1	0.1	NO	NO	0.0	0.0	NO	NO	NO	NO
34	Cataract Ave / Bonita Ave[4]	U	San Dimas	B	12.8	B	10.1	B	10.2	-2.7	-2.6	NO	NO	4.0	4.1	NO	NO	NO	NO
35	Monte Vista Ave / Second St	U	San Dimas	A	9.3	A	9.5	A	9.5	0.2	0.2	NO	NO	0.0	0.0	NO	NO	NO	NO
36	Monte Vista Ave / Bonita Ave	U	San Dimas	**E**	**41.2**	**E**	**39.2**	**E**	**39.6**	-2.0	-1.6	NO	NO	21.5	21.9	***YES***	***YES***	NO	NO
37	San Dimas Ave / Second St	U	San Dimas	B	14.0	B	13.8	B	13.8	-0.2	-0.2	NO	NO	-6.7	-6.7	NO	NO	NO	NO
38	San Dimas Ave / Bonita Ave	S	San Dimas	C	25.5	C	29.0	C	28.8	3.5	3.3	NO	NO	16.8	16.6	***YES***	***YES***	NO	NO
39	San Dimas Ave / Arrow Hwy	S	San Dimas	D	36.6	D	36.5	C	34.6	-0.1	-2.0	NO	NO	2.4	0.5	NO	NO	NO	NO
40	Walnut Ave / Bonita Ave	S	San Dimas	B	11.8	B	12.1	B	12.1	0.3	0.3	NO	NO	5.3	5.3	NO	NO	NO	NO
41	Walnut Ave / Arrow Hwy	S	San Dimas	C	21.5	C	21.7	C	21.7	0.2	0.2	NO	NO	8.2	8.2	***YES***	***YES***	NO	NO
42	San Dimas Canyon Rd / Bonita Ave	S	San Dimas	C	27.0	C	26.8	C	26.8	-0.2	-0.2	NO	NO	19.5	19.5	***YES***	***YES***	NO	NO
43	San Dimas Canyon Rd / Arrow Hwy	S	San Dimas	C	22.3	B	19.8	B	19.8	-2.5	-2.5	NO	NO	-7.8	-7.8	NO	NO	***YES***	***YES***
201	San Dimas Ave / First St	U	San Dimas																
202	San Dimas Ave / Railway St	U	San Dimas																
203	San Dimas Ave / Commercial St	U	San Dimas																

Table 2-10. AM Peak Hour Intersection Impacts Summary

				No Build[1]		Project Modifications Phase 1		Project Modifications Phase 2		Project Modifications Change in Delay vs. No Build		Project Modifications Significant Impact (vs. No Build)[3]		Project Modifications Change in Delay vs. Approved Project		Project Modifications Significant Impact (vs. Approved Project)[3]		FEIR Significant Impact (vs. No Build)[3]	FEIR Significant Impact After Mitigation
Number	Intersection Name	Control	Jurisdiction	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2		
44	Wheeler Ave & Third St	U	La Verne	C	18.0	C	18.2	C	18.2	0.2	0.2	NO	NO	1.5	1.5	NO	NO	NO	NO
45	Arrow Highway & Wheeler Ave	S	La Verne	C	22.7	C	20.5	C	20.2	-2.2	-2.5	NO	NO	-30.1	-30.4	NO	NO	***YES***	***YES***
46	A St & Third St	U	La Verne	B	10.3	B	10.5	B	10.4	0.2	0.1	NO	NO	0.1	0.0	NO	NO	NO	NO
47	A St & First St	U	La Verne	A	9.3	A	9.6	A	9.5	0.3	0.2	NO	NO	0.1	0.0	NO	NO	NO	NO
48	Arrow Highway & A St	U	La Verne	**F**	**273.1**	B	10.1	A	5.2	-263.0	-267.9	NO	NO	0.3	-4.6	NO	NO	NO	NO
49	D St & Third St	U	La Verne	A	9.6	B	10.4	B	10.2	0.8	0.6	NO	NO	0.2	0.0	NO	NO	NO	NO
50	D St & First St	U	La Verne	A	9.6	B	10.0	A	9.9	0.4	0.3	NO	NO	0.1	0.0	NO	NO	NO	NO
51	D St & Arrow Highway	S	La Verne	B	18.8	B	17.8	B	19.4	-1.0	0.6	NO	NO	-4.4	-2.8	NO	NO	***YES***	***YES***
52	E St & Third St	U	La Verne	B	10.1	B	10.8	B	10.7	0.7	0.6	NO	NO	0.2	0.1	NO	NO	NO	NO
53	E St & Second St	U	La Verne	B	10.0	B	11.1	B	10.9	1.1	0.9	NO	NO	-4.5	-4.7	NO	NO	NO	NO
54	E St & First St	U	La Verne	B	11.6	B	14.1	B	13.7	2.5	2.1	NO	NO	0.5	0.1	NO	NO	NO	NO
55	Fairplex Dr/E St & Arrow Highway	S	La Verne	C	29.0	C	24.1	C	26.1	-4.9	-2.9	NO	NO	-3.2	-1.2	NO	NO	NO	NO
56	White Ave & Third St	U	La Verne	B	14.9	C	17.7	C	17.2	2.8	2.3	NO	NO	-22.1	-22.6	NO	NO	***YES***	NO
57	White Ave & Second St	U	La Verne	B	14.8	C	16.4	C	16.1	1.6	1.3	NO	NO	-11.6	-11.9	NO	NO	NO	NO
58	White Ave & First St	U	La Verne	C	15.6	C	16.4	C	16.3	0.8	0.7	NO	NO	-16.7	-16.8	NO	NO	***YES***	NO
59	White Ave & Sierra Wy	U	La Verne	B	10.7	B	14.7	B	14.1	4.0	3.4	NO	NO	-0.1	-0.7	NO	NO	NO	NO
60	White Ave & Arrow Highway	S	La Verne	C	31.7	C	28.3	C	28.3	-3.4	-3.4	NO	NO	-3.6	-3.6	NO	NO	NO	NO
61	D St & Bonita Ave	S	La Verne	C	21.0	C	20.3	C	20.5	-0.7	-0.5	NO	NO	12.1	12.3	***YES***	***YES***	NO	NO
62	White Ave & Foothill Blvd	S	La Verne	C	28.1	C	28.1	C	28.1	0.0	0.0	NO	NO	-1.3	-1.3	NO	NO	NO	NO
63	White Ave & Bonita Ave	S	La Verne	C	27.2	C	28.4	C	27.9	1.2	0.7	NO	NO	14.1	13.6	***YES***	***YES***	NO	NO
64	La Verne Ave & Arrow Highway	S	La Verne	**F**	**50.6**	B	11.5	B	11.4	-39.1	-39.2	NO	NO	-129.8	-129.9	NO	NO	***YES***	NO
65	White Ave & McKinley Ave	S	La Verne	B	17.2	B	17.1	B	17.1	-0.1	-0.1	NO	NO	6.3	6.3	NO	NO	NO	NO
66A	N. Fulton Rd / Bonita Ave	U	Pomona	B	12.8			B	13.4	-12.8	0.6		NO		-16.0		NO	***YES***	NO
66B	S. Fulton Rd / Bonita Ave	U	Pomona	B	11.6			B	11.9	-11.6	0.3		NO		11.9		NO	***YES***	NO
67	Fulton Rd / Arrow Hwy	U	Pomona	C	20.8			C	17.3	-20.8	-3.5		NO		-10.1		NO	***YES***	NO
68	Garey Ave / Bonita Ave	S	Pomona	B	19.4			C	24.2	-19.4	4.8		NO		-8.4		NO	***YES***	NO
69	Garey Ave / Santa Fe St	U	Pomona	B	10.3			B	10.3	-10.3	0.0		NO		0.9		NO	NO	NO
70	Garey Ave / Arrow Hwy	S	Pomona	C	28.4			D	35.5	-28.4	7.1		**NO[5]**		5.6		***YES***	NO	NO

Table 2-10. AM Peak Hour Intersection Impacts Summary

Number	Intersection Name	Control	Jurisdiction	No Build[1]		Project Modifications Phase 1		Project Modifications Phase 2		Project Modifications Change in Delay vs. No Build		Project Modifications Significant Impact (vs. No Build)[3]		Project Modifications Change in Delay vs. Approved Project		Project Modifications Significant Impact (vs. Approved Project)[3]		FEIR Significant Impact (vs. No Build)[3]	FEIR Significant Impact After Mitigation
				LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2		
71	Towne Ave / Bonita Ave	S	Pomona	A	9.6			A	9.8	-9.6	0.2		NO		-8.7		NO	NO	NO
72	Towne Ave / Towne Center Dr	U	Pomona	D	26.0			A	9.3	-26.0	-16.7		NO		-19.4		NO	NO	NO
73	Towne Ave / Arrow Hwy	S	Pomona	D	45.3			**E**	**56.8**	-45.3	11.5		***YES***		11.0		***YES***	NO	NO
74	Garey Ave / Harrison Ave	S	Pomona	A	8.6			A	9.1	-8.6	0.5		NO		1.2		NO	NO	NO
1001	S. Fulton Rd & Metrolink W Driveway	U	Pomona	A	9.5			A	8.9	-9.5	-0.6		NO						
1002	Santa Fe St & Metrolink S Driveway	U	Pomona	A	8.9			B	13.3	-8.9	4.4		NO						
1003	Bonita Ave & Jacaranda Wy	U	Pomona	C	17.6			C	18.6	-17.6	1.0		NO						
1004	Arrow Highway & Pine St[4]	U	Pomona	B	12.4			B	13.7	-12.4	1.3		NO						
1005	Garey Ave & St B	U	Pomona	B	11.8			B	11.9	-11.8	0.1		NO						
1006	St A & Bonita Ave	U	Pomona	B	14.8			C	15.5	-14.8	0.7		NO						
1007	Garey Ave & Grevilia St.	S	Pomona	B	12.5			C	24.2	-12.5	11.7		*YES*						
1008	Pine St & Grevilia St.	U	Pomona	A	8.9			B	11.5	-8.9	2.6		NO						
1009	Arrow Hwy & Amberson St.	S	Pomona	C	19.1			A	4.8	-19.1	-14.3		NO						

Notes:

[1]No Build scenario was updated from what was reported in the 2013 FEIR based on updated geometry and/or change in signal phasing.

[2]Delay is reported in seconds per vehicle using HCM 2000 methodologies for signalized and unsignalized intersections.

[3]Impact criteria based on County of Los Angeles thresholds

[4]HCM 2010 methodology was applied due to HCM 2000 limitations with intersection geometry.

[5]The intersection would have significant impacts using Los Angeles County thresholds. However, using the City of Pomona traffic analysis methodology, parameters, and impact criteria there would be an impact at intersection No. 70 since it would still operate at LOS D or better (deemed acceptable by the City of Pomona traffic guidelines). Note: the other intersections in the City of Pomona with impacts per the Los Angeles County thresholds do not meet the City of Pomona criteria, so they remain impacted.

Shaded cells in the last six columns are intersections that were not analyzed for the Approved Project. Also, Intersections 201 to 203 were not evaluated for the AM peak period in any technical studies. Other shaded cells are intersections in Pomona that are not applicable for Phase 1.

S = Signalized / U = Unsignalized

Table 2-11. PM Peak Hour Intersection Impacts Summary

Number	Intersection Name	Control	Jurisdiction	No Build[1]		Project Modifications Phase 1		Project Modifications Phase 2		Project Modifications Change in Delay vs. No Build		Project Modifications Significant Impact (vs. No Build)[3]		Project Modifications Change in Delay vs. Approved Project		Project Modifications Significant Impact (vs. Approved Project)[3]		FEIR Significant Impact (vs. No Build)[3]	FEIR Significant Impact After Mitigation
				LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2		
1	Barranca Ave / Bennett Ave	S	Glendora	A	3.9	A	3.9	A	3.9	0.0	0.0	NO	NO	-8.5	-8.5	NO	NO	NO	NO
2	Barranca Ave / Foothill Blvd	S	Glendora	B	11.2	B	11.3	B	11.3	0.1	0.1	NO	NO	2.9	2.9	NO	NO	NO	NO
3	Grand Ave / Foothill Blvd	S	Glendora	C	30.6	C	30.3	C	30.3	-0.3	-0.3	NO	NO	1.8	1.8	NO	NO	NO	NO
4	Vermont Ave E / Ada Ave	U	Glendora	B	13.7	C	15.8	C	15.7	2.1	2.0	NO	NO	0.5	0.4	NO	NO	NO	NO
5	Vermont Ave / Route 66	S	Glendora	B	18.7	B	18.6	B	18.6	-0.1	-0.1	NO	NO	9.5	9.5	NO	NO	NO	NO
6	Vermont Ave / Foothill Blvd	S	Glendora	B	12.6	B	14.4	B	14.4	1.8	1.8	NO	NO	6.7	6.7	NO	NO	NO	NO
7	Vermont Ave W / Ada Ave	U	Glendora	B	12.4	B	14.0	B	13.9	1.6	1.5	NO	NO	0.8	0.7	NO	NO	NO	NO
8	Glendora Ave / Foothill Blvd	S	Glendora	C	22.2	C	21.9	C	21.9	-0.3	-0.3	NO	NO	-6.2	-6.2	NO	NO	NO	NO
9	Glendora Ave / Ada Ave	U	Glendora	B	14.9	C	15.4	C	15.4	0.5	0.5	NO	NO	0.1	0.1	NO	NO	NO	NO
10	Glendora Ave / Route 66	S	Glendora	D	43.8	D	50.4	D	49.6	6.6	5.8	***YES***	***YES***	18.0	17.2	***YES***	***YES***	NO	NO
11	Pasadena Ave / Lemon Ave	U	Glendora	A	7.7	A	7.8	A	7.8	0.1	0.1	NO	NO	0.0	0.0	NO	NO	NO	NO
12	Pasadena Ave / Route 66	S	Glendora	B	17.1	B	17.5	B	17.4	0.4	0.3	NO	NO	6.3	6.2	NO	NO	NO	NO
13	Glenwood Ave / Lemon Ave	U	Glendora	B	11.2	B	11.3	B	11.3	0.1	0.1	NO	NO	0.0	0.0	NO	NO	NO	NO
14	Glenwood Ave / Route 66	S	Glendora	C	23.3	C	20.5	C	20.6	-2.8	-2.7	NO	NO	7.5	7.6	***YES***	***YES***	NO	NO
15	Elwood Ave / Lemon Ave	U	Glendora	B	11.0	B	11.0	B	11.0	0.0	0.0	NO	NO	0.0	0.0	NO	NO	NO	NO
16	Elwood Ave / Route 66	S	Glendora	C	20.1	C	20.4	C	20.4	0.3	0.3	NO	NO	2.3	2.3	NO	NO	NO	NO
17	Lorraine Ave / Lemon Ave	U	Glendora	B	13.7	B	13.7	B	13.7	0.0	0.0	NO	NO	0.0	0.0	NO	NO	NO	NO
18	Lorraine Ave / Route 66	S	Glendora	C	21.1	C	23.7	C	23.7	2.6	2.6	NO	NO	12.1	12.1	***YES***	***YES***	NO	NO
19	Lone Hill Ave / Auto Centre Dr	S	Glendora	C	30.4	C	29.3	C	29.4	-1.1	-1.0	NO	NO	6.6	6.7	***YES***	***YES***	NO	NO
20	Barranca Ave / Sierra Madre Ave	U	Glendora	B	14.1	B	13.8	B	13.8	-0.3	-0.3	NO	NO	-1.7	-1.7	NO	NO	NO	NO
21	Glendora Ave / Sierra Madre Ave	U	Glendora	B	14.7	B	14.3	B	14.3	-0.4	-0.4	NO	NO	0.1	0.1	NO	NO	NO	NO
22	Lone Hill Ave / Glendora Marketplace	S	Glendora	B	18.0	B	18.0	B	18.0	0.0	0.0	NO	NO	-5.1	-5.1	NO	NO	NO	NO
101	Barranca Ave / Elderberry Dr	U	Glendora	B	10.3	B	10.3	B	10.3	0.0	0.0	NO	NO						
102	Grand Ave / Ada Ave	S	Glendora	A	6.5	A	7.3	A	7.1	0.8	0.6	NO	NO						
103	Grand Ave / Route 66	S	Glendora	D	39.2	D	37.6	D	37.7	-1.6	-1.5	NO	NO						
104	Vermont Ave / Carroll Ave	U	Glendora	B	12.6	B	13.8	B	13.8	1.2	1.2	NO	NO						
105	Glendora Ave / Carroll Ave	U	Glendora	D	25.8	D	25.5	D	25.5	-0.3	-0.3	NO	NO						
106	Glendora Ave / Avalon Apartments	U	Glendora	B	11.9	B	11.8	B	11.8	-0.1	-0.1	NO	NO						
107	Glendora Ave / Walnut Ave	U	Glendora	C	20.5	C	20.9	C	20.9	0.4	0.4	NO	NO						
108	Walnut Ave / Vista Bonita Ave	U	Glendora	B	11.3	B	11.3	B	11.3	0.0	0.0	NO	NO						
109	Glenwood Ave / Foothill Blvd	U	Glendora	D	34.5	D	32.6	D	32.6	-1.9	-1.9	NO	NO						
110	Elwood Ave / Foothill Blvd	S	Glendora	**F**	**69.1**	A	7.8	A	8.8	-61.3	-60.3	NO	NO						
23	Lone Hill Ave / Gladstone St	S	San Dimas	C	28.5	C	28.5	C	28.5	0.0	0.0	NO	NO	3.0	3.0	NO	NO	NO	NO
24	SR 57 SB / Arrow Hwy	S	San Dimas	**F**	**83.1**	**E**	**76.9**	**E**	**77.7**	-6.2	-5.4	NO	NO	57.5	58.3	***YES***	***YES***	NO	NO
25	SR 57 NB / Arrow Hwy & Bonita Ave	S	San Dimas	**F**	**95.8**	**F**	**93.5**	**F**	**94.3**	-2.3	-1.5	NO	NO	64.4	65.2	***YES***	***YES***	NO	NO
26	Eucla Ave / Fifth St	U	San Dimas	A	8.0	A	8.0	A	8.0	0.0	0.0	NO	NO	0.6	0.6	NO	NO	NO	NO
27	Eucla Ave / Second St	U	San Dimas	B	10.6	B	10.7	B	10.6	0.1	0.0	NO	NO	0.2	0.1	NO	NO	NO	NO
28	Eucla Ave / Bonita Ave	S	San Dimas	B	13.0	B	12.9	B	12.9	-0.1	-0.1	NO	NO	4.9	4.9	NO	NO	NO	NO

Table 2-11. PM Peak Hour Intersection Impacts Summary

				No Build[1]		Project Modifications				Project Modifications Change in Delay vs. No Build		Project Modifications Significant Impact (vs. No Build)[3]		Project Modifications Change in Delay vs. Approved Project		Project Modifications Significant Impact (vs. Approved Project)[3]		FEIR Significant Impact (vs. No Build)[3]	FEIR Significant Impact After Mitigation
						Phase 1		Phase 2											
Number	Intersection Name	Control	Jurisdiction	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2		
29	Eucla Ave / Arrow Hwy	S	San Dimas	C	21.0	C	20.9	C	20.9	-0.1	-0.1	NO	NO	9.2	9.2	***YES***	***YES***	NO	NO
30	Acacia St / Fifth St	U	San Dimas	A	9.3	A	9.3	A	9.3	0.0	0.0	NO	NO	0.0	0.0	NO	NO	NO	NO
31	Acacia St / Second St	U	San Dimas	A	9.2	A	9.1	A	9.1	-0.1	-0.1	NO	NO	0.0	0.0	NO	NO	NO	NO
32	Acacia St / Bonita Ave	U	San Dimas	B	13.5	B	13.2	B	13.2	-0.3	-0.3	NO	NO	-11.2	-11.2	NO	NO	NO	NO
33	Cataract Ave / Second St	U	San Dimas	B	10.0	B	10.4	B	10.3	0.4	0.3	NO	NO	0.1	0.0	NO	NO	NO	NO
34	Cataract Ave / Bonita Ave[4]	U	San Dimas	**E**	**37.5**	B	11.6	B	11.6	-25.9	-25.9	NO	NO	6.4	6.4	NO	NO	NO	NO
35	Monte Vista Ave / Second St	U	San Dimas	A	9.9	A	9.9	A	9.9	0.0	0.0	NO	NO	0.0	0.0	NO	NO	NO	NO
36	Monte Vista Ave / Bonita Ave	U	San Dimas	**F**	**136.0**	**F**	**134.3**	**F**	**134.3**	-1.7	-1.7	NO	NO	86.4	86.4	***YES***	***YES***	NO	NO
37	San Dimas Ave / Second St	U	San Dimas	C	16.8	C	17.3	C	17.2	0.5	0.4	NO	NO	-20.9	-21.0	NO	NO	***YES***	NO
38	San Dimas Ave / Bonita Ave	S	San Dimas	D	40.4	C	34.4	C	34.8	-6.0	-5.6	NO	NO	15.2	15.6	***YES***	***YES***	NO	NO
39	San Dimas Ave / Arrow Hwy	S	San Dimas	D	39.9	D	40.6	D	41.5	0.7	1.6	NO	NO	-7.7	-6.8	NO	NO	NO	NO
40	Walnut Ave / Bonita Ave	S	San Dimas	B	15.1	B	15.5	B	15.5	0.4	0.4	NO	NO	1.1	1.1	NO	NO	NO	NO
41	Walnut Ave / Arrow Hwy	S	San Dimas	B	18.0	C	21.5	C	20.8	3.5	2.8	NO	NO	8.6	7.9	***YES***	***YES***	NO	NO
42	San Dimas Canyon Rd / Bonita Ave	S	San Dimas	C	28.4	C	28.3	C	28.3	-0.1	-0.1	NO	NO	19.3	19.3	***YES***	***YES***	NO	NO
43	San Dimas Canyon Rd / Arrow Hwy	S	San Dimas	C	23.9	C	23.0	C	23.0	-0.9	-0.9	NO	NO	-5.1	-5.1	NO	NO	***YES***	***YES***
201	San Dimas Ave / First St	U	San Dimas	C	20.3	C	18.0	C	18.1	-2.3	-2.2	NO	NO						
202	San Dimas Ave / Railway St	U	San Dimas	C	15.6	A	3.6	A	3.6	-12.0	-12.0	NO	NO						
203	San Dimas Ave / Commercial St	U	San Dimas	C	18.1	A	9.0	A	9.0	-9.1	-9.1	NO	NO						
44	Wheeler Ave & Third St	U	La Verne	C	17.4	C	17.6	C	17.6	0.2	0.2	NO	NO	1.9	1.9	NO	NO	NO	NO
45	Arrow Highway & Wheeler Ave	S	La Verne	C	20.2	B	19.1	B	19.1	-1.1	-1.1	NO	NO	-18.7	-18.7	NO	NO	***YES***	***YES***
46	A St & Third St	U	La Verne	B	10.6	B	10.9	B	10.8	0.3	0.2	NO	NO	0.1	0.0	NO	NO	NO	NO
47	A St & First St	U	La Verne	B	10.0	B	10.1	B	10.1	0.1	0.1	NO	NO	0.1	0.1	NO	NO	NO	NO
48	Arrow Highway & A St	U	La Verne	**F**	**54.8**	A	4.7	A	4.7	-50.1	-50.1	NO	NO	-35.2	-35.2	NO	NO	NO	NO
49	D St & Third St	U	La Verne	B	13.5	C	15.8	C	15.5	2.3	2.0	NO	NO	0.4	0.1	NO	NO	NO	NO
50	D St & First St	U	La Verne	B	11.3	B	12.8	B	12.5	1.5	1.2	NO	NO	0.1	-0.2	NO	NO	NO	NO
51	D St & Arrow Highway	S	La Verne	B	18.8	B	18.3	B	18.3	-0.5	-0.5	NO	NO	-12.1	-12.1	NO	NO	***YES***	***YES***
52	E St & Third St	U	La Verne	B	12.7	B	10.4	B	10.6	-2.3	-2.1	NO	NO	-5.6	-5.4	NO	NO	NO	NO
53	E St & Second St	U	La Verne	B	12.6	C	16.8	C	16.0	4.2	3.4	***YES***	NO	-0.1	-0.9	NO	NO	NO	NO
54	E St & First St	U	La Verne	B	13.0	B	12.9	B	12.7	-0.1	-0.3	NO	NO	-0.8	-1.0	NO	NO	NO	NO
55	Fairplex Dr/E St & Arrow Highway	S	La Verne	C	33.8	C	31.2	C	32.6	-2.6	-1.2	NO	NO	-2.1	-0.7	NO	NO	NO	NO
56	White Ave & Third St	U	La Verne	C	21.5	C	23.2	C	22.9	1.7	1.4	NO	NO	-72.7	-73.0	NO	NO	***YES***	NO
57	White Ave & Second St	U	La Verne	C	19.0	C	24.9	C	23.9	5.9	4.9	***YES***	***YES***	-96.5	-97.5	NO	NO	***YES***	NO
58	White Ave & First St	U	La Verne	C	21.3	D	30.3	D	28.4	9.0	7.1	***YES***	***YES***	-111.9	-113.8	NO	NO	***YES***	NO
59	White Ave & Sierra Wy	U	La Verne	C	16.7	C	18.4	C	18.2	1.7	1.5	NO	NO	-1.2	-1.4	NO	NO	NO	NO
60	White Ave & Arrow Highway	S	La Verne	C	33.5	C	34.0	C	31.4	0.5	-2.1	NO	NO	2.3	-0.3	NO	NO	NO	NO
61	D St & Bonita Ave	S	La Verne	B	18.2	B	19.3	B	18.2	1.1	0.0	NO	NO	8.5	7.4	NO	NO	NO	NO
62	White Ave & Foothill Blvd	S	La Verne	D	39.1	D	37.4	D	38.8	-1.7	-0.3	NO	NO	-2.2	-0.8	NO	NO	NO	NO
63	White Ave & Bonita Ave	S	La Verne	C	34.4	D	35.4	D	35.1	1.0	0.7	NO	NO	17.5	17.2	***YES***	***YES***	NO	NO

Table 2-11. PM Peak Hour Intersection Impacts Summary

Number	Intersection Name	Control	Jurisdiction	No Build[1]		Project Modifications				Project Modifications Change in Delay vs. No Build		Project Modifications Significant Impact (vs. No Build)[3]		Project Modifications Change in Delay vs. Approved Project		Project Modifications Significant Impact (vs. Approved Project)[3]		FEIR Significant Impact (vs. No Build)[3]	FEIR Significant Impact After Mitigation
						Phase 1		Phase 2											
				LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2		
64	La Verne Ave & Arrow Highway	S	La Verne	**F**	**475.2**	B	10.4	B	10.3	-464.8	-464.9	NO	NO	-642.4	-642.5	NO	NO	***YES***	NO
65	White Ave & McKinley Ave	S	La Verne	B	19.2	B	17.8	B	19.1	-1.4	-0.1	NO	NO	3.7	5.0	NO	NO	NO	NO
66A	N. Fulton Rd / Bonita Ave	U	Pomona	C	17.6			C	18.7	-17.6	1.1		NO		-118.7		NO	***YES***	NO
66B	S. Fulton Rd / Bonita Ave	U	Pomona	B	13.3			B	14.2	-13.3	0.9		NO		14.2		NO	***YES***	NO
67	Fulton Rd / Arrow Hwy	U	Pomona	D	34.0			D	27.1	-34.0	-6.9		NO		-17.4		NO	***YES***	NO
68	Garey Ave / Bonita Ave	S	Pomona	C	26.7			C	26.9	-26.7	0.2		NO		8.4		***YES***	NO	NO
69	Garey Ave / Santa Fe St	U	Pomona	B	10.3			B	10.5	-10.3	0.2		NO		-2.7		NO	NO	NO
70	Garey Ave / Arrow Hwy	S	Pomona	D	36.9			D	44.0	-36.9	7.1		**NO[5]**		9.5		***YES***	NO	NO
71	Towne Ave / Bonita Ave	S	Pomona	B	11.3			B	13.0	-11.3	1.7		NO		-2.6		NO	NO	NO
72	Towne Ave / Towne Center Dr	U	Pomona	**F**	**51.4**			A	9.6	-51.4	-41.8		NO		-39.4		NO	NO	NO
73	Towne Ave / Arrow Hwy	S	Pomona	D	45.2			D	46.1	-45.2	0.9		NO		-0.6		NO	NO	NO
74	Garey Ave / Harrison Ave	S	Pomona	A	6.5			A	6.5	-6.5	0.0		NO		0.6		NO	NO	NO
1001	S. Fulton Rd & Metrolink W Driveway	U	Pomona	A	9.4			A	9.0	-9.4	-0.4		NO						
1002	Santa Fe St & Metrolink S Driveway	U	Pomona	A	8.8			B	12.0	-8.8	3.2		NO						
1003	Bonita Ave & Jacaranda Wy	U	Pomona	C	17.9			C	18.1	-17.9	0.2		NO						
1004	Arrow Highway & Pine St[4]	U	Pomona	B	11.3			B	11.4	-11.3	0.1		NO						
1005	Garey Ave & St B	U	Pomona	B	13.1			B	14.6	-13.1	1.5		NO						
1006	St A & Bonita Ave	U	Pomona	C	19.5			C	18.8	-19.5	-0.7		NO						
1007	Garey Ave & Grevilia St.	S	Pomona	B	12.2			B	10.8	-12.2	-1.4		NO						
1008	Pine Street & Grevilia St.	U	Pomona	A	8.9			B	12.8	-8.9	3.9		NO						
1009	Arrow Hwy & Amberson St.	S	Pomona	**F**	**63.6**			A	7.0	-63.6	-56.6		NO						

Notes:

[1]No Build scenario was updated from what was reported in the 2013 FEIR based on updated geometry and/or change in signal phasing.

[2]Delay is reported in seconds per vehicle using HCM 2000 methodologies for signalized and unsignalized intersections.

[3]Impact criteria based on County of Los Angeles thresholds

[4]HCM 2010 methodology was applied due to HCM 2000 limitations with intersection geometry.

[5]The intersection would have significant impacts using Los Angeles County thresholds. However, using the City of Pomona traffic analysis methodology, parameters, and impact criteria there would be an impact at intersection No. 70 since it would still operate at LOS D or better (deemed acceptable by the City of Pomona traffic guidelines). Note: the other intersections in the City of Pomona with impacts per the Los Angeles County thresholds do not meet the City of Pomona criteria, so they remain impacted.

Shaded cells in the last six columns are intersections that were not analyzed for the Approved Project. Also, intersections 201 to 203 were not evaluated for the AM peak period in any technical studies. Other shaded cells are intersections in Pomona that are not applicable for Phase 1.

S = Signalized / U = Unsignalized

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2.3.2.2 Existing Conditions Evaluation

The standard traffic engineering assessment, described earlier in this section (Section 2.3.2.1), is to compare Build against No-Build operations, which focuses the assessment on the effects of the project that are independent of the growth in population and employment that is projected by SCAG to occur without the project under evaluation. The comparison of the Build and No Build operations also allows the public to understand how the project would affect transportation conditions, taking into consideration the effects of other funded transportation improvements that are planned to be in operation by the project planning horizon. That evaluation was used to conduct the impact and mitigation strategy assessments in the 2013 FEIR and in Sections 2.3.3 and 2.3.4 of the SEIR. This evaluation allows for an “apples to apples” evaluation of the impact of the Approved Project and the impact of the Approved Project with the Project Modifications.

The SEIR also compares the transportation impacts of the Project against Existing Conditions so that the public is informed as to how traffic conditions would change with the Project compared to current traffic conditions. Intersection delays are lower for the Existing Conditions scenario as compared to the No-Build scenario (which has similar intersection geometry to existing conditions, but with 2035 traffic volumes), because background growth in traffic (largely with SCAG’s projected change in population and employment) increases delay. As further discussed in Section 2.4, background growth would result in an increase VMT of approximately 16 percent between 2013 and 2035 (from 463 million vehicle-miles per day to 538 million vehicle-miles per day), or 0.68 percent per year. The SCAG RTP/SCS projects an increase in total population of Southern California for the period from 2015 to 2040 of approximately 18 percent (from 18,779,000 to 22,138,000), or 0.66 percent per year. These projections both suggest consistent background growth, which drives the increase in delay when comparing future scenarios to existing conditions.

In other words, delay typically increases more when doing the comparison to Existing Conditions (Figure 2-4). The green arrow (No-Build to Project Modifications) is shorter than the red arrow (Existing Conditions to Project Modifications).

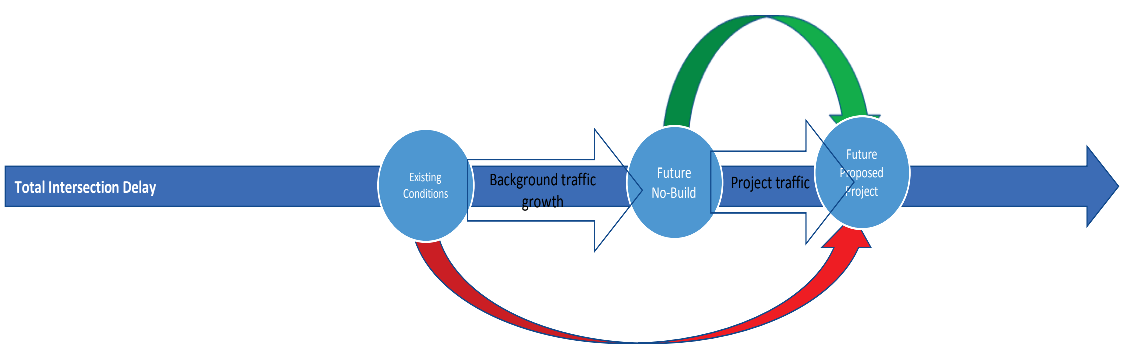

Figure 2-4. Total Intersection Delay

The assessment was quantified using the Los Angeles County impact criteria to identify changes in delay (Project Modifications compared to Existing Conditions) that would meet the impact threshold. Tables 2-12 and 2-13 provide details of the comparison between the Project Modifications and Existing Conditions, and also a comparison of the Approved Project to Existing Conditions for those intersections evaluated in the 2013 FEIR. Table 2-14 provides a summary of the number of intersections that exceed the impact criteria for those two scenarios. Comparisons of No-Build to Existing Conditions and Project Modifications to No Build are also provided for comparison.

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Table 2-12. AM Peak Project Modifications and Approved Project vs. Existing Conditions

				FEIR Existing (2010)		Project Modifications				FEIR Approved Project		Project Modifications Significant Impact (vs. Existing) [2]			New Future vs. Existing Impact with Project Modifications	
						Phase 1		Phase 2								
Number	Intersection Name	Control	Jurisdiction	LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	Phase 1	Phase 2	FEIR	Phase 1	Phase 2
1	Barranca Ave / Bennett Ave	S	Glendora	C	16.5	A	6.9	A	6.9	C	20.9	NO	NO	NO		
2	Barranca Ave / Foothill Blvd	S	Glendora	A	9.7	B	13.0	B	13.0	B	11.1	NO	NO	NO		
3	Grand Ave / Foothill Blvd	S	Glendora	C	27.3	C	30.5	C	30.5	C	29.9	NO	NO	NO		
4	Vermont Ave E / Ada Ave	U	Glendora	B	11.0	B	13.7	B	13.6	B	13.3	NO	NO	NO		
5	Vermont Ave / Route 66	S	Glendora	A	6.6	B	18.7	B	18.7	A	7.5	NO	NO	NO		
6	Vermont Ave / Foothill Blvd	S	Glendora	A	6.8	B	12.9	B	12.9	A	7.5	NO	NO	NO		
7	Vermont Ave W / Ada Ave	U	Glendora	B	10.6	B	13.3	B	13.2	B	12.3	NO	NO	NO		
8	Glendora Ave / Foothill Blvd	S	Glendora	C	20.1	C	20.4	C	20.4	C	28.1	NO	NO	**YES**		
9	Glendora Ave / Ada Ave	U	Glendora	B	10.6	B	12.3	B	12.3	B	12.3	NO	NO	NO		
10	Glendora Ave / Route 66	S	Glendora	B	17.9	C	31.0	C	31.0	C	22.8	**YES**	**YES**	NO	**YES**	**YES**
11	Pasadena Ave / Lemon Ave	U	Glendora	A	7.7	A	7.9	A	7.9	A	7.9	NO	NO	NO		
12	Pasadena Ave / Route 66	S	Glendora	A	9.4	C	22.9	C	22.9	B	12.4	**YES**	**YES**	NO	**YES**	**YES**
13	Glenwood Ave / Lemon Ave	U	Glendora	A	9.8	B	10.2	B	10.2	B	10.1	NO	NO	NO		
14	Glenwood Ave / Route 66	S	Glendora	B	11.2	C	22.6	C	22.5	B	14.7	**YES**	**YES**	NO	**YES**	**YES**
15	Elwood Ave / Lemon Ave	U	Glendora	B	10.4	B	10.8	B	10.8	B	10.8	NO	NO	NO		
16	Elwood Ave / Route 66	S	Glendora	B	16.7	C	21.6	C	21.6	B	15.5	NO	NO	NO		
17	Lorraine Ave / Lemon Ave	U	Glendora	C	16.7	C	19.7	C	19.7	C	19.8	NO	NO	NO		
18	Lorraine Ave / Route 66	S	Glendora	B	13.9	C	24.0	C	24.0	B	19.1	**YES**	**YES**	NO	**YES**	**YES**
19	Lone Hill Ave / Auto Centre Dr	S	Glendora	B	13.7	B	19.5	B	19.5	B	15.4	NO	NO	NO		
20	Barranca Ave / Sierra Madre Ave	U	Glendora	C	15.7	C	16.3	C	16.3	C	19.8	NO	NO	**YES**		
21	Glendora Ave / Sierra Madre Ave	U	Glendora	C	23.8	**E**	**44.8**	**E**	**44.8**	**E**	**43.3**	**YES**	**YES**	**YES**		
22	Lone Hill Ave / Glendora Marketplace	S	Glendora	B	15.1	B	11.6	B	11.6	B	15.2	NO	NO	NO		
101	Barranca Ave / Elderberry Dr	U	Glendora			B	11.0	B	10.9							
102	Grand Ave / Ada Ave	S	Glendora			A	5.5	A	5.5							
103	Grand Ave / Route 66	S	Glendora			D	38.0	D	38.3							
104	Vermont Ave / Carroll Ave	U	Glendora			B	11.7	B	11.7							
105	Glendora Ave / Carroll Ave	U	Glendora			C	19.0	C	19.0							
106	Glendora Ave / Avalon Apartments	U	Glendora			B	11.6	B	11.6							
107	Glendora Ave / Walnut Ave	U	Glendora			B	14.9	B	14.8							
108	Walnut Ave / Vista Bonita Ave	U	Glendora			B	10.6	B	10.6							
109	Glenwood Ave / Foothill Blvd	U	Glendora			**E**	**44.4**	**E**	**44.4**							
110	Elwood Ave / Foothill Blvd	S	Glendora			A	8.8	A	8.8							
23	Lone Hill Ave / Gladstone St	S	San Dimas	B	16.9	C	23.3	C	23.4	B	18.6	**YES**	**YES**	NO	**YES**	**YES**
24	SR 57 SB / Arrow Hwy	S	San Dimas	A	5.3	C	29.5	C	29.6	A	7.4	**YES**	**YES**	NO	**YES**	**YES**

Table 2-12. AM Peak Project Modifications and Approved Project vs. Existing Conditions

				FEIR Existing (2010)		Project Modifications				FEIR Approved Project		Project Modifications Significant Impact (vs. Existing) [2]			New Future vs. Existing Impact with Project Modifications	
						Phase 1		Phase 2								
Number	Intersection Name	Control	Jurisdiction	LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	Phase 1	Phase 2	FEIR	Phase 1	Phase 2
25	SR 57 NB / Arrow Hwy & Bonita Ave	S	San Dimas	B	17.6	D	47.3	D	47.5	C	27.5	**YES**	**YES**	**YES**		
26	Eucla Ave / Fifth St	U	San Dimas	A	7.2	A	7.8	A	7.8	A	7.4	NO	NO	NO		
27	Eucla Ave / Second St	U	San Dimas	A	9.4	A	9.9	A	9.8	A	9.8	NO	NO	NO		
28	Eucla Ave / Bonita Ave	S	San Dimas	A	4.7	B	13.1	B	13.1	A	4.8	NO	NO	NO		
29	Eucla Ave / Arrow Hwy	S	San Dimas	A	7.4	B	18.4	B	18.4	A	8.8	NO	NO	NO		
30	Acacia St / Fifth St	U	San Dimas	A	9.1	A	9.2	A	9.2	A	9.2	NO	NO	NO		
31	Acacia St / Second St	U	San Dimas	A	9.0	A	9.1	A	9.1	A	9.1	NO	NO	NO		
32	Acacia St / Bonita Ave	U	San Dimas	B	10.4	B	10.1	B	10.1	B	10.6	NO	NO	NO		
33	Cataract Ave / Second St	U	San Dimas	A	9.7	B	10.0	B	10.0	B	10.0	NO	NO	NO		
34	Cataract Ave / Bonita Ave[3]	U	San Dimas	B	10.3	B	10.1	B	10.2	A	6.1	NO	NO	NO		
35	Monte Vista Ave / Second St	U	San Dimas	A	9.2	A	9.5	A	9.5	A	9.5	NO	NO	NO		
36	Monte Vista Ave / Bonita Ave	U	San Dimas	C	15.4	**E**	**39.2**	**E**	**39.6**	C	17.7	**YES**	**YES**	**YES**		
37	San Dimas Ave / Second St	U	San Dimas	C	16.8	B	13.8	B	13.8	C	20.5	NO	NO	NO		
38	San Dimas Ave / Bonita Ave	S	San Dimas	B	10.2	C	29.0	C	28.8	B	12.2	**YES**	**YES**	NO	**YES**	**YES**
39	San Dimas Ave / Arrow Hwy	S	San Dimas	C	23.0	D	36.5	C	34.6	C	34.1	**YES**	**YES**	**YES**		
40	Walnut Ave / Bonita Ave	S	San Dimas	A	5.9	B	12.1	B	12.1	A	6.8	NO	NO	NO		
41	Walnut Ave / Arrow Hwy	S	San Dimas	B	10.8	C	21.7	C	21.7	B	13.5	**YES**	**YES**	NO	**YES**	**YES**
42	San Dimas Canyon Rd / Bonita Ave	S	San Dimas	A	6.3	C	26.8	C	26.8	A	7.3	**YES**	**YES**	NO	**YES**	**YES**
43	San Dimas Canyon Rd / Arrow Hwy	S	San Dimas	B	11.4	B	19.8	B	19.8	C	27.6	NO	NO	NO		
201	San Dimas Ave / First St	U	San Dimas													
202	San Dimas Ave / Railway St	U	San Dimas													
203	San Dimas Ave / Commercial St	U	San Dimas													
44	Wheeler Ave & Third St	U	La Verne	B	14.4	C	18.2	C	18.2	C	16.7	NO	NO	NO		
45	Arrow Highway & Wheeler Ave	S	La Verne	B	15.1	C	20.5	C	20.2	D	50.6	NO	NO	**YES**		
46	A St & Third St	U	La Verne	B	10.1	B	10.5	B	10.4	B	10.4	NO	NO	NO		
47	A St & First St	U	La Verne	A	9.2	A	9.6	A	9.5	A	9.5	NO	NO	NO		
48	Arrow Highway & A St	U	La Verne	**F**	**77.2**	B	10.1	A	5.2	A	9.8	NO	NO	NO		
49	D St & Third St	U	La Verne	A	9.1	B	10.4	B	10.2	B	10.2	NO	NO	NO		
50	D St & First St	U	La Verne	A	9.5	B	10.0	A	9.9	A	9.9	NO	NO	NO		
51	D St & Arrow Highway	S	La Verne	A	4.7	B	17.8	B	19.4	C	22.2	NO	NO	NO		
52	E St & Third St	U	La Verne	A	9.2	B	10.8	B	10.7	B	10.6	NO	NO	NO		
53	E St & Second St	U	La Verne	B	13.2	B	11.1	B	10.9	C	15.6	NO	NO	NO		
54	E St & First St	U	La Verne	B	10.9	B	14.1	B	13.7	B	13.6	NO	NO	NO		
55	Fairplex Dr/E St & Arrow Highway	S	La Verne	B	18.6	C	24.1	C	26.1	C	27.3	**NO**	**YES**	**YES**		
56	White Ave & Third St	U	La Verne	C	19.6	C	17.7	C	17.2	**E**	**39.8**	NO	NO	**YES**		
57	White Ave & Second St	U	La Verne	C	18.5	C	16.4	C	16.1	D	28.0	NO	NO	**YES**		
58	White Ave & First St	U	La Verne	C	20.0	C	16.4	C	16.3	D	33.1	NO	NO	**YES**		

Table 2-12. AM Peak Project Modifications and Approved Project vs. Existing Conditions

Number	Intersection Name	Control	Jurisdiction	FEIR Existing (2010)		Project Modifications				FEIR Approved Project		Project Modifications Significant Impact (vs. Existing) [2]			New Future vs. Existing Impact with Project Modifications	
						Phase 1		Phase 2								
				LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	Phase 1	Phase 2	FEIR	Phase 1	Phase 2
59	White Ave & Sierra Wy	U	La Verne	B	10.7	B	14.7	B	14.1	B	14.8	NO	NO	NO		
60	White Ave & Arrow Highway	S	La Verne	C	21.5	C	28.3	C	28.3	C	31.9	**YES**	**YES**	**YES**		
61	D St & Bonita Ave	S	La Verne	A	7.6	C	20.3	C	20.5	A	8.2	**YES**	**YES**	NO	**YES**	**YES**
62	White Ave & Foothill Blvd	S	La Verne	C	23.8	C	28.1	C	28.1	C	29.4	NO	NO	NO		
63	White Ave & Bonita Ave	S	La Verne	B	12.2	C	28.4	C	27.9	B	14.3	**YES**	**YES**	NO	**YES**	**YES**
64	La Verne Ave & Arrow Highway	S	La Verne	D	28.6	B	11.5	B	11.4	**F**	**141.3**	NO	NO	NO		
65	White Ave & McKinley Ave	S	La Verne	B	10.5	B	17.1	B	17.1	B	10.8	NO	NO	NO		
66A	N. Fulton Rd / Bonita Ave	U	Pomona	C	17.2			B	13.4	D	29.4		NO	NO		
66B	S. Fulton Rd / Bonita Ave	U	Pomona					B	11.9				NO	NO		
67	Fulton Rd / Arrow Hwy	U	Pomona	C	17.9			C	17.3	D	27.4		NO	**YES**		
68	Garey Ave / Bonita Ave	S	Pomona	B	13.2			C	24.2	C	32.6		**YES**	**YES**		
69	Garey Ave / Santa Fe St	U	Pomona	B	11.8			B	10.3	A	9.4		NO	NO		
70	Garey Ave / Arrow Hwy	S	Pomona	C	21.5			D	35.5	C	29.9		**YES**	**YES**		
71	Towne Ave / Bonita Ave	S	Pomona	A	7.3			A	9.8	B	18.5		NO	NO		
72	Towne Ave / Towne Center Dr	U	Pomona	C	18.4			A	9.3	D	28.7		NO	NO		
73	Towne Ave / Arrow Hwy	S	Pomona	C	34.9			**E**	**56.8**	D	45.8		**YES**	**YES**		
74	Garey Ave / Harrison Ave	S	Pomona	A	6.7			A	9.1	A	7.9		NO	NO		
1001	S. Fulton Rd & Metrolink W Driveway	U	Pomona					A	8.9							
1002	Santa Fe St & Metrolink S Driveway	U	Pomona					B	13.3							
1003	Bonita Ave & Jacaranda Wy	U	Pomona					C	18.6							
1004	Arrow Highway & Pine St[3]	U	Pomona					B	13.7							
1005	Garey Ave & St B	U	Pomona					B	11.9							
1006	St A & Bonita Ave	U	Pomona					C	15.5							
1007	Garey Ave & Grevilia St.	S	Pomona					C	24.2							
1008	Pine St & Grevilia St.	U	Pomona					B	11.5							
1009	Arrow Hwy & Amberson St.	S	Pomona					A	4.8							

Notes:

[1]Delay is reported in seconds per vehicle using HCM 2000 methodologies for signalized and unsignalized intersections.

[2]Impact criteria based on County of Los Angeles thresholds

[3]HCM 2010 methodology was applied due to HCM 2000 limitations with intersection geometry.

Shaded cells in the last six columns are intersections that were not analyzed for the Approved Project. Also, Intersections 201 to 203 were not evaluated for the AM peak period in any technical studies. Other shaded cells are intersections in Pomona that are not applicable for Phase 1.

S = Signalized / U = Unsignalized

Table 2-13. PM Peak Project Modifications and Approved Project versus Existing Conditions

				FEIR Existing (2010)		Project Modifications: Phase 1		Project Modifications: Phase 2		FEIR Approved Project		Project Modifications Significant Impact (vs. Existing) [2]			New Future vs. Existing Impact with Project Modifications	
Number	**Intersection Name**	**Control**	**Jurisdiction**	**LOS**	**Delay[1]**	**LOS**	**Delay[1]**	**LOS**	**Delay[1]**	**LOS**	**Delay[1]**	**Phase 1**	**Phase 2**	**FEIR**	**Phase 1**	**Phase 2**
1	Barranca Ave / Bennett Ave	S	Glendora	B	11.6	A	3.9	A	3.9	B	12.4	NO	NO	NO		
2	Barranca Ave / Foothill Blvd	S	Glendora	A	7.5	B	11.3	B	11.3	A	8.4	NO	NO	NO		
3	Grand Ave / Foothill Blvd	S	Glendora	C	23.9	C	30.3	C	30.3	C	28.5	**YES**	**YES**	NO	**YES**	**YES**
4	Vermont Ave E / Ada Ave	U	Glendora	B	12.3	C	15.8	C	15.7	C	15.3	NO	NO	NO		
5	Vermont Ave / Route 66	S	Glendora	A	7.8	B	18.6	B	18.6	A	9.1	NO	NO	NO		
6	Vermont Ave / Foothill Blvd	S	Glendora	A	6.2	B	14.4	B	14.4	A	7.7	NO	NO	NO		
7	Vermont Ave W / Ada Ave	U	Glendora	B	11.3	B	14.0	B	13.9	B	13.2	NO	NO	NO		
8	Glendora Ave / Foothill Blvd	S	Glendora	C	22.3	C	21.9	C	21.9	C	28.1	NO	NO	NO		
9	Glendora Ave / Ada Ave	U	Glendora	B	12.1	C	15.4	C	15.4	C	15.3	NO	NO	NO		
10	Glendora Ave / Route 66	S	Glendora	C	21.2	D	50.4	D	49.6	C	32.4	**YES**	**YES**	**YES**		
11	Pasadena Ave / Lemon Ave	U	Glendora	A	7.6	A	7.8	A	7.8	A	7.8	NO	NO	NO		
12	Pasadena Ave / Route 66	S	Glendora	A	8.7	B	17.5	B	17.4	B	11.2	NO	NO	NO		
13	Glenwood Ave / Lemon Ave	U	Glendora	B	10.7	B	11.3	B	11.3	B	11.3	NO	NO	NO		
14	Glenwood Ave / Route 66	S	Glendora	B	10.6	C	20.5	C	20.6	B	13.0	**YES**	**YES**	NO	**YES**	**YES**
15	Elwood Ave / Lemon Ave	U	Glendora	B	10.5	B	11.0	B	11.0	B	11.0	NO	NO	NO		
16	Elwood Ave / Route 66	S	Glendora	B	14.3	C	20.4	C	20.4	B	18.1	**YES**	**YES**	NO	**YES**	**YES**
17	Lorraine Ave / Lemon Ave	U	Glendora	B	12.4	B	13.7	B	13.7	B	13.7	NO	NO	NO		
18	Lorraine Ave / Route 66	S	Glendora	B	10.5	C	23.7	C	23.7	B	11.6	**YES**	**YES**	NO	**YES**	**YES**
19	Lone Hill Ave / Auto Centre Dr	S	Glendora	B	16.7	C	29.3	C	29.4	C	22.7	**YES**	**YES**	**YES**		
20	Barranca Ave / Sierra Madre Ave	U	Glendora	B	13.7	B	13.8	B	13.8	C	15.5	NO	NO	NO		
21	Glendora Ave / Sierra Madre Ave	U	Glendora	B	12.0	B	14.3	B	14.3	B	14.2	NO	NO	NO		
22	Lone Hill Ave / Glendora Marketplace	S	Glendora	B	19.5	B	18.0	B	18.0	C	23.1	NO	NO	NO		
101	Barranca Ave / Elderberry Dr	U	Glendora			B	10.3	B	10.3							
102	Grand Ave / Ada Ave	S	Glendora			A	7.3	A	7.1							
103	Grand Ave / Route 66	S	Glendora			D	37.6	D	37.7							
104	Vermont Ave / Carroll Ave	U	Glendora			B	13.8	B	13.8							
105	Glendora Ave / Carroll Ave	U	Glendora			D	25.5	D	25.5							
106	Glendora Ave / Avalon Apartments	U	Glendora			B	11.8	B	11.8							
107	Glendora Ave / Walnut Ave	U	Glendora			C	20.9	C	20.9							
108	Walnut Ave / Vista Bonita Ave	U	Glendora			B	11.3	B	11.3							
109	Glenwood Ave / Foothill Blvd	U	Glendora			D	32.6	D	32.6							
110	Elwood Ave / Foothill Blvd	S	Glendora			A	7.8	A	7.8							
23	Lone Hill Ave / Gladstone St	S	San Dimas	C	21.7	C	28.5	C	28.5	C	25.5	**YES**	**YES**	NO	**YES**	**YES**
24	SR 57 SB / Arrow Hwy	S	San Dimas	A	9.5	**E**	**76.9**	**E**	**77.7**	B	19.4	**YES**	**YES**	**YES**		
25	SR 57 NB / Arrow Hwy & Bonita Ave	S	San Dimas	B	19.9	**F**	**93.5**	**F**	**94.3**	C	29.1	**YES**	**YES**	**YES**		
26	Eucla Ave / Fifth St	U	San Dimas	A	7.2	A	8.0	A	8.0	A	7.4	NO	NO	NO		

Table 2-13. PM Peak Project Modifications and Approved Project versus Existing Conditions

				FEIR Existing (2010)		Project Modifications Phase 1		Project Modifications Phase 2		FEIR Approved Project		Project Modifications Significant Impact (vs. Existing) [2]			New Future vs. Existing Impact with Project Modifications	
Number	Intersection Name	Control	Jurisdiction	LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	Phase 1	Phase 2	FEIR	Phase 1	Phase 2
27	Eucla Ave / Second St	U	San Dimas	B	10.0	B	10.7	B	10.6	B	10.5	NO	NO	NO		
28	Eucla Ave / Bonita Ave	S	San Dimas	A	6.0	B	12.9	B	12.9	A	8.0	NO	NO	NO		
29	Eucla Ave / Arrow Hwy	S	San Dimas	A	9.8	C	20.9	C	20.9	B	11.7	**YES**	**YES**	NO	**YES**	**YES**
30	Acacia St / Fifth St	U	San Dimas	A	9.1	A	9.3	A	9.3	A	9.3	NO	NO	NO		
31	Acacia St / Second St	U	San Dimas	A	9.1	A	9.1	A	9.1	A	9.1	NO	NO	NO		
32	Acacia St / Bonita Ave	U	San Dimas	C	18.2	B	13.2	B	13.2	C	24.4	NO	NO	NO		
33	Cataract Ave / Second St	U	San Dimas	A	9.8	B	10.4	B	10.3	B	10.3	NO	NO	NO		
34	Cataract Ave / Bonita Ave[3]	U	San Dimas	C	15.0	B	11.6	B	11.6	A	5.2	NO	NO	NO		
35	Monte Vista Ave / Second St	U	San Dimas	A	9.7	A	9.9	A	9.9	A	9.9	NO	NO	NO		
36	Monte Vista Ave / Bonita Ave	U	San Dimas	**E**	**39.7**	**F**	**134.3**	**F**	**134.3**	**E**	**47.9**	**YES**	**YES**	**YES**		
37	San Dimas Ave / Second St	U	San Dimas	C	22.3	C	17.3	C	17.2	**E**	**38.2**	NO	NO	**YES**		
38	San Dimas Ave / Bonita Ave	S	San Dimas	B	13.0	C	34.4	C	34.8	B	19.2	**YES**	**YES**	**YES**		
39	San Dimas Ave / Arrow Hwy	S	San Dimas	C	29.4	D	40.6	D	41.5	D	48.3	**YES**	**YES**	**YES**		
40	Walnut Ave / Bonita Ave	S	San Dimas	B	10.7	B	15.5	B	15.5	B	14.4	NO	NO	NO		
41	Walnut Ave / Arrow Hwy	S	San Dimas	B	10.4	C	21.5	C	20.8	B	12.9	**YES**	**YES**	NO	**YES**	**YES**
42	San Dimas Canyon Rd / Bonita Ave	S	San Dimas	A	7.3	C	28.3	C	28.3	A	9.0	**YES**	**YES**	NO	**YES**	**YES**
43	San Dimas Canyon Rd / Arrow Hwy	S	San Dimas	B	10.1	C	23.0	C	23.0	C	28.1	**YES**	**YES**	**YES**		
201	San Dimas Ave / First St	U	San Dimas			C	18.0	C	18.1							
202	San Dimas Ave / Railway St	U	San Dimas			A	3.6	A	3.6							
203	San Dimas Ave / Commercial St	U	San Dimas			A	9.0	A	9.0							
44	Wheeler Ave & Third St	U	La Verne	B	13.8	C	17.6	C	17.6	C	15.7	NO	NO	NO		
45	Arrow Highway & Wheeler Ave	S	La Verne	B	13.3	B	19.1	B	19.1	D	37.8	NO	NO	NO		
46	A St & Third St	U	La Verne	B	10.3	B	10.9	B	10.8	B	10.8	NO	NO	NO		
47	A St & First St	U	La Verne	A	9.8	B	10.1	B	10.1	B	10.0	NO	NO	NO		
48	Arrow Highway & A St	U	La Verne	**E**	**40.0**	A	4.7	A	4.7	D	39.9	NO	NO	NO		
49	D St & Third St	U	La Verne	B	11.5	C	15.8	C	15.5	C	15.4	**YES**	**YES**	NO	**YES**	**YES**
50	D St & First St	U	La Verne	B	10.9	B	12.8	B	12.5	B	12.7	NO	NO	NO		
51	D St & Arrow Highway	S	La Verne	A	4.9	B	18.3	B	18.3	C	30.4	NO	NO	NO		
52	E St & Third St	U	La Verne	B	11.0	B	10.4	B	10.6	C	16.0	NO	NO	NO		
53	E St & Second St	U	La Verne	B	13.5	C	16.8	C	16.0	C	16.9	NO	NO	NO		
54	E St & First St	U	La Verne	B	11.7	B	12.9	B	12.7	B	13.7	NO	NO	NO		
55	Fairplex Dr/E St & Arrow Highway	S	La Verne	C	23.5	C	31.2	C	32.6	C	33.3	**YES**	**YES**	**YES**		
56	White Ave & Third St	U	La Verne	**E**	**41.8**	C	23.2	C	22.9	**F**	**95.9**	NO	NO	**YES**		
57	White Ave & Second St	U	La Verne	D	32.5	C	24.9	C	23.9	**F**	**121.4**	NO	NO	**YES**		
58	White Ave & First St	U	La Verne	D	29.7	D	30.3	D	28.4	**F**	**142.2**	NO	NO	**YES**		
59	White Ave & Sierra Wy	U	La Verne	C	15.3	C	18.4	C	18.2	C	19.6	NO	NO	**YES**		

Table 2-13. PM Peak Project Modifications and Approved Project versus Existing Conditions

Number	Intersection Name	Control	Jurisdiction	FEIR Existing (2010)		Project Modifications Phase 1		Project Modifications Phase 2		FEIR Approved Project		Project Modifications Significant Impact (vs. Existing) [2]			New Future vs. Existing Impact with Project Modifications	
				LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	Phase 1	Phase 2	FEIR	Phase 1	Phase 2
60	White Ave & Arrow Highway	S	La Verne	C	24.7	C	34.0	C	31.4	C	31.7	YES	YES	YES		
61	D St & Bonita Ave	S	La Verne	A	8.0	B	19.3	B	18.2	B	10.8	NO	NO	NO		
62	White Ave & Foothill Blvd	S	La Verne	C	34.2	D	37.4	D	38.8	D	39.6	NO	YES	YES		
63	White Ave & Bonita Ave	S	La Verne	B	13.9	D	35.4	D	35.1	B	17.9	YES	YES	YES		
64	La Verne Ave & Arrow Highway	S	La Verne	**F**	**196.9**	B	10.4	B	10.3	**F**	**652.8**	NO	NO	NO		
65	White Ave & McKinley Ave	S	La Verne	B	12.0	B	17.8	B	19.1	B	14.1	NO	NO	NO		
66A	N. Fulton Rd / Bonita Ave	U	Pomona	**E**	**30.8**			C	18.7	**F**	**137.4**		NO	YES		
66B	S. Fulton Rd / Bonita Ave	U	Pomona					B	14.2				NO	NO		
67	Fulton Rd / Arrow Hwy	U	Pomona	C	24.2			D	27.1	**E**	**44.5**		YES	YES		
68	Garey Ave / Bonita Ave	S	Pomona	B	13.3			C	26.9	B	18.5		YES	NO		YES
69	Garey Ave / Santa Fe St	U	Pomona	B	11.5			B	10.5	B	13.2		NO	NO		
70	Garey Ave / Arrow Hwy	S	Pomona	C	25.8			D	44.0	C	34.5		YES	YES		
71	Towne Ave / Bonita Ave	S	Pomona	A	9.5			B	13.0	B	15.6		NO	NO		
72	Towne Ave / Towne Center Dr	U	Pomona	D	27.9			A	9.6	**E**	**49.0**		NO	NO		
73	Towne Ave / Arrow Hwy	S	Pomona	D	37.0			D	46.1	D	46.7		YES	YES		
74	Garey Ave / Harrison Ave	S	Pomona	A	4.7			A	6.5	A	5.9		NO	NO		
1001	S. Fulton Rd & Metrolink W Driveway	U	Pomona					A	9.0							
1002	Santa Fe St & Metrolink S Driveway	U	Pomona					B	12.0							
1003	Bonita Ave & Jacaranda Wy	U	Pomona					C	18.1							
1004	Arrow Highway & Pine St[3]	U	Pomona					B	11.4							
1005	Garey Ave & St B	U	Pomona					B	14.6							
1006	St A & Bonita Ave	U	Pomona					C	18.8							
1007	Garey Ave & Grevilia St.	S	Pomona					B	10.8							
1008	Pine St & Grevilia St.	U	Pomona					B	12.8							
1009	Arrow Hwy & Amberson St.	S	Pomona					A	7.0							

Notes:

[1]Delay is reported in seconds per vehicle using HCM 2000 methodologies for signalized and unsignalized intersections.

[2]Impact criteria based on County of Los Angeles thresholds

[3]HCM 2010 methodology was applied due to HCM 2000 limitations with intersection geometry.

Shaded cells in the last six columns are intersections that were not analyzed for the Approved Project. Also, Intersections 201 to 203 were not evaluated for the AM peak period in any technical studies. Other shaded cells are intersections in Pomona that are not applicable for Phase 1.

S = Signalized / U = Unsignalized

Table 2-14. Intersections Meeting the Los Angeles County Criteria Using Different Scenario Comparisons

	AM Peak Hour		PM Peak Hour	
	Phase 1	Phase 2	Phase 1	Phase 2
1. Project Modifications vs. Existing Conditions	16	20	20	25
2. Approved Project vs. Existing Conditions	16		21	
3. No Build vs. Existing Conditions	21		23	
4. Project Modifications vs. No Build	1	1	4	3

Depending on the scenario, 16 to 25 intersections meet the impact criteria when comparing the Project Modifications to Existing Conditions. (The number of intersections is much higher than those meeting the criteria for the standard traffic engineering comparison of the Build and No-Build scenarios in line 4). Similarly, 16 to 21 intersections would meet the impact criteria for the Approved Project to Existing Conditions assessment. (For comparison, 21 to 23 intersections would meet the impact criteria for the No Build to Existing Conditions assessment.) In other words, approximately the same number of intersections meet the impact criteria when comparing the Approved Project and Project Modifications to Existing Conditions. This test is proper comparison for purposes of determining the significance of the impact of the Approved Project versus Existing Conditions compared to the impact of the project with Project Modifications versus Existing Conditions (line 1). This comparison reflects the assessment of the updated baseline required for the SEIR.

Sixteen intersections were identified where the test of Project Modifications versus Existing Conditions meets the impact criteria, but the Approved Project versus Existing Conditions test does not. These intersections vary by peak period and phase (Table 2-15). In all cases, the intersections operate at LOS C with the Project Modifications, and LOS A to C for the Approved Project. LOS C is acceptable for traffic operations per the criteria identified in Section 2.1.3. All of these intersections would operate at LOS C or better in 2035 with the Project Modifications, thus no further evaluation of impacts was conducted.

Table 2-15. Intersections Meeting the Impact Criteria for Project Modifications versus Existing Conditions but not Approved Project versus Existing Conditions

Number	Intersection Name	Control	Jurisdiction	AM		PM	
				Phase 1	Phase 2	Phase 1	Phase 2
3	Grand Ave/Foothill Blvd	S	Glendora			x	x
10	Glendora Ave/Route 66	S	Glendora	x	x		
12	Pasadena Ave/Route 66	S	Glendora	x	x		
14	Glenwood Ave/Route 66	S	Glendora	x	x	x	x
16	Elwood Ave/Route 66	S	Glendora			x	x
18	Lorraine Ave/Route 66	S	Glendora	x	x	x	x
23	Lone Hill Ave/Gladstone St	S	San Dimas	x	x	x	x
24	SR 57 SB/Arrow Highway	S	San Dimas	x	x		
29	Eucla Ave/Arrow Highway	S	San Dimas			x	x
38	San Dimas Ave/Bonita Ave	S	San Dimas	x	x		
41	Walnut Ave/Arrow Highway	S	San Dimas	x	x	x	x

Table 2-15. Intersections Meeting the Impact Criteria for Project Modifications versus Existing Conditions but not Approved Project versus Existing Conditions

Number	Intersection Name	Control	Jurisdiction	AM		PM	
				Phase 1	Phase 2	Phase 1	Phase 2
42	San Dimas Canyon Road/Bonita Ave	S	San Dimas	x	x	x	x
49	D St and Third St	U	La Verne			x	x
61	D St and Bonita Ave	S	La Verne	x	x		
63	White Ave and Bonita Ave	S	La Verne	x	x		
68	Garey Ave/Bonita Ave	S	Pomona				x

Note:

x= intersection that meets the Impact Criteria for Project Modifications versus Existing Conditions but not Approved Project versus Existing Conditions

S = Signalized / U = Unsignalized

More generally, mitigation measures are not identified for the intersections in lines 1 to 3 of Table 14 because the reason for meeting the threshold in those cases is the additional traffic associated with background growth, not the Project Modifications. The increase in delay associated with the comparison to Existing Conditions is due to background growth in traffic associated with the projected increase in employment and population. The average increase in delay at the affected intersections for Project Modifications versus Existing Conditions (19.1 seconds) is slightly lower that the average increase in delay for the No Build versus Existing Conditions scenario (19.9 seconds/intersection). more than all of the delay (104 percent) is associated with background growth and not the Project Modifications. The same assessment applies to the comparison of the Approved Project to Existing Conditions (line 2), thus the Project Modifications do not result in additional impacts with the updated baseline.

Further, many of the intersections that meet the criteria in the Project Modifications versus Existing Conditions evaluation shows delays are lower for the Project Modifications than for the No-Build scenario. This demonstrates that the Project Modifications would improve traffic conditions when population and employment growth are taken into consideration. In these cases, the Project Modifications would improve operations due to reduced automobile trips associated with new transit service. The increases in delay are associated with background growth. The background growth reflects cumulative impacts, thus the test to see if the Project Modifications are a substantial contribution to this cumulative impact is not met. The delay is reduced with the Project Modifications, thus there is no significant cumulative impact attributable to the Project Modifications.

The RTP/SCS is an adopted regional program that has identified funding to address the transportation and other impacts associated with the increases in population and employment that SCAG estimates would occur in the Project Area. The Project here would have beneficial impacts on transportation conditions and will contribute to the mitigation of transportation impacts associated with the growth in population and employment in the region. The discussion in Section 2.3.3 is therefore focused on the impacts and mitigation measures for the comparison of the Project Modifications to the Approved Project and No-Build scenario.

2.3.3 Mitigation Measures and Recommendations

The following subsections describe the mitigation strategies and other recommendations for addressing the impacts identified in Section 2.3.2. The intersections are described from west to east. The following are general modifications considered for significant impacts:

- Modification to intersection geometrics, if feasible
- Changes to signal operations (phasing) to improve efficiency
- Signalization of selected two- and four-way stop-controlled intersections
- Turn restrictions for one- or two-way stop-controlled intersections with heavy conflicting traffic, if feasible alternate routes for the restricted movements are available

2.3.3.1 Intersection 10 - Glendora Avenue/Route 66

The Glendora Avenue/Route 66 intersection has identified impacts for Phase 1 (La Verne) and Phase 2 (Pomona) in the PM peak hour. The intersection is projected to operate at LOS D in the 2035 PM peak hour in the No Build, Phase 1, and Phase 2 scenarios. However, the delay would increase by approximately 6 to 7 seconds during Phase 1 and Phase 2. Per the LA County criteria, this increase in delay represents a significant impact.

Potential mitigation measures were identified to address this impact. Because of the current configuration and channelization, intersection widening with additional through or turn lanes will be needed. There are gas stations on two corners of the intersection, and abutting land uses on all four approaches. With these right-of-way constraints, the only mitigation that was identified was widening the eastbound approach to add a second left-turn lane. Improvements to add capacity on other approaches will necessitate right-of-way acquisition.

2.3.3.2 Intersection 53 - E Street/Second Street

The E Street/Second Street intersection has identified impacts for Phase 1 of the Proposed Project in the PM peak hour. The intersection is projected to operate at LOS B in the No Build scenario, and at LOS C during Phase 1 with an increase in delay of more than 4 seconds. Per the LA County criteria, the projected LOS and the increase in delay represents a significant impact (during Phase 1 only).

However, the delay with the Project Modifications is lower (by 0.1 second) than the delay with the Approved Project, so that secondary criterion for an impact was not met. For that reason, and because standard traffic engineering practice is that LOS C is acceptable for traffic operations, no mitigation measures were identified. This intersection is not discussed in Section 2.3.4.

2.3.3.3 Intersection 57 - White Avenue/Second Street

The White Avenue/Second Street intersection has identified impacts for Phase 1 and Phase 2 in the PM peak hour. The intersection is projected to operate at LOS C in the 2035 PM peak hour in the No Build, Phase 1, and Phase 2 scenarios. However, the delay would increase by approximately 5 to 6 seconds during Phase 1 and Phase 2. Per the LA County criteria, this increase in delay represents a significant impact for an unsignalized intersection.

The signalization of this intersection is one potential mitigation measure that will address the impacts at this intersection. (This mitigation measure was identified in the 2013 FEIR.) However, a broader mitigation strategy and described in Chapter 1 – Project Description and across each of the technical disciplines included in Chapter 3 – Environmental Analysis, Impacts and Mitigation, the widening of White Avenue between First Street and Sixth Street, was identified to address operations impacts at the at-grade crossing. This widening will reduce the effects of queues during train operations, and also provide for reductions in delay to the intersections on White Avenue without the need to signalize the intersection.

- LTR-9: Widen White Avenue to include two lanes in both the northbound and southbound directions, a dedicated median turn lane, and curbs, gutters, and sidewalks.

2.3.3.4 Intersection 58 - White Avenue/First Street

The White Avenue/First Street intersection has identified impacts for Phase 1 and Phase 2 in the PM peak hour. The intersection is projected to operate at LOS C in the 2035 PM peak hour in the No Build scenario. However, the LOS is projected to worsen to LOS D and delay would increase by approximately 7 to 9 seconds during Phase 1 and Phase 2. Per the LA County criteria, this increase in delay represents a significant impact for an unsignalized intersection.

The signalization of this intersection is one potential mitigation measure that will address the impacts at this intersection. (This mitigation measure was identified in the 2013 FEIR.) However, as discussed above in Section 2.3.3.3, for the White Avenue/Second Street intersection (Section 2.3.3.3), the widening of White Avenue also eliminates these impacts.

2.3.3.5 Intersection 73 - Towne Avenue/Arrow Highway

The Towne Avenue/Arrow Highway intersection has identified impacts for Phase 2 in the AM peak hour. The intersection is projected to operate at LOS D in the 2035 PM peak hour in the No Build scenario. The intersection is projected to worsen to LOS E and the delay would increase by approximately 12 seconds during Phase 2. Per the LA County criteria, this increase in delay represents a significant impact. Per the City of Pomona criteria, the change from LOS D to E represents a significant impact.

Potential mitigation measures were identified to address the impacts. One potential mitigation is the addition of one northbound left-turn lane and a storage length extension from 100 feet to 175 feet. The potential mitigation provides the additional storage needed to accommodate the added trips from drivers heading from northbound Towne Avenue to westbound Arrow Highway for trips to Pomona Station. Roadway widening near the intersection will be needed to accommodate the improved lane configuration. A detailed engineering assessment is required to determine the feasibility of this potential mitigation.

LTR-10: Add one northbound left-turn lane and lengthen the storage from 100 feet to 175 feet.

2.3.4 Level of Impact After Mitigation

The following subsections provide details on intersection performance for each potential mitigation strategies. Results of the intersection operating conditions after implementation of the Proposed Project mitigation measures are summarized in Tables 2-16 and 2-17. Detailed LOS worksheets are provided in Appendix C

2.3.4.1 Intersection 10 - Glendora Avenue/Route 66

The proposed mitigation measure to add a second left-turn lane for eastbound Route 66 was evaluated. The improvement in LOS was negligible (resulting in a decrease of less than 1 second in delay for Phase 1 and Phase 2), and the impact (PM Peak only) remained after mitigation. Therefore, the significant impact cannot be addressed with any feasible mitigation measures. There are no identified mitigation measures that add capacity to reduce delay, without substantial right-of-way acquisitions that will in turn have secondary impacts related to the loss of these properties and the associated economic effects. Therefore, the Project Modifications would introduce a new unmitigable significant impact at this intersection during the PM peak period.

2.3.4.2 Intersection 57 - White Avenue/Second Street

The proposed mitigation measure to widen White Avenue between First Street and Sixth Street was evaluated. The potential mitigation is projected to improve intersection operations to LOS C (17.2

seconds in delay for Phase 1 and 16.6 seconds for Phase 2) during the PM peak hour. This improvement will allow the intersection to operate better than the 2035 No Build scenario and is therefore a feasible mitigation for the identified significant impact. Therefore, the Project Modifications, after mitigation, would not introduce a new or more severe significant impact.

2.3.4.3 Intersection 58 - White Avenue/First Street

The proposed mitigation measure to widen White Avenue between First Street and Sixth Street was evaluated. The potential mitigation is projected to improve intersection operations to LOS C (18.1 seconds in delay for Phase 1 and 17.4 seconds for Phase 2) during the PM peak hour. This improvement will allow the intersection to operate better than the 2035 No Build scenario and is therefore a feasible mitigation for the identified significant impact. Therefore, the Project Modifications, after mitigation, would not introduce a new or more severe significant impact.

2.3.4.4 Intersection 73 - Towne Avenue/Arrow Highway

The proposed mitigation measure to add an additional northbound left-turn lane was evaluated. The potential mitigation is projected to improve intersection operations to LOS D (44.2 seconds for Phase 2) during the AM peak hour. This improvement will allow the intersection to operate better than the 2035 No Build scenario and is therefore a mitigation for the identified significant impact. Therefore, the Project Modifications, after mitigation, would not introduce a new or more severe significant impact.

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Table 2-16. AM Peak Hour Mitigated Level of Service

Number	Intersection Name	Control	Jurisdiction	No Build[1]		Project Modifications				FEIR Approved Project		Proposed Mitigations to Significant Impacts				Residual Significant Impact	
						Phase 1		Phase 2				Phase 1		Phase 2			
				LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	Phase 1	Phase 2
10	Glendora Ave / Route 66	S	Glendora	C	32.3	C	31.0	C	31.0	C	22.8	C	30.9	C	30.9	NO	NO
57	White Ave & Second St	U	La Verne	B	14.8	C	16.4	C	16.1	D	28.0	B	14.5	B	14.7	NO	NO
58	White Ave & First St	U	La Verne	C	15.6	C	16.4	C	16.3	D	33.1	C	18.9	C	18.8	NO	NO
73	Towne Ave / Arrow Hwy	S	Pomona	D	45.3			**E**	**56.8**	D	45.8			D	44.2		NO

Notes:

[1]No Build scenario was updated from what was reported in the 2013 FEIR based on updated geometry and/or change in signal phasing.

[2]Delay is reported in seconds per vehicle using HCM 2000 methodologies for signalized and unsignalized intersections.

Shaded cells are intersections in Pomona that are not applicable for Phase 1.

S = Signalized / U = Unsignalized

Table 2-17. PM Peak Hour Mitigated Level of Service

Number	Intersection Name	Control	Jurisdiction	No Build[1]		Project Modifications				FEIR Approved Project		Proposed Mitigations to Significant Impacts				Residual Significant Impact	
						Phase 1		Phase 2				Phase 1		Phase 2			
				LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	Phase 1	Phase 2
10	Glendora Ave / Route 66	S	Glendora	D	43.8	D	50.4	D	49.6	C	32.4	D	50.0	D	49.2	***YES***	***YES***
57	White Ave & Second St	U	La Verne	C	19.0	C	24.9	C	23.9	**F**	**121.4**	C	17.2	C	16.6	NO	NO
58	White Ave & First St	U	La Verne	C	21.3	D	30.3	D	28.4	**F**	**142.2**	C	18.1	C	17.4	NO	NO
73	Towne Ave / Arrow Hwy	S	Pomona	D	45.2			D	46.1	D	46.7			D	43.0		NO

Notes:

[1]No Build scenario was updated from what was reported in the 2013 FEIR based on updated geometry and/or change in signal phasing.

[2]Delay is reported in seconds per vehicle using HCM 2000 methodologies for signalized and unsignalized intersections.

Shaded cells are intersections in Pomona that are not applicable for Phase 1.

S = Signalized / U = Unsignalized

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2.4 Vehicle Miles Traveled Analysis Results

Table 2-18 provides a summary of the projected VMT for the Southern California region and study area (a 2-mile buffer around the Gold Line stations). The Project Modifications would reduce VMT during both Phase 1 and Phase 2. Those reductions are associated with the shift in mode from automobile to transit trips with the increased Gold Line service. Based on these reductions, there would be no new or more severe significant impacts to VMT.

The relative changes in regional (and even Study Area) VMT are minimal, as would be expected for any individual project. The RTP/SCS is the regional plan adopted to reduce VMT through land use changes and regional transportation improvements. The reductions in VMT are clearly associated with the transit improvements, and the benefits increase as the Gold Line improvements are extended to the east. The Approved Project would have the highest reduction in VMT, both for the regional and Study Area assessments.

The VMT analysis confirms that the Project fits into the regional strategy to reduce VMT to meet the regional VMT emission reductions needed to achieve the CARB 3B 375 GHG emission reduction targets and the site GHG emissions reduction goals (e.g., transit reduces auto trips by providing alternatives to cars and by facilitating land use changes to reduce VMT).

Table 2-18. Summary of Vehicle Miles Traveled (Southern California Region and Study Area)

Alternative	Vehicle Miles Traveled (miles per day)	
	Region	Study Area
Existing Conditions (2013)	463,245,800	N/A
No Build (to Azusa)	537,968,460	10,563,900
Project Modification: Phase 1 (to La Verne)	537,759,460	10,541,200
Project Modification: Phase 2 (to Pomona)	537,710,260	10,533,000
Approved Project	537,473,260	10,517,100

Source: WSP, 2018; SCAG, 2016

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3. Environmental Analysis, Impacts, and Mitigation

This chapter provides information to help decision makers and the public understand the potential environmental impacts of the proposed Project Modifications compared to the impacts of the Project as evaluated in the 2013 FEIR with addenda, and possible ways to minimize or avoid the identified adverse impacts. This chapter covers a range of environmental topics and other key information required in the evaluation of impacts pursuant to CEQA.

Each environmental resource section in this chapter provides detailed discussions of the following:

- Regulatory setting
- Existing conditions
- Impacts described in the 2013 FEIR and addenda
- Environmental impacts
  - Evaluation methodology
  - Impact criteria
  - Short-term construction impacts
  - Long-term construction impacts
  - Cumulative impacts
- Mitigation measures (including short-term construction and long-term mitigation measures)
- Level of impact after mitigation (including short-term construction impacts and long-term impacts)

Impacts are addressed in two distinct ways. First, the proposed phasing has been analyzed according to the interim station termini condition associated with each phase; Second, the proposed design refinement and the new mitigation measure were analyzed according to their specific geographic applicability by city, including La Verne and Pomona, where the two Project Modifications are located, respectively. Impacts of the Project Modifications are also evaluated in other cities (Glendora, San Dimas, Claremont, and Montclair) where there is a potential for a significant impact resulting from the change to phasing of construction and operation (e.g., Traffic/Transportation and Air Quality). The potential impacts in these cities are evaluated in the relevant impact chapter.

The potential for new significant impacts or an increase in the severity of an already identified significant impact are assessed pursuant to CEQA, which requires that determinations of significance be made. Accordingly, for each potential impact, one of the following CEQA-defined determinations as previously presented and made in the 2013 FEIR and four subsequent addenda will be evaluated and confirmed, including: *less than significant impact, less than significant impact with mitigation incorporated,* or *potentially significant impact*. When no effect is determined to occur as a result of the project, a *no impact* determination is made.

Impacts on each environmental resource are evaluated within a study area that corresponds to the particular resource (for example, the South Coast Air Basin for air quality; the corridor surrounding the Project alignment for traffic and circulation; nearby corridor uses for visual effects; and adjacent uses for noise and vibration).

Study Area

The study area for the environmental analysis has been defined in two ways:

- The study area for the four construction phases focuses on the interim termini stations and the potential for corresponding traffic impacts.
- The study area for the design refinement/mitigation measure is exclusive to the areas where those changes are proposed (Pomona Station and White Avenue near La Verne Station).

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3.1 Air Quality

This section describes the regulatory and environmental setting with respect to air quality and evaluates potential air quality impacts that could result from the proposed Project Modifications.

3.1.1 Regulatory Setting

Air quality in California is regulated at the federal and state levels by the U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB). At the local level, regional air pollution control districts have been established to oversee the attainment of air quality standards within air basins throughout California. Regulatory settings at federal, state, and local levels are provided and discussed in the 2013 FEIR Section 3.1.1. This section provides regulatory updates related to the Project since the 20113 FEIR.

3.1.1.1 Federal and State Regulations

Clean Air Act and National Ambient Air Quality Standards

Federal air quality policies are regulated through the Federal Clean Air Act (CAA). Pursuant to the CAA, the EPA has established nationwide air quality standards to protect public health and welfare, with an adequate margin of safety. The National Ambient Air Quality Standards (NAAQS) developed in 40 *Code of Federal Regulations* (CFR) Part 50 are the maximum allowable atmospheric concentrations for six criteria pollutants: ozone, nitrogen dioxide (NO_2), carbon monoxide (CO), particulate matter less than 10 micrometers in aerodynamic diameter (PM_{10}), particulate matter less than 2.5 micrometers in aerodynamic diameter ($PM_{2.5}$), sulfur dioxide (SO_2), and lead. Current NAAQS are summarized in Table 3.1-1.

Table 3.1-1. National and California Ambient Air Quality Standards

Pollutant	Averaging Time	CAAQS[b]	NAAQS[a]	
			Primary[c]	Secondary[d]
Ozone	8 hours 1 hour	0.070 ppm 0.09 ppm	0.070 ppm –	0.070 ppm –
PM_{10}	Annual arithmetic mean 24 hours	20 µg/m^3 50 µg/m^3	– 150 µg/m^3	– 150 µg/m^3
$PM_{2.5}$	Annual arithmetic mean 24 hours	12 µg/m^3 –	12 µg/m^3 35 µg/m^3	15 µg/m^3 35 µg/m^3
CO	8 hours 1 hour	9.0 ppm 20 ppm	9 ppm 35 ppm	– –
NO_2	Annual arithmetic mean 1 hour	0.03 ppm 0.18 ppm	0.053 ppm 0.100 ppm	0.053 ppm –
SO_2	24 hours 3 hours 1 hour	0.04 ppm – 0.25 ppm	– – 0.075 ppm[e]	– 0.5 ppm –
Lead[f]	Calendar quarter Rolling 3-month	– – 1.5 µg/m^3	1.5 µg/m^3 (certain areas)	1.5 µg/m^3 – –

Table 3.1-1. National and California Ambient Air Quality Standards

Pollutant	Averaging Time	CAAQS[b]	NAAQS[a]	
			Primary[c]	Secondary[d]
	average 30-day average		0.15 μg/m^3 –	
Visibility-reducing particles	8 hours	[g]	–	–
Sulfates	24 hours	25 μg/m^3	–	–
Hydrogen sulfide	1 hour	0.03 ppm	–	–
Vinyl chloride[f]	24 hours	0.01 ppm	–	–

Source: CARB, 2016. https://www.arb.ca.gov/research/aaqs/aaqs2.pdf

[a] NAAQS other than ozone, PM, and those based on annual averages or annual arithmetic means are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 μg/m^3 is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, is equal to or less than the standard.

[b] California Ambient Air Quality Standards (CAAQS) for ozone, CO (except Lake Tahoe), SO_2 (1-hour and 24-hour), NO_2, and suspended particulate matter (PM_{10}, $PM_{2.5}$, and visibility-reducing particles) are not to be exceeded. All others are not to be equaled or exceeded.

[c] NAAQS Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[d] NAAQS Secondary Standards: The levels of air quality necessary to protect the public welfare from known or anticipated adverse effects of a pollutant.

[e] Final rule signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 parts per billion.

[f] CARB has identified lead and vinyl chloride as toxic air contaminants with no threshold level of exposure for adverse health effects determined. CARB made this determination following the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[g] In 1989, CARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

μg/m^3 = micrograms per cubic meter
ppm = parts per million (by volume)

EPA classifies areas as being in attainment or nonattainment with the NAAQS for each criteria pollutant. A region that meets the NAAQS for a pollutant is designated as being in attainment for that pollutant. A region that does not meet the NAAQS for a pollutant is designated as being in nonattainment for that pollutant. An area that was previously designated as a nonattainment area but has recently met the standard and has been reclassified by EPA as attainment with a maintenance plan is designated as a maintenance area.

The 1977 CAA amendment requires each state to develop and maintain a State Implementation Plan (SIP) for each nonattainment criteria pollutant. The SIP serves as a tool to help avoid and minimize emissions of nonattainment criteria pollutants and their precursor pollutants and achieve compliance with the NAAQS. In 1990, the CAA was amended to strengthen regulation of both stationary and mobile emission sources.

Transportation Conformity

The conformity requirement is based on the federal CAA Section 176©, which prohibits federal agencies from funding, authorizing, or approving plans, programs, or projects that do not conform to the applicable SIP for attaining the NAAQS. Conformity, to the purpose of the SIP, means that transportation activities will not cause or contribute to new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS. Transportation conformity applies to highway and transit projects and takes place on two levels: the regional—or planning and programming—level, and the project level.

Regional conformity is concerned with how well the regional transportation system supports plans for attaining the NAAQS, based on emission analysis of Regional Transportation Plans (RTPs) and Federal Transportation Improvement Programs (FTIPs), which include all transportation projects planned for a region in long-term and short-term period. RTP and FTIP conformity uses travel demand and emission models to determine whether or not the implementation of those projects would conform to emission budgets or other tests at various analysis years, showing that requirements of the CAA and the SIP are met. If the conformity analysis is successful, the Metropolitan Planning Organization (MPO), Federal Highway Administration (FHWA), and FTA make determinations that the RTP and FTIP are in conformity with the SIP for achieving the goals of the CAA.

SCAG is the federally designated MPO responsible for transportation planning for the Los Angeles, Orange, San Bernardino, Riverside, Ventura, and Imperial Counties.

California Clean Air Act and Air Quality Standards

In California, CARB oversees the state's air quality policies and regulations. Current CAAQS are listed in Table 3.3-1.

The California Clean Air Act, which was approved in 1988, requires each local air district, where ambient concentrations violate the CAAQS, to prepare an air quality management plan to achieve compliance with the CAAQS as a part of the SIP. CARB has ultimate responsibility for the SIP for nonattainment pollutants but relies on each local air district to adopt mandatory statewide programs and provide additional strategies for sources under their jurisdiction. The SIPs are a compilation of new and previously submitted plans, programs (e.g. monitoring, modeling, and permitting), district rules, state regulations, and federal controls. Local air districts and other agencies prepare SIP elements and submit them to CARB for approval. CARB forwards SIP revisions to EPA for approval and publication in the Federal Register.

South Coast Air Quality Management District

Refer to discussion of regulatory setting under South Coast Air Quality Management District (SCAQMD) included in Section 3.1.1.3 of the 2013 FEIR.

3.1.2 Existing Conditions

3.1.2.1 Local Meteorology

Air quality is affected by both the rate and location of pollutant emissions, and by meteorological conditions that influence movement and dispersal of pollutants in the atmosphere. Atmospheric conditions, such as wind speed, wind direction, and air temperature gradients, along with local topography, provide the link between air pollutant emissions and local air quality concentrations.

The Project is located in the South Coast Air Basin (SCAB), which includes all of Los Angeles and Orange Counties, as well as portions of Riverside and San Bernardino Counties. The SCAB is bordered by the Pacific Ocean to the west and the San Bernardino Mountains to the east. The climate of the basin is characterized by warm summers, mild winters, infrequent rainfall, light winds, and moderate humidity.

This mild climatological pattern is interrupted infrequently by extremely hot summers, winter storms, and Santa Ana winds.

Prevailing winds in the basin are mainly out of the west. These prevailing winds are due to SCAB's proximity to the coast and the blocking nature of the San Bernardino Mountains to the east; air masses pushed onshore into the basin are often trapped by the San Bernardino Mountains. During the summer, the SCAB is generally influenced by a Pacific Subtropical High cell that sits off the coast, which inhibits cloud formation and encourages daytime solar heating. The basin is rarely influenced by cold air masses moving south from Canada and Alaska, as these frontal systems are weak and diffuse by the time they reach the basin.

3.1.2.2 Local Monitored Air Quality; Existing Conditions

The SCAQMD monitors air quality conditions at multiple locations throughout the SCAB. Data from the Glendora and Pomona monitoring stations were used in the 2013 FEIR to characterize existing conditions in the Study Area. The Project Modifications would not cause a new significant impact or make an existing significant local air quality impact of the Project more severe. The monitored data of CO, ozone, NO_2, PM_{10}, and $PM_{2.5}$ from these two monitoring stations were updated in Table 3.1-2 using the most recent 3 years of data (2015-2017) to illustrate the Study Area's current existing air quality conditions. The monitoring data indicate that the ozone and $PM_{2.5}$ concentrations in the project study area exceeded the air quality standards in all 3 years. SO_2, lead, and sulfate were not monitored at these two stations.

Table 3.1-2. Air Quality Summary for Study Area Monitoring Stations

Air Pollutant	Standard/Exceedance**	840 Laurel, Glendora			924 North Garey Avenue, Pomona		
		2015	2016	2017	2015	2016	2017
Carbon Monoxide (CO)	Max. 1-hour Concentration (ppm)	1.1	1.1	0.8	1.8	1.7	2.0
	Max. 8-hour Concentration (ppm)	1.0	1.0	0.6	1.6	1.3	1.6
	# Days>Federal 1-hour Std. of >35 ppm	0	0	0	0	0	0
	# Days>Federal 8-hour Std. of >9 ppm	0	0	0	0	0	0
	# Days>California 8-hour Std. of >9.0 ppm	0	0	0	0	0	0
Ozone (O_3)	Max. 1-hour Concentration (ppm)	0.127	0.148	0.157	0.136	0.127	0.147
	Max. 8-hour Concentration (ppm)	0.012	0.114	0.122	0.099	0.092	0.114
	# Days>Federal 8-hour Std. Of >0.070 ppm	48	52	60	53	26	35
	# Days>California 1-hour Std. Of >0.09 ppm	37	38	45	30	20	18
	# Days>California 8-hour Std. Of >0.070 ppm	51	55	64	55	29	38
Nitrogen Dioxide (NO_2)	Max. 1-hour Concentration (ppm)	0.066	0.065	0.055	0.072	0.069	0.081
	Annual Average (ppm)	0.011	0.011	0.010	0.021	0.020	0.020
	# Days>California 1-hour Std. of >0.18 ppm	0	0	0	0	0	0

Table 3.1-2. Air Quality Summary for Study Area Monitoring Stations

Air Pollutant	Standard/Exceedance**	840 Laurel, Glendora			924 North Garey Avenue, Pomona		
		2015	2016	2017	2015	2016	2017
Suspended Particulates (PM_{10})	Max. 24-hour Concentration (µg/m³)	100.6	75.1	140.7	NM	NM	NM
	#Days>Fed. 24-hour Std. of>150 µg/m³	0	0	0	NM	NM	NM
	#Days>California 24-hour Std. of>50 µg/m³	***	***	***	NM	NM	NM
	National Annual Average (µg/m³)	30.2	31.0	32.9	NM	NM	NM
Suspended Particulates ($PM_{2.5}$)	Max. 24-hour Concentration (µg/m³)	86.5	44.1	109.6	NM	NM	NM
	State Annual Average (µg/m³)	***	*** ***	***	NM	NM	NM
	#Days>Fed. 24-hour Std. of>35 µg/m³	***	***	***	NM	NM	NM
	National Annual Average (µg/m³)	***		***	NM	NM	NM

Source:

California Air Resources Board, 2019: https://www.arb.ca.gov/adam/topfour/topfourdisplay.phphttp://www.arb.ca.gov/adam/

EPA AirData, 2019 (for 1-Hour CO only): http://www.epa.gov/airdata/

*** Insufficient data to determine the value

NM = not monitored

Attainment Status

EPA and CARB designate each county (or portions of counties) within California as attainment, maintenance, or nonattainment based on the area's ability to meet ambient air quality standards. The project is located in Los Angeles and San Bernardino County in the portions within SCAB. Table 3.1-3 summarizes the federal and state attainment status of the project study area for the NAAQS and CAAQS, respectively.

Under the federal criteria, the project area is currently designated as nonattainment for ozone and $PM_{2.5}$. Los Angeles County is also designated as nonattainment for Lead. Both Counties are in maintenance for PM, NO_2, and CO, and is in attainment or unclassified under the NAAQS for SO_2.

Under the state criteria, the project area is currently designated as nonattainment for ozone, PM_{10}, and $PM_{2.5}$. The project area is in attainment for the state CO, SO_2, NO_2, lead and sulfate. The area is unclassified for hydrogen sulfide (H_2S), the visibility-reducing particle, and vinyl chloride.

Table 3.1-3 Federal and State Attainment Status for the Project Area

Pollutant	State Designation	Federal Designation
Ozone (8-hour)	Nonattainment	Extreme Nonattainment
PM_{10}	Nonattainment	Attainment/Maintenance
$PM_{2.5}$	Nonattainment	Serious Nonattainment (2006 Standard) Moderate Nonattainment (1997 and 2012 Standard)
CO	Attainment	Attainment/Maintenance

Table 3.1-3 Federal and State Attainment Status for the Project Area

Pollutant	State Designation	Federal Designation
NO_2	Attainment	Attainment/Maintenance (1971 Standard) Attainment/unclassified (2010 Standard)
Lead	Attainment	Nonattainment in Los Angeles County Attainment/unclassified in San Bernardino County
SO_2	Attainment/Unclassified	Attainment/Unclassified
Sulfates	Attainment	No Federal Standard
H_2S	Unclassified	No Federal Standard
Visibility Reducing Particles	Unclassified	No Federal Standard
Vinyl Chloride	Unclassified	No Federal Standard

Sources:
State Area Designations (CARB, 2017). https://www.arb.ca.gov/desig/adm/adm.htm
Green Book National Area and County-Level Multi-Pollutant Information (EPA, 2019). https://www3.epa.gov/airquality/greenbook/anayo_ca.html

3.1.2.3 Regional Transportation Plan and Long-Range Transportation Plan

The CAA Section 176(c) (42 United States Code [U.S.C.] 7506©) requires transportation conformity to ensure that federal funding and approval are given to transportation projects that are consistent with the air quality goals established by a SIP.

As indicated above, SCAG is the designated MPO of the 6-county Southern California region and is responsible for the transportation conformity determination on the RTP/SCS and the Federal Transportation Improvement Program (FTIP). SCAG is also responsible for preparing the regional transportation strategy and control measures portion of the Air Quality Management Plan for the South Coast Air Basin.

SCAG's 2016-2040 RTP/SCS presents the transportation vision of the region through the year 2040 and provides a long-term investment framework for addressing the region's transportation and related challenges. The 2016 RTP/SCS was determined to conform to SIP by FHWA and FTA in June 2016. The FTIP is a listing of multi-modal transportation projects proposed over a six-year period for the SCAG region. SCAG's 2019 FTIP was determined to conform by FHWA and FTA in December 2018.

The Project is included in the SCAG's 2016-2040 RTP/SCS as Metro Gold Line Foothill Extension: Azusa to County Line (Project Identification [ID] 1120006) and Light Rail Extension from County Line to Montclair (Project ID 4120222) (SCAG, 2016).

3.1.3 Environmental Impacts

3.1.3.1 Evaluation Methodology

Evaluation of the air quality impacts in this SEIR focuses on the construction and operational changes caused by the Project Modifications in comparison to (1) what were analyzed in the 2013 FEIR and its addenda, and (2) existing conditions. Impact evaluation includes (1) Short-term construction impacts; (2) long-term regional impacts; (3) localized CO and PM hot spot assessment; and (4) mobile source air toxics effects assessment.

Short-term Construction Impacts

Short-term Construction Impacts from the Project Modifications were evaluated qualitatively in this SEIR. The potential construction activities changes associated with the proposed phasing, design refinement, and new mitigation measure (LTR-9) were compared to the construction assumptions used in the 2013 FEIR construction emission calculations to determine if the proposed changes would cause short-term construction impacts in addition to what was concluded in the 2013 FEIR.

Regional Emissions Analysis

The Project Modifications would not affect the overall long-term LRT operation evaluated in the 2013 FEIR. Regional impact changes due to the Project Modifications were analyzed qualitatively by comparing the VMT during the interim phases to (1) the No Build conditions to evaluate if the Project Modifications would change the 2013 FEIR's conclusion that the project would not have a significant impact on the region's air quality, (2) the 2035 Build conditions to evaluate if the incremental impact of the Project Modifications would result in a new or more severe significant air quality impact, and (3) existing conditions to determine the extent to which the Project Modifications would contribute to any significant changes to existing air quality conditions.

Carbon Monoxide Hot Spot Assessment

The Project Modifications including changes to the construction and operational phasing of the Project (going from two phases to four phases, a design refinement (moving the location of the Pomona Station parking facility), and implementation of a new traffic mitigation measure (LTR-9, described in Section 2.3.3.3) would cause local traffic condition changes near the interim termini, the affected parking facility, the widened street, and the roadways leading toward them. Automobiles and trucks emit air pollutants. The Project runs on electricity and does not have direct emissions from the LRT trains during operation. However, an indirect impact of any transit project is that they have the potential to alter traffic patterns as a result of (1) transit riders using cars to drive to a transit station, and (2) changes in levels of traffic at intersections in the vicinity of a transit station or where there are traffic delays in locations where the train crosses an at-grade intersection and the rail crossing is closed while the train passes.

Localized CO impacts resulting from the Project Modifications were evaluated following the Caltrans Transportation Project-Level Carbon Monoxide Protocol (CO Protocol) (UC Davis Institute of Transportation Studies, 1997). The CO Protocol was approved by EPA in 1997 and is the standard method for project-level CO analysis by Caltrans and describes the steps of evaluating the impacts of vehicle emissions at congested intersections. The procedures and guidelines in the CO Protocol comply with the following regulations without imposing additional requirements: Section 176(c) of the 1990 Clean Air Act Amendments, federal conformity rules, state and local adoptions of the federal conformity rules, the National Environmental Policy Act (NEPA), and CEQA requirements (Cal. Code Regs., tit. 21, § 1509.3(25))[2].

A screening analysis was performed to select the intersections with the highest potential of causing localized air quality impacts due to the Project Modification. Because the significant localized CO impacts would occur at congested intersections during morning (AM) and afternoon (PM) rush hours when the highest vehicle volume and delay would occur, the screening analysis was performed by ranking the intersection traffic volume and delay (represented by level of service [LOS]) during AM and PM) peak

[2] The CO Protocol has three sections. The first section provides a framework and roadmap for conducting a federal conformity determination at the project level as well as for NEPA and CEQA. The treatment of projects is very general and is not limited to a specific type. The second section, Appendix A, is intended to provide a procedure for conducting a screening analysis of local impacts of intersections. As of January 1, 2003, the screening procedure in Appendix A is no longer valid because it was developed based on outdated emission models. The third section, Appendix B, provides guidance to an experienced analyst conducting a more detailed analysis, required when a project does not pass the screening analysis or in situations for which the screening analysis is not applicable.

hours for signalized intersections affected by the Project Modifications. Intersections with LOS A, B, or C have low levels of delay, thus were considered to be insignificant in terms of impact to air quality, and no further analysis was needed (EPA 1992). For those intersections found to be at LOS D, E, or F, the three intersections with the highest volume and the three intersections with the highest delay were selected for quantitative modeling analysis. CO emissions from vehicles at the selected intersections were estimated by using CARB's Emission's Factors (EMFAC) 2014 program (CARB, 2014). The EMFAC program is developed and regularly updated by CARB to estimate emissions from vehicles. EPA approves the EMFAC program for use in analyzing air quality impacts. The emission factors used in the EMFAC program are updated on a regular bases to reflect changes in the emission performance of vehicle in the fleet. In general, resulting from state and federal regulations, vehicle emissions have been reduced to a significant extent over the last several decades. California laws and regulations encouraging the purchase of alternative fuel vehicles (natural gas, hydrogen, electric) has also contributed to the reductions in fleet emissions in recent years.

The estimated CO emissions from the intersections were modeled using EPA's CAL3QHC air dispersion model to obtain the CO concentrations at receptors near the intersections. CAL3QHC is an EPA-preferred air dispersion model program designed to predict ground-level CO concentrations resulting from motor vehicles emissions at roadway intersections. An air dispersion model is the mathematical simulation of how air pollutants disperse in the ambient atmosphere and is used to predict the ground-level pollutant concentration after the emissions were emitted from their sources. The CAL3QHC model includes an air dispersion model for roadway emission sources and a traffic algorithm for estimating vehicular queue length at signalized intersections.

CAL3QHC requires inputs of roadway geometries, receptor locations, meteorological conditions, vehicle emission rates, signal timing, and information describing the configuration of the intersection being modeled. Table 3.1-4 summarizes the input values used in CAL3QHC modeling.

Following the CO Protocol, receptors were located 3 meters from the roadway and were spaced at 0, 25, and 50 meters from the intersection. The maximum modeled CO concentrations were combined with the background CO concentrations from the representative air quality monitoring stations of the study area, and the sums were compared to the applicable NAAQS and CAAQS to determine if the Project Modification would cause new violations of CO standards.

Table 3.1-4. CAL3QHC Input Parameters

Parameter	Value[a]
Surface roughness	321 cm
Wind speed	1 m/s
Stability class	D
Mixing height	1,000 m
Wind direction increment	10 degrees
Receptor height	1.8 m
Source height	0 m
Signal type	Actuated
Intersection arrival rate	Average progression

[a] Parameter values are from EPA, 1992.

cm = centimeter(s)
m = meter(s)
m/s = meter(s) per second

Particulate Matter (PM_{10} and $PM_{2.5}$) Hot Spots

Particulate matter is a mixture of solid particles and liquid droplets found in the air. Some particles, such as dust, dirt, soot, or smoke are large or dark enough to be seen with the naked eye. Others are so small they can only be detected using an electron microscope. Particle pollution includes:

- PM_{10}: Inhalable particles, with diameters that are generally 10 micrometers and smaller.
- $PM_{2.5}$: Fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller. The average human hair is about 70 micrometers in diameter, making it 30 times larger than the largest fine particle.

These particles come in many sizes and shapes and can be made up of hundreds of different chemicals. Some are emitted directly from a source, such as construction sites, unpaved roads, fields, smokestacks, or fires. Most particles form in the atmosphere as a result of complex reactions of chemicals such as sulfur dioxide and nitrogen oxides, which are pollutants emitted from power plants, industries, and automobiles.

Qualitative PM hot spot evaluation was performed for the Project Modifications using the criteria in EPA's Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10}.

As with carbon monoxide, the operation of a transit project can result in indirect particulate matter from changing traffic patterns, particularly changes in truck and diesel vehicle patterns. Nonattainment and Maintenance Areas (EPA, 2015). According to the guidance, PM hot spots tend to occur for highway and transit projects that involve significant levels of diesel vehicle traffic. Therefore, the impact evaluation focused on the diesel traffic changes caused the proposed modifications. A new adverse impact would occur if the Project Modifications cause substantial diesel traffic on highways or congregating at a single location in the study area.

Mobile Source Air Toxics

Mobile Source Air Toxics (MSAT) refers to certain pollutants primarily associated with vehicle engines. Unlike criteria pollutants") neither the EPA nor the State of California has established maximum allowable concentrations of MSATs, or a cap on MSAT emissions in a region. As a result, there is no regulatory standard applicable to the evaluation of MSAT emissions from transportation projects.

Instead, EPA and CARB adopted the regulatory strategy to reduce MSAT emissions through standards imposed on the manufacture of new vehicle engines. The state and federal regulation of vehicle engines has been dramatically successful -- resulting in large reductions in MSAT emissions. EPA estimates that MSAT emissions will continue to decline dramatically as new vehicles with increasingly more stringent MSAT controls are put into service.

Qualitative MSAT effect evaluation was performed for the proposed Project Modifications. The evaluation follows the approach recommended in the FHWA's Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents (FHWA, 2016) and focused on the potential of the VMT change due to the Project Modifications. Additional MSAT effects would occur if the modifications would cause VMT increases in the study area or move substantial amount of vehicle emissions closer to sensitive receptors.

3.1.3.2 Impact Criteria

Air quality impacts are considered significant if the Project Modification would:

- Conflict with or obstructs implementation of the applicable air quality plan
- Result in 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

- Expose sensitive receptors (i.e., health care facilities, rehabilitation centers, retirement homes, residences, schools, playgrounds, child care centers, playgrounds) to substantial pollutant concentrations including air toxics such as diesel particulates
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people

Compliance with these four thresholds would mean that the Project Modifications would have less than significant impact on air quality and related health risks from Project air emissions because (1) the SCAQMD Air Quality Management Plan includes enforceable measures to achieve compliance with the state and federal air quality standards that are established to protect human health with a margin of safety, (2) there would not be cumulatively considerable increases in any criteria pollutants, and (3) sensitive receptors would not be exposed to substantial pollutant concentrations.

The levels of air quality impacts from the Project Modifications were analyzed based on the SCAQMD CEQA thresholds for air quality, as shown in Table 3.1-5. These thresholds include updates by SCAQMD in March 2015, after the approval of the 2013 FEIR. A project with emissions below the CEQA threshold is not expected to have significant adverse impacts to the regional air quality to cause new violations or worsen existing violations to NAAQS and CAAQS. If the emissions of the Project with the proposed modifications would become greater than these thresholds, the impacts would be significant.

Table 3.1-5. SCAQMD Air Quality Significance Thresholds

Mass Daily Thresholds[a]		
Pollutant	***Construction [b] (lbs/day)***	***Operation [c] (lbs/day)***
NOx	100	55
VOC	75	55
PM_{10}	150	150
$PM_{2.5}$	55	55
SOx	150	150
CO	550	550
Lead	3	3
Toxic Air Contaminants (TACs) and Odor Thresholds		
TACs (including carcinogens and noncarcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million Cancer Burden > 0.5 excess cancer cases (in areas ≥ 1 in 1 million) Chronic and Acute Hazard Index ≥ 1.0 (project increment)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	

Table 3.1-5. SCAQMD Air Quality Significance Thresholds

Ambient Air Quality Standards for Criteria Pollutants[d]	
NO_2 1-hour average annual arithmetic mean	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 0.18 ppm (state) 0.03 ppm (state) and 0.0534 ppm (federal)
PM_{10} 24-hour average annual average	10.4 µg/m³ (construction)[e] and 2.5 µg/m³ (operation) 1.0 µg/m³
$PM_{2.5}$ 24-hour average	10.4 µg/m³ (construction)[e] and 2.5 µg/m³ (operation)
SO_2 1-hour average 24-hour average	0.25 ppm (state) and 0.075 ppm (federal [99th percentile]) 0.04 ppm (state)
Sulfate 24-hour average	25 µg/m³ (state)
CO 1-hour average 8-hour average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 20 ppm (state) and 35 ppm (federal) 9.0 ppm (state/federal)
Lead 30-day average rolling 3-month average	1.5 µg/m³ (state) 0.15 µg/m³ (federal)

[a] Source: SCAQMD, 1993.

[b] Construction thresholds apply to both the South Coast Air Basin and Coachella Valley (Salton Sea and Mojave Desert Air Basins).

[c] For Coachella Valley, the mass daily thresholds for operation are the same as the construction thresholds.

[d] Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, Table A-2 unless otherwise stated.

lbs/day = pounds per day

3.1.3.3 Short-Term Construction Impacts

Significance of construction emission impacts to air quality were determined in the 2013 FEIR based on the comparisons of the project emissions to the SCAQMD CEQA air quality significance thresholds. Maximum daily emissions from the Project construction were evaluated in the 2013 FEIR based a worst-case scenario that took into account the various construction activities of building the tracks, stations, parking structures, and other supporting facilities. The 2013 FEIR concluded that the maximum day emissions from construction may exceed the SCAQMDs daily thresholds for NOx, and localized significance thresholds for NOx, PM_{10}, and $PM_{2.5.}$ were determined to be significant after mitigation (Section 3.1.6 of the FEIR). The level of the Project's short-term construction-related impacts would not change with the Project Modifications and would continue to be significant.

The proposed changes in project phasing would not affect the alignment or total length of the light rail. The number of stations and other supporting facilities would remain the same as evaluated in the 2013 FEIR. Construction activities would occur at a different time frame from what were evaluated in the 2013

FEIR, the additional phasing and the resulted longer construction period would not increase the intensity of the worst-case daily construction activities as analyzed in the 2013 FEIR. Because construction would be spread over a longer period time, the amount of construction emissions from the project at any particular time are likely to be less. The amount of construction in each phase of the project would be very similar to the amount of construction occurring in the two construction phases evaluated in the 2013 FEIR and addenda. For these reasons, the construction of the Project in four (as compared to two phases) would not result in a significant increase in construction emissions.

Shifting the Pomona parking facility location from the north side to the south side of the station is not expected to cause additional construction needs since construction of the parking facility was included in the 2013 FEIR analysis. Widening of the White Avenue, as a new mitigation measure, in the City of La Verne was not included in the 2013 FEIR. The 2013 FEIR used conservative assumptions in the analysis of construction emissions from construction equipment and vehicles, including up to 20 heavy duty construction equipment and up to 200 heavy duty truck round trips in a worst-case day. This evidence supports the conclusion that the minor changes of construction activities throughout the construction phases of the project would not result in new or more severe significant impacts from construction emissions beyond those already identified in the 2013 FEIR.

The revised phasing, the design change of Pomona parking facility, and widening of White Avenue (LTR-9) would not affect the worst-case daily construction emissions evaluated in 2013 FEIR. Maximum daily construction emissions from the Project with the proposed Project Modifications would be similar to the worst-case daily emissions estimated in the 2013 FEIR for the Project. As such, the Proposed Modification would not change the short-term impact conclusion in Section 3.1.3.3 of the FEIR. The maximum day emissions from construction may exceed the SCAQMDs daily thresholds for NOx, and localized significance thresholds for NOx, PM_{10}, and $PM_{2.5}$. but no new or more severe significant impacts would result from changes in short-term construction from the Project Modifications.

3.1.3.4 Long-Term Impacts

Regional Emissions Impacts

The Project Modifications would not change the overall Project scope as evaluated in the 2013 FEIR. The Project elements, including alignment, stations, grade crossings, and parking, would be the same as presented in the 2013 FEIR and addenda, except for the minor design refinement, the location change of the parking facility in Pomona and the new traffic mitigation measure, LTR-9, the widening of White Avenue in the City of La Verne . All other features of the project would remain the same as described in the 2013 FEIR and addenda. The operation of the Project in four phases (as compared to two phases) would delay realization of some of the transportation benefits of the Project such as reduction in VMT and associated reduction in air pollutants emissions attributable to VMT reductions. All of the phases of the Project, however, are expected to be completed by the horizon year used to evaluate the regional emission impacts of the Project. This evidence supports that conclusion that, the proposed phasing and the other minor refinement and new mitigation measure (Pomona Station parking location, LTR-9: White Avenue widening) would not change the long-term operation of the Project and the associated emission reductions as discussed in the Section 3.1.3.4 of the 2013 FEIR once all phases are completed.

During the Project Modifications interim termini station periods of operation (Phases 1, and 2), the regional VMT and the associated vehicle emissions would be lower than the No Build condition due to the lower ridership in the interim phases as discussed, as shown in Table 2-11 of the Traffic Study. Lower ridership results in lower VMT because fewer drivers are traveling to the stations to take the train.

As discussed above, the interim and long-term regional emission impacts from the Project with the Project Modifications are consistent with the conclusions in the 2013 FEIR and addenda, that the reginal vehicle emissions from operation of the Project would be lower than the No Build conditions. Therefore, no new or more severe significant impacts to regional emissions would result from the Project Modifications.

Carbon Monoxide Hot Spot Assessment

In comparison to the traffic conditions analyzed in the 2013 FEIR, the project phasing modification would cause localized traffic condition changes during the interim period when La Verne (Phase 1) and Pomona (Phase 2) stations are used as the interim station termini. In addition, the design refinement of the parking facility in Pomona and the new traffic mitigation measure, as described in Section 2.3.3.3, regarding the White Avenue widening in La Verne, would introduce traffic condition changes at these two locations from what were analyzed in the 2013 FEIR.

The 2013 FEIR provided the CO impact analysis at ten intersections throughout the entire project area for the Project horizon year 2035. Addendum #2 analyzed additional seven intersections for the operational conditions when the Claremont Station (Phase 3) would operate as a temporary interim terminus. The intersections evaluated in this SEIR represent the interim operation conditions when La Verne and Pomona would be used as interim station termini. The intersections analyzed in this SEIR do not overlap with the ones analyzed in the 2013 FEIR and the addenda. Existing conditions and CO impacts at the full build out of the Project would remain the same as described in the 2013 FEIR and addenda.

To evaluate the localized impacts of the traffic condition changes due to Project Modification, CO impacts due to the phasing, the design refinement, and new mitigation measure were analyzed following the methodologies described in Section 3.1.3.1 of this SEIR. Based on the screening criteria described in Section 3.1.3.1, the following intersections were selected for detailed quantitative CO hot-spot analysis:

- Phase 1- Interim Termini at Le Verne
  - Glendora Avenue/Route 66, PM peak hour
  - Arrow Highway/SR 57 South Bound Ramp, PM peak hour
  - SR 57 North Bound Ramp/Bonita Avenue/Arrow Highway, PM peak hour
  - White Avenue/Foothill Boulevard, PM peak hour
  - Grand Avenue/Route 66, PM peak hour
- Phase 2- Interim Termini at Pomona (interim Termini)
  - Arrow Highway/SR 57 South Bound Ramp, PM peak hour
  - SR 57 North Bound Ramp/Bonita Avenue/Arrow Highway, PM peak hour
  - Towne Avenue/Arrow Highway, AM peak hour
  - Grand Avenue/Route 66, PM peak hour
- No Build
  - Glendora Avenue/Route 66, PM peak hour
  - Arrow Highway/SR 57 South Bound Ramp, PM peak hour
  - SR 57 North Bound Ramp/Bonita Avenue/Arrow Highway, PM peak hour
  - White Avenue/Foothill Boulevard, PM peak hour
  - Towne Avenue/Arrow Highway, AM peak hour
  - Grand Avenue/Route 66, PM peak hour

The CAL3QHC dispersion model was used to model the maximum 1-hour CO concentrations in the vicinity of the affected intersections. 8-hour CO concentrations were obtained by multiplying the maximum 1-hour CO concentrations by a persistence factor of 0.7 (EPA, 1992). The persistence factor accounts for the fact that over 8 hours (as distinct from a single hour), vehicle volumes will fluctuate downward from the peak hour, vehicle speeds may vary, and meteorological conditions, including wind speed and wind direction, will vary compared to the conservative assumptions used for the single hour.

Modeling results of CO concentrations are summarized in Table 3.1-6. CO concentrations at the intersections affected by the Project Modifications with the highest estimated concentrations of CO would not cause exceedances to the CO CAAQS or NAAQS. All other intersections within the project study area would have lower CO concentrations than were estimated in the 2013 FEIR. Therefore, the Project

Modifications would not cause new violations of the CAAQS or NAAQS for CO at affected intersections within the project study area, and no new or more severe significant impacts would result.

CO concentrations of existing conditions and with the full Project buildout at the intersections listed in Table 3.1-6 were not quantified in this SEIR because the worst-case intersections were analyzed in the 2013 FEIR, which demonstrated compliance with the NAAQS and CAAQS. Any intersections that were not included in the 2013 FEIR CO modeling would have CO concentrations lower than the modeling results presented in the 2013 FEIR, Tables 3.1-8 and 3.1-9. Therefore, the intersections analyzed in the SEIR would not exceed the CO NAAQS and CAAQS in 2035.

Table 3.1-6. Maximum Predicted Concentrations for Worst-Case Intersections

Intersection	2035 No Build		2035 Phase 1		2035 Phase 2	
	1-hour ppm	8-hour ppm	1-hour ppm	8-hour ppm	1-hour ppm	8-hour ppm
Glendora Ave / Route 66, PM	2.1	1.6	2.1	1.6	N/A	N/A
Arrow Hwy / SR 57 SB Ramps, PM	2.1	1.6	2.1	1.6	2.1	1.6
SR 57 NB Ramps/Bonita Ave / Arrow Hwy, PM	2.2	1.6	2.2	1.6	2.2	1.6
White Ave / Foothill Blvd, PM	2.1	1.6	2.1	1.6	N/A	N/A
Towne Ave / Arrow Hwy, AM	2.1	1.6	N/A	N/A	2.1	1.6
Grand Ave / Route 66, PM	2.2	1.6	2.2	1.6	2.2	1.6
CAAQS	**20**	**9**	**20**	**9**	**20**	**9**
NAAQS	**35**	**9**	**35**	**9**	**35**	**9**

[1] Results include the maximum second-high 8-hour background concentration for the most recent 3 years of available data (2015 - 2017) of 1.5 ppm recorded at the monitoring station at 924 N. Garey Ave., Pomona.

[2] Refer to 2013 FEIR Tables 3.1-8 and 3.1-9 for CO concentrations of Build Alternative in 2035 for the entire Project area.

N/A = Not applicable (intersection did not require evaluation based on screening criteria presented)

Particulate Matter (PM_{10} and $PM_{2.5}$) Hot Spots

PM hot spot impacts tend to occur for certain highway and transit projects that involve significant levels of diesel vehicle traffic, such as major highway projects and projects at congested intersections that handle significant diesel traffic. The Project would utilize electric powered trains; therefore, no diesel emissions would occur from the LRT train operation. Buses that service the train stations would be powered by compressed natural gas as required by state air quality regulations. Commuter rail projects do not contribute to any increases in diesel traffic. The Project Modifications would not change the Project operational factors to cause increases of diesel vehicle traffic in the project study area in long-term or during the interim phases with the interim station termini. The conclusion in Section 3.1.3.4 of the FEIR for the PM hot spots impacts form the project is still valid with the Proposed Modifications. The proposed modifications would not cause new localized PM hot spots impacts in the Study Area and no new or more severe significant impacts would result.

Mobile Source Air Toxics

The proposed Project would involve electrically powered LRT vehicles and would provide an additional transit option to the region. This new transit option is expected to remove some passenger vehicles from the regions surface streets and highways. MSAT emissions are primarily associated with diesel engine emissions. There would be no direct MSAT emissions from the LRT train operations. The amount of MSAT emitted from the roadways would be proportional to the VMT on these roadways assuming other variables such as the vehicle or railcar fleet mix would not change. As discussed in the 2013 FEIR, the VMT for the Project are lower than those for the No Build Alternative, attributed to the removal of vehicles from roadways when people switch or make the mode choice to use the LRT option. Therefore, regional MSAT emissions would be lower with the Project, as concluded in the 2013 FEIR.

The proposed phasing of the Project would not change the overall long-term LRT operation. The VMT would be lower than the No Build condition even during the interim station termini operation phases, as demonstrated in Table 2-11 of the traffic study. VMT reductions in the first two phases of Project construction and operation (La Verne and Pomona) are expected to be slightly less than would occur under the approved Project because ridership in the first two phases is estimated to be less. The design refinement of the parking facility location may shift the MSAT emissions from one location to another, but any shift is not estimated to be significant because of the small percentage of diesel vehicle trips related to Project Modifications. The widening of the White Avenue as a new traffic mitigation measure (LTR-9), may move the vehicle emission closer to the near road receptors. These localized MSAT effects were acknowledged in the 2013 FEIR, including specific references that the localized increases in MSAT emissions would likely occur near the LRT stations and the park-and-ride locations. Nationwide MSAT emissions are expected to be lower than present levels in the future years as a result of EPA's national emissions control programs. EPA's vehicle and fuel regulations, coupled with fleet turnover, will cause substantial reductions over time that will cause region-wide MSAT levels to be significantly lower than current levels. FHWA estimates that even if VMT increases by 45 percent from 2010 to 2050 as forecasted, a combined reduction of 91 percent in the total annual emissions for the MSATs is projected for the same time period (FHWA, 2016).The historical record of reductions in MSAT emissions, and the FHWA's projections of the continuation of this trend, supports the conclusion that that MSAT emissions in the study area are e expected to be lower in the future. The Project Modifications would not change the MSAT impact conclusion of the 2013 FEIR and the addenda, and no new or more severe significant impacts would result.

Human Health Impacts

Air toxics emitted from vehicles could cause human health effects after long-term (i.e., chronic) and/or short-term (i.e., acute) exposure. Cancer risk can result from chronic exposure, and non-cancer health effects can result from either chronic or acute exposure. In addition to MSAT which would be emitted from vehicles and off-road mobile equipment, air toxic emissions can also be emitted from stationary sources of the industrial processes. The health impacts of vehicle emissions are described in Table 3.1-1 of the 2013 FEIR.

Cancer risk due to air toxic emissions has declined in the SCAB as a result of federal, state and local regulations. SCAQMD initiated the first urban toxic air pollution study, Multiple Air Toxics Exposure Study (MATES) in 1998. The subsequent 2000 MATES II study estimated a 44 to 63 percent decrease in cancer risk compared to the risks in 1990 estimated in MATES. The 2008 MATES III study reported a SCAB-wide cancer risk decrease of 8 percent from the time period from the MATES II study. The most recent update, the 2015 MATES IV study, reported a SCAB-wide cancer risk decrease of 57 percent from the MATES III study period (2004-2006). The SCAQMD MATES studies show a decline in SCAB cancer risks despite continuing population growth (SCAQMD, 2015). The MATES IV study concluded that diesel exhaust was the key driver for air toxic health risks, accounting for approximately 68% of the total estimated air toxics risks in the SCAB.

At the regional level the Project (including the Project Modifications) would not cause significant adverse health risk impacts, as demonstrated by the following:

- The LRT vehicle would be powered by electricity; therefore, operation of the vehicles does not have direct emissions of air toxics such as diesel particulate matter to cause adverse health risk impacts.
- The Project is intended to improve efficiency of the regional transportation networks by increasing transit ridership and reducing vehicle miles traveled on highways and local streets. The reduced VMT would reduce vehicle air toxics emissions and associated health risks in the region.
- The Project would not introduce diesel traffic into the region to cause increase of diesel emissions.
- The Project is an element of the SCAG's RTP/SCS that conforms to the SCAQMD air quality plan by reducing mobile source emissions in compliance with the mobile source emissions budget established to achieve the health-based air quality standards established by EPA and CARB. The health-based standards are set at levels to protect human health of sensitive persons with a margin of safety.

As discussed, the Project (with the Project Modifications) would result in overall reduced air toxic emissions and the associated cancer and non-cancer chronic and acute risks in comparison to the No Build condition and the existing conditions. In addition, with implementation of the federal, state and local regulatory requirements to reduce emissions of air toxics from mobile and stationary sources, cancer risks in the region are expected to decrease in future years with or without the Project, as supported by the SCAQMD MATES IV Study.

At local level, the Project Modifications are not expected to cause localized adverse health risk impacts, because:

- Operation of the LRT parking facilities would involve a 1) limited number of vehicles using the parking facility, and 2) the majority of the vehicles using the parking facility and widening roadway being passenger vehicles powered by gasoline or other alternative fuels, thus having minimal diesel emissions to cause substantial health risks.

  The Project Modification would move the parking structure at Pomona station from north of the station to the south of the station. Because the number of parking spaces and the number of vehicles using the facility would not change, MSAT emissions and the associated health risks from the parking structure and the nearby roadways would be similar to the approved Project.

  The shifting of the parking structure location could have the potential to expose the residents and workers (receptors) in the immediate vicinity of the new parking structure location to higher MSAT emissions in comparison to the approved Project. However, the vehicles using the parking structure would be passenger cars and light duty trucks that are predominantly gasoline or alternative fuel powered. There would be no diesel emissions increases from the parking structure location change. Because diesel exhaust is the top contributor to health risks in the SCAB and shifting of the parking structure location would not result in diesel emission increases, the Project Modification would not cause new or more severe significant health risk impacts to the nearby receptors.
- The new traffic mitigation measure, LTR-9, would not induce additional vehicle traffic, especially diesel traffic, along the widened section of this roadway. In general, emissions from vehicles traveling on local streets do not have the same potential to cause substantial health risks as emissions from major highways or ports due to the relative very low traffic volume, especially the low heavy-duty diesel traffic. LTR-9 would not cause a fleet mix change or any corresponding increase to MSAT or diesel emissions thereby causing additional health risks. Although the added travel lane could potentially move the vehicles closer to the receptors along the widened segments, the effects would be minimal due to the minimal distance shifted and the low traffic volumes involved. Therefore, there would not be new or more severe significant health risk increases associated with the White Avenue widening mitigation measure.
- Other traffic condition changes associated with the Project Modification and the interim station termini operations, such as the slightly increased traffic volume on streets near the stations, are not also expected to cause significant adverse health impacts. The additional vehicle traffic to or from the stations would be passenger vehicles with minimal diesel exhaust. In addition, although vehicle

volume would increase at some roadways and intersections, very few intersections would experience LOS worse than No Build conditions due to the Project Modification. LOS at most of the intersections in the project study area would remain the same or slightly improve in comparison than No Build and 2013 FEIR conditions, as shown in Table 2-5 of the traffic discussion (Chapter 2, Transportation). Even at roadways or intersections that have increases in traffic volume and delay, the increase of health risks would be minimal due to the lower overall traffic volumes and diesel vehicle volumes.

3.1.4 Cumulative Impacts

Because the Project Modifications would not result in additional emissions associated with the Project during the long-term or interim operations in comparison to what was evaluated in the 2013 FEIR, the proposed modifications would not change the cumulative impact conclusions as discussed in Section 3.1.4 of the 2013 FEIR. The Project Modifications would provide emission reduction benefits by improving ridership and reducing VMT in the region over the Project horizon conditions and would therefore not contribute to cumulative air quality impacts.

3.1.5 Mitigation Measures

3.1.5.1 Short-Term Construction Mitigation Measures

As discussed in Section 3.1.3.3, the Project Modifications would not cause additional short-term air quality impacts from project construction in comparison to the conclusions made in 2013 FEIR. Therefore, the same mitigation measures CN-1 through CN-19 as described in Section 3.1.5.1 of the 2013 FEIR would apply. The short-term construction impacts of the Project (with the Project Modifications) would be the same as the approved Project. These impacts are significant after mitigation for NOX, $PM_{2.5}$, and PM_{10} because the threshold criteria established by the SCAQMD are exceeded for those pollutants. No new mitigation measures or modifications to mitigation measures as identified in the 2013 FEIR are proposed for the SEIR. Actual emissions from the construction activities may be lower than what were quantified in the 2013 FEIR based on a very conservative emission estimate approach. As technological advances in construction methodology and low emission equipment become more accessible, new emission reduction measures may become available and feasible to the Project that would further reduce the emissions from Project construction.

3.1.5.2 Long-Term Mitigation Measures

As discussed in Section 3.1.3.4, the proposed Project Modifications would not cause additional significant impacts in comparison to those evaluated in the 2013 FEIR. The project is anticipated to have regional benefits of reducing vehicle emissions, therefore, no long-term mitigation is required

3.1.6 Level of Impact after Mitigation

The Project Modifications would not change the maximum daily emissions of the Project evaluated in the 2013 FEIR. With the same mitigation measures the level of impact from the project construction with the Project Modifications would remain the same as described in the 2013 FEIR. The peak day construction emissions of NOx pollutants are estimated to exceed the SCAQMD's daily emission threshold, and construction emissions of $PM_{2.5}$ and PM_{10} are also estimated to exceed localized emissions thresholds. The construction impacts of the Project Modifications would be temporary and would not be any greater than the $PM_{2.5}$ and PM_{10} emissions for the Project estimated in the 2013 FEIR. As indicated in the 2013 FEIR, the project operation would reduce NOx and PM_{10} emissions by 166 and 111 pounds per day, respectively. Therefore, the Project emissions would be partially offset during the project operation through vehicle emission reductions due to reduced VMT and increase transit ridership in the region and impacts of the Project would continue to be significant after mitigation.

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3.2 Climate Change

Climate change includes major changes in temperature, precipitation, or wind patterns, among other effects, that occur over several decades or longer. The predominant driver of climate change is GHG. As the concentration of GHG continues to increase in the atmosphere, the earth's temperature continues to climb above historic levels.

GHG include both naturally occurring and anthropogenic gases that trap heat in the earth's atmosphere. GHG include, but are not limited to, carbon dioxide (CO_2), methane, nitrous oxide, hydrochlorofluorocarbons, perfluorocarbons, and sulfur hexafluoride. These gases trap the energy from the sun and help maintain the temperature of the earth's surface, creating a process known as the greenhouse effect. The accumulation of GHG in the atmosphere influences the long-term range of average atmospheric temperatures. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to produce economic and social consequences across the globe.

3.2.1 Regulatory Setting

3.2.1.1 State and Federal Greenhouse Gas Regulations

Federal Greenhouse Gas Regulations

The 2013 FEIR described the regulatory background of EPA's Endangerment and Cause or Contribute Finding for Greenhouse Gases that was signed in 2009. This SEIR includes the EPA regulatory updates relevant to the project that was not covered in the 2013 FEIS.

EPA in conjunction with the National Highway Traffic Safety Administration (NHTSA) issued the first of a series of GHG emission standards for new cars and light-duty vehicles in April 2010 and significantly increased the fuel economy of all new passenger cars and light trucks sold in the United States (U.S.). The standards required these vehicles to meet an average fuel economy of 34.1 miles per gallon by 2016. In August 2012, the federal government adopted the second rule that increases fuel economy for the fleet of passenger cars, light-duty trucks, and medium-duty passenger vehicles for model years 2017 and beyond to average fuel economy of 54.5 miles per gallon by 2025. As part of the 2017-2025 standards rulemaking, EPA conducted a Midterm Evaluation of the longer-term standards for model years 2022-2025 and proposed in 2018 to amend the Corporate Average Fuel Economy and GHG emissions standards for passenger cars and light trucks and establish new standards, covering model years 2021 through 2026 (83 *Federal Register* [FR] 16077).

In October 2016, NHTSA and EPA issued a Final Rule for "Phase 2" for medium- and heavy-duty vehicles to improve fuel efficiency and cut carbon pollution. The agencies estimate that the standards will save up to 2 billion barrels of oil and reduce CO_2 emissions by up to 1.1 billion metric tons over the lifetimes of model year 2018–2027 vehicles.

In March 2017, Presidential Executive Order (EO) 13783, Promoting Energy Independence and Economic Growth, was signed. EO 13783 orders all federal agencies to apply cost-benefit analyses to regulations of GHG emissions and evaluations of the social cost of carbon, nitrous oxide, and methane.

California Greenhouse Gas Regulations

This section describes the regulatory updates in California since the 2013 FEIR. Refer to Section 3.2.1.1 of the 2013 FEIR for regulatory backgrounds of Assembly Bill 1493, EO S-3-05, Senate Bill (SB) 97, and SB 375.

Assembly Bill 32

The goal of EO S-3-05 was further reinforced with the passage of Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006. AB 32 sets the same overall GHG emissions reduction goals as outlined in EO S-3-5, and further mandating that CARB create a scoping plan and implement rules and to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." EO S-20-06, signed October 18, 2006, further directs state agencies to begin implementing AB 32, including the recommendations made by the state's Climate Action Team.

Following the AB 32 requirements, in May 2014, CARB approved the *First Update to the Climate Change Scoping Plan* (CARB, 2014). The Update identifies opportunities to leverage existing and new funds to further drive GHG emission reductions through strategic planning and targeted low carbon investments. The Update highlights California's progress toward meeting the near-term 2020 GHG emission reduction goals defined in the initial scoping plan. It also evaluates how to align longer-term GHG reduction strategies with other state policy priorities for water, waste, natural resources, clean energy, transportation, and land use.

In November 2017, CARB released *California's 2017 Climate Change Scoping Plan: The strategy for achieving California's 2030 greenhouse gas target* (CARB, 2017). The proposed framework includes the following elements:

- 50 percent renewable energy
- 50 percent reduction in statewide vehicular petroleum use
- Doubling of energy efficiency in existing buildings
- Carbon sequestration in California's land base
- Aggressive reductions in short-lived climate pollutants, such as black carbon, fluorinated gases, and methane
- Climate adaptation strategy

Executive Order S-01-07

With EO S-01-07, signed January 18, 2007, Governor Schwarzenegger set forth the low carbon fuel standard for California. Under this executive order, the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by 2020. CARB re-adopted the low carbon fuel standard in September 2015, and the changes went into effect on January 1, 2016. The program promotes the low-carbon fuel adoption necessary to achieve the Governor's 2030 and 2050 GHG reduction goals.

Renewables Portfolio Standard

Established in 2002 under SB 1078, accelerated in 2006 under SB 107, and expanded in 2011 under SB 2, California's Renewables Portfolio Standard (RPS) is one of the most ambitious renewable energy standards in the United States. The RPS requires investor-owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 33 percent of total procurement by 2020.

California EO B-30-15

California EO B-30-15, which was signed by Governor Brown in April 2015, requires a California GHG reduction target of 40 percent below 1990 levels by 2030. This is the most aggressive GHG emissions reduction goal in North America.

SB 32 and AB 197

SB 32 (California Global Warming Solutions Action of 2006: Emissions Limit) issued in 2006 establishes a new target for GHG emissions reductions in the state at 40 percent of 1990 levels by 2030. This new target required CARB to reduce statewide GHG emissions to 1990 levels by 2020. Tied to SB 32, AB 197 (Chapter 250, 2016) increases legislative oversight of CARB, creating a Joint Legislative Committee on

Climate Change Policies to ascertain facts and make recommendations to the Legislature concerning the state's programs, policies, and investments related to climate change. The bills became effective on January 1, 2017.

Amendments to CEQA Guidelines

SB 97 (Chapter 185, 2007) required the Governor's Office of Planning and Research (OPR) to develop draft CEQA guidelines "for the mitigation of GHG emissions or the effects of GHG emissions." On April 13, 2009, the OPR submitted to the Secretary for Natural Resources its proposed amendments to the CEQA Guidelines for GHG emissions. On February 16, 2010, the amendments were approved and filed with the Secretary of State for inclusion in the CCR. In late 2018, the CEQA Guidelines were amended again, including changes to CEQA Guidelines section 15064.4, which addresses the analysis of GHG emissions. The amendments were approved by the Office of Administrative Law and filed with the Secretary of State. The amendments became effective on December 28, 2018. The revision of CEQA Guidelines section 15064.4 clarified several points, including the following:

- Lead agencies must analyze the GHG emissions of proposed projects.
- The focus of the lead agency's analysis should be on the project's foreseeable incremental contribution of the project's emissions to the effects of climate change rather than simply focusing on the quantity of emissions and how that quantity of emissions compares to statewide or global emissions.
- The impacts analysis of GHG emissions is global in nature and thus should be considered in a broader context. A project's incremental contribution may be cumulatively considerable even if it appears relatively small compared to statewide, national or global emissions.
- Lead agencies should consider a timeframe for the analysis that is appropriate for the project.
- A lead agency's analysis must reasonably reflect evolving scientific knowledge and state regulatory schemes.
- Lead agencies may rely on plans prepared pursuant to section 15183.5 (Plans for the Reduction of Greenhouse Gases) in evaluating a project's GHG emissions.
- In determining the significance of a project's impacts, the lead agency may consider a project's consistency with the State's long-term climate goals or strategies, provided that substantial evidence supports the agency's analysis of how those goals or strategies address the project's incremental contribution to climate change and its conclusion that the project's incremental contribution is consistent with those plans, goals, or strategies.
- The lead agency has discretion to select the model or methodology it considers most appropriate to enable decision makers to intelligently take into account the project's incremental contribution to climate change.

3.2.1.2 Regional Greenhouse Gas Regulations

South Coast Air Quality Management District

Please refer to 2013 FEIR for the discussion of South Coast Air Quality Management District's interim CEQA threshold for GHGs.

3.2.2 Existing Conditions

GHGs differ in their ability to trap heat. For example, one ton of CO_2 emissions has a different effect than one ton of methane emissions. To compare emissions of GHGs, compilers use a weighting factor called a Global Warming Potential, where the heat-trapping ability of 1 metric ton (1,000 kilograms) of CO2 is taken as the standard, and emissions are expressed in terms of CO_2 equivalent (CO2e) but can also be expressed in terms of carbon equivalent.

In 2017, total gross U.S. GHG emissions were 6,472.3 million metric tons CO2e. Total U.S. emissions have increased by 1.6 percent from 1990 to 2017. Between 1990 to 2016, electric power accounted for the top contributor to GHG emissions in the U.S. In 2017, however, GHG emissions from transportation activities, in aggregate, accounted for the largest portion (28.7 percent) of total U.S. GHG emissions in 2017. Electric power accounted for the second largest portion (27.5 percent) of U.S. GHG emissions in 2017, while emissions from industry accounted for the third largest portion (22.4 percent). Emissions from industry have in general declined over the past decade, due to a number of factors, including structural changes in the U.S. economy, fuel switching, and energy efficiency improvements (EPA, 2019).

In California, transportation sources (passenger cars, light-duty trucks, other trucks, buses, and motorcycles) have been composing the largest category of GHG-emitting sources over the years. In 2016, the annual California statewide GHG emissions were 429 million metric tons of CO2e (CARB, 2018). The GHG emissions from the transportation sector were 169.38 million metric tons of CO2e, which account for about 41 percent of the statewide GHG emissions inventory. Industrial and the electric power sectors account for 23 and 16 percent, respectively, of the total statewide GHG emissions inventory (CARB, 2018). The dominant GHG emitted is CO_2, primarily from fossil fuel combustion.

3.2.2.1 Impact Criteria

Evaluation of the Project Modification impacts uses the same criteria as described in the 2013 FEIR. GHG impacts are considered significant if the Project with the proposed modifications would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment
- Conflict with applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs

The threshold of significance criteria were derived from Appendix G of the CEQA Guidelines as revised by the Natural Resources Agency in December 2018. Compliance with the above thresholds serves to demonstrate how the impact of the Project (as modified by the Project Modifications) would be less than significant by evaluating (1) the extent to which the Project would generate GHG emissions, and (2) whether the Project GHG emissions conflict with the RTP/SCS. Those documents were adopted to demonstrate compliance with the GHG emissions reduction targets established for SCAG region transportation projects and pursuant to state law (the Sustainable Communities and Climate Protection Act, also known as SB 375). Consistency of the Project with the SB 375 GHG emissions reductions targets in the SCAG region also serves to demonstrate the extent to which the Project is contributing to cumulative reductions in GHG emissions from the transportation sector to implement the applicable action elements of the 2014 ARB Scoping Plan.

3.2.3 Environmental Impacts

3.2.3.1 Short-term Construction Impacts

GHG emissions from the Project construction were estimated in the 2013 FEIR based on the total energy use for construction of at-grade and elevated LRT tracks of the Project. The proposed modifications of the project would not change the overall length of the tracks or the number of stations and parking facilities. Therefore, the construction activities are expected to be the similar to what was evaluated in the 2013 FEIR. The Project Modification would not cause additional impacts in comparison to the impact determinations provided in the 2013 FEIR and subsequent addenda. The amount of GHG emissions from the project construction would similar to what were estimated in Section 3.3.3.1 of the 2013 FEIR, which is 33,131 metric tons of CO_2e, and no new or more severe significant impacts would result.

3.2.3.2 Long-term Impacts

The Project Modifications would not cause long-term operational changes in comparison to the Project as described in the 2013 FEIR and addenda. The Project as modified by the Project Modifications would not cause additional long-term GHG emissions. As described in the 2013 FEIR, the Project would reduce the GHG emissions by 544 metric tons per day compared to the No Build alternative.

The Project Modification would not conflict with any applicable plan, policy, or regulation adopted to reduce GHG emissions in California. The requisite elements of SB 375 require each State's federally-designated MPO, including SCAG, to develop an SCS or an Alternative Planning Strategy that meets the regional GHG emission reduction targets set by CARB for transportation projects in the SCAG RTP/SCS (2016).

The targets set for the SCAG region are an 8 percent decrease in 2020 and a 13 percent decrease in 2035 relative to 2005 levels. On June 28, 2016, CARB determined that the SCAG's 2016 RTP/SCS would achieve the GHG emissions reduction targets that the CARB established for the region for 2020 and 2035. The Proposed Modifications would not affect the overall GHG emissions from the Project as included in the 2016 RTP/SCS. Therefore, as part of the projects listed in the 2016 RTP/SCS that demonstrated meeting the regions GHG emission reduction goals, the Proposed Modifications would not conflict with, or hinder the implementation of the regional GHG emission reduction plan and strategy.

With the Project Modification, the long-term GHG impact conclusions would remain the same as determined in the 2013 FEIR and addenda, and no new or more severe significant impacts would result.

3.2.4 Cumulative Impacts

The Project Modifications would not introduce additional GHG emissions from construction or operation in comparison to what were evaluated in the 2013 FEIR and the subsequent addenda. As such, the Proposed Modifications would not introduce or contribute to adverse cumulative impacts on GHG emissions.

No individual project generates enough GHG emissions to significantly influence global climate change. Rather, global climate change is a cumulative impact. This means that a project may contribute to a potential impact through its *incremental* change in emissions when combined with the contributions of all other sources of GHGs. As discussed above, the Project is included in the SCAG's 2016 RTP/SCS that was determined by CARB to achieve the GHG emissions reduction targets that the CARB established for the region for 2020 and 2035 (EO G-16_66). Because all significant transportation projects in Southern California that are planned to be in operation by the RTP planning horizon (currently 2040), the RTP/SCS (and associated EIR) documents the cumulative impact of transportation projects in the SCAG region on climate change. The 2016 RTP/SCS and associated Program EIR are available through the SCAG website (http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx; http://scagrtpscs.net/Pages/FINAL2016PEIR.aspx).

The 2016 RTP/SCS is anticipated to result in an 8 percent reduction in emissions by 2020, an 18 percent reduction by 2035, and a 22 percent reduction by 2040 as compared to 2005 levels. As part of the projects listed in the 2016 RTP/SCS that have demonstrated reductions in the regions GHG and the ability to meet the CARB's regional GHG reduction goals, the project would not cause cumulatively considerable impacts on GHG. The Project Modifications do not conflict with the regional GHG emission reduction strategies and policies. Furthermore, when considering the combined effect of reduced roadway VMT and increased power usage for the rail system, the Project shows a slight reduction in GHG emissions from a cumulative perspective.

3.2.5 Mitigation Measures

3.2.5.1 Short-Term Construction Mitigation Measures

Because there would not be new short-term impacts associated with the GHG emissions from the Project Modifications, the mitigation measures CON-9 through CON-16 identified in the 2013 FEIR Section 3.3.5.1 remain valid to reduce GHG emissions from the construction activities. No additional mitigation measures are needed for the Project Modifications.

3.2.5.2 Long-Term Mitigation Measures

As documented in Section 3.3.5.2 of the 2013 FEIR and the addenda, GHG emissions are not expected to increase in comparison to the No Build alternative. The Project would contribute to meeting the GHG emissions reductions targets established by CARB for transportation projects in the SCAG region and to implement relevant portions of the CARB Scoping Plan. Thus, no mitigation measures are required for the Project. The Project Modifications would not cause new GHG impacts in comparison to what were analyzed in the 2013 FEIR and addenda. Therefore, no long-term mitigation measures are required for the Project Modification.

3.2.6 Level of Impact after Mitigation

Because the project GHG emissions would not change with the Project Modifications and the same mitigation measures will apply to the project for GHG emissions. GHG construction emissions would be partially or entirely offset through the GHG emission reductions during the Project operation due to the reduction of VMT and the associated GHG emissions from the increased ridership and more efficiency travel system. Level of temporary GHG construction emission impacts after mitigation would be less than significant.

3.3 Communities, Population, and Housing

3.3.1 Regulatory Setting

No material updates to the regulatory setting have occurred since the completion and approval of the 2013 FEIR. Therefore, the discussion provided in Section 3.4.1 Regulatory Setting of the approved 2013 FEIR should be reference for the respective regulatory information. Existing Conditions

The study area for assessing the potential impacts to community, population, and housing is exclusive to the two cities of La Verne and Pomona where the design refinement and mitigation measure would occur. To remain consistent with the evaluated impacts of the 2013 FEIR, as well as the Traffic and Transportation analysis presented in Chapter 2 of this SEIR, the existing conditions for the following sections (3.3.2.1 through 3.3.2.3) are based on the 2035 horizon year.

3.3.1.1 Population and Employment

The forecasted projected population and employment changes in the study area from 2008 to 2035 have not change and are presented in Section 3.4.2.1 of the 2013 FEIR. These population and employment forecasts were used and are based on the 2012 SCAG 2012-2035 *Regional Transportation Plan/Sustainable Communities Strategy* (2012 RTP/SCS) projections and are the same as presented in the 2013 FEIR because they correspond to the 2035 planning horizon year utilized in that document.

3.3.1.2 Housing Characteristics

The forecasted projected housing characteristics in the study area from 2008 to 2035 have not changed and are presented in Section 3.4.2.2 of the 2013 FEIR. These housing forecasts are based on the SCAG 2012 RTP projections. These household forecasts are the same as presented in the 2013 FEIR.

3.3.1.3 Acquisition and Displacement of Existing Uses

The study area surrounding the Pomona Station design refinement and new traffic/transportation mitigation measure includes a fully developed urban area with residential, commercial, industrial, and institutional land uses. The area where the proposed Pomona parking facility would be relocated to is currently designated as a Transit Oriented District, with mixed land use including commercial and industrial designated land use. The segment of White Avenue where the proposed widening would occur is primarily low-density residential use and community facility use. A discussion of local and regional land uses is included in the Land Use and Planning Section of this SEIR (Section 3.7).

An acquisition or displacement of an existing use typically occurs when a project requires the partial or full take of privately-owned property. A partial take occurs when only a portion of the parcel is necessary to accommodate a project. A full take generally occurs under two circumstances: (1) when the majority of the property is required for a project due to insufficient right-of-way or the need to construct supporting facilities, and/or (2) when a severe loss of access due to a project reduces the useful operation of the property. The proposed Project Modifications' design refinement and new mitigation measure (LTR-9) would involve three partial acquisitions in the city of La Verne and one full acquisition in the city of Pomona. A detailed analysis of these acquisitions is provided below in Section 3.3.3, Environmental Impacts.

3.3.2 Environmental Impacts

3.3.2.1 Evaluation Methodology

To assess the types of potential community, population, and housing impacts, including displacements, due to the proposed Project Modifications, an evaluation of new traffic and transportation impacts associated with construction and operation of the project in four phases (see Chapter 2, Transportation) was conducted along with a review of conceptual engineering plans for the proposed design refinement, and a review of economic data for the study area. The economic data used included the 2012 RTP/SCS projections and the web pages for Pomona, La Verne, and Los Angeles County.

Construction and Operation in Four Phases

As presented in Chapter 2, Transportation, the "Measure R" travel demand model was updated to prepare ridership forecasts for the Proposed Project phasing. Additional information on the travel demand model, including the agency that developed/approved the model and the purpose, key data inputs, key assumptions, and uncertainties of the model are also provided in Chapter 2, Transportation. For the proposed four-phase analysis the terminus of the project extension was modified from the ultimate termini at Montclair to an interim termini at La Verne (for Phase 1) and Pomona (for Phase 2). The interim termini at Claremont (Phase 3) was already analyzed as part of the 2013 FEIR Addendum No. 2. Ridership forecasts with the La Verne and Pomona stations as the temporary interim termini stations were compared with the Montclair Station as the ultimate terminus, as presented in the 2013 FEIR, to determine any potential impacts to land use.

Design Refinement and Mitigation Measure

This section evaluates the potential impacts of temporary or permanent acquisitions as a result of the Project Modifications. To further assess the potential impacts from the design refinement and mitigation measure, the types of acquisition (partial or full) were also analyzed based on information from the Los Angeles County property assessor (https://portal.assessor.lacounty.gov/). The information included parcel details such as Assessor's ID number, address, and property type. Based on the results of these efforts, a determination was also made of how much of the area (square feet) on the parcels would be affected and whether that acreage would constitute a partial or full acquisition.

3.3.2.2 Impact Criteria

The impact criteria are the same as applied in the 2013 FEIR. An impact on population, housing, and community is considered significant if the Project Modifications would:

- Displace a substantial number of existing residential properties or businesses, necessitating the construction of replacement housing or businesses elsewhere
- Displace a substantial number of people or businesses, necessitating the construction of replacement housing or business property elsewhere
- Physically divide an established community
- Induce substantial population growth in an area, either directly or indirectly

To assess potential impacts of acquisitions and displacement, consideration was given to the following:

- Whether the acquisition would be permanent or temporary
- The type of acquisition required (full or partial acquisition, or easement)
- Whether the acquisition would include relocation
- Whether Metro-owned property is currently leased to a tenant who would be displaced

Compliance with the above thresholds would mean that the Project Modifications would have a less than significant impact on communities, population, and housing, because (1) the modifications would not induce substantial population growth or displacement, (2) the Transportation Management Plan includes mitigation measures to address impacts related to traffic and access during construction, and (3) acquisitions needed to implement the Project Modifications would be compliant with the California Relocation Assistance Act.

3.3.2.3 Short-Term Construction Impacts

Socioeconomic Impacts

Short-term construction activities required to implement the proposed Project Modifications would necessitate the mobilization of equipment, materials, personnel, and staging and storage areas. The previous short-term construction-related impact analysis and determinations presented in Section 3.4.3.3 of the 2013 FEIR and Addendum No. 2 remain applicable for the Project Modifications. Based on discussion in Section 3.1, Air Quality, of this SEIR, the construction of the relocated Pomona Station parking facility is not expected to cause additional construction activities beyond those already analyzed because the construction of a parking facility at this station was previously included and approved in the 2013 FEIR analysis. The widening of White Avenue as a mitigation measure was not included in the 2013 FEIR; however, considering the conservative nature of the construction equipment and vehicle assumptions used in the 2013 FEIR, the analysis conducted for the proposed actions would be sufficient to accommodate minor changes of construction activities throughout the construction of the Project. Therefore, the widening of White Avenue and the construction of the Pomona Station parking facility on the south site would not result in any new or more severe impacts. The proposed construction phasing would not affect the alignment, the number of stations, or the overall construction activities as presented in the 2013 FEIR, thus the proposed construction phasing of the project would not increase the intensity of the worst-case daily construction activities as analyzed in the 2013 FEIR. In addition, similar to the two-phased construction approved as part of Addendum No. 2, the shift to a proposed four phased construction of the project would also not introduce new or more severe significant impacts from short-term construction as presented in Section 3.4.3 of Addendum No. 2.

Based on analysis conducted and documented in the 2013 FEIR and the subsequent four addenda, along with the review and analysis presented in this SEIR, the construction activities for the implementation of design refinement, mitigation measure, and the four-phased implementation approach would be similar to the 2013 FEIR analysis and, therefore, would not result in new short-term construction impacts related to community, population, or housing resources.

Acquisitions and Displacements

The Project Modification changing implementation from two phases to four phases would not require additional short-term land acquisitions or displacements. Similar to the two-phased construction approved by the Authority, the shift to a proposed four-phased construction of the project would not change the overall makeup of the community, population, or housing. Therefore, the construction phasing would not introduce new or more significant short-term construction impacts of the Project to communities, population, and housing, as presented in the 2013 FEIR and four subsequent addenda.

The new traffic mitigation measure, LTR-9, would change existing conditions and the impact of the approved Project because the widening would result in three partial acquisitions. The three properties are identified below by assessor parcel number (APN) and existing land use type:

- 2070 N. White Avenue – northeast corner of N. White Avenue and Railroad crossing, APN 8371-004-014, designated commercial/industrial property type (take of approximately 14 square feet)
- 2109 N. White Avenue – northwest corner of N. White Avenue and 1st Street (northwest corner), APN 8377-019-028, designated single-family residential (take of approximately 0.59 square foot)
- 2478 Bonita Avenue - southwest corner of N. White Avenue and Bonita Avenue, APN 8377-007-001, designated single-family residential (take of approximately 26 square feet)

Construction activities for LTR-9 (see Section 2.3.3.3) would also require temporary road and lane closures along the identified limits of the widening along White Avenue, as well as the need for temporary construction easements and staging areas. However, as indicated and also provided in the 2013 FEIR (Section 3.4.3.3, Short-Term Construction Impacts), these lane closures, easements, and staging areas would all be temporary in nature and once construction is completed, the lanes would be reopened and temporary easements and construction staging areas would revert to their original condition and use. As also indicated in the referenced section of the 2013 FEIR, temporary construction easements and construction staging areas could result in the loss of street parking along the railroad right-of-way during construction, but this loss of parking would also be temporary and short-term (see Section 2.6.3.1 of the 2013 FEIR). As presented in Section 2.8.1 of the 2013 FEIR, the implementation of the Traffic Management Plan (TMP; see Section 2.8.1 of the 2013 FEIR) and Mitigation Measures S-1 through S-5 presented in Section 3.3.4 of this SEIR, would be implemented to minimize the construction impacts related to temporary access restrictions and/or loss of parking and these impacts would be reduced to less than significant (see Chapter 2, Transportation). Therefore, the widening of White Avenue would not introduce new or more significant short-term acquisition or displacement impacts to communities, population, and housing.

The relocated Pomona Station parking facility site change existing conditions and the impacts of the approved Project because the relocated parking facility would require the full acquisition of one property in Pomona. This 5.05-acre property is currently a distribution facility that is labeled in the Los Angeles County Office of the Assessor Property Assessment Information System as a commercial/industrial property type (Los Angeles County, 2018).

- 260 W. Santa Fe Street – southwest corner of W. Santa Fe Street and Supply Street, APN 8371-012-023, designated commercial/industrial

Construction activities for the Pomona Station Refinement would also require temporary road and lane closures, as well as the need for temporary construction easements and staging areas. However, as indicated above, these lane closures, easements, and staging areas would all be temporary, and once construction is completed, the lanes would be reopened and parcels within easements and construction staging areas would revert to their original condition and use. Temporary construction easements and construction staging areas may also result in the loss of parking along Santa Fe Street; however, this loss of parking would also be temporary and short-term.

During construction, construction vehicles would access the parking facility site through Santa Fe Street or, with permission, would use the designated privately-owned Supply Street. (Figure 1-3). This construction vehicle access would also be temporary and short-term. As presented in Section 2.8.1 of the 2013 FEIR, the TMP would also be implemented to reduce construction impacts to a less than significant level. The construction impacts from the relocation of the parking facility site would be similar to those impacts discussed for the parking facility site in the 2013 FEIR Section 2.6.4.4. Therefore, the relocation of Pomona's parking facility would not introduce new or more significant short-term impacts to communities, population, and housing.

Based on the analysis conducted and documented in the 2013 FEIR, the four subsequent addenda, along with the review and analysis presented in this SEIR, there are no indicators that the design refinement, new traffic mitigation measure or the four-phased implementation approach would result in new short-term construction impacts to community, population, or housing resources.

3.3.2.4 Long-Term Impacts

Socioeconomic Impacts

The construction and operation of the Proposed Project in four phases would temporarily result in increased ridership levels and increased parking demand at each of the interim terminus stations described in Chapter 2, Transportation. During the La Verne Station - Phase 1 operation, the parking demand at the Glendora, San Dimas, and La Verne stations is projected to increase slightly compared to the parking demand reported in the 2013 FEIR. However, there would still be sufficient parking at the affected stations. For Phase 2 of the Project's operation, when the Pomona Station is the end of line termini, there would be sufficient parking at all stations, except at the Pomona Station, where the demand would exceed the supply by approximately 6 percent. These short-term increases in ridership and parking demand at termini stations would not be of a sufficient amount to change the overall long-term socioeconomic makeup of the cities in the study area. Thus, the long-term impacts of phasing are similar to the impacts of the previous phasing as presented in Section 3.4.3.4 of the 2013 FEIR and Section 3.4.3 of Addendum No. 2. In addition, the temporary increase in the number of boardings during each phase and at each interim station would not be of a sufficient amount to induce substantial long-term changes in housing, employment, or the location and economic viability of commercial activities. Once the four phases of construction are completed, the 2035 forecasted daily passenger boardings for the project would remain the same as those presented in the 2013 FEIR and Chapter 2, Transportation, of this SEIR.

Therefore, the construction phasing would not introduce new or more significant long-term impacts to communities, population, and housing.

The proposed White Avenue widening (LTR-9) would be implemented almost entirely within the existing publicly owned right-of-way. White Avenue is an established part of the City's transportation infrastructure and currently provides access within the community as well as local and regional connectivity. White Avenue both north and south of the proposed widening limits is already configured as two north- and southbound lanes. The proposed new traffic mitigation measure, LTR-9, would address the existing reduced roadway width and single lane configuration within the limits of the proposed widening, providing roadway continuity along White Avenue from the existing at-grade railroad crossing to the intersection with 6th Street. These proposed improvements would provide a benefit to traffic circulation (see Section 2.3.3.3) without introducing community impacts or removing barriers to growth. Therefore, the widening of White Avenue would not introduce new or more significant long-term impacts to communities, population, and housing.

Similar to the approved location identified in the 2013 FEIR, the proposed Pomona Station parking facility would be located adjacent to the current Metro right-of-way and remain within a designated mixed-use zoning area including commercial and industrial land use. The City of Pomona identifies the area within and surrounding the Pomona North Station as a Transit Oriented District that allows for mixed land use, including development to increase transit use and access within these district areas. The approved and proposed parking facility are both within the same Transit-Oriented District and therefore have similar impacts to the district and surrounding land use. Building a parking facility adjacent to the current right-of-way within a mixed-use Transit Oriented District is consistent with the City of Pomona's general and regional plans and zoning maps. Also, because only a single business, currently a distribution facility, would be displaced, the socio-economic related impacts would be negligible within the local and regional area. Therefore, the relocation of Pomona's parking facility site would not introduce new or more significant long-term socio-economic impacts to communities, population, and housing, as presented in the 2013 FEIR and four addenda. Based on the analysis conducted and documented in the 2013 FEIR and the four subsequent addenda, along with the review and analysis presented in this SEIR, the design refinement, new mitigation measure, and the four-phased implementation approach would result in no new long-term impacts to communities, population, or housing.

Acquisitions and Displacements

The construction phasing and operation of the La Verne (Phase 1), Pomona (Phase 2), and Claremont (Phase 3 – 2013 FEIR, Addenda No.2) stations as interim termini would not result in any acquisitions or displacements. Therefore, the modification from two to four phases for construction and operation would not introduce new or more significant long-term impacts to communities, population, and housing.

As presented in Section 3.3.3.1 of this SEIR, the widening of White Avenue (LTR-9) would result in three small partial acquisitions. The partial acquisitions would be triangular slivers and would not displace residences or businesses. Similar to the minor acquisitions approved as part of the 2013 FEIR, Addenda No. 3 and No. 4, these minor acquisitions would not result in significant impacts. Therefore, the White Avenue widening would not introduce new or more significant long-term impacts to communities, population, and housing.

The Pomona Station Refinement would involve the full acquisition of a property south of the station. The full acquisition would require the relocation of the existing commercial business.

Relocating the parking facility to this parcel, which is zoned for industrial land uses, would maintain consistency as industrial land use with the proposed parking facility, and would not conflict with the City of Pomona's land use plan. The potential acquisition from the Pomona Station Refinement would also have similar impacts to the originally approved parking structure location, which also involved a full acquisition as presented in Section 3.4 of the 2013 FEIR. Therefore, the relocation of Pomona's parking facility would not introduce new or more significant long-term impacts to communities, population, and housing, as presented in the 2013 FEIR and four subsequent addenda.

This property acquisition, consistent with the 2013 FEIR and four subsequent addenda, would be conducted following the provisions of and consistent with the California Relocation Act of 1969 and California Government Code Section 7260 (see Section 3.3.1.1 of this SEIR). Those provisions require that all real property acquired by the Authority be appraised to determine its fair market value. Based on that appraisal, just compensation would not be less than the approved appraisal made for this existing property. As a result of the proposed Pomona Station parking facility relocation, the owner/displaced business would be given advance written notice and informed of their eligibility for relocation assistance and payments. By conforming with the California Relocation Assistance Act, the Proposed Project would not have new or more severe significant impacts on communities, housing, and population.

Based on the analysis conducted and documented in Section 3.4 of the 2013 FEIR and four addenda, along with the review and analysis presented in this SEIR, the design refinement, mitigation measure and the four-phased implementation approach would not result in new or more severe long-term impacts to communities, population, or housing.

3.3.2.5 Cumulative Impacts

The Proposed Modifications would not result in any new or more severe significant cumulative impacts to communities, population, and housing.

3.3.3 Mitigation Measures

3.3.3.1 Short-Term Construction Mitigation Measures

As identified in Section 3.4.4 of the 2013 FEIR and four subsequent addenda, the following mitigation measures would be implemented as part of the TMP (see Chapter 2, Transportation, for more information) to address impacts related to traffic and access during construction:

- **S-1.** Schedules for street closures shall be developed in consultation with the study area cities.
- **S-2.** Advance notice shall be posted on city streets indicating when access would be closed or limited.
- **S-3.** Signs shall be posted indicating access routes and alternate access points, as well as announcing that affected businesses are open.
- **S-4.** Newspaper notices shall be placed to indicate street and access closures.
- **S-5.** The Authority website shall include information regarding planned street and access closures.

The mitigation measures will be implemented during the construction of the project, including the proposed Project Modifications if they are approved. With implementation of these measures, the short-term impacts of the proposed Project Modifications would not result in any new or increased impacts on communities, population, or housing.

3.3.3.2 Long-Term Mitigation Measures

As identified in Section 3.4.4 of the 2013 FEIR and four subsequent addenda, the proposed design refinement and mitigation measure would be implemented in compliance with the California Relocation

Assistance Act. This compliance would reduce potential long-term impacts on communities, population, and housing to a less-than-significant level. No mitigation measures are required.

3.3.4 Level of Impact after Mitigation

With mitigation, impacts would be less than significant.

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3.4 Cultural Resources

3.4.1 Regulatory Setting

For purposes of this SEIR, cultural resources are defined as prehistoric and historic-era buildings, structures, objects, sites, and districts. Historical resources include any cultural resources listed, or determined to be eligible for listing, in the California Register of Historical Resources (California Register). (Pub.Resources Code, § 21084.1.) Properties listed or eligible for listing in the National Register of Historic Places (National Register) are automatically listed in the California Register. Historical resources are also presumed to be significant if they are included in a local register of historical resources or identified as significant in a qualified historical resource survey. Section 15064.5 of the CEQA Guidelines sets forth the criteria and procedures for determining significant historical resources and the potential effects of a project on such resources.

The cultural resources analysis for the Project Modifications also includes tribal cultural and paleontological resources and provides an impact evaluation for such resources.

The following provides a summary of the overall applicable regulatory framework for cultural, tribal cultural, and paleontological resources analyzed for this SEIR. This section focuses on changes or new regulations that were not discussed previously as part of the 2013 FEIR with addenda. By following the state, local, and regional regulations discussed in the 2013 FEIR with addenda and the modified regulations included below, the Proposed Project would meet all objectives and policies relevant to cultural resources.

3.4.1.1 State Regulations

California Assembly Bill 52

AB 52 requires the analysis of impacts to tribal cultural resources (TCRs) in EIRs. TCRs are defined by California PRC Section 21074 as either (1) sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe that is either on or eligible for inclusion in the California Register or a local historic register; or (2) a resource that the lead agency, at its discretion and supported by substantial evidence, chooses to treat as a TCR. A cultural landscape may also qualify as a TCR if it meets the criteria to be eligible for inclusion in the California Register and is geographically defined in terms of the size and scope of the landscape. Other historical resources (as described in PRC 21084.1), including unique archaeological resources (as defined in PRC 21083.2(g)) or nonunique archaeological resources (as described in PRC 21083.2(h)), may also be considered TCRs if they conform to the criteria to be eligible for inclusion in the California Register.

AB 52 required consultation with California Native American tribes during the CEQA process to determine whether the proposed project may have a significant impact to a TCR. PRC Section 21073 defines California Native American tribes as “a Native American tribe located in California that is on the contact list maintained by the California Native American Heritage Commission (NAHC) for the purposes of Chapter 905 of the Statutes of 2004.” This includes both federally and non-federally recognized tribes.

Recognizing that California tribes are experts in their TCRs and heritage, AB 52 requires that CEQA lead agencies carry out consultation with tribes at the commencement of the CEQA process to identify TCRs. Furthermore, because a significant effect on a TCR is considered a significant impact on the environment under CEQA, consultation is required to develop appropriate mitigation measures. Consultation is concluded when either the lead agency and tribes agree to appropriate mitigation measures to mitigate or avoid a significant effect, if a significant effect exists, or when a party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached (21080.3.2[b]), whereby the lead agency uses its best judgement in requiring mitigation measures that avoid or minimize impact to the greatest extent feasible.

3.4.1.2 Regional and Local Regulations

This SEIR analysis utilizes the planning guidance provided by local ordinances and general plans regarding the assessment and protection of cultural resources for the Cities of La Verne and Pomona, since these are the only jurisdictions that include new or modified project elements that were not analyzed in the 2013 FEIS and previous addenda. There have been no changes to the regulations and policies for the City of La Verne since the publication of the 2013 FEIR with addenda; however, there have been changes to the regulations and policies for the City of Pomona, which are discussed further below.

City of Pomona

City of Pomona 2014 General Plan Update

Chapter 7, Planning Components – 7-F, Community Design, of the *City of Pomona 2014 General Plan Update* (City of Pomona, 2014, p. 150), says:

> *This historic preservation section gives the community an opportunity to focus appropriate attention on the protection of its cultural resources. The purpose of this section is to provide guidance in developing and implementing activities that ensure the identification, designation and protection of cultural resources as part of the City's community planning. development, and permitting processes. In doing so, this component has the potential to enhance the sense of place, improve the quality of life, and provide economic stability for Pomona.*
>
> *The historic preservation section addresses a variety of issues:*
>
> 1. *Preserving the city's important physical connections to the past.*
> 2. *Protecting existing historical and cultural resources,*
> 3. *Balancing the principles of historic preservation with the need for redevelopment and economic revitalization, and*
> 4. *Promoting the benefits of historic preservation through an increased historic tourism economy and reinvestment of individual property tax savings into historical properties.*

Pomona Historic Ordinance (Section .5809-13. Historic preservation of the Zoning Ordinance)

The City's Register of Historic Resources was created under the Pomona Historic Ordinance. Listing automatically triggers environmental review of significant modifications to a property. Part D of Section .5809-13, Historic preservation, of Pomona's Zoning Ordinance states:

> *…an improvement, natural feature, or site may be designated an historic landmark by the historic preservation commission and city council and any area within the city of Pomona may be designated an historic district pursuant to subsection E of this section if the building or majority of the buildings (in a district) are fifty (50) or more years old or of exceptional quality if less than fifty (50)years old, and it meets one or more of the following criteria:*
>
> 1. *It exemplifies or reflects special elements of the City of Pomona's cultural, social, economic. political, aesthetic, engineering. architectural, or natural history;*
> 2. *It is identified with persons or events significant in local. state, or national history;*
> 3. *It embodies distinctive characteristics of a style, type, period, or method of construction or is a valuable example of the use of indigenous materials or craftsmanship;*
> 4. *It contributes to the significance of a historic area (i.e., a geographically definable area possessing a concentration of historic or scenic properties or thematically related grouping of properties that contribute to each other and are unified aesthetically by plan or physical development);*
> 5. *It is the work of a notable building, designer, landscape designer, or architect;*

6. *It has a unique location or singular physical characteristics or is a view or vista representing an established and familiar visual feature of a neighborhood, community, or the City of Pomona;*
7. *It embodies elements of architectural design, detail, materials, or craftsmanship that represent a significant structural or architectural achievement or innovation;*
8. *It is similar to other distinctive properties, sites, areas, or objects based on a historic, cultural, or architectural motif;*
9. *It reflects significant geographical patterns, including those associated with different eras of settlement and growth. particular transportation modes. or distinctive examples of park or community planning;*
10. *It is one of the few remaining examples in the City of Pomona, region. state. or nation possessing distinguishing characteristics of an architectural or historical type or specimen.*

3.4.2 Methodology

3.4.2.1 Project Modifications Area

Historical resources can be broken into two major categories: 1) aboveground buildings, structures, objects, and districts that may be referred to as historic architectural resources, and 2) prehistoric and historic-era archaeological sites, objects and districts that may be referred to as archaeological resources.

The Project Modifications area for identifying historic architectural and archaeological resources that may be affected by the proposed design refinement and new mitigation measure includes the following:

- The Project Modifications area for historic architectural resources includes portions of parcels directly affected by the Pomona Station Refinement parking facility, White Avenue widening (Mitigation Measure LTR-9), along with the associated construction staging and acquisition areas.
- The Project Modifications area for archaeological resources includes the areas that may be affected by ground-disturbing activities during project construction, construction staging areas, and acquisition areas for both of the identified design refinement areas.

Figures 3.4-1 and 3.4-2 depict the Project Modifications area used to analyze historic architectural and archaeological resources.

The Project Modifications areas for tribal cultural properties is the same as archaeological resources, except that information was sought for a broader area because specific documentation of tribal presence and activities is rarely geographically specific.

3.4.2.2 Historical Resources Criteria for Evaluation

All properties listed in or determined eligible for the National Register are automatically listed in the California Register and are therefore historical resources for the purposes of CEQA. In addition, Section 15064.5 of the CEQA Guidelines states that the term historical resources shall include the following:

> *A resource listed, or determined to be eligible by the State Historical Resources Commission for listing, in the California Register of Historical Resources (Public Resources Code Section 5024.1, Title 14, California Code of Regulations [CCR] Section 4850 et seq.).*
>
> *A resource included in a local register of historical resources. as defined in Section 5020.1(k) of the Public Resources Code, or identified as significant in a historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, shall be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.*

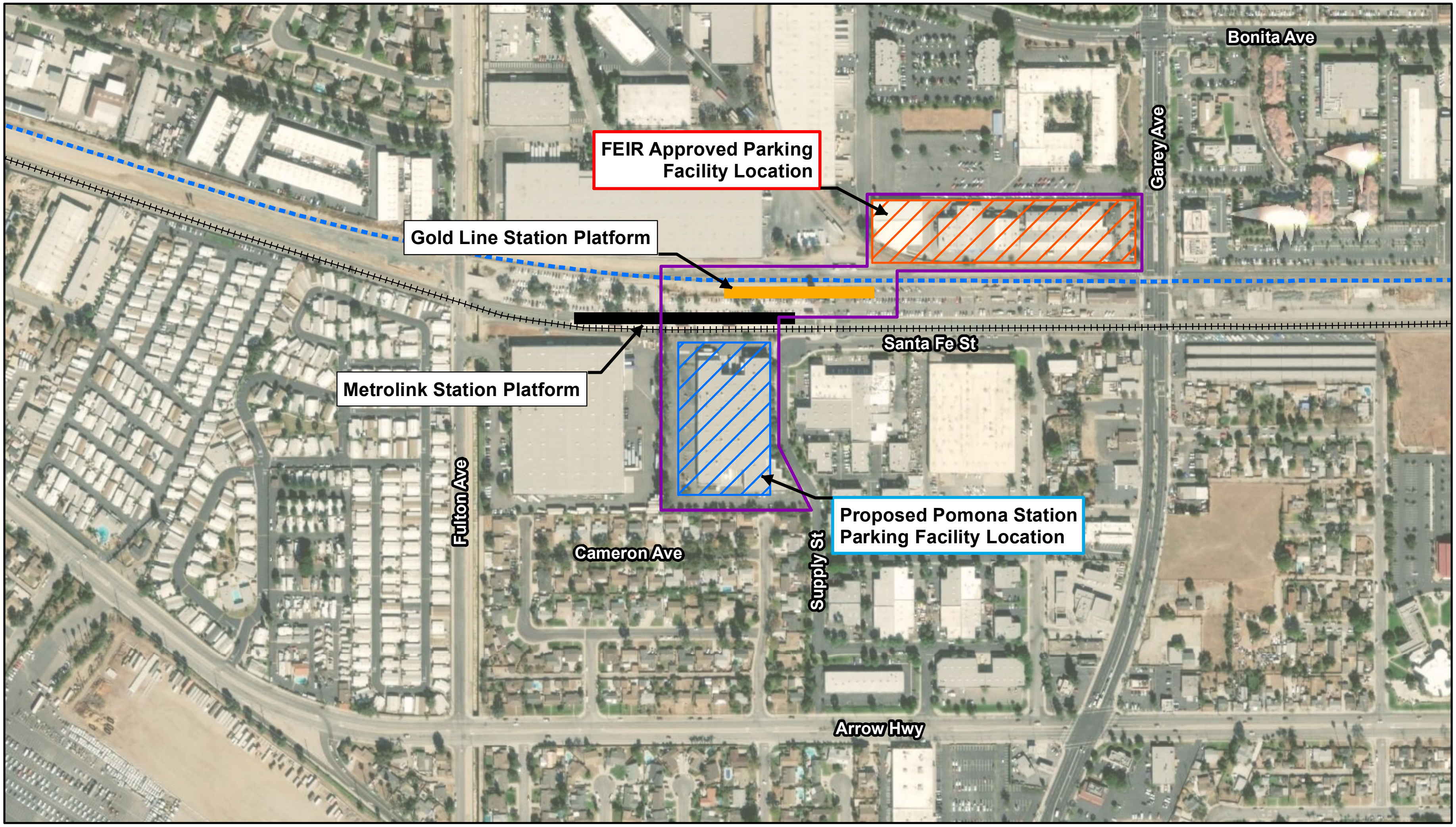
> *Any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be a historical resource provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be historically significant if the resource meets the criteria for listing in the California Register of Historical Resources (Public Resources Code Section 5024.1, Title 14, CCR Section 4852), including the following:*
>
> *(a) [Criterion 1] is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;*
>
> *(b) [Criterion 2] is associated with the lives of persons important in our past;*
>
> *(c) [Criterion 3] embodies the distinctive characteristics of a type, period region, or method of construction or represents the work of an important creative individual/ or possesses high artistic values; or*
>
> *(d) [Criterion 4] has yielded, or may be likely to yield, information important in prehistory or history*
>
> *The fact that a resource is not listed or not determined eligible for listing in the California Register of Historical Resources or not included in a local register of historical resources (pursuant to Section 5020.1(k) of the Public Resources Code), or not identified in a historical resources survey (meeting the criteria in Section 5024.1[g] of the Public Resources Code) does not preclude a lead agency from determining that the resource may be a historical resource, as defined in Public Resources Code Sections 5020.1(j) and 5024.1.*

3.4.2.3 Identifying Historical Resources

To identify historical resources in the Project Modifications area, background research and surveys were conducted, and documentation was prepared in accordance with the Secretary of Interior's Standards and Guidelines for the Identification of Historic Properties (48 FR 44716), under the direct supervision of professionals who meet the Secretary of Interior's Professional Standards (48 FR 22716). Because the Proposed Modifications area is fully developed, no pedestrian archaeological survey was warranted as the Project Modifications area has been extensively disturbed and no cultural resources were located.

For the purposes of this SEIR, the broad pool of cultural resources within the Project Modifications area that require evaluation as historical resources for purposes of CEQA may be categorized into two major types, as follows:

- **Archaeological resources**, which include resources that represent important evidence of past human behavior, including portable artifacts such as arrowheads or tin cans; non-portable features such as cooking hearths, foundations, and privies; and residues such as food remains and charcoal. Archaeological remains can be almost any age, from materials of the early 20th Century to prehistoric deposits thousands of years old.
- **Historic architectural resources**, which include man-made features that compose the recognizable built environment. This category typically includes extant aboveground buildings and structures that date from the earliest territorial settlements until the present day.



Legend

- Metro Gold Line Phase 2B
- Metrolink
- Metrolink Station Platform
- Gold Line Station Platform
- FEIR Approved Parking Facility Location
- Proposed Pomona Station Parking Facility Location
- Area of Potential Effects

N

0 250 500

Feet

Figure 3.4-1
Area of Potential Effects Map –
Proposed Pomona Station Parking Facility
Metro Gold Line Phase 2B –
Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

Basemap Source: ESRI World Imagery

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Legend

Area of Potential Effects

Metro Gold Line Phase 2B

Metrolink

Basemap Source: Google Earth Pro

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Feet

Figure 3.4-2
Area of Potential Effects Map – Proposed Widening of White Avenue near La Verne Station
Metro Gold Line Phase 2B –
Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

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A records search was conducted at the South Central Coastal Information Center at San Diego State University Department of Anthropology on March 1 and 2, 2011. The search included the Project Modifications area for the Proposed Project. The records search was conducted as part of the 2013 FEIR Project with addenda to identify previously documented cultural resources within a 0.5-mile to 1-mile search radius of the project and to help establish a context for resource significance. In addition, a Sacred Lands File (SLF) search was requested for this SEIR, and results were received from the NAHC on February 4, 2019. Results indicated that there are Native American cultural resources recorded in the SLF located in the Project Modifications area environs. The NAHC recommended contacting the Gabrieleno Band of Mission Indians – Kizh Nation for additional information.

Numerous previously conducted cultural resources studies have been completed within and adjacent to the Proposed Project, and the reports from many of these were obtained from the South Central Coastal Information Center. The reports were examined to identify overall past survey coverage and the distribution of previously recorded cultural resources, and to assess the general sensitivity of the area and its potential to contain archaeological deposits. The following sources were also consulted:

- National Register
- California Register
- California Historical Resources Inventory System
- California Historical Landmarks
- California Points of Historical Interest
- City of Pomona Register of Historic Resources
- City of La Verne Heritage Buildings

Research was also conducted using topographic maps and geologic information to identify historic architectural, archaeological, tribal cultural, and paleontological resources. In addition, available local, regional, and railroad histories were consulted.

Results of the Record Check – Archaeological Resources

City of La Verne

The archaeological records search conducted for the Proposed Project in the City of La Vern indicates that nine archaeological resources were previously recorded in the general vicinity; however, none are located in the Project Modifications area boundaries.

City of Pomona

The archaeological records search conducted for the Proposed Project's Pomona Station parking facility indicates that one prehistoric resource, which is listed as California Historical Landmark 372, was previously recorded in the general vicinity of the station; however, the resource is located approximately 3,255 feet southeast of the Project Modifications area boundaries.

Results of the Record Check – Historic Architectural Resources

City of La Verne

La Verne Orange Growers Association Packing House No. 2 - University of La Verne Central Services Office (2234 1st Street, La Verne) was previously identified approximately 1,400 feet west of the Project Modification area boundaries. Built in 1920, this property is a prominent example of a citrus packing house that is reflective of the agricultural development of La Verne from 1920 to approximately 1955.

Historic-period U.S. Geological Survey (USGS) 7.5-minute quadrangle maps from 1908 through 1956 show the Atchison, Topeka, and Santa Fe Railway bisecting the Project Modifications area, and the Pacific Electric Railway/Southern Pacific Railroad located south of this same area. The maps also depict White Avenue surrounded by residential development and orchards.

City of Pomona

The Santa Fe North Pomona Station (2701 North Garey Avenue, Pomona) was previously identified approximately 1,600 feet east of the Proposed Modification area. The building represents a period when railroad transportation was key to the economic development of the San Gabriel Valley in general, and Pomona in particular.

Additionally, historic-period USGS 7.5-minute quadrangle maps from 1908 through 1953 show the Atchison, Topeka, and Santa Fe Railway and the Pacific Electric Railway/Southern Pacific Railroad located north of the Project Modification boundaries, surrounded by vacant land and orchards.

Historic Architectural Supplemental Research and Surveys

Supplemental research and surveys to identify previously unrecorded historic architectural resources in the Project Modifications area were completed in January 2019. The purpose of the research and surveys were to identify potential historic architectural resources that may be significantly impacted by the Project Modifications. The research and surveys included the Project Modification boundaries and adjacent areas to facilitate an understanding of the historic context, character, and narrative of the area, as well as to consider whether the Project Modification boundaries requires expansion past its current limits due to overall sensitivity of any resources.

The supplemental research and surveys for historic architectural resources included the following steps:

- Visual examination and review of photographs and imagery of Project Modifications area parcels and adjacent areas including an assessment of integrity and current conditions
- Identification of architectural style and construction type of buildings, structures, objects, and districts located within the Project Modification boundaries and adjacent areas
- Review of previous survey data

Site-specific research was also conducted using the following sources:

- Building Department building permits in the cities of Pomona and La Verne
- Los Angeles County assessor data
- Historic aerial photos and maps
- City directories for Los Angeles County, California

The supplemental research and surveys identified the following previously unrecorded extant historic architectural resources within the Project Modifications area:

City of La Verne

- **The Atchison, Topeka, and Santa Fe Railway**, located within the Metro Gold Line Phase 2B alignment right-of-way, bisects the Project Modification area immediately south of the intersection of White Avenue and 1st Street. The segment of the railroad in these areas no longer retains its historic integrity of design, materials, and workmanship (due to alterations), and has diminished integrity of feeling, setting, and association due to substantial development in the area. The original rails, ties, and ballasts have been replaced, and large-scale recent and infill development surrounding the railroad has impacted the railroad's historic character, visual narrative, and sense of place and time. Additionally, this segment of the railroad has a common and utilitarian arrangement and form and is not reflective of the larger engineering achievements associated with the Atchison, Topeka, and Santa Fe Railway in other geographies. Therefore, while segments of the railroad outside of the Project Modification boundaries (such as in other areas of Los Angeles County) may have been previously recorded and/or previously determined significant, the segment within the Project Modification boundaries would not be considered a historical resource for purposes of CEQA as an individual resource or as a contributor to a larger linear resource (like the entirety of the railroad in Los Angeles County), if such a resource is ever determined to exist. Figure 3.4-3 depicts the current conditions of the Atchison, Topeka, and Santa Fe Railway.

- **The Pacific Electric Railway/Southern Pacific Railroad**, located within the Metrolink right-of-way, also bisects the Project Modifications area and is located immediately south of the Atchison, Topeka, and Santa Fe Railway. The segment of the railroad in these areas no longer retains its historic integrity of materials, design, and workmanship (due to alterations), and has diminished integrity of feeling, setting, and association due to substantial development in the area. The original rails, ties, and ballasts have been replaced, and large-scale recent and infill development surrounding the railroad has impacted the railroad's historic character, visual narrative, and sense of place and time. Additionally, this segment of the railroad has a common and utilitarian arrangement and form, and is not reflective of the larger engineering achievements associated with the Southern Pacific Railroad in other geographies. Therefore, while e segments of the railroad outside of the Project Modifications boundaries (such as in other areas of Los Angeles County) may have been previously recorded and/or determined significant, the segment within the Project Modification area would not be considered a historical resource for purposes of CEQA as an individual resource or as a contributor to a larger linear resource (like the entirety of the railroad in Los Angeles County), if such a resource is ever determined to exist. Figure 3.4-4 depicts the current conditions of the Pacific Electric Railway/Southern Pacific Railroad.

Figure 3.4-3. Current Condition of the Atchison, Topeka, and Santa Fe Railway, view to the Northwest

Figure 3.4-4. Current Condition of the Pacific Electric Railway/Southern Pacific Railroad, view to the West-northwest

City of Pomona

No previously unrecorded extant historic architectural resources were identified in the Pomona Station Refinement area.

Tribal Cultural Resources

Efforts to identify and determine impacts to tribal cultural resources, if present, were carried out for the Project Modifications area through a tribal consultation process that is required by CEQA, through the passage of AB 52, which is described in Section 3.4.3.4.

3.4.3 Existing Conditions

3.4.3.1 Prehistoric and Historical Archaeological Resources Identified

The Pomona Station parking facility site presently has a large commercial/industrial building constructed in 1991. This property, located at 260 West Santa Fe Street in Pomona, would be acquired for the Pomona Station Refinement. Figure 3.4-5 shows the large commercial/industrial property constructed in 1981 that would be acquired.

Figure 3.4-5. 260 West Santa Fe Street, Pomona.

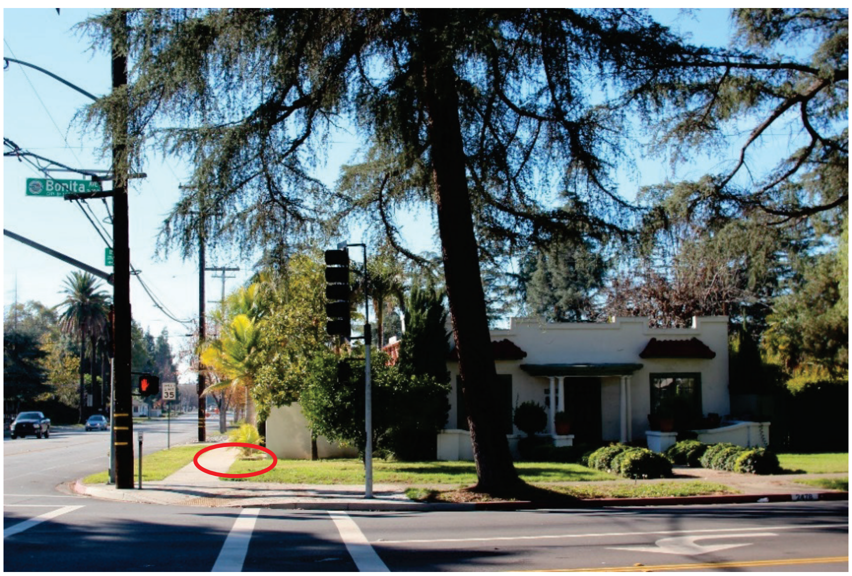
The new White Avenue Mitigation Measure (LTR-9) area in La Verne is located primarily within the White Avenue right-of-way, which is a paved built-up-surface roadway. Three small acquisitions would occur immediately outside of the right-of-way:

- At the northwest corner of the Atchison, Topeka, and Santa Fe Railway and White Avenue intersection, to accommodate modifications to the at-grade crossing (Figure 3.4-6)
- At the northwest corner of the 1st Street and White Avenue intersection (Figure 3.4-7)
- At the southwest corner of the Bonita Avenue and White Avenue intersection (Figure 3.4-8)

The acquisitions are very small triangular shaped areas, ranging from approximately less than 1 square foot to 26 square feet in size. These acquisitions are located in disturbed areas adjacent to the sidewalk.

Figure 3.4-6. Acquisition Area at Northwest Corner of the Atchison, Topeka, and Santa Fe Railway and White Avenue Intersection (area encircled in red)

Figure 3.4-7. Acquisition Area at Northwest Corner of the 1st Street and White Avenue Intersection (area encircled in red)



3.4.3.2 Figure 3.4-8. Acquisition Area at Southwest Corner of the Bonita Avenue and White Avenue Intersection (area encircled in red) Historic Architectural Resources Identified

As described above, the results of the records search, supplemental research, and surveys identified two historic architectural resources in the Project Modifications area:

- Atchison, Topeka, and Santa Fe Railway
- Pacific Electric Railway/Southern Pacific Railroad

These resources do not meet the definition of a historical resource for purposes of CEQA as individual resources or as contributors to a larger linear resource (like the entirety of the railroad in Los Angeles County), if such a resource is ever determined to exist.

3.4.3.3 Paleontological Resources

To determine the potential for encountering paleontological resources, in compliance with CEQA, the Division of Geological Sciences of the San Bernardino County Museum completed a literature review and record search for the 2013 FEIR Project with addenda in 2011. Geological mapping (completed as part of the literature review) between Sierra Madre Villa in Pasadena and Central Avenue in Montclair indicated that the geology along the alignment consists primarily of Quaternary alluvial sediments, either as fan deposits or alluvium from drainages from the San Gabriel Mountains to the north. Marine deposits of the Miocene Topanga Formation occur to the south. Younger deposits extend from San Dimas Wash eastward to Interstate 210. Older deposits extend to San Dimas Canyon Road, and younger deposits extend to the area west of North Garey Avenue in Pomona. The younger, uppermost layers of these alluvial and fan sediments are unlikely to contain vertebrate fossils. Older sediments, which may underlie the younger deposits, are known as the San Dimas Foundation and have yielded Late Pleistocene vertebrate fossil material in other locations, such as the Rancho La Brea asphalt deposits in Los Angeles. Excavations in these areas may expose fossil material. Excavations near the Topanga Formation, known to have yielded a variety of fossils, such as sharks, bony fishes, sea turtles, marine birds, and marine mammals, may encounter similar remains.

Overall, there is high potential to discover fossils in locations where deep excavations greater than 6 feet beneath existing ground surface may take place in previously undisturbed soils. These excavations may expose the older Quaternary sediments in the Pomona and La Verne areas. However, the Project Modifications are not expected to have ground disturbance in previously undisturbed soils.

3.4.3.4 Tribal Cultural Resources

The Authority, in concert with the AB 52 consultation requirements, contacted the NAHC for a search of its SLF as part of this SEIR and for resources of importance to Native Americans, including sacred sites and traditional cultural properties. The NAHC responded on February 4, 2019 and indicated that Native American cultural resources recorded in the SLF are located in the Project Modifications area environs. The NAHC recommended contacting the Gabrieleno Band of Mission Indians – Kizh Nation for additional information. Appendix D includes copies of the consultation request letters distributed to the recommended Native American tribal representatives.

As part of the ongoing AB 52 consultation, the Authority determined that it had sufficient information to decide to undertake a project and begin consultation. The Authority is awaiting responses from the tribal representatives in regard to the general request letters distributed on February 26, 2019 to determine whether or not there are Tribal Cultural Resources within the proposed Project Modifications area and if so whether the proposed Project Modifications would have a significant impact on those resources (refer to Appendix B, AB 52 Consultation). The letters provided the tribal representatives 30 days to respond to the opportunity to consult under AB 52. The 30-day period end on March 24, 2019.

3.4.4 Environmental Impacts

The cultural resources impacts analysis focused on direct short-term (construction) and long-term (permanent) impacts to archaeological, paleontological, and tribal cultural resources, and historical architectural resources within and near the Project Modifications area, as well as impacts to the setting, feeling, and context of the Proposed Modifications area vicinity.

3.4.4.1 Impact Criteria

Paleontological Resources

Implementation of the Project Modifications would result in a significant impact on paleontological resources if they would directly or indirectly destroy a unique paleontological resource or site or unique geologic feature (CEQA Guidelines, Appendix G). This is the same significance criteria applied in the 2013 FEIR.

Compliance with the referenced thresholds would mean that the Project Modifications would have less than significant impacts on cultural, tribal cultural, and paleontological resources from the Pomona Station parking facility relocation and White Avenue widening (LTR-9), because (1) the Project includes enforceable mitigation measures (CR-1 and CR-2) to achieve compliance with CEQA regulations and standards, (2) the Project would not cause short-term or long-term substantial adverse changes to the significance of cultural, tribal cultural, and paleontological resources, (3) no significant cultural, tribal cultural, and paleontological resources are known to exist in the Pomona Station Refinement parking facility and White Avenue widening project footprints, and (4) the Project would not cause cumulative impacts to any known historical resources from implementation of the project.

Tribal Cultural Resources

Impacts to TCRs are considered significant if the Project Modifications would cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as a site, feature, place, or cultural landscape that is geographically defined in terms of the size and scope of the landscape; a sacred place; or an object with cultural value to a California Native American tribe, and that is:

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

Historical Architectural and Archaeological Resources

The project would result in a significant impact on historical architectural or archaeological resources if it would:

- Cause a substantial adverse change in the significance of a historical resource, as defined in Section 15064.5 of the CEQA Guidelines
- Cause a substantial adverse change in the significance of an archaeological resource, as defined in Section 15064.5 of the CEQA Guidelines
- Disturb any human remains, including those interred outside of formal cemeteries

This is the same significance criteria applied in the 2013 FEIR.

Section 15064.5(b) (1) of the CEQA Guidelines states that a substantial adverse change in the significance of a historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired.

3.4.4.2 Short-Term Construction Impacts

Archaeological, Paleontological, and Tribal Cultural Resources

Short-term impacts consist of construction activities required to implement the Project Modifications (widening White Avenue [LTR-9], constructing the Pomona Station parking facility, and phasing the construction of the Proposed Project). Construction would result in ground-disturbing activities. Although previous ground disturbances and the developed nature of the Project Modifications area have reduced the potential for encountering important archaeological and tribal cultural resources, subsurface structural remains, Native American resources, or prehistoric sites could be present within the Project Modification areas and may be exposed during ground disturbance. Although no paleontological resources have been recorded in the Project Modifications area, paleontological resources may also be encountered during deep excavations.

Historical Architectural Resources

The Project Modifications are not expected to result in significant impacts to the historical architectural resources identified. The construction of the Pomona Station Refinement would demolish a building constructed in 1991. The building is less than 50 years and is not exceptionally significant, so it would not be considered a historical resource for purposes of CEQA. Therefore, there would not be a significant impact from the construction of the Pomona Station Refinement.

The widening of White Avenue as a new mitigation measure (LTR-9) would be limited to the existing roadway right-of-way, except for three small partial acquisitions:

- The northwest corner of the Atchison, Topeka, Santa Fe Railway and White Avenue intersection (2070 White Avenue; constructed 2000), approximately 14 square feet (Figure 3.4-6)
- The northwest corner of the 1st Street and White Avenue intersection (2109 White Avenue; constructed 1912), approximately 0.59 square foot (Figure 3.4-7)
- The southwest corner of the Bonita Avenue and White Avenue intersection (2478 Bonita Avenue; constructed 1922), approximately 26 square feet (Figure 3.4-8)

The acquisitions are very small triangular areas ranging from approximately less than 1 square foot to 26 square feet, located within heavily disturbed areas. Two of the parcels have buildings older than 50 years in age (2109 White Avenue and 2478 Bonita Avenue), but the buildings would not be affected by the acquisition or the widening activities. The acquisitions would be a small sliver impact to the larger parcels and would be located at the parcel boundary immediately adjacent to the existing non-historic sidewalks. The existing ground surface consisting of grass and sidewalk would be replaced with concrete sidewalk materials. Despite these changes, these parcels would retain their overall feeling, setting, and visual narrative, and the acquisitions would have no noticeable impact to the buildings' setback from the roadway or to their orientation and overall arrangements and forms. Ultimately, the buildings would retain their character, appearance, and form, and the acquisitions would be negligible changes that would not have a significant impact. The project improvements would not be noticeable because they would match the existing conditions, are covered by dense vegetation, or there are limited views from the resource to the improvement.

The new traffic mitigation measure, LTR-9, would also include improved and modified railroad crossings over the Atchison, Topeka, and Santa Fe Railway tracks (located within the Metro Gold Line Phase 2B alignment right-of-way) and Pacific Electric Railway/Southern Pacific Railroad tracks (located within the Metrolink right-of-way). The new rail crossing would be similar to the existing conditions. They would be at-grade, small-scale elements that would remain consistent with the character of the area and its overall appearance and form. Additionally, both right-of-way areas are heavily altered, lack distinctive designs, and do not possess integrity of design, materials, feeling, setting, workmanship, and feeling (Figures 3.4-3 and 3.4-4). They do not qualify as historical resources for the purposes of CEQA. Therefore, changes to the railroad crossings would not have a significant impact to these resources.

In conclusion, the Project Modifications would not have substantial adverse short-term changes to any historic architectural resources in the Project Modifications area. The construction phasing would not impact any historic architectural resources in the Project Modifications area, nor would the new traffic mitigation measure, LTR-9, or the Pomona Station Refinement, and there would no new or more significant short-term construction impacts to historic resources from the Project Modifications. As a result, the impacts of the Project would remain less than significant.

3.4.4.3 Long-Term Impacts

Archaeological, Paleontological, and Tribal Cultural Resources

No new long-term impacts would occur from the Project Modifications. The potential for impacts to archaeological, paleontological, and tribal cultural resources exist only during short-term construction activities.

Historic Architectural Resources

The Project Modifications would have no long-term impacts to historic architectural resources identified in the Project Modifications area. The operational phasing, the new traffic mitigation measure (LTR-9), and Pomona Station Refinement would not cause direct or indirect impacts that would diminish the historic integrity of any resources or modify the setting, feeling, viewshed, character, appearance, and historic narrative of the project environs near the resources. Therefore, the Project Modifications do not have the potential to cause significant impacts to any historic architectural resources.

3.4.4.4 Cumulative Impacts

Future development in the area and in the region is anticipated and planned for in the SCAG RTP/SCS. According to the EIR for the 2016-2040 RTP/SCS (SCAG, 2016), transportation projects in the region have the potential to yield previously undiscovered human remains because some projects would take place in previously undisturbed or minimally disturbed areas. The referenced EIR acknowledges that excavation and soil removal of any kind, irrespective of depth, has the potential to encounter human remains. The Project Modifications would have no adverse impacts on known cultural resources, and therefore would not contribute to a significant cumulative impact; however, if unknown buried cultural resources are discovered by implementation of the Proposed Project, the project could contribute to the significant cumulative impacts related to discovery of unknown materials at a regional scale identified in the 2016-2040 RTP/SCS EIR.

3.4.5 Mitigation Measures

3.4.5.1 Short-Term Mitigation Measures

The mitigation measures identified in the 2013 FEIR and addenda remain valid to reduce short-term impacts from Project Modifications to cultural resources. The mitigation measures will be implemented during construction activities and will be included in all construction documents.

Mitigation measures CR-1 and CR-2, as detailed in the 2013 FEIR, would be implemented to minimize construction impacts to archaeological, paleontological, and tribal cultural resources.

3.4.5.2 Long-Term Mitigation Measures

The Project Modifications do not have the potential to cause significant long-term impacts on cultural resources; therefore, no mitigation is required.

3.4.6 Level of Impact after Mitigation

The level of impact of the Project Modifications before and after mitigation is less than significant. The mitigation measures in the 2013 FEIR apply to the Project Modifications.

3.5 Energy

3.5.1 Regulatory Setting

Two regulations relevant to energy discussed in the 2013 FEIR (CRC Title 24, Part 6 and Part 11; and the Renewable Portfolio Standard Program) are still valid and applicable to the Project Modifications and the Proposed Project as a whole. As part of this SEIR analysis and documentation, these two regulations have been updated to reflect changes since the 2013 FEIR, in addition to the inclusion of two additional regulatory setting topics discussed (California Energy Commission and AB 32: Global Warming Solutions Act).

3.5.1.1 California Code of Regulations, Title 24, Part 6 and Part 11, Energy Efficiency Standards

The 2013 FEIR, Section 3.7.1.2, indicated that Title 24, Part 6 of the CCR, Energy Efficiency Standards, promotes efficient energy use in new buildings constructed in California. The standards regulate energy consumed for heating, cooling, ventilation, water heating, and lighting. Part 11 contains the mandatory green building standards for nonresidential buildings. The standards are enforced through the local building permit process.

3.5.1.2 Renewable Portfolio Standard Program (Senate Bill 1078)

The 2013 FEIR considered the then-existent Renewable Portfolio Standard Program applicable in California. In 2006, the program requiring that 20 percent of electrical retail sales by served by renewable energy resources by 2010. In April 2011, SB 2 (1X) was passed, requiring a 33 percent renewable portfolio standard be met by 2020. In 2015, SB 350 mandated a 50 percent standard by December 31, 2030. SB 350 includes interim annual renewable portfolio standard targets with 3-year compliance periods. In 2018, SB 100 again increased the standard to 60 percent by 2030 and required all of the state's electricity to come from carbon-free resources by 2045. SB 100 became effective on January 1, 2019.

3.5.1.3 California Energy Commission

Created by the Legislature in 1974, the California Energy Commission (CEC) is the state's primary energy policy and planning agency and is responsible for, among other things, forecasting future energy needs for the state. SB 1389 (Chapter 568, Statutes of 2002) requires the CEC to prepare a biennial Integrated Energy Policy Report. This report contains an integrated assessment of major energy trends and issues facing the state’s electricity, natural gas, and transportation fuel sectors, and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the state’s economy; and protect public health and safety. The commission published the *2011 Integrated Energy Policy Report* in February 2012.

3.5.1.4 AB 32: Global Warming Solutions Act

Governor Arnold Schwarzenegger signed AB 32 (Global Warming Solutions Act) into law on September 27, 2006, requiring that CARB) reduce GHG emissions to 1990 levels by 2020, and maintain and continue reductions beyond 2020. This is outlined in a scoping plan that was first approved by CARB in 2008 and is updated every 5 years. CARB approved the Final 2017 Climate Change Scoping Plan that contains a range of GHG reduction actions, including direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, market-based mechanisms such as a cap-and-trade system, and an AB 32 program implementation regulation to fund the program.

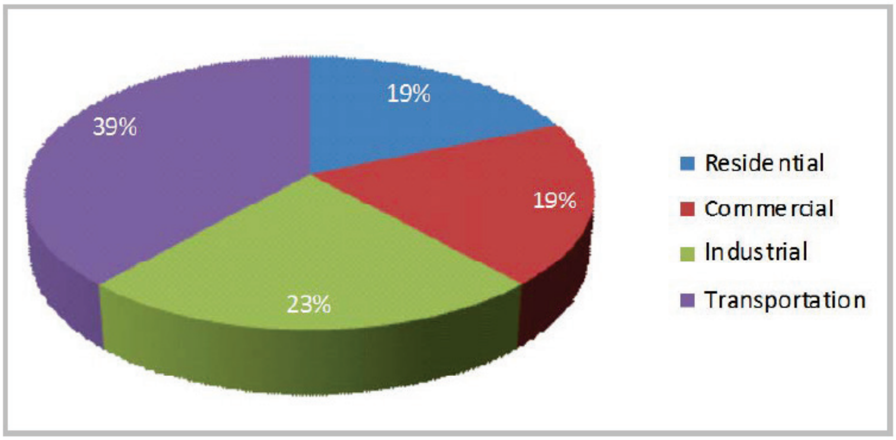
On September 8, 2016, Governor Jerry Brown signed SB 32 (Global Warming Solutions Act of 2006: emissions limit), which codified a state strategy to reduce GHG emissions by 40 percent below 1990 levels by 2030, and 80 percent below 1990 levels by 2050. With SB 32 came the accompanying AB 197, which provides additional direction for developing the scoping plan. CARB is currently developing a second update to the scoping plan to reflect the 2030 target set by EO B-30-15 and codified by SB 32 (CARB, 2019).

3.5.2 Existing Conditions

Energy resources used for transportation include petroleum, natural gas, electricity, liquefied petroleum gas, hydrogen, and biofuels such as ethanol. California's gasoline and diesel markets are characterized by increasing demand, tight supply, and volatile prices. California imports more than 50 percent of its crude oil and over 15 percent of refined oil products, and the State's dependence on this increasingly expensive energy resource continues to grow. Moreover, fossil fuel-based transportation of products and people is a major contributor of CO_2, the principal catalyst to climate change. Changes in energy supply and demand are affected by factors such as energy prices, U.S. economic growth, advances in technologies, changes in weather patterns, and public policy decisions.

Energy consumption in California continues to be dominated by growth in passenger vehicles, and nearly 40 percent of all energy consumed in the state is used for transportation (Figure 3.5-1). California is the second largest consumer of transportation fuels in the world (behind the U.S. as a whole); more than 16 billion gallons of gasoline and 4 billion gallons of diesel fuels are consumed each year. California's population is estimated to exceed 44 million by 2020, which would result in substantial increases in transportation fuel demand for the state. Table 3.5-1 outlines the 149-million-barrel increase in California's transportation fuel demand through 2020. California must address its petroleum infrastructure problems to secure transportation fuels and meet the needs of a growing population by adjusting choices of transportation, land use policies, and alternative fuels.

Figure 3.5-1. Estimated California Energy Consumption by Sector (2010)



Source: Metro Gold Line Foothill Extension Construction Authority, 2013

Table 3.5-1. California Transportation Fuel Demand

Year	Barrels (millions/year)	Daily Energy Consumption (billions of British thermal units)
2005	553	8,787
2010	617	9,804
2015	661	10,504
2020	702 (est.)	11,155 (est.)

Source: California Energy Commission, 2007

Transportation energy consumption reflects the types and number of vehicles, the extent of their use (VMT), and their fuel economy (miles per gallon or equivalent). Implementing the Proposed Project is expected to change the dynamics of all vehicle classes with regard to changes (reductions) in VMT in the project corridor as drivers switch to light rail transit. Changes in VMT, in turn, would affect energy consumption. VMT is also important in determining the demand for infrastructure improvements. Urban growth patterns have resulted in an annual increase of over 3 percent in California's VMT between 1975 and 2004. In 2005, SCAG data showed automobile VMT in California at 372 million, which is equivalent to 2.14 trillion British thermal units (Btu) or 368,966 barrels of oil.

SCAG estimates the VMT for transportation plans developed in the region and is discussed further in Chapter 2 and Section 3.1.1.1 of this SEIR. Projections show a 29 percent increase in VMT from 2008 to 2035. VMT is directly related to energy use and is the main contributor to air quality pollutants in the SCAG region. A reduction in VMT through alternative modes of transportation (e.g., LRT) would lower energy needs and reduce pollutant emissions.

Table 3.5-2 displays the energy requirements for various modes of transportation including automobile, bus, and rail transit, as provided by the Oak Ridge National Laboratory, which has set only one level of energy intensity for transit buses regardless of the fuel type (e.g., compressed natural gas or diesel). Urban rail projects (such as the Metro Gold Line Foothill Extension) have a lower Btu-per-passenger-mile rate compared to automobiles and buses.

Table 3.5-2. Transportation Energy Intensity

Transport Mode	Btu/Passenger-Mile	Btu/Vehicle-Mile
Automobile[1]	3,514	5,517
Transit Bus (all vehicle types)[1]	4,315	39,048
Commuter Rail[1]	2,638	90,328
Light Rail-Los Angeles[2]	2,621	Not applicable

[1] Source: Oak Ridge National Laboratory, 2010
[2] Source: U.S. Department of Energy, 2013

Table 3.5-3 shows the energy usage associated with transportation within the SCAG region, as well as regional VMT and VMT per Btu. In 2008, motor vehicle energy used was approximately 950 trillion Btu and this use could approach 1,383 trillion Btu by 2035.

Table 3.5-3. Annual Motor Vehicle Energy Usage within the SCAG Region

Scenario	Billion Btu	VMT	VMT per Btu
2008 Existing	949,680	429,178,401	452
2035 Future No Project	1,383,126	551,600,000	399

Source: SCAG, 2008

Table 3.5-4 shows the regional energy consumption by existing Metro facilities. Metro's energy usage has been steadily increasing as the Metro regional transit system has continued to expand.

Table 3.5-4. Metro Facilities Regional Energy Consumption

Daily Energy Consumption (kilowatt-hours)	Daily Energy Consumption (Btu)
189,041	645,008,219

Source: Metro, 2009

3.5.3 Environmental Impacts

3.5.3.1 Evaluation Methodology

The 2013 FEIR described the Project's energy needs in petroleum and equivalent Btu, which is the quantity of heat required to raise the temperature of water 1-degree Fahrenheit at sea level. Other units of energy can all be converted into equivalent Btu. Therefore, Btu are used as the basis for comparing energy consumption associated with different resources, including those necessary for the construction and operation of the Proposed Project. Table 3.5-5 shows comparisons of various types of energy and their equivalent Btu.

Table 3.5-5. Energy Comparisons

Energy Type	Energy Unit	Equivalent Btu
Electricity	kilowatt-hour	3,412
Natural gas	cubic foot	1,034
Crude oil	barrel (42 gallons)	5,800,000
Gasoline	gallon	125,000

Source: Metro Gold Line Foothill Extension Construction Authority. 2013

3.5.3.2 Impact Criteria

Energy impacts are considered significant if the Project Modifications would:

- Result in wasteful, inefficient, or unnecessary use of energy, and/or
- Substantially increase energy demand.

Compliance with the above thresholds would mean that the Project Modifications would have less than significant impacts on energy because (1) the Project is expected to result in lower VMT in the project corridor as drivers switch to light rail transit, and (2) there would not be cumulatively considerable increases in energy consumption resulting solely from the Project Modifications.

3.5.3.3 2013 FEIR and Addenda Impacts

The 2013 FEIR described the Project’s impacts as not being adverse because energy usage would decrease over time when compared to the No Build Alternative. This includes project refinements established in subsequent addenda. A one-time energy expenditure would occur during project construction and would result in less than significant impacts with the incorporation of mitigation measures outlined in the 2013 FEIR and subsequent addenda.

3.5.3.4 Short-Term Construction Impacts

The Project Modifications would not change the anticipated total energy estimates for construction of the project, as shown in Table 3.7-6 of the 2013 FEIR. Construction of the project, including the four-phased approach, the design refinement and the new mitigation measure, would result in the one-time expenditure of energy during construction consistent with the analysis and impact determinations provided in the 2013 FEIR and subsequent addenda. Therefore, no new or more severe significant impacts are anticipated.

3.5.3.5 Long-Term Impacts

The Project Modifications would not change the anticipated daily project energy use as compared to either existing conditions or compared to the energy effects of the Project described in the 2013 FEIR. As concluded in the 2013 FEIR, the Project is predicted to slightly decrease energy usage during operation. The analysis and impact determination provided in the 2013 FEIR and subsequent addenda predicting a slight decrease in energy usage would not change with implementation of the proposed Project Modifications. Therefore, no new or more severe significant impacts are anticipated.

3.5.3.6 Cumulative Impacts

The Project Modifications would not introduce new or more severe impacts in comparison to the cumulative energy impacts of the Project described in the 2013 FEIR and subsequent addenda, nor result in wasteful, inefficient, or unnecessary use of energy as compared against existing conditions. Based on the small reduction in energy consumption predicted, the Project Modifications would also be consistent with the state's energy conservation goals and strategies reflected in legislation such as AB 32, SB 32, SB 375, and AB 2076. The Project implements a key element of the SCAG RTP/SCS by providing a rail transit alternative to the private automobile in the Project area. The small reduction predicted under the Project Modifications would be in compliance with the policy recommendations implemented by the CEC, as described in Section 3.5.1.3. The Project Modifications would not introduce or contribute to any cumulative impacts.

3.5.4 Mitigation Measures

3.5.4.1 Short-Term Mitigation Measures

The mitigation measures outlined in the 2013 FEIR (see Section 3.7.6) would also be implemented for the construction of the Project Modifications.

3.5.4.2 Long-Term Mitigation Measures

The Project Modifications would not increase the Project's energy use, thus there would be no adverse long-term impacts and no long-term mitigation measures would be required.

3.5.5 Level of Impact After Mitigation

The Project Modifications would have a less than significant impact on energy use after mitigation. With implementation of mitigation measures described in the 2013 FEIR (see Section 3.7.6), the Project Modifications would not result in wasteful, inefficient, or unnecessary use of energy or in a substantial increase energy demand during construction or operation.

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3.6 Geologic Hazards

3.6.1 Regulatory Setting

3.6.1.1 State Regulations

The regulatory setting (Alquist-Priolo Earthquake Fault Zoning Act and Seismic Hazards Mapping Act) as described in Section 3.8, Geologic Hazards. of the 2013 FEIR is applicable to the Project Modifications, and there are no material changes to the regulatory setting.

3.6.1.2 Local Regulations

General Plan Policies and Ordinances

The General Plan Policies and Ordinances information presented in the 2013 FEIR, Section 3.8, Geologic Hazards, is applicable to the Project Modifications. The municipalities in the study area are obligated by the State of California to have general plan safety elements/zoning codes that address geotechnical, subsurface, and seismic concerns.

Grading Codes

The local Grading Code (and associated California Building Code [CBC]) information presented in the 2013 FEIR, Section 3.8, Geologic Hazards, is applicable to the Project Modifications. The municipalities in the study area have engineering, building, and safety or planning departments that administer and oversee regulatory requirements related to geotechnical, subsurface, and seismic concerns. The requirements of these municipalities are based on the CBC or local building codes such as the County of Los Angeles Building Codes, which are also based on the CBC.

3.6.2 Existing Conditions

The following subsections describing the existing conditions are from the 2013 FEIR and have been revised as needed due to updates to the technical information, and/or as applicable to address the Project Modifications.

The 2013 FEIR, Section 3.8.1.3, Existing Conditions, indicates “[t]he Study Area is located along the Atchison, Topeka & Santa Fe railroad right-of-way in the San Gabriel Valley. The Study Area includes the existing rail alignment and the adjacent buffer zone, which extends 1,000 feet along both sides of the railroad. Most of the project alignment lies within areas of commercial and residential development.” This information is applicable to the Project Modifications. The area of the Pomona Station Refinement is included within the 1,000-foot buffer zone (on either side of the existing railroad right-of-way), which composed the larger study area identified in the 2013 FEIR. The area of the new traffic mitigation measure (LTR-9) extends approximately 1,000 feet past the northern end of the 2013 FEIR Buffer Zone; however, Section 3.8.1.3 is also valid for the area of LTR-9. This area is immediately adjacent to the 2013 FEIR Buffer Zone and, for the reasons described below, the geologic conditions are the same as those along White Avenue within the Buffer Zone.

3.6.2.1 Site Description

The 2013 FEIR, Section 3.8.1.4, Site Descriptions, indicates “[t]he project alignment is located on generally flat to gently inclined terrain along its 12.3-mile length. Elevations along the alignment range from approximately 610 feet above mean sea level in Glendora to 1,180 feet above mean sea level in Montclair. Elevations vary locally across major washes (intermittent streams) and rivers. The San Gabriel Mountains lie one to two miles north of the Study Area. Three isolated hills-South Hills, Way Hill, and the

Puente Hills-are elevated above the valley south of the San Gabriel mountains along or north and south of the project alignment."

This information is applicable to the Project Modifications. The topography in the area of the Pomona Station Refinement and the new traffic mitigation measure (LTR-9) area is flat to gently inclined.

3.6.2.2 Regional and Local Geologic Setting

The 2013 FEIR, Section 3.8.1.5, Regional and Local Geologic Setting indicates "[t]he project alignment is located in the Transverse Range geomorphic province of Southern California, which extends approximately 300 miles westward from the Mojave Desert to the Pacific Ocean. The Study Area lies within the northeastern portion of the Los Angeles Basin at the base of the San Gabriel Mountains. The Los Angeles Basin is a large trough, filled with marine and non-marine sediments. Deposition of marine sediments began approximately 65 million years ago in a deep, structural trough that existed off the coast of Southern California (Yerkes 1972). Over time, sedimentation slowly filled the trough with thousands of feet of sediments. About seven million years ago, as sedimentation continued, an eastward shift of the boundary between the Pacific and North American Plates began shaping the Los Angeles Basin from this deep trough. Deformation of the basin along contractional faults acted to shorten the basin in a north-south direction and uplift the bedrock units to form hills and mountains. Approximately two to five million years ago, the Elysian, Repetto, and Puente Hills were uplifted, predominately along northwest-trending faults (Shaw and Suppe 1996). Shortening of the Los Angeles Basin and San Gabriel Valley continues today along generally east-west trending faults (Shaw and Suppe 1996; Shaw et al. 2002 ; Fuis et al. 2001)."

This information is applicable to the Project Modifications. The study area, including the Project Modifications, is located at the boundary of the Transverse Ranges and Peninsular Ranges Geomorphic Provinces of Southern California, within the Los Angeles Basin. The Peninsular Ranges province is characterized by a series of northwest-trending mountains, valleys, and faults (such as the Chino fault), all of which generally parallel the San Andreas Fault system.

Local Geology

The 2013 FEIR, Section 3.8.1.5, Local Geology, indicates "[t]he San Gabriel Valley is bound on the northwest by the Verdugo Mountains and Raymond Hill fault system, on the north by the San Gabriel Mountains, on the east by the San Jose Hills, on the south by the Puente Hills, and on the southwest by the Repetto Hills Elysian Park Anticline. The Repetto Hills are the surface expression of the Elysian Park Anticline, which is an elongated west-northwest trending fold belt in the shape of a dome. The San Gabriel Valley floor is composed primarily of unconsolidated recent alluvial fan and stream deposits, consisting predominately of sands and gravels derived from the surrounding mountains and hills, with finer clays and silts deposited over the broad floodplain of the rivers and streams that flow into the basin. These recent deposits are underlain by a thick sequence of late Cretaceous- to Pleistocene-age marine and non-marine sedimentary rock units that are locally intruded by middle Miocene-age volcanic rocks. The sedimentary sequence that overlies the basement complex ranges from Miocene-age plutonic rocks in the eastern portion of the San Gabriel Valley to Precambrian-age plutonic rocks in the northern San Gabriel Valley. The bedrock units within the San Gabriel Valley are exposed at the base of the mountains and foothills north and south of the project alignment.

The San Gabriel Valley is an almost-enclosed basin drained by the Rio Hondo and San Gabriel Rivers. The deepest part of the San Gabriel Basin lies beneath the San Gabriel River where approximately 4,000 to 6,000 feet of Upper Pleistocene- to Holocene-age (approximately one million years ago to recent) sediments are deposited."

The information is applicable to the Project Modifications. The Pomona Station Refinement and the new traffic mitigation measure (LTR-9) areas are located within the San Gabriel ValleyLocal Geologic Units

The 2013 FEIR, Section 3.8.1.5, Local Geologic Units, describes the geologic units that underlie the study area based on California Geological Survey (CGS) geologic maps. The distribution of geologic units mapped in the study area has not substantially changed. The geology of the Pomona Station Refinement and new traffic mitigation measure (LTR-9) area is mapped as Quaternary Young Alluvial Fan Deposits (unit Qyf) in the 2013 FEIR Figure 3.8-1 – Regional Geologic Map.

3.6.2.3 Regional Faulting and Seismicity

The 2013 FEIR, Section 3.8.1.6, Regional Faulting and Seismicity indicates "[t]he two principal seismic considerations for most sites in Southern California are surface rupture along active fault traces and damage to structures caused by to seismically induced ground shaking. Surface rupture occurs during an earthquake when movement along an active fault breaks the ground surface. Strong ground shaking may also affect any area of Southern California to varying degrees because of the proximity and earthquake potential of nearby active faults, and because of the local geologic and topographic conditions that can either amplify or attenuate the seismic waves. Seismic hazards that may affect the project alignment include primary hazards from surface rupturing of the ground surface along active fault traces, and secondary hazards resulting from strong ground shaking."

The information is applicable to the Project Modifications. The Pomona Station Refinement and new traffic mitigation measure (LTR-9) areas are located in Southern California and may experience significant seismic shaking and associated secondary effects as discussed in the following subsections.

Surface Rupture

The 2013 FEIR, Section 3.8.1.6, Surface Rupture, indicates "[s]urface rupture can devastate structures built across an active fault. A fault is considered active if there is evidence of movement (either directly observable or inferred) along one or more of its segments in the last 11,000 years. Figure 3.8-2 in the 2013 FEIR shows the project alignment and the active and potentially active faults in the region. To protect structures from the hazard of ground-surface rupture along a fault line, the CGS, under the State-mandated *Alquist-Priolo Earthquake Fault Zoning Act,* has delineated "earthquake fault zones" along well-defined active or potentially active faults. No earthquake fault zone crosses the project alignment; however, the Duarte and San Jose Faults and other local faults are known to cross the project alignment, and many active and potentially active faults are located in the region (2013 FEIR, Figure 3.8-2). Ground rupture from these faults and strong ground shaking from an earthquake on one of these regional faults could adversely affect the Study Area."

This information is applicable to the Project Modifications. No known active faults transect the area of the Pomona Station Refinement and the new traffic mitigation measure (LTR-9) areas, and these locations are not within an Alquist-Priolo Earthquake Fault Zoning Act – Earthquake Fault Zone.

Seismic Shaking

The 2013 FEIR, Section 3.8.1.6, Seismic Shaking, presents a general discussion on seismic shaking, provides a preliminary estimate of the level of ground shaking (peak ground acceleration [PGA[3]]) anticipated for the study area, and presents the Modified Mercalli Scale (a scale used to document the intensity of seismic shaking that occurred in a specific area).

The 2013 FEIR, Section 3.8.1.6, Seismic Shaking, indicates "[t]he Study Area is likely to experience strong ground shaking during its lifetime. The intensity of ground shaking at a given location along the project alignment would depend primarily upon the earth quake's magnitude, faulting mechanism, distance from the seismic source (focus), and the site response characteristics (Petersen et al. 1998).

[3] PGA is expressed as a percentage of the acceleration due to gravity (g).

The intensity of shaking is generally amplified in areas underlain by deep deposits of loose, unconsolidated soils. The most common effects of strong seismic shaking include liquefaction and its related ground deformations, dynamic settlement, and landsliding….” This information is applicable to the Project Modifications.

The PGA for the Project Modifications has been calculated using current (February 2019) resources available from USGS. Using an earthquake reoccurrence interval of roughly 2,475 years (2 percent probability of exceedance in 50 years), the 2013 FEIR indicated that the PGA near the Pomona Station Refinement and LTR-9 area varies from approximately 0.96g (g is Earth’s constant gravitation acceleration) to 0.99g. An estimated PGA of 0.98g has been calculated for the Pomona Station parking facility and 0.99g for the LTR-9 area using current resources. These results are very similar to that indicated in the 2013 FEIR. The actual PGA to be used during design would be calculated on a structure-specific basis, in accordance with the design requirements of the structure.

The 2013 FEIR, Section 3.8.1.6, Seismic Shaking, indicates that “[a]nother way of describing the intensity of an earthquake at a particular site is based on the observations of individuals during and after the earthquake. This represents the severity of shaking, as perceived by those who experienced it. It is also based on observations of damage to structures, movement of furniture, and changes in the earth's surface as a result of tectonic deformation during the earthquake. The Modified Mercalli Intensity Scale is commonly used to quantify intensity descriptions. The intensity scale ranges from I to XII (Table 3.6-1).

Table 3.6-1. Modified Mercalli Intensity Scale

I	Not felt by people, except under especially favorable circumstances. However, dizziness or nausea may be experienced. Sometimes birds and animals are uneasy or disturbed. Trees, structures, liquids, bodies of water may sway gently, and doors may swing very slowly.
II	Felt indoors by a few people, especially on upper floors of multistory buildings and by sensitive or nervous persons. As in Level I, birds and animals are disturbed, and trees, structures, liquids, and bodies of water may sway. Hanging objects swing, especially if they are delicately suspended.
III	Felt indoors by several people, usually as a rapid vibration that may not be recognized as an earthquake at first. Vibration is similar to that of a light truck, or lightly loaded trucks passing nearby, or heavy trucks some distance away. Duration may be estimated in some cases. Movements may be appreciable on upper levels of tall structures. Standing cars may rock slightly.
IV	Felt indoors by many, outdoors by few. Awakens a few individuals, particularly light sleepers, but frightens no one except those apprehensive from previous experience. Characterized by vibration like that due to passing of heavy or heavy loaded trucks, sensation like a heavy body striking building, or the falling of heavy objects inside. Dishes, windows, and doors rattle; glassware and crockery clink and clash. Walls and house frames creak, especially if intensity is in the upper range of this level. Hanging objects often swing. Liquids in open vessels are disturbed slightly. Stationary cars rock noticeably.
V	Felt indoors by practically everyone, outdoors by most people. Direction can often be estimated by those outdoors. Awakens many or most sleepers. Frightens a few people, with slight excitement; some persons run outdoors. Buildings tremble throughout. Dishes and glassware break to some extent. Windows crack in some cases, but not generally. Vases and small or unstable objects overturn in many instances, and a few fall. Hanging objects and doors swing open or close abruptly. Pendulum clocks stop, or run fast or slow. Small objects move, and furnishings may shift to a slight extent. Small amounts of liquids spill from well-filled open containers. Trees and bushes shake slightly.
VI	Felt by everyone, indoors and outdoors. Awakens all sleepers. Frightens many people; results in general excitement, and some persons run outdoors. Persons *move* unsteadily. Trees and bushes shake slightly to moderately. Liquids are set in strong motion. Small bells in churches

Table 3.6-1. Modified Mercalli Intensity Scale

	and schools ring. Poorly built buildings may be damaged. Plaster falls in small amounts. Other plaster cracks somewhat. Many dishes and glasses, and a few windows, break. Knickknacks, books, and pictures fall. Furniture overturns in many instances. Heavy furnishings *move.*
VII	Frightens everyone. General alarm, and everyone runs outdoors. People find it difficult to stand. Persons driving cars notice shaking. Trees and bushes shake moderately to strongly. Waves form on ponds, lakes, and streams. Water is muddied. Gravel or sand banks along streams cave in. Large church bells ring. Suspended objects quiver. Damage is negligible in buildings of good design and construction, slight to moderate in well-built ordinary buildings, and considerable in poorly built or badly designed buildings, adobe houses, old walls (especially where laid up with mortar), spires, etc. Plaster and some stucco fall. Many windows and some furniture break. Loosened brickwork and tiles shake down. Weak chimneys break at the roofline. Cornices fall from towers and high buildings. Bricks and stones are dislodged. Heavy furniture overturns. Concrete irrigation ditches are considerably damaged.
VIII	General fright, and alarm approaches panic. Persons driving cars are disturbed. Trees shake strongly, and branches and trunks break off (especially palm trees). Sand and mud erupt in small amounts. Flow of springs and wells is temporarily and sometimes permanently changed. Dry wells renew flow. Temperatures of spring and well waters vary. Damage is considerable in ordinary substantial buildings, with some partial collapse, and heavy in some wooden houses, with some tumbling down. Panel walls break away in frame structures. Decayed pilings break off. Walls fall. Solid stone walls crack and break seriously. Wet grounds and steep slopes crack to some extent. Chimneys, columns, monuments, and factory stacks and towers twist and fall. Very heavy furniture moves conspicuously or overturns.
IX	General panic. Ground cracks conspicuously. Damage is great in masonry structures and buildings, with some collapsing in large part. Some wood frame houses built especially to withstand earthquakes are thrown out of plumb; others are shifted wholly off foundations. Reservoirs are seriously damaged, and underground pipes sometimes break.
X	Most masonry and frame structures and their foundations are destroyed. Ground, especially where loose and wet, cracks up to widths of several inches; fissures up to a yard in width run parallel to canal and stream banks. Landsliding is considerable from riverbanks and steep coasts. Sand and mud shift horizontally on beaches and flat land. Water level changes in wells. Water is thrown on banks of canals, lakes, rivers, etc. Dams, dikes, and embankments are seriously damaged. Well-built wooden structures and bridges are severely damaged and some collapse. Dangerous cracks develop in excellent brick walls. Railroad rails bend slightly. Pipelines buried in earth tear apart or are crushed endwise. Open cracks and broad wavy folds open in cement pavements and asphalt road surfaces.
XI	Few masonry structures remain standing. Disturbances in ground are many and widespread, varying with the ground material. Broad fissures, earth slumps, and landslips develop in soft, wet ground. Water charged with sand and mud is ejected in large amounts. Sea waves of significant magnitude may develop. Damage is severe to wood frame structures, especially near epicenter, and great to dams, dikes and embankments, even at long distances. Supporting piers or pillars of large, well-built bridges are wrecked. Wooden bridges that "give" are less affected. Railroad rails bend greatly and some thrust endwise. Pipelines buried in earth are put completely out of service.
XII	Damage is nearly total. Practically all works of construction are damaged greatly or destroyed. Disturbances in the ground are great and varied, and numerous shearing cracks develop. Landslides, rockfalls, and slumps in riverbanks are numerous and extensive. Large rock masses are wrenched loose and torn off. Fault ruptures develop in firm rock, and horizontal and vertical displacements are noted. Water channels, both surface and underground, are disturbed and modified greatly. Lakes are dammed, new waterfalls are produced, rivers are deflected, etc.

Table 3.6-1. Modified Mercalli Intensity Scale	
	Surface waves are seen on ground surfaces. Lines of sight and level are destroyed. Objects are thrown upward into the air.

Magnitude (Moment Magnitude) and Intensity (Modified Mercalli Intensity Scale) measure different characteristics of earthquakes. magnitude measures the energy released at the source of the earthquake; intensity is determined from the effects on people, human structures, and natural environment. A comparison of Magnitude and Intensity for the faults at each station is provided in the Construction-Period Impacts subsection.

The greatest impact of an earthquake is usually in the epicenter, with lower intensities occurring in zones outward from the epicenter. The quality of construction and variation of geologic conditions also affect the distribution of intensity. Some buildings are safer than others, depending on design, foundation, location, and furnishings. Most buildings constructed on bedrock suffer less damage than those constructed on thick alluvium (unconsolidated sediments) or fill.

This information is applicable to the Project Modifications.

Nearby Active Faults

The 2013 FEIR, Section 3.8.1.6, Nearby Active Faults indicates "[n]umerous active and potentially active faults lie within a few miles of the Study Area. Descriptions of the more prominent faults near the site and a few that cross the alignment are provided below. The descriptions indicate the type of fault, approximate distance to the proposed alignment, maximum potential earthquake in terms of magnitude (M). M is a measurement of an earthquake ' s magnitude based on area of the fault, amount of movement during the earthquake, and the strength of the rocks ruptured during the earthquake."

This information is applicable to the Project Modifications. Updates to the 2013 FEIR information are presented below.

Red Hill Fault

The Red Hill Fault was not addressed in the 2013 FEIR text, although it is depicted on the 2013 FEIR Regional Fault Map, Figure 3.8-2. The Red Hill Fault (also known as the Etiwanda Avenue Fault) is mapped approximately 4 miles east-northeast of the eastern end of the alignment. According to the Southern California Earthquake Data Center, the fault is approximately 15 miles long, although the eastern 9 miles of the fault are thought to be part of the Sierra Madre-Cucamonga Fault Zone. The Red Hill Fault is a thrust fault with a maximum magnitude of 6 to 7. The slip rate of the fault is unknown. This fault would be considered during development of the PGA value (estimated amount of seismic shaking) used for the design of the Proposed Project.

Chino Fault

The 2013 FEIR, Section 3.8.1.6, Chino Fault indicates "[t]he Chino Fault, located about 4.5 miles east of the eastern terminus of the Study Area, is the northward extension of the Elsinore Fault Zone, which is north of the Puente Hills (Figure 3.8-2). Offset drainages, fault scarps, and trench excavations show that this is an active fault with predominately right-lateral strike-slip motion (Dolan et al. 2001). It has been estimated that the Chino Fault could generate a maximum magnitude 6.7 earthquake."

This information is applicable to the Project Modifications. However, the 2013 FEIR indicates that this fault is located "about 4.5 miles east of the eastern terminus of the Study Area." Following an updated review of this information, the Chino Fault is located about 4 miles south of the Pomona Station Refinement area.

Clamshell-Sawpit Fault

The 2013 FEIR, Section 3.8.1.6, Clamshell-Sawpit Fault, indicates "[t]he Clamshell-Sawpit Fault is located approximately six miles northwest of the eastern end of the project. It is a 10 -mile-long, north-to-northeast dipping fault zone that branches northeastward from the Sierra Madre Fault Zone (Cao et al. 2003, Leighton 1990). It has a slip rate of 0.06 to 0.1 inch per year and could produce a magnitude 6.5 earthquake (Cao et al. 2003, Dolan et al. 1995)."

This information is applicable to the Project Modifications. However, the 2013 FEIR indicates that this fault is located "approximately six miles northwest of the eastern end of the project." Following an updated review of this information, the Clamshell-Sawpit Fault is located about 6 miles northwest of the western end of the Project.

Duarte Fault

The 2013 FEIR, Section 3.8.1.6, Duarte Fault, indicates: "[t]he Duarte Fault is a southern splay of the main Sierra Madre Fault trace that is adjacent to the Study Area (Figure 3.8-2), approximately 1.0-mile west of the proposed Glendora Station, in Azusa. It has been mapped (Morton 1973, Crook et al. 1987) as scarps within the older and younger alluvial fan deposits emanating from Bradbury, Spinks, and Monrovia Canyons north of Duarte and Azusa. Multiple groundwater barriers north of Azusa indicate the presence of an Upper Duarte Fault, which has an inferred trace a few thousand feet north of the Duarte Fault (Crook et al. 1987). The Upper Duarte and Duarte Faults have not been zoned under the Alquist-Priolo Act because the timing of their latest movements has not been determined; however, the Duarte Fault is considered active by the County of Los Angeles (Leighton 1990). The CGS has not delineated the Duarte Fault as active at this time."

This information on the Duarte Fault is applicable to the Project Modifications. The 2013 FEIR indicates that this fault is located "approximately 1.0 mile west of the proposed Glendora Station." Following an updated review of this information, the Duarte Fault is located approximately 1.0 mile northwest of the proposed Glendora Station.

Puente Hills Blind-Thrust Fault

The 2013 FEIR, Section 3.8.1.6, Puente Hills Blind-Thrust Fault, indicates "[m]ovement on the Puente Hills Blind-Thrust Fault caused the 1987 Whittier Narrows earthquake. Blind-thrust faults are located in the subsurface with no mapped fault trace at the ground surface. The focus of the 1987 event was approximately eight miles below the San Gabriel Valley near Whittier Narrows. This fault does not reach the surface, and a fold has formed above the fault at or just below the ground surface (Shaw and Shearer 1999; Pratt et al. 2001; Christofferson et al. 2001; Dolan et al. 2003). To the north of the 1987 focus, the fault flattens and continues beneath the San Gabriel Mountains and merges with the Sierra Madre - Cucamonga Fault system (Fuis et al 2001). The Puente Hills Blind-Thrust Fault is located in the subsurface west of the Study Area and could produce a maximum 7.1 M earthquake (Cao et al. 2003; Petersen et al. 1996)."

The information is applicable to the Project Modifications. No updates to existing conditions have been identified.

Raymond Hill Fault

The 2013 FEIR, Section 3.8.1.6, Raymond Hill Fault, indicates "[t]he Raymond Hill Fault extends across the Los Angeles Basin from the Los Angeles River to the foot of the San Gabriel Mountains west of the Study Area. Its trace trends roughly east-west at the western portion, then curves to an east-northeast trend in the eastern portion (Figure 3.8-2). This fault has been delineated as an earthquake fault zone under the Alquist-Priolo Act (Bryant and Hart 2007).Indications that the Raymond Hill Fault is a predominately a left-lateral strike-slip fault are its left-lateral offset of a basement ridge at its eastern termination, and a suite of geomorphic observations, including pressure ridges, sag ponds, and left-lateral stream deflections along its trace (Crook et al. 1987; Jones et al. 1990; Weaver and Dolan 2000). Seismic evidence and aftershock analyses indicate that the 1988 Pasadena earthquake occurred on the Raymond Hill Fault (Jones et al. 1990). This fault could produce a magnitude 6.5 M earthquake, and has a slip rate of 0.06 to 0.04 inch per year (Marin et al. 2000).

Evidence from fault trenching (Crook et al. 1987; Weaver and Dolan 2000) suggests the most recent surface-rupturing event occurred more than 1,000 years ago."

This information is applicable to the Project Modifications. No updates to existing conditions have been identified.

San Andreas Fault Zone

The 2013 FEIR, Section 3.8.1.6, San Andreas Fault Zone, indicates "[t]he San Andreas Fault is the longest and most well-known fault in California. Its activity is known from historic earthquakes- most notably the 1857 and 1906 earthquakes - and from many fault studies that have shown that the San Andreas offsets (or displaces) recently deposited alluvial sediments. The closest portion of the San Andreas Fault to the Study Area is the San Bernardino segment, which is located about 16 miles to the east-northeast and is considered the most active segment of the San Andreas Fault system. This segment could produce a maximum magnitude 7.1 earthquake (Petersen et al. 1996; Cao et al. 2003)."

This information is applicable to the Project Modifications. However, following an updated review of this information, at its closest point to the project alignment, the San Andreas Fault Zone (San Bernardino Segment) is located approximately 17 miles northeast of the eastern end of the project terminus.

San Jacinto Fault Zone

The 2013 FEIR, Section 3.8.1.6, San Jacinto Fault Zone, indicates "[t]he San Jacinto Fault Zone extends more than 124 miles northwest from El Centro to Cajon Pass, California, where it intersects with the San Andreas Fault. Movement along this fault is predominately right-lateral strike-slip with minor amounts of dip-slip displacement. This fault zone is segmented along its entire length into smaller sub-parallel stands and cross faults. The closest segment to the Study Area is the San Bernardino segment, which is approximately 12.5 miles from the eastern terminus of the project alignment. The San Jacinto Fault Zone has produced more moderate to large earthquakes than any other fault zone in Southern California (Petersen and Wesnousky 1994). The most recent earthquake occurred November 24, 1987, on the Superstition Hills Fault segment, approximately 90 miles east of San Diego. Up to approximately 5 inches of surface displacement was observed for this magnitude 6.2 seismic event. Along the length of the fault, slip rate data are variable, ranging from approximately 0.08 to almost 0.8 inch per year. The slip rate for the San Bernardino segment is unknown, but the fault could produce a maximum magnitude 6.7 earthquake (Petersen et al. 1996; Cao et al. 2003)."

This information is applicable to the Project Modifications. However, following an updated review of this information, at its closest point to the project alignment, the San Jacinto Fault Zone (San Bernardino Segment) is located approximately 15 miles northeast of the eastern project terminus.

San Jose Fault

The 2013 FEIR, Section 3.8.1.6, San Jose Fault, indicates "[t]he San Jose Fault is an 11- to 14-mile -long fault that splays west-southwest from the Cucamonga-Sierra Madre Fault Zone in the Upland area and continues southwest along the southern boundary of the San Jose Hills. The fault crosses the project alignment approximately 0.5-mile west of the proposed Claremont Station. The fault has been mapped based on a water barrier near the Study Area that reportedly impedes the flow of groundwater, with groundwater levels on the north side of the fault higher than water levels on the south side of the fault (Tinsley et al. 1985; Los Angeles County Department of Public Works 1996). Two Upland earthquakes of

1988 and 1990 have been attributed to this fault (Hauksson and Jones 1991). Analyses of these earthquakes indicate the San Jose Fault has left-lateral strike-slip motion on a northeast-oriented fault plane. However, apparent dip-slip separation of a buried aquifer offset across the fault, plus subsurface mapping suggest the San Jose Fault may be a reverse fault (Yeats 2001; Hauksson and Jones 1991). An earthquake on this fault, rupturing the entire length of the fault, could produce a maximum magnitude 6.5 earthquake (Cao et al. 2003), with the potential to cause offset to the project alignment."

This information is applicable to the Project Modifications. No updates to existing conditions have been identified.

Sierra Madre-Cucamonga Fault Zone

The 2013 FEIR, Section 3.8.1.6, Sierra Madre-Cucamonga Fault Zone, indicates "[t]he Sierra Madre-Cucamonga Fault Zone includes several fault segments that extend more than 86 miles along the southern margin of the San Gabriel Mountains. The two main portions of this fault zone include the Sierra Madre Fault to the west and the Cucamonga Fault to the east. The fault zone is inclined to the north, dipping below the San Gabriel Mountains and uplifting them above the Los Angeles Basin. The 1971 San Fernando earthquake near the town of Sylmar is attributed to movement along the San Fernando Fault, a splay of the Sierra Madre Fault Zone. The Sierra Madre Fault Zone passes through the northern portions of Glendora, and portions of San Dimas. The Sierra Madre Fault is less than one mile at its closest point to the project alignment north of Glendora. This fault segment could produce a maximum magnitude 7 earthquake (Cao et al. 2003; Petersen et al. 1996).

The Cucamonga Fault is the eastern extent of the Sierra Madre Fault Zone and lies to the north of Pomona, Claremont, and Montclair. It is located 2.2 miles north of Claremont at its closest point to the Study Area. This segment of the Sierra Madre-Cucamonga Fault Zone could produce a maximum magnitude 7 earthquake (Cao et al. 2003; Petersen et al. 1996)."

This information is applicable to the Project Modifications. This fault zone, at its closest point to the alignment is located approximately 1.2 miles north of the northern end of the White Avenue Mitigation Measure (LTR-9) area.

Upper Elysian Park Blind-Thrust Fault

The 2013 FEIR, Section 3.8.1.6, Upper Elysian Park Blind Thrust Fault, indicates "[t]he Upper Elysian Park Blind-Thrust Fault does not intersect with the ground surface. This fault is expressed as an elongated group of low hills (Elysian Park Hills, Repetto Hills and Monterey Hills) extending approximately 12.4 miles from northern Los Angeles to San Gabriel (Dolan et al. 2001). These hills are Pliocene to Quaternary-aged (approximately two million years old) folded sediments that have been uplifted and folded along the northeast-dipping fault. The Elysian Park Blind-Thrust Fault has a slip rate of 0.04 to 0.07 inch per year and could produce a maximum magnitude 6.4 earthquake (Cao et al. 2003, Oskin et al. 2000). It is located west of the Study Area."

This information is applicable to the Project Modifications. No updates to existing conditions have been identified.

Whittier Fault

The 2013 FEIR, Section 3.8.1.6, Whittier Fault, indicates "[t]he Whittier Fault is the northwestward extension of the Elsinore Fault Zone, a 155-mile-long fault zone traced from Los Angeles, California, to northern Baja California, Mexico. The Whittier segment is approximately 24 .8 miles long and extends from the Whittier Narrows section of the San Gabriel River southeastward to the Santa Ana River. Although no major historical earthquakes have been attributed to the Whittier Fault, studies (most of which included trenching) completed by several investigators have documented movement on this fault in the last 11,000 years (Leighton et al. 1987, Rockwell et al. 1988, Gath et al. 1992, Patterson and

Rockwell 1993). The closest section of the Whittier Fault lies approximately 10.5 miles southwest of the Study Area. A maximum 6.8 M earthquake has been estimated for this fault (Cao et al. 2003, Petersen et al. 1996).”

This information is applicable to the Project Modifications. However, following an updated review of this information, at its closest point to the study area, the Whittier Fault is located approximately 12 miles to the southwest.

Local Faults

The 2013 FEIR, Section 3.8.1.6, Local Faults, indicates “[l]ocal faults include short, inferred faults that cross the Study Area and either are not considered active, or their activity has yet to be determined because of their inaccessibility (i.e., buried). In the northeastern San Gabriel Valley, three faults have been identified based on ground water barriers observed by the California Department of Water Resources. The San Jose Fault (discussed above) is oriented northeast- southwest along the southern edge of the San Jose Hills and has been determined to be the causative fault of the 1988 and 1990 Upland earthquakes (Hauksson and Jones 1991). Walnut Creek Fault has an inferred location on the north side of the San Jose Hills and is oriented roughly parallel to the San Jose Fault. The Indian Hill Fault, also called the Way Hill-Lone Hill Fault, is known to exist based on differences in groundwater levels across this part of the San Gabriel Valley (California Department of Water Resources 2003 and 1966). This fault has been mapped along the trend of Way and Lone Hills east to the Cucamonga Fault.”

This information is applicable to the Project Modifications. No updates to existing conditions have been identified.

3.6.2.4 Subsidence

The 2013 FEIR, Section 3.8.1.7, Subsidence, indicates “[i]n California, subsidence related to human activities has been attributed to withdrawal of subsurface fluids, such as oil and groundwater; oxidation of subsurface organic material, such as peat and coal; and by hydro-consolidation (from excessive irrigation) of loose, dry soils in a semi-arid climate.

Withdrawal of groundwater has occurred in the San Gabriel Valley and along the project alignment for past agricultural activities. This practice has been greatly reduced over the years because of urbanization. As a result, groundwater elevations in the San Gabriel Valley have risen or remained constant in recent years (California Department of Water Resources 2003). A majority of the San Gabriel Valley and the project alignment is underlain by alluvial deposits that can include isolated organic-rich soils and floodplain deposits. Subsidence due to oxidation of these deposits is possible. The extent or exact locality of such subsidence would be determined during standard geotechnical investigations for the proposed stations and alignment. Given that groundwater withdrawal is highly regulated, subsidence is not expected to be a substantive concern.”

This information is applicable to the Project Modifications, and no updates to existing conditions have been identified. Regional subsidence is not expected to be a substantive concern to the Pomona Station parking facility or the White Avenue Mitigation Measure (LTR-9) area.

3.6.2.5 Volcanic Hazards

The 2013 FEIR, Section 3.8.1.8, Volcanic Hazards, indicates “[h]azards from nearby volcanic activity may include surface rupture, lava flows, and ash falls. Amboy Crater is the closest potentially active volcano to the Study Area and lies approximately 100 miles northeast of the alignment. The Study Area is not within the potential hazard area of the Amboy Crater volcanic area. Accordingly, impacts related to volcanic hazards would be considered minimal.”

This information is applicable to the Project Modifications, and no updates to existing conditions have been identified. Potential impacts to the Pomona Station parking facility and the White Avenue Mitigation Measure (LTR-9) area related to volcanic hazards are considered to be minimal.

3.6.2.6 Slope Stability

The 2013 FEIR, Section 3.8.1.9, Slope Stability, indicates "[m]ost of the project alignment is located on flat terrain. The few slopes that exist are those constructed for railroad bridges to cross above local roads and streams. These manmade slopes appear in good, stable condition. However, within the alignment buffer zone there are a few areas where slope instability could exist, particularly during an earthquake. These areas are mapped as potential seismically induced landslide zones on the Seismic Hazard Zones Maps and Reports (Figure 3.8-4) (California Division of Mines and Geology 1999a, 1999b, 1999c, and 1999d; Perez et al. 1998; Schlosser and Wills 1998a and 1998b). A seismically induced landslide zone is an area where previous landslides have occurred or an area where conditions exist for potential permanent ground displacement such that mitigation (as defined in Public Resources Code Section 2693 (c)) would be required. These areas include the northern slopes of the South Hills and Puente Hills. In these areas, seismically induced landslides could occur if shaking from an earthquake were to cause preexisting landslides to reactivate or trigger new landslides along planes of weakness. For the rest of the alignment, which is not within the seismically induced landslide zones, the potential for this hazard is low."

This information is applicable to the Project Modifications. Neither the Pomona Station Refinement nor the White Avenue Mitigation Measure (LTR-9) area is located within a seismically induced landslide hazard zone, and the potential for slope instability is low.

3.6.2.7 Groundwater

The 2013 FEIR, Section 3.8.1.10, Groundwater, indicates "[t]he San Gabriel Valley Groundwater Basin is structurally bound by the Raymond Fault and Sierra Madre -Cucamonga Fault Zone to the north and northwest, the Puente and Repetto Hills to the south, and the San Jose and Chino Faults to the southeast. Groundwater is contained in the older and more recent alluvium shed from the San Gabriel Mountains and is transported to the basin mainly by the Rio Hondo and San Gabriel river drainage systems and associated tributaries (California Department of Water Resources 2003).

Historically high groundwater levels vary across the basin, which is due, in part, to faults that act as groundwater barriers and depth of sediments contained in the intervening valleys bounded by range fronts and smaller hills within the basin. Generally, groundwater depth ranges from 10 feet bgs to 200 feet bgs near the western end of the Study Area. As the alignment trends southeast, groundwater rises, ranging from 150 to 100 feet bgs near the Glendora Station, and rises southerly until the alignment crosses the southeastern portion of South Hills where groundwater is only 30 to 50 feet bgs. Between the South Hills and Puente Hills to the southeast, groundwater again deepens to 100 feet bgs near the San Dimas Station, and rises as the alignment nears the northwestern slopes of the Puente Hills where groundwater elevations again rise to 30 to 50 feet bgs. As the alignment trends southeasterly from the flanks of the Puente Hills, groundwater deepens to 250 feet near the inferred San Jose and Indian Hill Faults, which act as groundwater barriers that impede flow, resulting in contrastingly different elevations across the inferred faults. Southerly of Claremont Station and west of San Antonio Creek, groundwater elevations across the faults vary by as much as 300 feet.

In general, depth to groundwater should be expected to vary significantly across the project alignment. The alignment predominately spans alluvial sediments deposited from varying formations with contrastingly different lithology. The nature of alluvial deposition (sedimentation) is such that permeable and less permeable sedimentary structures exist at varying depths below the alignment, allowing for perched groundwater conditions to develop during periods of extended rainfall or persistent irrigation. Based on interpretation of historically highest groundwater contours and borehole log data locations within the Glendora, Baldwin Park, San Dimas, and portions of the Ontario Quadrangles, groundwater can be anticipated to be shallowest (approximately 10 feet bgs) near the western end of the Study Area and deepest (approximately 250 feet bgs) near the Claremont Station. However, the reported levels are associated with historically high groundwater levels compiled from multiple well soundings and borings drilled over many years. Current groundwater levels in Southern California are generally not near their historically high levels generally because of human activities such as groundwater pumping, paving, and stormwater diversion channels."

This information is applicable to the Project Modifications. Based on the California Geological Survey Seismic Hazard Zone Reports, the historically highest groundwater level at the Pomona Station parking facility site is 75 to 100 feet below ground surface (bgs), and 100 to 130 feet bgs in the area of the White Avenue Mitigation Measure (LTR-9) area.

3.6.2.8 Soils

The 2013 FEIR, Section 3.8.1.11, Soil, indicates "[s]oils in the study area have been heavily disturbed by urban development, which often includes the importation of soils for fill. Since soils underlying the Study Area have proven capable of supporting rail infrastructure for over 100 years, no analysis of their characteristics was undertaken. All areas proposed for stations and parking have been previously developed; nonetheless, individual sites would be evaluated as part of the permitting processes to demonstrate that structural requirements are met (such as constructing on expansive soils) with the use of construction techniques that meet current state and federal requirements and compliance with applicable building codes.

Of concern in California is whether soils are prone to liquefaction during seismic events. Liquefaction often occurs in earthquake-prone areas underlain by young alluvium where the groundwater table is within 50 feet of the ground surface. Section 3.8.2.4 discusses the issues of liquefaction soils for each station/parking location and the capability of soils to adequately support the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater for each station/parking location."

This generalized information on soils, is applicable to the Project Modifications. No updates to existing conditions have been identified.

3.6.3 Environmental Impacts

The introductory text presented in the 2013 FEIR, Section 3.8.2, Environmental Impacts, is applicable to the Project Modifications. As indicated in the 2013 FEIR, Section 3.8.2, the severity of potentially significant geologic hazards varies along the alignment. Potential impacts are discussed for the specific locations of the design refinement and new mitigation measure in the two cities in the study area. Hazards related to subsidence, tsunamis, and volcanos are not discussed further in this report as these hazards are not anticipated to impact the project.

3.6.3.1 Evaluation Methodology

The evaluation methodology described in Section 3.8.2.1, Evaluation Methodology, of the 2013 FEIR is applicable to the Project Modifications. Consistent with the 2013 FEIR, the preliminary geotechnical assessment for this SEIR was conducted in accordance with California Geological Survey (CGS) Note 52 (*CGS, 1982 and 2001* in the 2013 FEIR; the CGS updated Note 52 in 2013), which provides guidance for the preparation of EIRs. CGS Note 52 identifies geologic hazards and conditions that must be evaluated for their potential impact to the proposed project/development.

This evaluation is based on readily available topographic maps, geologic maps, geologic hazard maps, and general plans available from the cities affected by the Project Modifications.

3.6.3.2 Impact Criteria

The impact criteria described in Section 3.8.2.2, Impact Criteria, of the 2013 FEIR, is applicable to the Project Modifications. Consistent with the 2013 FEIR, an impact on geologic and seismic resources is considered significant if the project would: expose people or structures to potential substantial adverse effects involving rupture of a known earthquake fault, strong seismic shaking, or landslides; or be located in an area underlain by erosive, liquefiable, and/or expansive soils.

Compliance with the above described thresholds serves to demonstrate that the potential geologic hazards would have less than significant impact on the Project Modifications, because the Project would be designed and constructed per design codes and standards that account for the potential geologic hazards. These codes and standards, such as Metro's Rail Design Criteria and the CBC, dictate that geotechnical design reports be prepared to address the proposed improvements and potential geologic hazards. These future geotechnical design reports would include geotechnical explorations (borings) that would provide structure specific data that would be used to design the structures and address potential geologic hazards.

Fault-Induced Ground Rupture

The general information on fault-induced ground rupture presented in the 2013 FEIR, Section 3.8.2.2, Fault-Induced Ground Rupture, is applicable to the Project Modifications. Fault-induced ground rupture occurs during an earthquake, as one block of earth is forced to move relative to another block of earth. This movement can physically rupture the ground surface along a fault line where the two blocks meet, creating a potential to expose people or structures to adverse effects such as foundation damage and/or structural collapse.

Seismic Shaking

The information on seismic shaking presented in the 2013 FEIR, Section 3.8.2.2, Seismic Shaking, is applicable to the Project Modifications. The PGA values estimated for the Pomona Station Refinement and White Avenue Mitigation Measure (LTR-9) area are presented above in the Seismic Shaking subsection of Section 3.6.2.3, Regional Faulting and Seismicity. The severity of ground shaking a site experiences during an earthquake depends on the earthquake's magnitude (or PGA), the distance from the site to the earthquake hypocenter (the three-dimensional location of the earthquake origin), and the subsurface conditions at the site. The PGA is measured relative to Earth's constant gravitational force, or "g." For example, an earthquake with a PGA of 1g represents ground shaking equivalent to the force of earth's gravity.

Secondary Effects of Seismic Shaking

The general information on the secondary effects of seismic shaking, including liquefaction, lateral spreading, seismically induced landslides, seismically induced inundation, and seismically induced inundation, presented in the 2013 FEIR, Section 3.8.2.2, is applicable to the Project Modifications. The Pomona Station Refinement and White Avenue Mitigation Measure (LTR-9) area are not located within a zone of required investigation for liquefaction or seismically induced landslides, as established by the CGS.

Liquefaction

During strong ground-shaking, loose, saturated cohesionless alluvial soils in the upper 50 to 75 feet bgs can experience a temporary loss of shear strength and ground deformations can occur, leading to liquefaction. Liquefaction can result in structural distress as the ground deformation occurs.

Lateral Spreading

In liquefiable areas, where the ground surface is gently sloped and/or has a free face (such as a river bank), there is a potential for lateral spreading to occur. Lateral spreads develop on a relatively continuous layer of liquefiable soil that is present near the ground surface. Seismic and gravitational forces can cause the soil mass to move on the liquefied soil layer. Lateral spreading can result in structural distress as the ground moves.

Seismically Induced Landslides

A seismically induced landslide is a landslide in which movement is initiated by earthquake shaking. The potential for seismically induced landslides to occur depends on the steepness of the slope, strength and structure of the soil/rock, groundwater depth and extent, and level of ground shaking.

Seismically Induced Settlement

Loose, unsaturated granular soils are susceptible to seismically induced settlement. This could include alluvial soils that are situated above the groundwater table. This settlement of granular soils can result in total and differential settlement of soils supporting structures and utilities. The magnitude of these settlements depends on the type of structure, the characteristics of the soil below the structure, and the level of ground shaking.

Seismically Induced Inundation

This hazard can occur when an earthquake causes catastrophic failure of a water-retaining structure such as a reservoir, dam, or levee, and subsequent flooding occurs due to the release of water from the structure.

Soil Properties

The general information on the adequacy of soils to support the use of septic tanks or alternative wastewater disposal systems presented in the 2013 FEIR, Section 3.8.2.2, Soil Properties, is applicable to the Project Modifications. Some subsurface conditions are not suitable to support the use of septic tanks or alternative wastewater disposal systems where sewer systems are not in place. The study area is served by municipal sewer systems and as such, the suitability of soils to support septic or alternative wastewater disposal system is not addressed further.

3.6.3.3 Short-Term Construction Impacts

The discussion on short-term construction impacts presented in the 2013 FEIR, Section 3.8.2.3, is applicable to the Project Modifications. The Pomona Station Refinement and the new traffic mitigation measure, LTR-9, would not have any elements that would be affected by geologic or seismic hazards during construction. Specific design elements associated with these two design refinements would be subject to geologic and seismic influences during construction; however, these influences would be the same as the Proposed Project as a whole. Therefore, no new or more severe significant impacts would result.

3.6.3.4 Long-Term Impacts

In Section 3.8.2.4, Build Alternative, of the 2013 FEIR, the impact determinations are separated or broken down by city. From a geologic hazards standpoint, the cities of Glendora, San Dimas, Claremont and Montclair would not be impacted by the Pomona Station Refinement or the White Avenue Mitigation Measure (LTR-9). These design refinement and the new mitigation measure are located in the cities of Pomona and La Verne, respectively, and as such, the potential for new or more severe significant impacts and the corresponding determinations for these two cities has been revisited.

City of Pomona

The Pomona Station Refinement would be situated in the same geologic environment and be exposed to the same geologic hazards (seismically induced inundation and seismic shaking) as described in the 2013 FEIR Section 3.8.2.4, City of Pomona. The improvements included as part of this design refinement would be consistent with the 2013 FEIR Project with addenda. The Project Modifications would be constructed in strict compliance with local, state, and federal regulations as well as permits as outlined in the 2013 FEIR that have been developed by regulatory agencies to manage concerns related to geologic hazards. Therefore, no new or increased impact would result. With this mandatory compliance and with the current seismic safety and geotechnical safety requirements and regulations, including safety design standards, the phasing modifications, design refinement and new mitigation measure would not result in new or more severe significant impacts as compared to the project analyzed in the 2013 EIR and four subsequent addenda.

City of La Verne

The new traffic mitigation measure, LTR-9, would be situated in the same geologic environment and be exposed to the same geologic hazards (liquefaction, seismically induced inundation, and seismic shaking), as described in the 2013 FEIR Section 3.8.2.4, City of La Verne. However, based on the Los Angeles County General Plan (Los Angeles County Department of Regional Planning, 2015), Figure 9.4 - Dam and Inundation Routes, the limits of the seismically induced inundation area extend from near Wheeler Avenue to past the eastern limits of the city of La Verne (the 2013 FEIR indicates that the inundation hazard zone extends from Wheeler Avenue to D Street). The improvements included as part of White Avenue Mitigation Measure (LTR-9) would be consistent with the 2013 FEIR Project and addenda. As discussed above, the Project Modifications would be constructed in strict compliance with local, state, and federal regulations, as well as permits as outlined in the 2013 FEIR that have been developed by regulatory agencies to manage concerns related to geologic hazards. Therefore, no new or increased impact would result. With this mandatory compliance and with the current seismic safety and geotechnical safety requirements and regulations, including safety design standards, the phasing modifications and design refinements would not result in new or more severe significant impacts as compared to the project analyzed in the 2013 FEIR and the four subsequent addenda.

3.6.3.5 Cumulative Impacts

Consistent with the 2013 FEIR, the Project Modifications are not expected to result in any new or more severe significant geologic or seismic hazards-based impacts. Therefore, the Proposed Project would not contribute to significant cumulative impacts.

3.6.3.6 Impacts Addressed by Regulatory Compliance

Construction-Period Impacts

Consistent with the 2013 FEIR, construction-related impacts that could affect the Proposed Project, including the Project Modifications, would be eliminated or reduced through compliance with the regulatory requirements identified in Section 3.6.1. Therefore, no new or more severe significant impacts would occur.

Long-term Impacts

Consistent with the 2013 FEIR, the Proposed Project, including the Project Modifications, would be designed in compliance with the regulatory and design requirements identified in Section 3.8.2.3 of the 2013 FEIR. Operation of the Proposed Project would result in less than significant impacts due to geologic and seismic hazards.

3.6.4 Mitigation Measures

3.6.4.1 Short-term Construction Mitigation Measures

Consistent with the 2013 FEIR, construction period impacts associated with the Proposed Project, including the Project Modifications, would be reduced to a less than significant level through compliance with the regulatory requirements identified in Section 3.8.2.3 of the 2013 FEIR. Table 3.8-9 of the 2013 FEIR presents a Summary of Design Guidelines for Potentially Significant Geologic Hazards, and compliance with these guidelines would be required. Therefore, no additional mitigation measures, beyond those already provided in the 2013 FEIR and four subsequent addenda are necessary.

3.6.4.2 Long-term Mitigation

Consistent with the 2013 FEIR, long-term impacts associated with the Proposed Project, including the Project Modifications, would be reduced to a less than significant level through compliance with the regulatory requirements identified in Section 3.8.2.3 of the 2013 FEIR. Table 3.8-9 of the 2013 FEIR presents a Summary of Design Guidelines for Potentially Significant Geologic Hazards, and compliance with these guidelines would be required. Therefore, no additional mitigation measures, beyond those already provided in the 2013 FEIR and four subsequent addenda are necessary.

3.6.5 Level of Impact after Mitigation

Consistent with the 2013 FEIR, the Proposed Project, including the Project Modifications, would be designed, constructed, and operated in compliance with the regulatory requirements identified in Section 3.8.2.3 of the 2013 FEIR, and as such, impacts after mitigation would be less than significant.

3.7 Land Use and Planning

3.7.1 Regulatory Setting

3.7.1.1 Regional

The regional regulatory setting is described in the 2013 FEIR, Section 3.10.1. This discussion focuses only on material changes and updates to the regulatory setting since the 2013 FEIR.

Southern California Association of Governments Regional Comprehensive Plan

The 2013 FEIR outlines goals established in the 2008 Southern California Association of Governments Regional Comprehensive Plan. The plan has not been updated since the approval of the 2013 FEIR; therefore, the regulatory setting remains the same as presented in Section 3.10.1.1 of the 2013 FEIR.

SCAG 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy

Since the certification of the 2013 FEIR, SCAG has approved an updated RTP/SCS. The SCAG RTP/SCS (SCAG, 2016) presents the transportation vision for Los Angeles, Orange, San Bernardino, Imperial, Riverside, and Ventura Counties. The RTP/SCS identifies priorities for transportation planning within the Southern California region, sets goals and policies, and identifies performance measures for transportation improvements to ensure that future projects are consistent with other planning goals for the area. Transportation projects being constructed within the SCAG region must be listed in the RTP/SCS.

Although the RTP/SCS uses 2040 as the horizon year, to be consistent with the 2013 FEIR, SEIR land use analysis will continue to use 2035 as the horizon year. As discussed in Section 3.3 Community, Population, and Housing and Chapter 2, Transportation, the transportation analysis used the version of Metro's "Measure R" travel demand model that was used in the 2013 FEIR. The "Measure R" travel demand model uses assumptions regarding socioeconomic and transportation network characteristics to develop estimates on trips and ridership within the area of interest. The model represents all Measure R projects anticipated to be operational by the year 2035. The proposed phased approach for the extension is expected to be completed by 2026, thereby making the use of the 2035 as the horizon year appropriate.

The updated RTP/SCS includes reference to the Metro Gold Line Foothill Extension Phase 2B as a transit capital project within the region. The goals detailed in the 2016 RTP/SCS remain unchanged from those adopted in the 2012 RTP/SCS. The guiding policies for the 2016 RTP/SCS have been updated to include two additional guiding policies, as follows:

- *Support investments and strategies to reduce non-recurrent congestion and demand for single occupancy vehicle use, by leveraging advanced technologies*
- *Encourage transportation investments that result in cleaner air, a better environment, a more efficient transportation system, and sustainable outcomes in the long run*

3.7.1.2 Local

The local land use regulatory setting is described in Section 3.10.1.2 of the 2013 FEIR. This discussion focuses on change to the local land use regulatory setting since the certification of the 2013 FEIR relevant to the Project Modifications. The Project traverses six Southern California cities. The Project Modifications include changes to Project elements in La Verne and Pomona.

The following general or specific plans govern growth and development within the corridor area. For the City of Glendora, City of San Dimas, City of Claremont, and City of Montclair, the general or specific plans were not analyzed in this SEIR since they are outside the scope of the proposed design refinement and new mitigation measure. Only the City of La Verne and the City of Pomona are discussed in this section.

The City of La Verne General Plan (1998), along with the Arrow Corridor Specific Plan (2006), and the Lordsburg Specific Plan (2004) have not been updated since the approval of the 2013 FEIR. Therefore, the local regulatory setting for the City of La Verne is the same as presented in Section 3.10.1.2 of the 2013 FEIR.

City of Pomona

Pomona General Plan

Since the approval of the 2013 FEIR, the City of Pomona has updated the City's 1976 General Plan (City of Pomona, 2014). The updated General Plan was adopted in March 2014. The General Plan identifies future Metro Gold Line and potential high-speed rail expansions. According to the General Plan, the foundation for the transportation programs, including the Metro Gold Line Foothill Extension, of the General Plan should be to align new development with transit networks and improve connectivity between systems. The General Plan also identifies transit-oriented districts throughout the city, including the area of the Pomona North Station. These districts would promote the restructuring of these areas into higher-intensity, higher-activity, transit-oriented districts. These districts would feature a mix of uses located close to major transit stops or transportation crossroads. The districts are intended to take advantage of transit service by concentrating potential rider populations of residents, workers, and visitors next to stations and creating settings to encourage connectivity. According to the General Plan, some of the areas surrounding the alignment would be designated urban neighborhoods. This designation would include moderately intense clusters of development that would contain a mix of uses.

Pomona North Compass Blueprint Station Area Plan

Additionally, the Pomona North Compass Blueprint Station Area Plan was adopted in 2014. The Plan focuses on existing and future land uses located around the Pomona station to facilitate planning efforts. The goal of the Plan is to identify design alternatives for the creation of a transit-oriented development. The concepts include exploring parking strategies, such as evaluating parking facilities on both sides of the track, sharing parking facilities with Metrolink, and identifying new reuse (similar or modification of existing land uses) or conversion opportunities that would be located near existing uses. The concepts include converting warehouses to include parking and the envisioned land uses include urban residential, live/work, office, and other adaptive reuse, thereby creating a pedestrian-friendly atmosphere.

3.7.2 Existing Conditions

The study area for assessing the potential impacts to land use and planning is exclusive to the two cities of La Verne and Pomona where the Project Modifications, including the construction and operation phasing, the design refinement, and the mitigation measure, would occur.

Existing land uses are defined as land uses currently in the vicinity of the proposed Project Modifications. Planned land uses are those land use designations and policies contained in applicable land use plans and policies. Planned uses were identified using the adopted general plans, zoning codes, zoning maps, and applicable specific plans of the cities in which the proposed Project Modifications would be located.

3.7.2.1 City of La Verne

As presented and approved in the 2013 FEIR with addenda, the alignment for the approved project would traverse the southern portion of the city of La Verne, north of and roughly parallel to Arrow Highway. The proposed White Avenue widening occurs, defined in Section 1.2.2, within the North La Verne Hillside and South La Verne neighborhoods. Land uses surrounding the La Verne Station and White Avenue include industrial, commercial, residential, and community facility. Land use along White Avenue is primarily residential and industrial with some community land use (Figure 3.7-1), including the Church of Christ at La Verne and Lincoln Park

Legend

Metro Gold Line Phase 2B

Metrolink

Proposed Widened White Avenue - Roadway Boundary

Proposed Curbs, Driveways, Gutters, Sidewalks

City of La Verne General Plan Land Use

C-BP - Commercial/Business Park

CF - Community Facility/Freeway

I - Industrial

LDR - Low Density Residential

MDR - Medium Density Residential

Source:
1) Land Use - City of La Verne General Plan Update, 2018

Basemap Source: Google Earth Pro

N

0 300 600
Feet

Figure 3.7-1
La Verne General Plan Land Uses Surrounding the Proposed Widening of White Avenue
Metro Gold Line Phase 2B –
Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

JACOBS

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3.7.2.2 City of Pomona

As presented and approved in the 2013 FEIR, the alignment for the 2013 FEIR Project with addenda would traverse the northern portion of the city of Pomona. The Pomona General Plan identifies the Pomona Station surrounding area of the site as an Industrial Workplace District, including commercial, industrial, and residential land use designations (Figure 3.7-2). An existing single-family residential neighborhood is located southwest of the proposed Pomona Station parking facility site.

3.7.3 Environmental Impacts

3.7.3.1 Evaluation Methodology

An evaluation of the Project Modifications' impacts on existing and planned land uses was conducted to assess the types and severity of the impacts. The changes in land use associated with construction and operation of the project in four phases, if any, and the design refinement and mitigation measure were evaluated.

The existing land use for the design refinement and mitigation measure in Pomona and La Verne respectively is discussed in Section 3.7.2 of this SEIR. Information regarding existing and planned uses, zoning and land use policies in the vicinity of the proposed Project Modifications was used to determine the compatibility of the land uses associated with the proposed Project Modifications.

Design Refinement and Mitigation Measure

A review of regional and local land use and planning general and specific plans was conducted to determine if there would be any temporary (short-term) or permanent (long-term) impacts to land use and planning from the design refinement and mitigation measure.

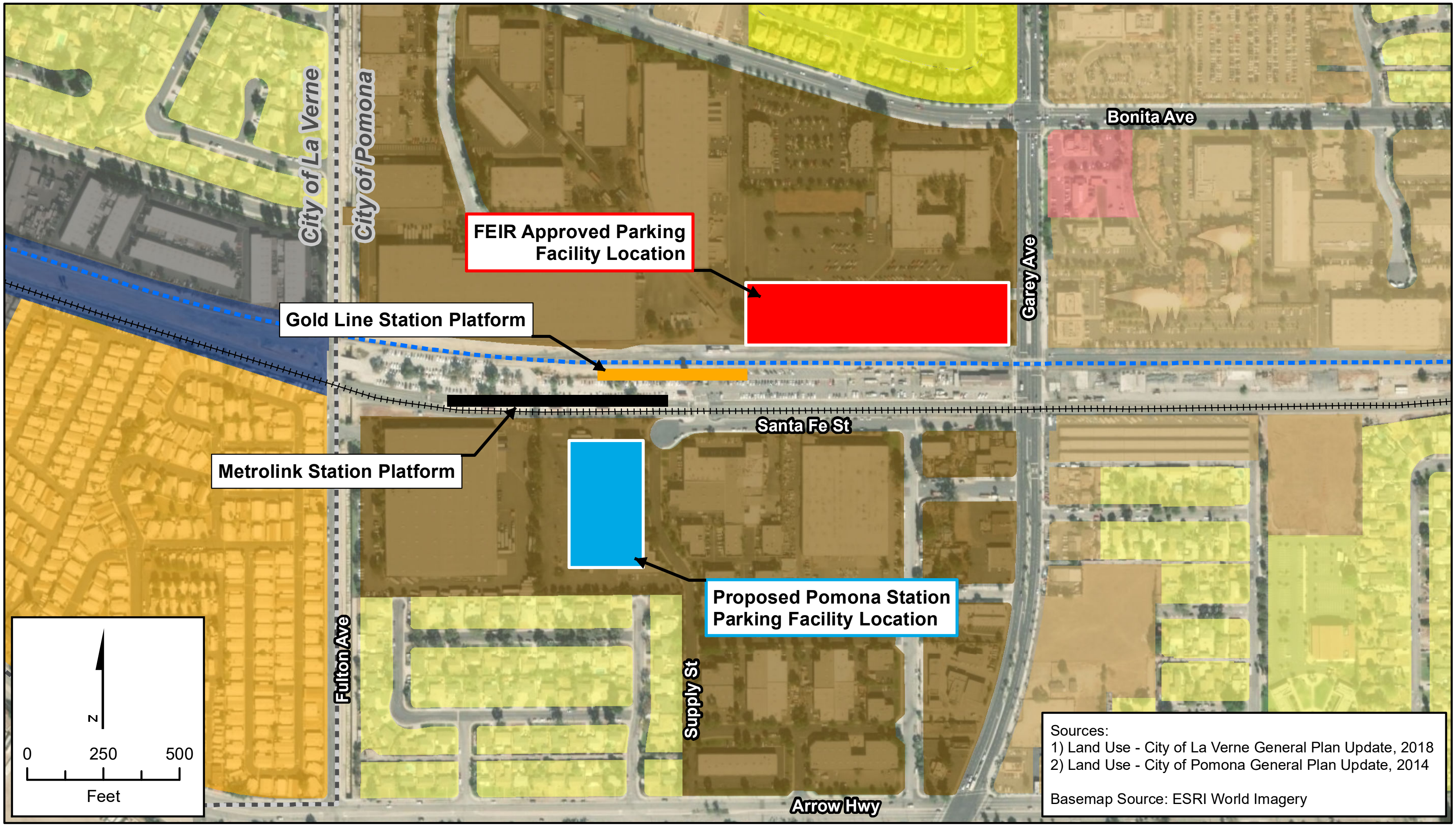
3.7.3.2 Impact Criteria

An impact to land use and planning is considered significant if a Proposed Project Modification has the potential to:

- Conflict with any applicable land use plan, policy, or regulation by an agency with jurisdiction over the project (including, but not limited to, a General Plan, Specific Plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect
- Physically divide an established community
- Conflict with any applicable habitat conservation plan or natural community conservation plan

Compliance with the above thresholds would mean that the Project Modifications would have a less than significant impact to land use and planning, because (1) the modifications, in general, do not conflict with any applicable land use plan and (2) the Project is included in the six-corridor city's land use plans.

No habitat conservation plan or natural community conservation plan apply to the study impact of the Proposed Project or study area, and as presented in Section 3.3, Communities, Population, and Housing*,* of this SEIR. Therefore, the proposed Project Modifications would not physically divide an established community; therefore, these impact criteria are not discussed further.



Legend

- Metro Gold Line Phase 2B
- Metrolink
- Metrolink Station Platform
- Gold Line Station Platform
- FEIR Approved Parking Facility Location
- Proposed Pomona Station Parking Facility Location

City of La Verne General Plan Land Use

- C-BP - Commercial/Business Park
- CF - Community Facility/Freeway
- I - Industrial
- LDR - Low Density Residential
- MDR - Medium Density Residential

City of Pomona General Plan Land Use

- Activity Center
- Residential Neighborhood
- Neighborhood Edge
- Transit Oriented District: Core
- Transit Oriented District: Neighborhood

Figure 3.7-2
Pomona General Plan Land Uses Surrounding the Proposed Pomona Station Parking Facility Location
Metro Gold Line Phase 2B –
Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

JACOBS

3.7.3.3 Short-Term Construction Impacts

Short-term construction activities required to implement the proposed Project Modifications would necessitate the mobilization of equipment, materials, personnel, and staging and storage areas. The construction of the Pomona Station parking facility is not expected to cause additional construction needs because the construction of the parking facility was previously included and approved in the 2013 FEIR analysis. The widening of White Avenue as a mitigation measure was not included in the 2013 FEIR; however, considering the conservative nature of construction equipment and vehicle assumptions used in the 2013 FEIR, the proposed actions would be sufficient to accommodate minor changes to construction activities through the construction phases of the Project. Any additional easements and staging areas that may also be needed, as determined during final design, would revert back to their designated use upon completion of the construction.

Based on the previously conducted short-term construction-related impact analysis and determinations presented in Section 3.10.3.3 of the 2013 FEIR and subsequent addenda, the new traffic mitigation measure (LTR-9) and the relocation and construction of the Pomona Station parking facility construction activities would also not affect the planning or zoning designations of adjoining properties, conflict with applicable land use plans, or physically divide a community. Therefore, the design refinement and mitigation measure would not result in any new or significant impacts. Similar to the two phases of construction approved as part of Addendum No. 2 Section 3.4.9, the shift to a proposed four-phased construction of the Project would also not introduce new or more severe significant impacts from short-term construction.

Based on analysis conducted and documented in the 2013 FEIR and addenda, along with the review and analysis presented in this SEIR, there are no indicators that the design refinement, new mitigation measure or the four-phased implementation approach would result in new or more severe short-term construction impacts related to land use and planning.

3.7.3.4 Long-Term Impacts

The four-phased construction and operation of the project would not require additional land acquisitions. Similar to the two-phased operation approved as part of Addendum No. 2, the shift to a proposed four-phased implementation of the project would not introduce new or more significant long-term impacts as presented in Section 3.4.9 of Addendum No. 2. Therefore, the phasing would not introduce new or more significant impacts to land use as presented in the 2013 FEIR and four subsequent addenda.

The new traffic mitigation measure, LTR-9, would be implemented almost entirely within publicly owned right-of-way. White Avenue widening improvements occurring outside of the existing right-of-way would require three minor land acquisitions, as follows:

- 2070 N. White Avenue – designated industrial property type (Figure 3.4-6)
- 2109 N. White Avenue – designated low-density residential (Figure 3.4-7)
- 2478 Bonita Avenue – designated low-density residential (Figure 3.4-8)

These minor acquisitions would convert a small portion of the land outside of the public right-of-way from the existing use to transportation use but would not result in significant impacts because the widening does not eliminate the existing uses. The existing buildings and land use designations would remain the same as presented in existing conditions. The La Verne general and specific plans both set goals to decrease traffic flow issues along the corridor. However, the Lordsburg Specific Plan discusses concerns regarding potential cultural and visual impacts that may result from the widening of White Avenue (LTR-9). These potential visual and cultural impacts are discussed further in Section 3.4, Cultural Resources, and 3.10, Visual Quality, including mitigation measures to reduce any potential impacts. Therefore, with mitigation measures in place, the minor acquisitions would not conflict with any applicable land use plan, policy, or regulation, or physically divide a community, or conflict with a habitat conservation plan or natural community conservation plan within the city of La Verne. Therefore, the widening of White Avenue would not introduce new or more significant impacts to land use.

The location of the proposed parking facility at the Pomona Station would be moved from north of the right-of-way to south of the right-of-way at 260 W. Santa Fe Street (Figure 3.4-5). Both the previously approved and currently proposed parking facility sites would have or would involve full acquisitions to accommodate the proposed improvements. As shown in Figure 3.6-1, both the approved parking facility site and the proposed parking facility site are also within Pomona's designated Transit-Oriented District. The southern site and the surrounding adjacent areas are zoned for Special Industrial (M) and Light Industrial (M-1) uses. Transportation, commercial, office, automotive, and some manufacturing uses are permitted in the M-1 zone (City of Pomona, 2014). The construction of a transportation building (i.e., a parking facility) is allowed within designated Transit-Oriented Districts. As with the previously approved northern site, the southern site for the Pomona Station parking facility could encourage the redevelopment of other parcels near the Pomona Station. The City of Pomona's General Plan includes goals for future redevelopment and intensification of uses in Transit-Oriented Districts around the Pomona Station (City of Pomona, 2014). Therefore, locating the parking facility at the south side is consistent with the City of Pomona's adopted land use plans, zoning, and regulations. The relocation of the parking facility would not conflict with any applicable land use plan, policy, or regulation for the City of Pomona. The approved parking facility and the proposed parking facility are within the same zoning and land use types; therefore, the relocation of Pomona's parking facility would not introduce new or more significant impacts to land use as presented in the 2013 FEIR and four subsequent addenda.

Based on the analysis conducted and documented in the 2013 FEIR and the four subsequent addenda, and the conclusions presented above, the design refinement, new mitigation measure, and the four-phased implementation approach would not result in new or more severe long-term impacts to land use and planning.

3.7.3.5 Cumulative Impacts

No cumulative impacts to land use are expected to occur from the Project Modifications. Therefore, cumulative impacts to the surrounding land uses would be less than significant.

3.7.4 Mitigation Measures

Mo mitigation measures related to land use would be required as no significant short term or long-term land use or planning impacts would be expected.

3.7.5 Level of Impact after Mitigation

The proposed Project Modifications would not introduce new or more significant short-term construction impacts or long-term impacts to land use and planning.

3.8 Noise and Vibration

This section of the SEIR assesses the potential noise and vibration impacts of the Project Modifications. There is a potential for changes to noise and vibration impacts at the relocation of the Pomona Station parking facility site and at the new traffic mitigation measure, LTR-9, widening of a portion of White Avenue in the city of La Verne as discussed in Chapter 1 and Chapter 2. The widening of White Avenue as a new mitigation measure (Section 2.3.3.3) would be from the current Metrolink railroad crossing extending north to the intersection with 6th Street (Figure 3.8-1). The widening would be within the existing publicly owned roadway right-of-way except for three small property acquisitions. See Section 3.3 of this SEIR for detailed discussions on the acquisitions. The location change of the Pomona Station parking facility site would move from the north side of the Pomona Station to the south side of the station (Figure 3.8-2). The property proposed for the parking facility relocation is currently occupied by a commercial business. All other features of the project remain the same as described in the 2013 FEIR and the four subsequent addenda.

The Authority proposes to construct and operate the Project in four construction phases rather than a two-phase delivery. There would be no difference in noise and vibration between a two-phase or four-phase construction delivery.

3.8.1 Background on Noise

A comprehensive noise and vibration assessment was conducted in accordance with FTA's *Transit Noise and Vibration Impact Assessment* (FTA, 2006) guidelines, commonly referred to as the FTA Guidance Manual. The FTA guidelines present the basic concepts, methods, and procedures for evaluating the extent and severity of noise and vibration impacts from transit projects. Background information on noise (noise levels or intensity, scientific frequency, and noise level variation over time) as well as the methodology for its evaluation consistent with FTA guidelines is provided in Section 3.11 of the 2013 FEIR.

3.8.2 Background on Vibration

As referenced above, please see the approved 2013 FEIR and addenda for background information on vibration (vibration sources, resulting displacement, velocity of vibration levels, and acceleration).

3.8.3 Noise and Vibration Sources Associated with Light-Rail Transit Systems

A detailed discussion of the noise and vibration sources typically associated with and evaluated as part of light-rail transit projects is provided in Section 3.11.3 of the approved 2013 FEIR.

3.8.4 Regulatory Setting

The noise assessment utilizes noise impact thresholds defined in the FTA Guidance Manual. The FTA recently released the 2018 version of the FTA Guidance Manual, however, there are no changes in the assessment methodology that affect the current analysis.

The noise prediction models are described in detail in the 2013 FEIR. The current assessment uses the same prediction models used in the 2013 FEIR and the subsequent four addenda; any differences in predicted noise compared to the 2013 FEIR are due to changes to the input to the models reflecting the design refinement and new mitigation measure.

The FTA criteria are based on the best available research on community response to noise. Section 3.11.6.2 of the 2013 FEIR contains a detailed regulatory discussion. The 2013 FEIR Project noise included the operational noise from the light rail vehicles and the change in noise exposure from the relocation of the BNSF or Metrolink tracks within the right-of-way. Noise due to road traffic and other sources is considered project-related when a project has caused changes in road patterns that alter the existing noise landscape.

3.8.5 Existing Conditions

The existing no-build noise levels and predicted noise levels due to the approved 2013 Project conditions are listed in Table 3.8-1. The 2013 FEIR and four addenda contain additional details about the existing and 2013 approved Project noise conditions. Additionally, an updated noise and vibration assessment conducted in late 2018 has also been referenced and incorporated as part of this analysis (Appendix E)

Table 3.8-1. Existing and 2013 Approved Project Noise Levels

Closest Receiver[a]	Distance to Closest Receiver from LRT near Track (feet)	Noise Levels (Ldn) dBA	
		Existing, No-Build	2013 Approved Project without Design Modifications
La Verne: SFR on White Ave and 1st St[b]	230	59	62
Pomona: Homes on Cameron Ave	750	58	58

[a] Existing noise for both locations taken and adjusted from measurement performed at 1736 1st Street, La Verne.

[b] Single family residence on corner of 1st St and White Ave (2109 White Ave). This is the closest residence to the rail corridor that is on White Ave.

Notes:

dBA = A-weighted decibels

Ldn = day-night average sound level

SFR = single-family residence

3.8.5.1 Noise Measurements

The 2013 FEIR and addenda 1 through 4 contain details about the noise measurements along the Project alignment.

City of La Verne

A noise measurement conducted for the 2013 FEIR at 1736 1st Street in La Verne (long term noise measurement LT-25) was used to establish the existing noise conditions in the City of La Verne. This measurement was previously used in the Addendum No. 4 noise analysis for receivers in La Verne (WB 7B) and is appropriate because the site of the measurement is located close to White Avenue and 1st Street.

City of Pomona

A previous noise measurement conducted for the 2013 FEIR at 1736 1st Street in La Verne (LT-25) was used to establish the existing noise conditions. This noise measurement is appropriate for the Pomona parking facility site (which has a row of homes on Cameron Avenue that are about 50 feet from the parking facility) because the parking facility is located near the La Verne-Pomona boundary at Fulton Road and is close to a residential cluster of homes (La Verne EB4 also near Fulton Road) where noise impacts were modeled using measurement LT-25 for the 2013 FEIR.

3.8.6 Environmental Impacts

3.8.6.1 Evaluation Methodology

Noise Measurement Procedures

The noise assessment used the same methodology as was used in the 2013 FEIS noise evaluation. The noise evaluation methodology combines operational noise predictions for the light rail and the BNSF freight rail and Metrolink commuter rail (where appropriate) trains in conjunction with non-train ambient noise (mostly due to road traffic). This total noise level is then compared to the total existing noise level (road traffic plus freight and commuter rail noise) to determine if FTA impacts threshold are exceeded. The evaluation methodologies are described in Section 3.11.6.1 of the 2013 FEIR.

For the case where the Project Modification modifies (e.g. noise increases that cause new moderate or severe impacts) the road traffic conditions enough to influence the existing noise landscape, the potential increase in noise due to those changes are included as project noise. For the White Avenue widening, the new mitigation measure's (LTR-9) effect on noise levels at residences was predicted using the Federal Highway Administration (FHWA) Traffic Noise Model (TNM; Menge et al., 1998). The TNM model accounts for traffic flow, effect of pavements, existing sound barriers, and noise attenuation over and through rows of buildings. The TNM model utilized the traffic circulation data forecasted for year 2035 for widening and no-widening options.

The evaluation of the noise levels due to the Pomona parking facility are based on a reference sound equivalent level, reference sound equivalent level (SEL_{ref}). SEL_{ref} is a building block for determining the total project noise level in conjunction with the total number of parking spaces in the structure and the total number of parking spaces applicable to the residential receivers.

Vibration Propagation Measurement Procedures

The Proposed Modifications would not alter the vibration conditions for the Project. Section 3.11.6.1 of the 2013 FEIR and addenda 1 through 4 contain details on vibration propagation procedures for the reminder of the project.

Analytic Methodology

Section 3.11.6.1 of the 2013 FEIR and references therein contain details on the analytic methodologies.

3.8.6.2 Impact Criteria Thresholds

The impact criteria used in 2013 FEIR and the subsequent four addenda have not changed and are appropriate for the current analysis. Table 3.8-2 list the noise and vibration impact criteria for both operation and construction of the Project.

Table 3.8-2. Impact Criteria for Operation and Construction of the Project

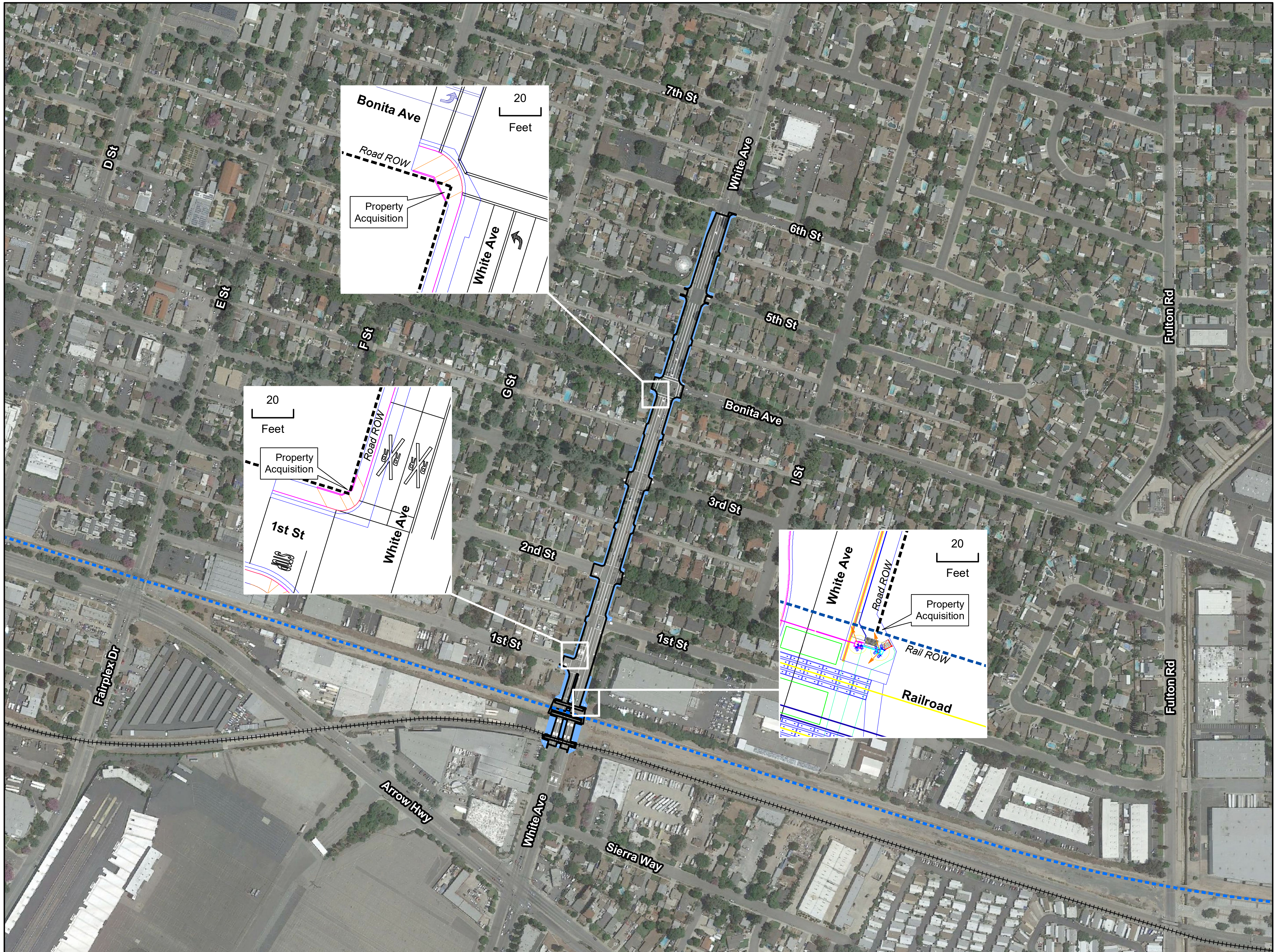
Closest Receiver[a]	Distance to Closest Receiver from LRT near track (feet)	Operational Noise Criteria (Ldn) dBA		Operational Vibration Criteria VdB[b]	Construction Noise Criteria (8-hr Leq) dBA[c]	Construction Vibration Criteria PPV (in/s)[d]
		Moderate Impact	Severe Impact			
La Verne: SFR on White Ave and 1st St	230	61	64	72	80 (70)	0.2
Pomona: Homes on Cameron Ave	750	61	64	72	80 (70)	0.2

[a] Existing noise for both locations taken and adjusted from measurement performed at 1736 1st St, La Verne.
[b] Using a reference velocity level of 1 micro-inch/sec
[c] Daytime (Nighttime) criteria
[d] Criteria for non-engineered buildings, which is applicable to most single family residential structures.

Notes:

hr = hour
in/s = inch(es) per second
PPV = part(s) per volume
VdB = vibration velocity levels in decibels

Compliance with the above thresholds would mean that the Project Modifications would have less than significant impact on noise and vibration generated by the construction and operation of the Project. This is based on (1) the evaluation of the expected noise and vibration levels produced due to the Project Modifications, (2) comparison of the expected levels with federal guidelines for rail transit projects that are established to protect both human and building structures from excessive exposure, and (3) the implementation of the already completed and recommended noise and vibration mitigation plan to restrict noise and vibration levels to within the federally established criteria and thus ensuring sensitive receptors would not be exposed to substantial noise and vibration levels.



Legend

- Metro Gold Line Phase 2B
- Metrolink
- Proposed Widened White Avenue - Roadway Boundary
- Proposed Curbs, Driveways, Gutters, Sidewalks

Basemap Source: Google Earth Pro

N

0 400 800

Feet

Figure 3.8-1
Proposed Widening of White Avenue in La Verne
Metro Gold Line Phase 2B –
Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

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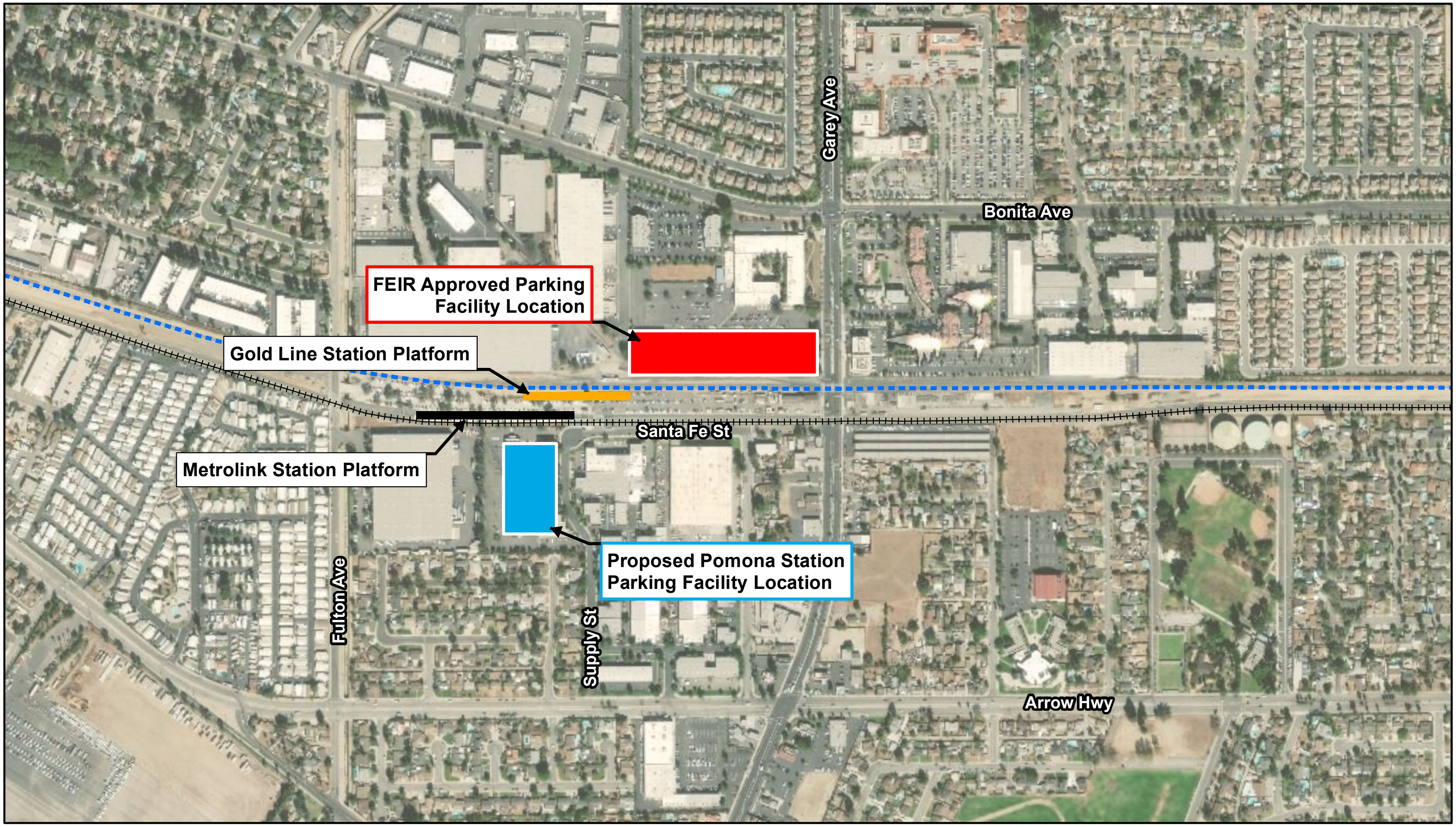


Legend

- Metro Gold Line Phase 2B
- Metrolink
- Metrolink Station Platform
- Gold Line Station Platform
- FEIR Approved Parking Facility Location
- Proposed Pomona Station Parking Facility Location

N

0 500 1,000

Feet

Basemap Source: ESRI World Imagery

Figure 3.8-2
Proposed Pomona Station Parking Facility Location
Metro Gold Line Phase 2B – Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

JACOBS

3.8.6.3 Short-term Construction Impacts

The construction of the Project would require the use of heavy earth-moving equipment, pneumatic tools, cranes, and generators. As discussed in Section 3.11.6.3 of the 2013 FEIR, the predicted construction activities may exceed the recommended FTA construction noise level threshold of 80-dBA equivalent continuous sound level (8-hour). This may occur for both the Pomona parking facility relocation and the White Avenue widening (LTR-9), where there are nearby homes within about 50 feet. Construction noise impacts are likely and therefore noise-control mitigation measures, N-1 and N-2 as presented in Section 3.11.9.1 of the 2013 FEIR, would be required when working near residences. Section 3.8.7.1, Short-term Construction Mitigation Measures includes a more detailed summary of the referenced mitigation measures.

Construction Vibration

It is unlikely that construction activities for the Proposed Modifications would occur close enough to residential receivers to create vibration levels that exceed FTA criteria. It is not anticipated that any substantial vibration generating construction equipment (e.g., large auger drills, hoe rams, or large bulldozers) would be used within 15 feet of homes. Jackhammers should be used no closer than 8 feet from homes. Therefore, no new or more severe impacts are likely to result from construction activities. In the event that equipment may approach applicable limits, the noise and vibration control plan would also include measures to minimize vibration impacts during construction.

3.8.6.4 Long-Term Impacts

City of La Verne

As presented in Section 2.3.3.3, the new traffic mitigation measure, LTR-9, would widen White Avenue from the current Metrolink railroad crossing north to the intersection with 6th Street. This change would shift traffic on White Avenue approximately 12 feet closer to residences on both sides of the street.

Traffic data from the 2013 FEIR, along with additional traffic data for each of the four phases of the project, showed that modified Phase 1 within the interim terminus station in the City of La Verne would have the largest increase in traffic volumes; therefore these Phase 1 data were used to predict the scenario for the largest noise increase on White Avenue. It is noted that percent increase in total traffic volumes, under Phase 1, would be less than 6 percent. Noise levels are generally proportional to $10*\log_{10}(\text{volume})$. This means that doubling the traffic volume would cause a 3-decibel increase in the noise levels, and halving the traffic volume would cause a 3-decibel decrease in noise levels. Based on this formula, the change in traffic volume caused by LTR-9 would cause a fraction of a decibel change in the traffic noise levels. Table 3.8-3 presents the total peak-hour traffic counts for year 2035 under non-widening and widening of White Avenue.

The main contributor to the traffic noise level change resulting from LTR-9 is the reduced distance between the outside traffic lane and nearby residences. The widening would move traffic about 12 feet closer to the residences along White Avenue. The traffic volumes and roadway configurations for the widened and non-widened configurations were input to the TNM model and used to predict existing and future noise levels from traffic operations on White Avenue. The TNM model results shows a maximum increase in traffic noise at residential receivers along White Avenue of less than 1 decibel. Incorporating this increase into the predicted 2013 FEIR Project with addenda noise level results in an increase in overall project noise of 0.25 decibel at the closest residences and up to 1 dB increase at homes farther from the tracks (e.g., near 6th Street). This overall increase is insufficient to create any new FTA noise impacts and is considered an imperceptible change in loudness (a 3-decibel noise level change is generally considered a barely perceptible change in loudness). Therefore, no new or more significant impacts would result. The predicted noise levels are shown in Table 3.8-4.

Table 3.8-3. Peak Hour Total Traffic Volumes at White Avenue

Intersection Name	Total Traffic Counts	
	Non-Widening of White Avenue (Year 2035)	Widening of White Avenue (Year 2035)
White Ave / Third St	1673	1739
White Ave / Second St	1617	1709
White Ave / First St	1649	1749
White Ave / Sierra Way	1605	1688
White Ave / Arrow Highway	3516	3721
White Ave / Bonita Ave	2680	2712

Table 3.8-4. Predicted Noise Levels due to Widening of White Avenue

Closest Receiver[a]	Distance to Closest Receiver from LRT near track (feet)	Operational Noise Criteria, (Ldn) dBA		Total Project Noise w/o Design Modification, (Ldn) dBA	Total Project Noise with Design Modification, (Ldn) dBA
		Moderate Impact	Severe Impact		
La Verne: SFR on White Ave. and 1st St[b]	230	61	64	62	63

[a] Existing noise for both locations taken and adjusted from measurement performed at 1736 1st St, La Verne.
[b] SFR on corner of 1st St and White Ave (2109 White Ave). This is the closest residence to the rail corridor that is on White Ave.

City of Pomona

The Pomona Station Refinement would move the facility to a new location south of the existing railroad tracks and at the west end of the Santa Fe Street cul-de-sac. The parking facility would be approximately 50 feet from a row of single-family homes on Cameron Avenue in Pomona. Predictions of the noise at these receivers due to the parking structure followed the procedure in Section 3.8.6.1. Based on the methods employed, the predicted project noise levels at these residential receivers would be below the impact threshold for both moderate and severe impacts, as shown in Table 3.8-5. Predicted Noise Levels at the Relocated Pomona Parking Facility. Therefore, no new or more severe impacts would occur. It is noted that the predictions are based on estimated peak-hour noise produced by the parking facility.

Table 3.8-5. Predicted Noise Levels at the Relocated Pomona Parking Facility

Closest Cluster	Distance to Closest Receiver from Parking Facility (feet)	Parking Spaces		Noise Levels (Ldn) dBA						New Impact?
		Total Number	Applicable Number[a]	Existing	Predicted Parking	Project w/o Parking	Project with Parking	Thresh. Mod. Impact	Thresh. Sev. Impact	
Pomona: Homes on Cameron Ave[b]	50	725	363	58	54	58	60	61	64	no

[a] Approximate number of parking spaces within 125 feet of the receivers.
[b] Existing noise for this location taken and adjusted from measurement performed at 1736 1st St, La Verne.
Note: Ldn = day-night average sound level

3.8.6.5 Cumulative Impacts

The Project Modifications would not introduce new or more severe noise or vibration impacts in comparison to the 2013 FEIR and subsequent addenda. Therefore, the Project Modifications would not substantially contribute to any cumulative noise impacts. The cumulative noise levels in areas impacted by the Project Modifications in La Verne and Pomona are below the noise and vibration thresholds.

3.8.7 Mitigation Measures for Noise and Vibration

No new or increased noise and vibration impacts were predicted due to the Proposed Modifications analyzed above. Therefore, the existing approved noise mitigation measures as described in detail in Section 3.11.9.2 of the 2013 FEIR would still be applicable without changes or revisions. A summary description of the noise and vibration mitigation measures from the 2013 FEIR is provided below in Sections 3.8.7.1 and 3.8.7.2. Refer to Section 3.11.9 of the 2013 FEIR, Section 3.2.3 of Addendum No. 3, and Section 3.11.3 of Addendum No. 4 for complete discussions of mitigation measures.

3.8.7.1 Short-term Construction Mitigation Measures

Noise

Short-term construction noise mitigation measures for the design refinement and new mitigation measure may be required to address the impacts discussed in Section 3.8.6.3. If so, they would follow those detailed in Section 3.11.9.1 of the 2013 FEIR and as provided in the summary listing below.

- **N-1**. Construction shall proceed in accordance with the construction specifications for the project, including but not limited to detailed requirements for the following:
  - Noise and Vibration Control Plan. A Noise and Vibration Control Plan shall be developed that demonstrates how the appropriate noise limits would be achieved. The plan shall include measurements of existing noise, a list of the major pieces of construction equipment that would be used, and predictions of the noise levels at the closest sensitive receptors (including residences, hotels, schools, churches, temples, and similar facilities). The noise and vibration control plan shall be approved by the Construction Authority prior to initiating construction and implemented during construction.
  - Alternative Construction Procedures. Where construction cannot be performed in accordance with the requirement of the noise limits, the Construction Authority shall investigate and implement alternative construction measures that would result in lower sound levels.
  - Noise Monitoring. The Construction Authority shall conduct noise monitoring to demonstrate compliance with contract noise limits
  - Best Management Practices. The Construction Authority shall use the following best management practices for noise abatement wherever practical:
    - Use specialty equipment with enclosed engines and/or high-performance mufflers when feasible.
    - Locate equipment and staging areas as far as possible from noise-sensitive receptors.
    - Limit unnecessary idling of equipment.
    - Reroute construction-related truck traffic away from residential streets to the extent permitted by the relevant municipality.
    - Avoid impact pile driving where possible. Where geological conditions permit, use quieter alternatives, such as drilled piles or a vibratory pile driver.
- **N-2**. The Construction Authority shall implement complaint resolution procedures, including a contact person and telephone number, to rapidly resolve any construction noise problems.

Vibration

No short-term construction vibration mitigation measures are required for the design refinement or new mitigation measure. A reliance, as applicable, on the reference Noise and Vibration Control Plan will be employed.

3.8.7.2 Long-term Mitigation Measures

Long-term construction noise and vibration mitigation measures for the design refinement and new mitigation measure may be required to address the impacts discussed in Section 3.8.6.4, although no new mitigation recommendations are recommended. The long-term mitigation measures would follow those detailed in Section 3.11.9.2 of the 2013 FEIR and the four subsequent addenda. A summary listing of those measures is provided below.

- **N-3**. The Construction Authority shall employ noise reduction strategies to reduce noise, including erecting noise barriers, employing building sound insulation, and modifying at-grade audible warning devices and operation.
- **N-4**. The Construction Authority shall employ vibration reduction strategies, such as ballast mats, shredded tire or recycled rubber chip underlay, relocation of crossovers, and special track work.
- **N-5**. Prior to construction, the Construction Authority shall contact property owners of residences identified as having noise or vibration impacts listed as significant and unavoidable.

3.8.8 Level of Impact after Mitigation

The mitigation measures for the Project Modifications would reduce construction and operational noise levels to less than a significant level.

3.9 Safety and Security

This section describes the potential safety and security impacts of the Project Modifications. Safety relates to the prevention of unintentional harm, such as from accidents, to the passengers, employees, and the community during operation of the LRT. Security relates to the protection of people and property from intentional acts that could cause injury or harm.

The approved 2013 FEIR Project found that the project would be designed and would incorporate mitigation measures to protect the safety and security of passengers, employees, and the community in the vicinity of the LRT facilities and would be operated in accordance with Metro's standard operating procedures, operator rules, system safety plan, and the emergency plan, as well as the requirements of the CPUC. Therefore, the 2013 FEIR Project was shown to not result in significant impacts related to safety and security.

Based on a preliminary evaluation conducted and comments received during the NOP and public scoping processes, safety and security was identified for potential environmental effects of the proposed Project Modifications. The analysis of those effects is presented below.

3.9.1 Regulatory Setting

Federal, state, and local regulations, laws, and standards govern the design and safety and security of LRT. The Proposed Project is being designed in accordance with applicable federal, state, and local laws and regulations, including:

- FTA regulations
- U.S. Department of Homeland Security Transportation Security Administration (TSA) regulations
- CPUC General Orders
- Uniform Fire Code (UFC)
- Americans with Disabilities Act of 1990 (ADA)
- CBC
- Local regulations administered by Metro

A discussion of the federal, state and local regulatory framework relevant to safety and security for the Proposed Project that are either newly enacted since the approval of the 2013 FEIR or were not included as part of the 2013 FEIR or the four subsequent addenda is presented below.

3.9.1.1 Federal and State Regulations

The following federal regulations and agencies are applicable to and have discretionary authority over the Proposed Project.

Fixing America's Surface Transportation Act

The FTA created a state-managed oversight program for rail transit safety and security. The program is applicable to all states that have within their boundaries a fixed-guideway rail system not regulated by the Federal Railroad Administration (FRA). The program requires that transit agencies address the safety and security of their bus and light rail passengers and employees by preparing a system safety program conforming to the state-managed system safety program standard.

The Fixing America's Surface Transportation (FAST) Act was signed into law in December 2015. The Act, which supports transit funding through fiscal year 2020, reauthorizes FTA programs and includes changes to improve mobility, streamline capital project construction and acquisition, and increase the safety of public transportation systems across the country. The FAST Act builds on the safety and security initiatives set forth under previous legislation (Moving Ahead for Progress in the 21st Century) such as:

- National Public Transportation Safety Plan: In accordance with 49 U.S.C. 5329(b), the FTA will "create and implement" a National Safety Plan to "improve the safety of all public transportation systems that receive FTA funding." At a minimum, the National Safety Plan will include: (1) safety performance criteria for all modes of public transportation; (2) the definition of "state of good repair" developed through the implementation of the National Transit Asset Management System; (3) minimum safety performance standards for transit vehicles used in revenue service that are not regulated by other U.S. Department of Transportation (USDOT) modes or any other federal agency; and (4) a public transportation safety certification training program.
- Public Transportation Safety Certification Training Program: In accordance with 49 U.S.C. 5329(c), the FTA is required to establish a Public Transportation Safety Certification Training Program for the certification and training of federal and state employees or other designated personnel who conduct safety audits and examinations of public transportation systems, and employees of public transportation agencies directly responsible for safety oversight.
- Public Transportation Agency Safety Plan: In accordance with 49 U.S.C. 5329(d), public transit agencies are required to develop, implement, and certify a Public Transit Agency Safety Plan. The Authority will develop a plan and submit the plan for approval to its Board of Directors and to FTA for certification of the plan.

The FAST Act provides explicit authority to the FTA to issue nationwide safety directives and clarifies FTA's authority to issue regulations that restrict or prohibit unsafe conditions or practices that create a substantial risk of death or personal injury. FTA is also given authority to withhold or direct federal funds for recipients that do not comply with federal law regarding safety of the public transportation system.

Federal Transit Administration

The FTA created a state-managed oversight program for rail transit safety and security for major capital projects. The program is applicable to recipients of funding for major capital projects covered by 49 CFR Part 33. FTA Circular 5800.1 (FTA, 2007) requires that transit agencies address the safety and security of their passengers and employees by preparing a Safety and Security Management Plan (SSMP). The Authority would prepare a SSMP in accordance with Circular 5800.1 requirements. For security reasons, the SSMP would not be available for public review. The project plans that are required by the SSMP would also be prepared to comply with Circular 5800.1 requirements.

In addition, FTA's Security and Emergency Preparedness Action Items for Transit Agencies (FTA, 2014) provides a list of 17 security and emergency management action items updated to include cyber security and the Department of Homeland Security National Advisory System. Transit agencies are encouraged to include all of these action items in their security programs, scaled appropriately to the risk environment and operation size. High-level elements such as management, accountability, training, and risk management are used to organize and group similar action items.

Federal Railroad Administration

The FRA is the agency within USDOT responsible for the promulgation and enforcement of rail safety regulations, administration of railroad assistance programs, and conducting research and development in support of improved railroad safety and national rail transportation policy. For further discussion, refer to Section 3.12.1 of the 2013 FEIR (Authority, 2013).

U.S. Department of Homeland Security Transportation Security Administration

49 CFR Part 1580 authorizes the TSA to inspect rail transit facilities for security, requires that rail transit systems appoint primary and secondary rail security coordinators, and provides general security incident reporting guidance. TSA Security Directives RAILPAX-04-01 and RAILPAX-04-02 Passenger Rail Security require rail transportation operators to implement certain protective security measures, to

designate a primary and alternate security coordinator, and to report potential threats and security concerns to the TSA.

Fire/Life Safety

The UFC provides a comprehensive approach to fire code regulation and hazard management to ensure public safety on a routine basis. The code contains applicable regulations related to the construction and maintenance of buildings and use of their premises. Relevant issues addressed in the UFC for the project include fire department access, fire hydrants, automatic sprinkler systems, fire alarm systems, fire and explosion hazards safety, hazardous materials storage and use, provisions to protect and assist first responders, and many other general and specialized fire safety requirements for new and existing buildings and their surrounding premises. The UFC contains specialized technical regulations related to fire and human safety that would also be applicable. Federal regulations relating to fire and life safety include National Fire Protection Association 101 Life Safety Code and 130 Standard for Fixed Guideway Transit and Passenger Rail Systems, which have been adopted by Metro, and are discussed further in the approved 2013 FEIR in Section 3.12.1.2.

28 CFR Part 36, Americans with Disabilities Act

28 CFR Part 36, Nondiscrimination on the Basis of Disability in Public Accommodations and Commercial Facilities, implements Title III of the ADA. It sets guidelines for accessibility to places of public accommodation and commercial facilities by individuals with disabilities. These guidelines are to be applied during the design, construction, and alteration of such buildings and facilities to the extent required by regulations issues by federal agencies, including the Department of Justice, under the ADA.

California Public Utilities Commission

Federal law (49 CFR 659) requires every state to identify a state safety oversight agency to oversee safety requirements for fixed-guideway systems. In California, the CPUC has been identified as the state safety oversight agency. The CPUC has adopted two key General Orders (GO), GO 164-D and GO 143-B, which established the Safety Rules and Regulations Governing Rail Transit State Safety Oversight in California for fixed-guideway systems. For further discussion, refer to Section 3.12.1 of the 2013 FEIR.

The following state regulations related to safety and security would also be applicable to the Proposed Project:

- **California Code of Regulations** – California Department of Industrial Relations has safety orders established in Title 8 of the CCR. Codes relevant to the project include:
  - Subchapter 4, Construction Safety Orders, which establish minimum safety standards related to construction and maintenance, alteration, painting, repairing, renovation, removal or wrecking of any fixed structure or its parts
  - Subchapter 5, Electrical Safety Orders, which provide minimum safety requirements and assist in the elimination of accidents that may result from the operation, installation, removal, use and maintenance of electrical equipment and tools
- **California Building Code** – CCR Title 24 of the CBC, is a compilation of building standards and provides design and construction requirements relating to fire and life safety, structural safety, and access compliance. State fire regulations set forth in the California Health and Safety Code, Section 13000 et seq., include regulations for building standards (as also set forth in the CBC) for fire protection and notification systems, fire protection devices such as extinguishers and smoke alarms, and fire suppression training. CBC Chapter 4, Section 443, Fixed Guideway Transit and Passenger Rail Systems, applies to the design criteria for the safety of the project.
- **California Department of Transportation** – The California Department of Transportation (Caltrans) *California Manual of Uniform Traffic Control Devices* (MUTCD) (Caltrans, 2014) would apply to the Project to provide uniform standards and specifications for all official traffic control devices, in

accordance with California Vehicle Code Section 21400 et seq. For further discussion on Caltrans, refer to Section 3.12.1 of the 2013 FEIR.

The above referenced regulations and standards include requirements for construction safety, electrical safety, tunnel safety, fixed-guideway transit systems, and various design standards.

3.9.1.2 Regional Regulations

In addition to Metro, Los Angeles County Department of Public Works' *Standard Plans Manual* (Los Angeles County Department of Public Works, 2000) applies to design improvements within County right-of-way. The *Los Angeles County General Plan 2035* (Los Angeles County Department of Regional Planning, 2015) includes policies that affect police and fire services in the project area.

Los Angeles County Metropolitan Transportation Authority

Metro and the Authority are responsible for compliance with all FTA and CPUC regulations governing the safe construction and operation of the project, both for patrons and employees. The following Metro policies are applicable to this project:

- *Metro Grade Crossing Policy for Light Rail Transit* (Metro, 2010a)
- *Metro Emergency Response Plan Policy* (Metro, 2010b)
- *Metro Rail Design Criteria* (Metro, 2010c)
- *Metro Fire/Life Safety Design Criteria* (Metro, 2010d)
- *Metro Systemwide Station Design Standards Policy* (Metro, 2018)
- *Metro First/Last Mile Strategic Plan* (Metro, 2014)
- *Metro Transit Homeless Action Plan* (Metro, 2017)

Several other transit-specific measures and programs to enhance safety for transit riders, employees, and the community include, but are not limited to video surveillance, direct communication between operators and Metro Transit Security dispatch/emergency response centers, safety awareness programs and campaigns, emergency response training, and other integrated security measures installed at Metro facilities. For further details, refer to Section 3.12.2 of the 2013 FEIR.

Metro Grade Crossing Policy for Light Rail Transit

The *Metro Grade Crossing Policy for Light Rail Transit* (Metro, 2010a) provides a structured process for evaluating potential grade separations versus at-grade operation along LRT lines. The policy describes a three-step process.

- **Initial Screening** - A preliminary planning-level assessment of roadway crossings based upon readily available, planning-level data for roadway volumes and proposed train frequencies leading to an initial categorization of roadway crossings into three groups: "At Grade Should be Feasible," "Possible At Grade Operation," and "Grade Separation Usually Required."
- **Detailed Analysis** - This step is a detailed evaluation of operations, taking into account peak-period movement-by-movement analysis of roadway traffic in conjunction with an assessment of potential impacts to rail operations due to priority control. It provides a more refined assessment of feasibility of at-grade operation and identifies operational trade-offs between roadway traffic conditions and rail operations. This review includes an initial assessment of safety issues based on site-specific evaluation of geometric conditions and observed and/or projected use of proposed crossings. It results in a preliminary determination of locations that may be operated at-grade versus grade-separated.
- **Verification** - This step includes the process of developing consensus regarding the proposed design solution with local constituencies, including other involved agencies and the community as appropriate. This step may include preliminary engineering studies and cost estimates for alternative treatments. It may also include refinement of projected traffic volumes and validation of traffic and rail

operations using simulation modeling. Finally, it may include additional analysis of safety issues and countermeasures. At the conclusion of this step, it is expected that all technical studies will have been completed leading to a final recommendation by Metro for the crossing configuration.

For more information, refer to the detailed analysis for the evaluation of the grade separations and at-grade operation in Chapter 7, Responses to Comments, of the 2013 FEIR.

Metro Emergency Response Plan Policy

The *Metro Emergency Response Plan Policy* (Metro, 2010b) establishes guidelines for standard operating policies and procedures for mobilizing Metro employees and resources during an emergency situation. The policy is shared with other public safety resources and agencies to provide fast, controlled, and coordinated response to the various emergencies that may occur on the Metro rail system. The policy aims to impact the fewest number of responders, allowing the emergency situation to be mitigated with as little impact to the system as practicable and with service restored as quickly as possible.

Metro Rail Design Criteria Manual

Section 12 of the *Metro Rail Design Criteria Manual* (MRDC Manual; Metro, 2010c) identifies the methods by which Metro will construct, maintain, and monitor the safety of its transit facilities. The MRDC Manual requires the preparation of a Functional Hazard Analysis to analyze the potential for a loss or malfunction for each and every LRT operational function and categorize the effects by the associated hazard levels. For further discussion, refer to Section 3.12.2 of the 2013 FEIR.

Metro Fire/Life Safety Design Criteria

Metro's *Fire/Life Safety Design Criteria* (Metro, 2010d) are designed to address specific fire protection requirements for the design and construction of LRT systems and equipment and establishes minimum requirements that help provide safety from fire and related hazards. For further discussion, refer to Section 3.12.2 of the 2013 FEIR.

Metro Systemwide Station Design Standards Policy

The *Metro Systemwide Station Design Standards Policy* (Metro, 2018) adopted in January 2018 requires all future Metro rail and bus rapid transit station designs to follow a new systemwide design approach, incorporating safe and highly durable materials, and integrating public art and sustainable elements in terms of architectural materials, energy usage, and landscaping. Metro aims to provide safer, more accessible, easy to navigate, and comfortable station public areas for transit riders. The design standards provide station layouts that allow for coordination with Metro Operations, Safety, and Security Departments to ensure improved visibility through and across stations.

Metro First/Last Mile Strategic Plan

In April 2014, Metro adopted the *First/Last Mile* (FLM) *Strategic Plan* (Metro, 2014) to maximize the mobility benefits of the transit system and improve the transit experience by providing transit users with safe and efficient routes when accessing stations and while making multi-modal transfers. Given that most transit users are pedestrians, cyclists, and users of nonmotorized modes during the first, last, and transfer components of their trips, ensuring their safety is a priority for Metro.

A Foothill Gold Line Phase 2B FLM Plan is currently in development. It will identify pathways and physical improvements that will help protect transit users walk to, bike to, and otherwise safely access the future stations along the project alignment. FLM elements include, but are not limited to, ADA-compliant curb ramps, wayfinding signage, crosswalk upgrades, traffic signals, bus stops, carshare, bikeshare, bike parking, and enhanced, context-sensitive sidewalk and bike infrastructure. The FTA considers these elements as crucial infrastructure providing users with access to public transit in a safe environment.

Metro Transit Homeless Action Plan

The homelessness crisis in Los Angeles County affects the region's transit systems; with more than two-thirds of the homeless populations being unsheltered, many individuals find temporary shelter in Metro transit facilities and vehicles. Metro has developed the *Metro Transit Homeless Action Plan* (Metro, 2017), which implements a comprehensive outreach and engagement plan providing homeless individuals with resources and services, while maintaining a clean environment and a high level of public safety for Metro transit patrons. The action plan is based on a four-step approach:

- **Research** – Produce data and demographic profiles of homeless populations in Metro facilities, vehicles, and rights-of-way.
- **Education** – Educate Metro staff and passengers on transit homelessness, what to do, and how to best respond when encountering them in the public transit system.
- **Coordination** – Engage and partner with providers and others involved in the homeless services delivery system. Participate and collaborate with Los Angeles County and neighboring cities to align and integrate with adopted strategic plans.
- **Outreach** – Implement a coordinated comprehensive transit homeless outreach approach providing homeless individuals with services, resources, and housing solutions.

The agency is working with Los Angeles County to coordinate their efforts of county-wide homelessness strategic plans, providing multi-disciplinary homeless outreach teams to engage and educate individuals regarding services and homeless housing programs. The program has resulted in approximately 12 percent of those contacted going into permanent housing solutions.

Southern California Regional Rail Authority Design Criteria Manual

The SCRRA provides a commuter rail system serving the Southern California region under Metrolink. The *SCRRA Design Criteria Manual* (Metrolink, 2014) defines the procedures, standards, codes, specifications, guidelines, and manuals that govern the initiation, progress, and execution of design work associated with SCRRA. Section 4.3.3, Shared Corridor, applies to the project as clearances for LRT paths within the SCRRA corridor require compliance based on their design criteria standards, codes, and guidelines due to some segments of the Gold Line project alignment sharing the corridor with the Metrolink San Bernardino Line.

3.9.2 Existing Conditions

3.9.2.1 Security

Since the approval of the 2013 FEIR and four subsequent addenda, Metro's law enforcement model has been restructured as a multi-policing model that includes Metro's Transit Security guards and contract police services. The Los Angeles County Sheriff's Department (LASD) Transit Services Bureau, Los Angeles Police Department (LAPD), and Long Beach Police Department (LBPD) provide contract police services to Metro. This multi-agency approach allows for higher visibility, enhanced response time, improved customer experience, and deployment of specifically trained officers to engage patrons with mental illness and/or homelessness.

The analysis of security issues addresses the potential for violent crimes, property theft, fare evasion, and vandalism. Potential impacts are assessed by reviewing project design features in the context of Metro procedures and prior experiences of other rail systems.

Crime data from the LASD Transit Services Bureau, LAPD Transit Services Division, and LBPD Transit Security Unit related to Metro operations were examined. The data were derived from the Transit Safety and Security Reports provided monthly by the Operations, Safety, and Customer Experience Committee (formerly known as System Safety, Security and Operations Committee, until July 2018) at Metro Board meetings and include reported incidents occurring on rail/bus facilities and rights-of-way. The statistics for 2016 through 2018 are summarized in Table 3.9-1. Larceny-theft, robbery, aggravated assault, motor vehicle theft, and vandalism on Metro property occur more than other crimes.

Table 3.9-1. LASD Transit Services Bureau, LAPD, and LBPD Incidents Reported for Metro Train/Bus Facilities and Rights-of-Way

Crime	2016	2017	2018
Larceny-Theft	851	821	652
Robbery	410	424	259
Aggravated Assault	303	261	215
Aggravated Assault on Operator	12	15	12
Grand Theft Auto	110	98	21
Burglary	12	14	11
Forcible Rape	6	11	10
Arson	7	2	1
Homicide	3	2	1
TOTAL *(minus vandalism)*	**1,714**	**1,648**	**1,182**
Vandalism	351	190	83

Source: LASD Transit Services Bureau, LAPD, LBPD, Metro 2016, 2017, 2018

Note: Crime data unavailable for June 2018 and December 2018. Vandalism data unavailable between March 2018 and July 2018.

Since the approval of the 2013 FEIR, five of the nine types of criminal incidents occurring on Metro rail and bus facilities and rights-of-way saw an increase. The remaining four types of criminal incidents occurring on Metro rail and bus facilities and rights-of-way have since decreased. There are several contributing factors that may have influenced the change in the number of the criminal incidents since the 2013 FEIR, such as increased law enforcement personnel and presence on the Metro system that has prevented crimes and caused a greater number of crimes to be reported. Another contributing factor is the expansion of the Metro rail and bus system, including:

- Metro Orange Line Extension to Chatsworth (added 4 new stations)
- Metro Expo Line from Downtown Los Angeles to Culver City (added 10 new stations)
- Metro Foothill Gold Line Extension to APU/Citrus College Station (added 6 new stations)
- Metro Expo Line Extension to Downtown Santa Monica Station (added 7 new stations)

Based on the increased police presence across Metro systems and the expansion of the rail and bus rapid transit system, while certain crimes being reported have seen an increase since the preparation of the 2013 FEIR, the actual safety and security conditions of the Metro system have significantly improved.

3.9.2.2 Emergency Response

Station and track design (e.g., access, layout, exits, alarms, and evacuation infrastructure) and operational procedures (e.g., interagency agreement, training, and evacuation) are pertinent to the effectiveness and timeliness of emergency response. The conclusions from the analysis of emergency response presented in the 2013 FEIR remain unchanged. Section 3.12.2.4 of the 2013 FEIR provides more detailed discussion about emergency response during construction and operation of the project. Information about emergency response services in the locations of the design refinement and new mitigation measure is presented below.

City of La Verne

As presented and approved in the 2013 FEIR and four subsequent addenda, the proposed LRT alignment in La Verne is mostly within an industrial or commercial area. However, there are single-family units between Wheeler Avenue and B Street, along the north side of the Metro right-of-way, and a residential area west of Fulton Road, along the south side of the Metro right-of-way. There would be five at-grade crossings in La Verne.

Police protection services are provided by the La Verne Police Department. The police station is located approximately 0.2 mile from the alignment, at 2061 3rd Street, La Verne, CA 91750. Fire protection and emergency medical services are provided by the La Verne Fire Department Station 1, located approximately 0.2 mile from the alignment, at 2061 3rd Street, La Verne, CA 91750. La Verne Medical Center is available to assist in case of medical emergencies. The hospital is approximately 1 mile away from the alignment, and is located at 2100 Foothill Boulevard A, La Verne, CA 91750. The locations of the police station, fire station, and hospital are shown on Figure 3.9-1.

The City of La Verne General Plan (City of La Verne Community Development Department, 1998) contains language that specifically mandates the City to keep track of traffic accidents within city limits and identify dangerous intersections and railroad grade crossings (both existing and proposed), and to develop improvements accordingly. For further discussion, refer to Section 3.12.2.4 of the 2013 FEIR.

City of Pomona

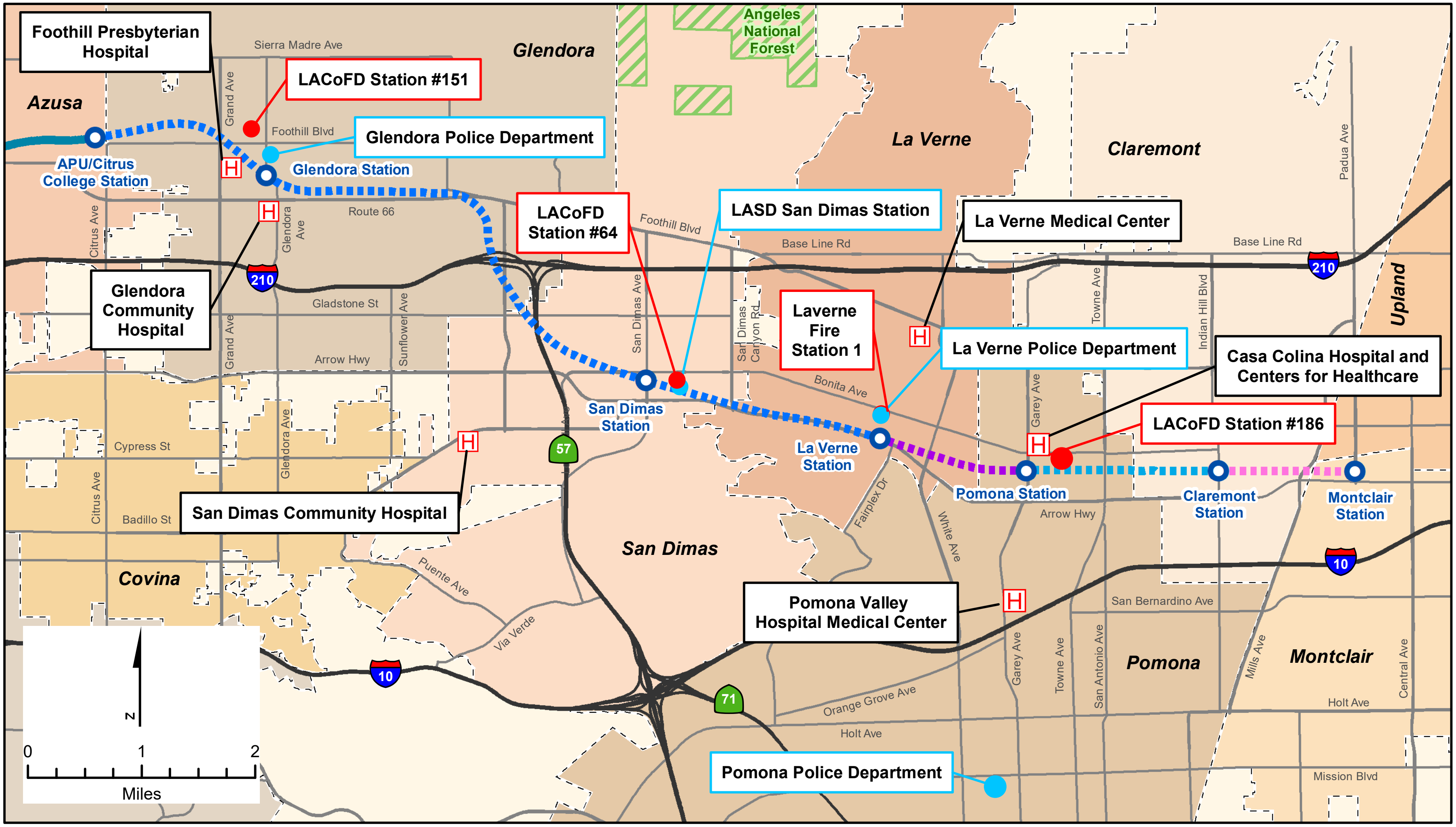
The proposed LRT alignment extending to Pomona Station is surrounded mostly by industrial developments. There are two existing at-grade crossings of the right-of-way in Pomona.

Police protection services are provided by the Pomona Police Department. The police station is located approximately 3 miles from the alignment, at 490 West Mission Boulevard, Pomona, CA 91766. Fire protection and emergency medical services are provided by Los Angeles County Fire Department Station #186, located approximately 0.3 mile from the alignment, at 280 East Bonita Avenue, Pomona, CA 91767. There are two hospitals available to assist in case of medical emergencies. Casa Colina Hospital and Centers for Healthcare is located approximately 0.25 mile from the project alignment, at 255 East Bonita Avenue, Pomona, CA 91767, and Pomona Valley Hospital Medical Center, approximately 1.2 miles from the alignment, is located at 1798 N Garey Avenue, Pomona, CA, 91767. Both hospitals are open 24 hours a day and equipped with emergency rooms. The locations of the police station, fire station, and hospitals are shown on Figure 3.9-1.

3.9.3 Environmental Impacts

3.9.3.1 Evaluation Methodology

As presented and approved in the 2013 FEIR and four subsequent addenda, the safety analysis considered passengers, employees, and the community including pedestrian, bicyclist, and motorists where they would cross over tracks, enter stations, or encounter hazards in the vicinity of other transit facilities during construction and operation of the LRT. The security analysis considered crime prevention and the potential for crime within the vicinity of the LRT.



Legend

- Police Station
- Fire Station
- Hospital
- Phase 1 – La Verne
- Phase 2 – Pomona
- Phase 3 – Claremont – subject to availability of funding
- Phase 4 – Montclair – subject to availability of funding
- Existing Metro Gold Line
- Metro Gold Line Phase 2B Station

Figure 3.9-1
Police Stations, Fire Stations, and Hospitals along the Project Alignment
Metro Gold Line Phase 2B –
Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

JACOBS

3.9.3.2 Impact Criteria

Impacts on safety and security would be considered significant if the Project Modifications would have the potential to:

- Create the potential for increased pedestrian and/or bicycle safety risks
- Create substantial hazards including station, boarding, or disembarking accidents; right-of-way accidents; collisions between LRT/automobile and LRT/pedestrian; fires; or major structural failures
- Substantially limit the delivery of emergency responses such as police, fire or emergency services to locations along the proposed alignment.
- Create the potential for adverse security conditions including incidents, offenses, crimes, or terrorism

Compliance with the above thresholds would signify that the Project Modifications would have less than significant impacts on pedestrian, bicyclist, and motorist safety and security, as the Project would be designed, constructed, and operated in adherence to design codes and standards, including the Occupational Safety and Health Administration (OSHA), California OSHA, CPUC, MUTCD, and Metro safety and security programs and standards. The project would be designed in accordance with the MRDC and *Metro Systemwide Station Design Standards Policy* and incorporate Metro's *First/Last Mile Plan* and Crime Prevention Through Environmental Design (CPTED) principles and features, demonstrating that the Project Modifications would have less than significant impacts on safety and security and would not contribute to cumulative impacts.

3.9.3.3 Short-Term Construction-Impacts

Construction of the design refinement and new mitigation measure could have temporary significant impacts on pedestrian and bicycle safety, emergency response services, security and prevention of crimes and terrorism within the cities in the project area if the implementation of these improvements did not comply with required safety and security standards. Temporary construction activities could affect pedestrians, cyclists, and motorists, experiencing additional safety hazards. This would result from the number and proximity of vehicles and people adjacent to LRT construction, as well as right-of-way improvements. Construction activities involving demolition; excavation; construction of stations, track, and street improvements; movement of construction equipment and materials between staging and storage areas and areas of construction; transport of excavation debris along haul routes within communities; as well as the possibility for bystanders to suffer falls or other accidents near construction sites and staging areas could impact pedestrian, cyclist, and motorist safety. However, pedestrian, bicyclist, and motorist safety would be maintained during construction through the use of signage, construction barriers, and supervision by safety and security personnel at access points and throughout construction sites.

Construction activities associated with the new Pomona Station parking facility and the new traffic mitigation measure, LTR-9, as presented in Section 2.3.3.3, would require lane closures, traffic detours, and designated truck ingress, egress, and haul routes, which may further temporarily affect pedestrian, cyclist, and motorist safety. These same temporary construction activities could also potentially increase traffic near emergency facilities, which could impact the ability of emergency response services, such as medical, police and fire, to provide timely responses. However, as presented in the 2013 FEIR, Section 3.12.3.3, the potential for such significant safety and security impacts would be minimized through compliance with OSHA, California OSHA, CPUC, MUTCD, and Metro safety and security programs and standards, which are designed to reduce potential impacts during construction. Additionally, as part of the specific design refinement analysis conducted and consistent with the long-term mitigation measure SS-2 (see Section 3.9.4.1), the preparation of a Construction Safety and Security Plan would also be coordinated between Metro and the contractor, implementing best practices and standards to avoid and minimize impacts related to construction safety.

Incidents of crime adjacent to the project alignment would not likely increase during construction of the Project Modifications. There is potential for property crimes to occur at the specific construction sites, including construction equipment and staging areas being targeted by potential thieves if not adequately secured. Again, consistent with the efforts to reduce potential impacts identified and described in the 2013 FEIR, the two design refinement construction sites would include security features such as closed-circuit television (CCTV), onsite guards, and security teams, as well as perimeter fencing to prohibit unauthorized individuals from accessing the construction area. Security lighting could be used at potential access points to the site to further deter access. Security measures would be implemented in accordance with federal and state requirements and permits during construction. These practices have been shown to reduce potential impacts to less than significant levels.

3.9.3.4 Long-Term Impacts

Pedestrian and Bicycle Safety

The Project Modifications, specifically the termini stations at La Verne and Pomona due to the phasing of the Proposed Project, would contribute to an increase in pedestrian and biking activity within or adjacent to their respective station areas, since 76 percent of Metro Rail customers arrive at existing termini stations by walking, biking, or rolling (Metro, 2016). This increase in pedestrian and bicyclist activities would create the potential for safety conflicts between pedestrian and bicyclists with LRT. In addition, the phasing of the Proposed Project would result in changes to the ridership demand at each phased terminus station that could impact pedestrian and bicyclist safety. According to the traffic analysis, ridership demand at the La Verne Station as a terminus station under Phase 1 would increase by 34 percent compared to the 2013 FEIR, from 1,840 passengers per day to 2,470 passengers per day. The station platform sizing, capacity, and accessibility of La Verne as designed would support the increase in ridership in the Phase 1 condition. This would be a temporary condition as La Verne Station would no longer be a terminus station once Phase 2 and Phase 3 are constructed, which would result in a corresponding decrease in ridership at La Verne Station. Therefore, the interim terminus station at La Verne under Phase 1 would not be expected to have any new impacts related to pedestrian and bicycle safety. However, based on the proposed construction and operation phasing, there is the potential for impacts at the Pomona Station and that analysis is provided below in the Pomona Station subsection. Adherence to the previously described MRDC, Metro's *First/Last Mile Plan*, and *Systemwide Station Design Standards Policy*, along with the already approved design features of the Proposed Project, would provide the following safety measures: visibility through and across stations for passengers and transit operators; uncluttered station entrances and platforms to provide safety; more comfortable open spaces for passengers; and intuitive station layouts to create an environment for passengers to easily recognize and navigate. These measures would largely minimize conflicts between LRT facilities or trains and pedestrians and bicycles.

White Avenue At-Grade Crossing

The new traffic mitigation measure, LTR-9, which is defined as the widening of White Avenue between the at-grade crossing and 6th Street, would not result in any significant pedestrian and safety impacts at this at-grade crossing. The improvements at the crossing would include sidewalk width expansion from 4 feet to 22 feet, signing and striping, and signals, as well as maintaining the existing full-quadrant gates. The new traffic mitigation measure, LTR-9, between 1st Street and 6th Street would provide adequate sidewalk width (5 feet) for pedestrians, curb ramps, and crosswalks.

In addition, quadrant gates and/or other equivalent safety and prevention measures would be implemented at all at-grade crossings as described in the 2013 FEIR. The new traffic mitigation measure, LTR-9, would not introduce any changes to these commitments, and the safety benefits would be achieved, such as restricting pedestrian and bicyclist movements when the LRTs are within the vicinity of the at-grade crossings. Consistent with the 2013 FEIR and four subsequent addenda, pedestrians and bicyclists would only be permitted to cross when LRTs are not present, and the project would continue to adhere to the MRDC, the hazard analysis recommendations, and the grade crossing analysis recommendations based on Metro's *Grade Crossing Policy for Light Rail Transit*. Therefore, no new or more severe significant impacts would result.

Pomona Station

The Pomona Station Refinement would result in the station platforms being separated from the parking facility by the Metrolink Pomona North Station and the Metrolink parking lot. Access between the station platforms and the parking facility would be provided by a pedestrian crosswalk across the Metrolink parking lot and a designated at-grade pedestrian crossing with gates across the Metrolink tracks. This designated at-grade crossing across the Metrolink tracks would include gates, swing gates, detectable warning surface, warning signs, wayfinding, concrete panels, railing, and signals. Direct connection of the parking facilities to the station platforms via a pedestrian bridge is not possible due to lack of available right-of-way at the platforms.

The relocation of the parking facility may potentially increase the risk of pedestrian and light rail vehicle conflicts as large numbers of people would converge at the station platform near the LRTs and cross the adjacent tracks before or after riding the trains. . In addition, pedestrians may see a train boarding at a station and run to catch it, often ignoring any safety signals along the way. In some cases, this may result in a collision with a train approaching from the opposite direction. When considering the phasing options of the proposed project and the changes to the ridership demand at each of the phased terminus stations, pedestrian and bicyclist safety also changes. According to the traffic analysis, the ridership demand at the Pomona Station as a terminus station under Phase 2 would nearly double compared to the 2013 FEIR Project from 3,010 passengers per day to 5,950 passengers per day. As such, the potential for the conflicts described above would increase. However, the Pomona Station is only a terminus station during Phase 2, which has a proposed construction schedule of 2019 to 2025, while construction of Phase 3 to Claremont is planned for 2020 to 2028. Therefore, the long-term ridership impacts at Pomona Station are minimized due to the temporary nature of this interim station terminus. The potential impacts and increased probability due to the higher ridership demands would be further minimized as the Proposed Project would be designed in accordance with the MRDC and the *Metro Systemwide Station Design Standards Policy* to provide adequate pedestrian queuing, warning signs and detectable surfaces, and refuge areas at station platforms. Section 6 of the MRDC requires that safety measures, including Fire/Life Safety Criteria, in regard to station platform sizing, capacity, and accessibility are incorporated into all designs at Metro LRT stations, The pedestrian capacity of the proposed crosswalks at the Metrolink parking lot, the at-grade crossing of Metrolink tracks, and new parking facility would be sufficient to serve the increased ridership demand. In addition, Metro's First/Last Mile Plan for the Foothill Gold Line Phase 2B (in preparation) would introduce additional safety features around station locations for pedestrian and bicycles. However, the existing sidewalk that connects the proposed parking facility and the at-grade crossing of the Metrolink tracks (Figure 3.9-2) would not provide sufficient width for the increased ridership demands. Implementation of mitigation measure SS-4 (see Section 3.9.4) to widen the existing sidewalk, along with the previously described safety features and design standards, would minimize the impact as a result of the increased ridership at the Pomona Station under Phase 2.

Another potential impact as a result of the higher ridership demands at the Pomona Station and the Project Modifications of the Metrolink Pomona North Station separating the Proposed Project's station and parking facility, is the potential for pedestrians mistakenly using the Metrolink Pomona North Station and boarding the wrong train. In addition to the previously described *Metro Systemwide Station Design Standards Policy* and Metro's First/Last Mile Plan for the Foothill Gold Line Phase 2B, mitigation measure SS-5 would minimize the potential for pedestrians confusing the adjacent Metrolink and Proposed Project's station platforms and boarding the wrong train. Therefore, no new or more severe significant impacts would result.

Figure 3.9-2. Existing Safety Features of the At-Grade Pedestrian Crossing at the Metrolink Pomona North Station

Motorist Safety

As presented and approved in Section 3.12.3.4 of the 2013 FEIR and four subsequent addenda, the Proposed Project includes design features that would largely minimize conflicts between LRTs and motorists, including those associated with the Project Modifications. The grade crossings analysis prepared from *Metro's Grade Crossing Policy for Light Rail Transit* for the 2013 FEIR and four subsequent addenda would remain unchanged for the Proposed Modifications. As previously described, Metro's First/Last Mile Plan for the Foothill Gold Line Phase 2B would also be in effect, thereby introducing additional safety features around station locations, including the La Verne and Pomona Stations, to prevent and minimize potential conflicts between motorists and pedestrians and bicycles. A more detailed discussion of the design refinement and new mitigation measure related to motorist safety is presented below.

White Avenue At-Grade Crossing

The new traffic mitigation measure, LTR-9, as presented in Section 2.3.3.3, would include providing two dedicated northbound and southbound travel lanes, eliminating the need to merge as motorists approach 6^{th} Avenue to the north and the existing at-grade railroad crossing to the south. Other improvements to motor safety would include painted median islands and dedicated turn lanes, new striping and signing, and improved sight distance as a result of tree removal. The existing full-quadrant gates would also remain in place at the at-grade crossing. The full-quadrant gates would restrict vehicle movement when LRTs are approaching or crossing White Avenue. Therefore, the White Avenue widening mitigation measure (LTR-9) would not result in new or more severe significant impacts to motorist safety.

Pomona Station

The new Pomona Station parking facility would be designed for safe circulation of buses and vehicles, as well as to avoid potential conflicts between LRTs, pedestrians, bicycles, and motorists. Vehicular and pedestrian gate operations at the Pomona Station entrances and exits would be optimized to accommodate the anticipated vehicle movement and increased number of activations. For traffic analysis within or around the parking facilities and station locations, refer to Chapter 2, Transportation, of this SEIR.

Security

As presented and approved in Section 3.12.4.3 of the 2013 FEIR, the project would be designed using CPTED features to provide a safe, secure, and comfortable transit system. The project would be designed with CPTED principles for transit stations such as open visible platforms, lighting, signage, emergency telephones, public address system, and CCTV monitoring systems. Law enforcement personnel would rove across the Gold Line stations to help prevent crime from occurring.

Similar CPTED design principles would be used to deter vagrancy at stations along the project, such as lighting, roving law enforcement personnel, and benches that would prevent people from lying down comfortably. In addition, Metro's *Transit Homeless Action Plan*, as discussed in Section 3.9.1.2, would implement a comprehensive outreach and engagement plan providing homeless individuals with resources and services, while maintaining a clean environment and a high level of public safety for Metro transit patrons using the LRT.

The new traffic mitigation measure, LTR-9, and the Pomona Station Refinement with the design features described above would not result in any new or more severe significant security impacts.

3.9.3.5 Cumulative Impacts

The Project Modifications would not contribute to safety and security cumulative impacts as they would not have new significant safety and security impacts.

3.9.4 Mitigation Measures

3.9.4.1 Short-Term Construction Mitigation Measures

The Project Modifications would be constructed in accordance with OSHA, California OSHA, ADA, and MUTCD requirements, as well as Metro safety and security policies and practices. These requirements, policies, and practices reduce potential impacts during construction to less than significant levels through the implementation of safety and security principles in environmental design, identification of roles and responsibilities for safety management. This ensures safety procedures are followed and regular safety inspections occur at the construction site. s. In addition, the following mitigation measures from the 2013 FEIR will be incorporated to ensure that the Project Modifications would not result in new or increased short-term construction impacts related to safety and security:

- **SS-1.** Work plans, schedules, and traffic control measures shall be coordinated with police and fire service providers prior to and during construction to limit effects on emergency response times.
- **SS-2.** Incorporate security measures at the construction sites and staging areas. Security features would include, but not limited to, CCTV, onsite guards and security teams, lighting focused on potential access points to the site to deter access, and perimeter fencing to prohibit unauthorized individuals from accessing the construction area.

Construction effects from the Project Modifications would be minimized to less than significant impacts through the implementation of 2013 FEIR mitigation measures SS-1 and SS-2. Therefore, no new or more severe significant impacts would result, and no new mitigation measures are required.

3.9.4.2 Long-Term Mitigation Measures

Mitigation measures presented and approved from the 2013 FEIR with addenda remain valid and will be implemented. The following mitigation measures will be incorporated to ensure that the Project Modifications would not result in new or increased long-term safety and security impacts:

- **SS-3 (from the 2013 FEIR).** Incorporate first/last mile strategies to improve pedestrian, bicyclists, and motorist safety developed by the Metro Foothill Gold Line Phase 2B First/Last Mile Plan.
- **SS-4 (new).** Widen the existing sidewalk between the proposed parking facility at the Pomona Station and the existing at-grade crossing over the Metrolink tracks from 4 feet to 8 feet to properly accommodate the higher ridership demands projected as a result of the Pomona Station being a terminus station under Phase 2.
- **SS-5 (new).** Install large, easily visible station identifiers for both the Metrolink Pomona North Station and the Proposed Project's Pomona Station. The station identifiers shall stand out visually in a busy urban environment and be distinguishable from the parking facility to differentiate between the Metrolink station and Metro's Pomona Station. Kiosks shall be placed near each station identifier that provide information and wayfinding such as station maps, system maps, real-time train arrival data, and fare information.

With the identified safety features and mitigation measures, no new or more severe significant long-term impacts would result due to the Project Modifications.

3.9.5 Level of Impact after Mitigation

With safety- and security-oriented design, adherence to standard policies and requirements, and the incorporation of mitigation measures, the Project Modifications would not result in new significant safety and security impacts. Therefore, safety and security impacts of the Proposed Project would be less than significant. The conclusions from the analysis of safety and security in the 2013 FEIR remain unchanged.

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3.10 Visual Quality

This section examines visual resources in the project vicinity and potential impacts the Project Modifications may have on the aesthetic character of the landscape. Visual resources are generally defined as the natural and built features of the landscape that can be viewed. Landforms, water, and vegetation patterns are among the natural landscape features that define an area's visual character, whereas buildings, roads, and other structures reflect human modifications to the landscape. These natural and built landscape features are considered visual resources that contribute to the public's experience and appreciation of the environment. This section analyzes whether the Pomona Station refinement or the White Avenue mitigation measure (LTR-9) would alter the perceived visual character of the environment and cause visual impacts.

The proposed modification to construction and operational phasing would not result in physical changes to the environment and so does not have the potential to cause visual impacts. No further analysis of this proposed modification was conducted.

3.10.1 Regulatory Setting

State and local laws, ordinances, regulations, and standards were reviewed for applicability to the design refinement and mitigation measure.

3.10.1.1 State

The **state** regulatory setting as described in Section 3.**13.1.1** of the 2013 FEIR is applicable to the Project Modifications**.** There are no officially designated State Scenic Highways located within the viewshed of the design refinement or mitigation measure.

3.10.1.2 Local

The design refinement and mitigation measure include physical changes to the environment and have the potential to result in impacts to visual resources within two local jurisdictions, the City of La Verne and the City of Pomona. The local regulatory setting within these two cities, as described in Section 3.13.1.2 of the 2013 FEIR, is applicable to the Project Modifications. Table 3.10-1 outlines additional measures adopted by these jurisdictions that relate to visual resources and are directly applicable to the Project Modifications.

Table 3.10-1. Local General and Specific Plan Policies and Goals

Jurisdiction	Document	Policy or Goal	Text
City of La Verne	General Plan (1998)	Transportation Goal 3, Policy 3.2, Implementation Measure f	Strive for improved street aesthetics
City of La Verne	General Plan (1998)	Community Design Goal 2, Policy 2.1, Implementation Measure a	Require street tree plantings be mature and dense enough to shade and beautify adjacent areas within 10 years of growth. Street tree selection shall consider the use of tree varieties already found along the street and those listed in Table CD-a: Arterial Street Tree Selection.

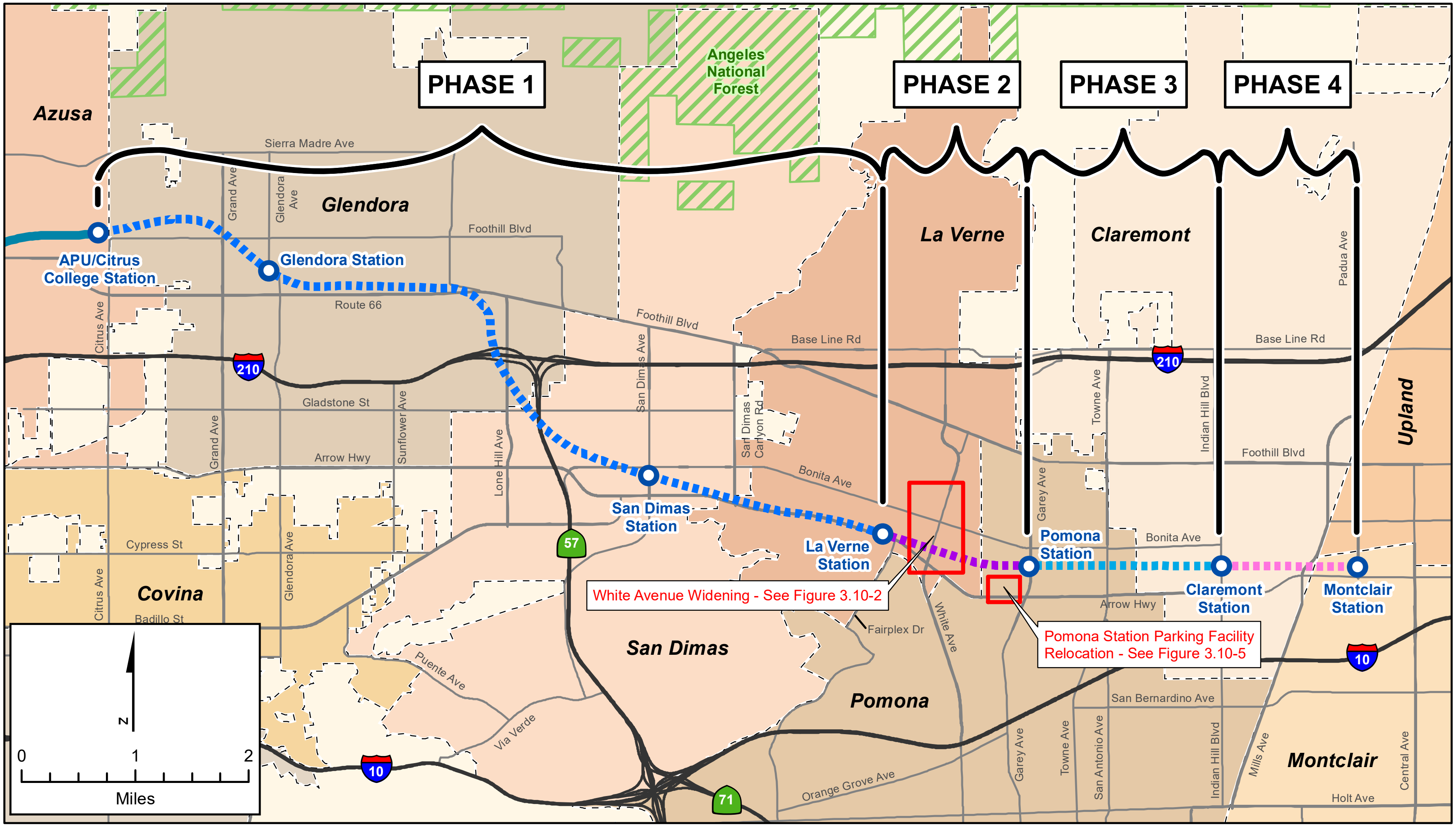
Table 3.10-1. Local General and Specific Plan Policies and Goals

Jurisdiction	Document	Policy or Goal	Text
City of La Verne	General Plan (1998)	Community Design Goal 2, Policy 2.1, Implementation Measure b.1	Require strict adherence to the City's Landscape Design Guidelines & Standards, which prescribes specific procedures for achieving the following: Boulevard Trees shall be: • Formally massed to promote a rhythmic, ceremonial appearance. • Selected from Table CD-1 for use along arterial streets.
City of La Verne	General Plan (1998)	Community Design Goal 2, Policy 2.4, Implementation Measure a	Require tree preservation plans with all development.
City of La Verne	General Plan (1998)	Community Design Goal 2, Policy 2.4, Implementation Measure c	Preserve all our significant stands of native, protected, and heritage trees.
City of La Verne	General Plan (1998)	Community Design Goal 2, Policy 2.4, Implementation Measure f	Require that all trees permitted for removal be replaced by a ratio of four-to-one.
City of La Verne	Lordsburg Specific Plan (2004)	Neighborhood Design and Aesthetics Objectives	Protect heritage trees.
City of Pomona	General Plan (2014)	Community Design Policy 7F.P2	Ensure that design review and standards require projects to: • Where parcels change dramatically in size, provide for privacy of nearby smaller parcels and maintain some visual continuity along the street. • Ensure that new development does not cast significant sun shadow over adjacent, small-scale development by utilizing detailed shadow studies as needed.

3.10.2 Existing Conditions

3.10.2.1 Regional Setting

The 12.3-mile project alignment is located in Los Angeles and San Bernardino Counties and traverses the cities of Azusa, Glendora, San Dimas, La Verne, Pomona, Claremont, and Montclair. Figure 3.10-1 shows the regional location of the project.



Legend

- Existing Metro Gold Line
- Metro Gold Line Phase 2B Station
- Phase 1 – La Verne – 2019 to 2024
- Phase 2 – Pomona – 2019 to 2025 subject to availability of funding from Metro
- Phase 3 – Claremont – 2021 to 2028 subject to availability of funding from Metro
- Phase 4 – Montclair – 2021 to 2028 subject to availability of funding from SBCTA for the portion from Claremont to Montclair

Figure 3.10-1
Regional Location
Metro Gold Line Phase 2B –
Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

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The communities crossed by the project corridor vary from urban to suburban and are characterized by a mix of residential, industrial, and commercial land uses. Nestled in the San Gabriel and Pomona Valleys, the cities are bounded to the north by the San Gabriel Mountains and to the southwest by the San Jose Hills. Rising to an elevation of greater than 10,000 feet, the San Gabriel Mountains provide a dramatic backdrop for the region and are an important scenic resource. This mountain range has an east-west orientation and roughly parallels the project alignment.

3.10.2.2 Local Setting

This section discusses the existing visual character and quality of the communities in close proximity to the proposed White Avenue widening (LTR-9) and the Pomona Station parking facility located in the City of La Verne and in the City of Pomona, respectively. Photographs presented on the figures in this section (referenced below) were taken during a site visit conducted on January 9, 2019.

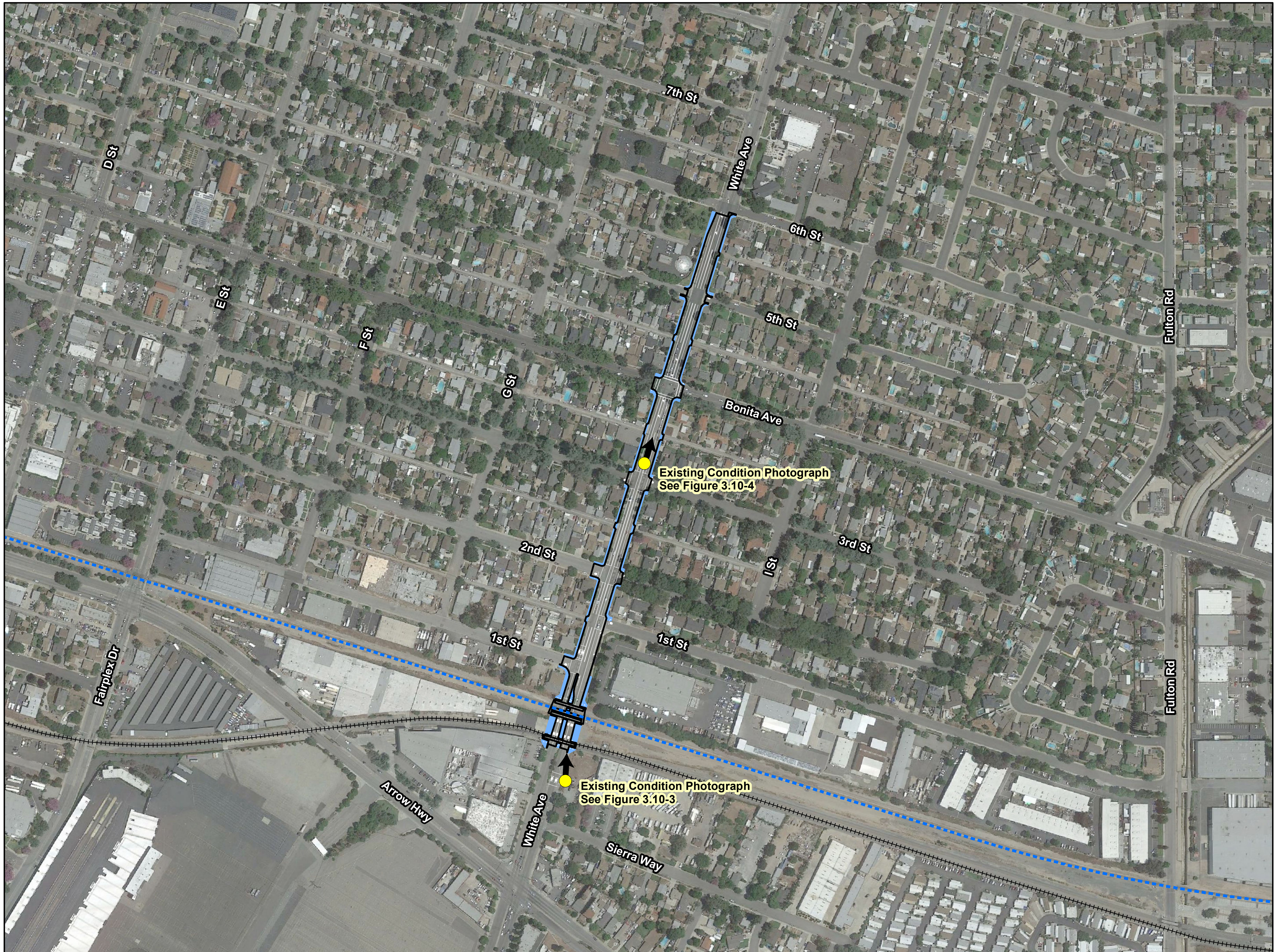
City of La Verne

The new traffic mitigation measure, LTR-9, is in the city of La Verne. Physical changes to the roadway would occur between Sierra Way and 6th Street. This 0.4-mile length segment of White Avenue is 0.4-mile east of Old Town La Verne. The portion of White Avenue between 2nd Street and 5th Street is within the area covered by the Lordsburg Specific Plan (City of La Verne Community Development Department, 2004). The portion of White Avenue from 2nd Street to Sierra Way is within the area covered by the Arrow Corridor Specific Plan (City of La Verne Community Development Department, 2006). Figure 3.10-2 shows the location of the proposed widening of White Avenue. Key visual resources within the White Avenue project viewshed include the San Gabriel Mountains, roadside landscaping and trees, and existing residential bungalows.

The segment of White Avenue proposed to be widened, as part of LTR-9 (section 2.3.3.3) is currently a single lane in each direction and generally travels in a north-south orientation. Both to the north of 6th Street and to the south of the existing railroad tracks, White Avenue is striped for two lanes in each direction. Frequent backups occur during peaks hours within the project area because of the bottleneck created when the road is reduced to a single lane. This arterial road connects to Interstate 210 in the north and to Interstate 10 in the south.

Figure 3.10-3 depicts a north-facing view of the roadway taken from just north of Sierra Way at the southern end of the proposed widened White Avenue segment as part of LTR-9. Light industrial and commercial uses are located within one block on either side of the railroad crossing, which is seen in the foreground of the existing condition photograph. A row of wooden utility poles runs along the western side of the road and is an intrusive visual element that reduces visual intactness. There is a mix of roadside landscaping, including trees and shrubs, that adds a moderate level of visual interest but that is not particularly lush or well-coordinated. North-facing travelers are provided wide views of the San Gabriel Mountains, which are tall, rugged, and vary in color from shades of brown to green. Overall visual quality of White Avenue between Sierra Way and 2nd Street is average.

The northern segment of White Avenue between 2nd Street and 6th Street is generally of higher visual quality. Figure 3.10-4 shows a representative view taken from 3rd Street facing north toward Bonita Avenue. Many of the visual elements from Figure 3.10-3 remain, including the row of utility poles, the roadway surface, and views toward the mountains. However, vegetation through this residential neighborhood tends to be more distinctive and visually interesting. Grassy sidewalk strips line both sides of the road, increasing greenery and making the busy street more pedestrian-friendly. There is a variety of lush, mature tree species, from palm to pine, both along the roadside and on properties neighboring White Avenue. Deodar cedar trees, planted in the first half of the 20th century, are found at the intersections of White Avenue at 3rd Street and White Avenue at Bonita Avenue. The deodar cedars and other historic trees throughout Old Town greatly contribute to the sense of place one feels in the older neighborhoods of La Verne. Overall visual quality of White Avenue between 2nd Street and 6th Street is moderately high.



Legend

Metro Gold Line Phase 2B

Metrolink

Proposed Widened White Avenue - Roadway Boundary

Proposed Curbs, Driveways, Gutters, Sidewalks

Existing Condition Photograph Location and Direction

Basemap Source: Google Earth Pro

N

0 400 800

Feet

Figure 3.10-2
Proposed Widening of White Avenue in La Verne and Existing Condition Photograph Locations
Metro Gold Line Phase 2B –
Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

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Existing view of White Avenue from south of the railroad crossing facing north.

Figure 3.10-3
Existing Condition Photograph –
White Avenue South of Railroad Crossing
Metro Gold Line Phase 2B –
Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

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Existing view of White Avenue from 3rd Street facing north toward Bonita Avenue.

Figure 3.10-4
Existing Condition Photograph – White Avenue at Bonita Avenue
Metro Gold Line Phase 2B – Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

JACOBS

The existing utility line poles that run along the west side of White Avenue, visible in the two existing condition photographs described above, are located within the sidewalk planter strips that will be removed with implementation of the mitigation measure. This utility line will be undergrounded as part of a separate project to be completed by the City of La Verne and Southern California Edison. Timing of the undergrounding effort is unknown.

Viewers in the area of the proposed road widening would be a mix of residents that live in the neighborhood (including in houses adjacent to the street), commuters traveling north or south on White Avenue, and workers employed at the industrial and commercial facilities located near the railroad corridor. Residents would have a high level of visual concern, while commuters and workers would have a moderate level of concern.

City of Pomona

The proposed modified location of the parking facility to be constructed at the Pomona Station is in the City of Pomona. Figure 3.10-5 shows the revised site of the proposed parking facility, which would be built on a 5-acre parcel south of the Gold Line station platform, adjacent to the existing Metrolink railroad tracks. Figure 3.10-6 is a photograph depicting the view from the Metrolink parking lot looking southwest toward the site of the proposed parking facility. An approximately 2.5-story light industrial warehouse is currently located on the parcel. The warehouse, which has a white exterior and few architectural details, is bounded by Supply Street on the east and by facility parking on the north, south, and west. The parcel is lightly landscaped with trees and shrubs lining Supply Street and trees along the northern, western, and southern property lines.

The proposed parking facility would be located in an area of mainly industrial land uses with limited visual resources save for intermittent north-facing views toward the San Gabriel Mountains. Other warehouses and industrial operations surround the parking facility parcel on all sides except to the south and southwest. Here, a residential neighborhood of single-family homes adjoins the southern property line. The existing warehouse structure is visible from this neighborhood, and it partially to fully screens the San Gabriel Mountains to the north from view (see Figure 3.10-7). For homes along Cameron Avenue, immediately south of the parcel, the existing warehouse is an imposing backdrop to the neighborhood that reduces visual quality.

Lacking scenic resources, overall visual quality in the area of the proposed parking facility is moderately low. Viewers in the area would be a mix of the residents that live in the neighborhood to the south, Metrolink rail commuters, and the workers employed at the industrial and commercial facilities located near the railroad corridor. Residents would have a high level of visual concern, while commuters and workers would have a moderate level of concern.

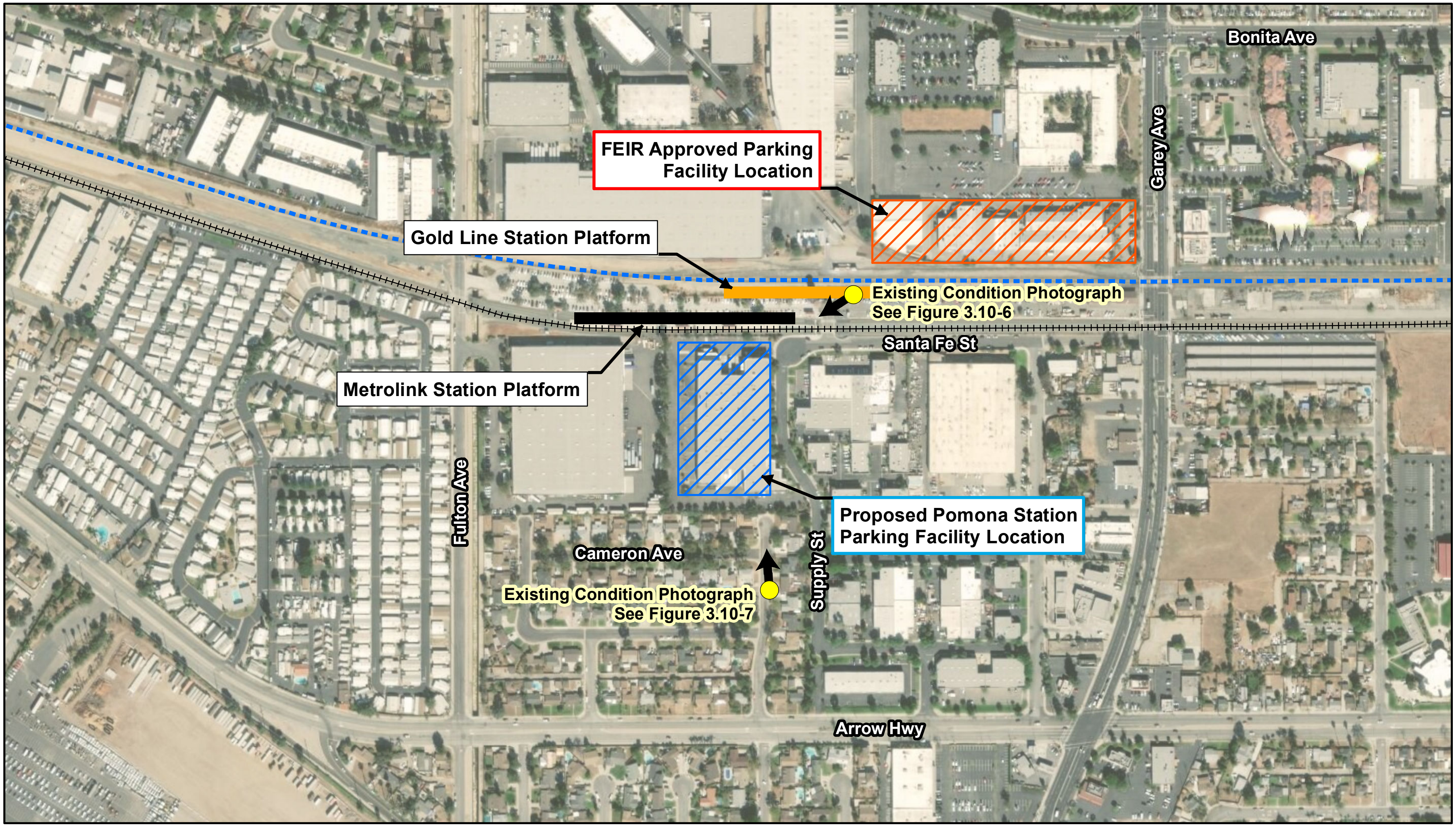
3.10.3 Environmental Impacts

3.10.3.1 Evaluation Methodology

This analysis of the visual resource issues associated with the new traffic mitigation measure, LTR-9, and Pomona Station refinement was prepared in accordance with the visual impact assessment system developed by the FHWA in *Visual Impact Assessment for Highway Projects* (2015). This method is robust and widely used to provide systematic evaluation of visual changes. The assessment also considered local policy documents (Table 3.10-1) that address locally important resources and set guidelines for achieving visually attractive projects.

The FHWA method addresses the following primary questions:

- What are the visual qualities and characteristics of the existing landscape in the project area?
- What are the potential effects of the project's proposed alternatives on the area's visual quality and aesthetics?
- Who would see the project, and what is their likely level of concern about or reaction to the way the project visually fits within the existing landscape?



Legend

- Metro Gold Line Phase 2B
- Metrolink
- Metrolink Station Platform
- Gold Line Station Platform
- FEIR Approved Parking Facility Location
- Proposed Pomona Station Parking Facility Location
- Existing Condition Photograph Location and Direction

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0 250 500

Feet

Basemap Source: ESRI World Imagery

Figure 3.10-5
Proposed Pomona Station Parking Facility Location and Existing Condition Photograph Locations
Metro Gold Line Phase 2B –
Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

JACOBS

Existing view from the Metrolink parking lot facing southwest toward the proposed parking facility location.

Figure 3.10-6
Existing Condition Photograph –
Parking Facility from Metrolink Parking Lot
Metro Gold Line Phase 2B –
Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

JACOBS

Existing view from the residential neighborhood south of the proposed parking facility location facing north.

Figure 3.10-7
Existing Condition Photograph –
Parking Facility from Residential Neighborhood
Metro Gold Line Phase 2B –
Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

The initial step in the evaluation process was a review of planning documents applicable to the project area to gain insight into the types of land uses intended for the general area, and the guidelines given for the protection or preservation of visual resources. Consideration was then given to the existing visual setting within the project viewshed, which is defined as the geographical area in which the project can be seen. Site reconnaissance was conducted to view the site and surrounding area and take representative photographs of existing visual conditions. The existing visual conditions were evaluated using the FHWA visual quality assessment system.

The FHWA visual quality assessment asks: Is this particular view common or dramatic? Is it a pleasing composition (a mix of elements that seem to belong together) or not (a mix of elements that either do not belong together or contrast with the other elements in the surroundings)? Under the FHWA visual quality analysis system, the visual quality of each view is evaluated in terms of its vividness, intactness, and unity:

- **Vividness** is defined as the degree of drama, memorability, or distinctiveness of the landscape components. Overall vividness is an aggregated assessment of landform, vegetation, water features, and human-made components in views.
- **Intactness** is a measure of the visual integrity of the natural and human-built landscape and its freedom from encroaching elements. This factor can be present in well-kept urban and rural landscapes, as well as in natural settings. High intactness means that the landscape is free of unattractive features and is not broken up by features and elements that appear out of place. Low intactness means that visual elements that are unattractive and/or detract from the quality of the view can be seen.
- **Unity** is the degree of visual coherence and compositional harmony of the landscape considered as a whole. High unity frequently attests to the careful design of individual components and their relationship in the landscape or refers to an undisturbed natural landscape.

Changes associated with the design refinement and mitigation measure are described in Section 1.2.2 and the anticipated visual effects of these proposed changes to the visual environment are described in Sections 3.10.3.3 and 3.10.3.4.

Once all effects were examined, a determination was made as to whether any potential impacts would reach a level that would be significant under the four CEQA Guidelines checklist questions discussed below in Section 3.10.3.2.

3.10.3.2 Impact Criteria

The significance criteria for assessing the impacts to visual resources come from the CEQA Environmental Checklist. According to the CEQA Checklist, a project causes a potentially significant impact if it would:

- Have a substantial adverse effect on a scenic vista
- Substantially damage scenic resources within a state scenic highway, including, but not limited to, trees, rock outcroppings, and historic buildings
- Substantially degrade the existing visual character or quality of the site and its surroundings
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area

The following additional criterion was also analyzed for consistency with the 2013 FEIR:

- Introduce substantial new shadow effects on sensitive users

Compliance with these thresholds of significance (as modified by the Project Modifications) would demonstrate (1) the extent to which the Project would conform with applicable laws, ordinances, and regulations governing visual resources, and (2) whether the Project would generally degrade the visual character and quality of the site and its surroundings. The questions from the CEQA Checklist and the additional criterion regarding shadow effects provide a comprehensive assessment of potential impacts to visual resources. Compliance with the thresholds would mean that the Project's impacts on visual resources are less than significant.

3.10.3.3 Short-Term Construction Impacts

Short-term construction impacts associated with the project were analyzed in Section 3.13.3.3 of the 2013 FEIR. The analysis reached the conclusion that, with mitigation, the project would not result in significant impacts to visual resources (Section 3.13.5).

Four addenda to the 2013 FEIR analyzed visual impacts the would result from changes to the project design. These analyses determined that, with implementation of the mitigation proposed in the 2013 FEIR, short-term construction impacts to visual resources would be less than significant (Addendum No. 1, Section 3.3; Addendum No. 2, Section 3.4.11; Addendum No. 3, Section 3.3.2; Addendum No. 4, Section 3.13.13).

Construction of the mitigation measure and design refinement would result in additional short-term impacts to visual resources in the vicinities of the White Avenue widening (LTR-9) and Pomona Station parking facility. Impacts would include temporary visual obstructions, distractions, and interferences within the existing visual environment due to the presence of construction equipment and construction objects (e.g., staged/stockpiled building materials, traffic barricades, signage, and construction personnel). These activities would be visible from residences, businesses, and roadways adjacent to the areas where the modifications are proposed. Construction activities are not expected to create new shadow effects on sensitive users.

Short-term construction mitigation measures VIS-1, VIS-2, and VIS-3 that were included in the 2013 FEIR (Section 3.13.4.1) to reduce visual impacts remain valid and would be applied, as required, to all project construction activities. Adherence to these mitigation measures would ensure that the Project Modifications would not result in new or increased short-term construction impacts on visual resources.

3.10.3.4 Long-Term Construction Impacts

Long-term construction impacts associated with the project were analyzed in Section 3.13.3.4 of the 2013 FEIR. Mitigation measures to reduce impacts to visual resources were proposed (Section 3.13.4.2); however, the analysis concluded that, with mitigation, the project would result in two significant and unavoidable impacts to visual resources (Section 3.13.5). The significant and unavoidable impacts were related to the construction of a rail flyover structure at Towne Avenue in Pomona and to the removal of deodar cedar trees along the railroad right-of-way in La Verne.

City of La Verne

Long-term changes to the visual environment along White Avenue that would occur with implementation of the proposed mitigation measure (LTR-9) include: a widened roadway surface to accommodate two lanes of traffic in both directions; new striping and signage; removal of sidewalk planting strips and associated trees and other vegetation within those planting strips; reconfiguration of sidewalks and driveways; construction of new curbs and gutters; and installation of street lighting consistent with and according to City standards (see Section 2.3.3.3). Most of these changes would have a negligible impact on visual resources in the vicinity of White Avenue. The widened roadway would not introduce physical elements capable of creating a substantial shadow effect.

Modifications to the White Avenue roadway, as part of LTR-9, do not have the potential to interfere with views from the road or adjacent residences toward the San Gabriel Mountains. However, removal of trees and other vegetation, particularly larger and older trees such as the deodar cedars, would represent a negative impact on visual quality along the segment of White Avenue between 2nd Street and 5th Street. This is the segment of White Avenue covered by the Lordsburg Specific Plan, and the plan emphasizes the important role that street trees play in defining Lordsburg's identity and in contributing to the richness of its urban landscape. With removal of the sidewalk planter strips and associated vegetation, White Avenue would look and feel much closer to the adjacent residences. The street would be busier and less pedestrian-friendly.

The Proposed Project has committed to a tree replacement policy that incorporates the following provisions:

- Trees with trunk diameters of 4-8 inches would be replaced with 24-inch-box trees at a 2:1 ratio.
- Trees with trunk diameters of 8-18 inches would be replaced with 48-inch-box trees at a 2:1 ratio.
- Trees with trunk diameters of greater than 18 inches would be replaced with 48-inch-box trees at a 4:1 ratio.
- The trees would be offered to the City of La Verne, which would decide on placement.

In addition to the project's tree replacement policy, mitigation measure VIS-1, described in Section 3.13.4.1 of the 2013 FEIR, will be implemented to minimize impacts to heritage and specimen trees.

Given that the sidewalk planter strips would not be replaced, and the expanded roadway and sidewalks would occupy the entire right-of-way, it is unlikely that any replacement trees could be planted alongside White Avenue. In this case, per the Project tree replacement policy, replacement trees would be offered to the City of La Verne to place at their discretion. Visual quality would potentially increase in parts of La Verne where the replacement trees are planted but the localized impact of removing and not replacing the trees along White Avenue would remain. With less roadside vegetation and landscaping, there would be a reduction in vividness along the street. However, there is an abundance of mature trees and landscaping on the residential parcels adjacent to the street. This vegetation would not be affected by the Project Modifications and its presence would limit the impact to visual quality caused by removal of the sidewalk planter strips. Figures 3.10-8 through 3.10-11 are provided to put the relative significance of the removal of the sidewalk planter vegetation in perspective. In most areas adjacent to the road, a variety of tree species and visually interesting landscaping would continue to be visible.

The Lordsburg Specific Plan acknowledges the importance of White Avenue to circulation within La Verne and notes that the increased congestion within Lordsburg that would result from not widening White Avenue or providing an alternative would be undesirable in the preservation of the area. Nevertheless, the Plan prefers an alternative to a widened White Avenue and states, "Further expansion of the [White Avenue] right-of-way…will damage the visual quality of the neighborhood," and "Widening White Avenue would not be consistent with the objective of the Lordsburg Specific Plan to preserve the character of the neighborhood" (City of La Verne Community Development Department, 2004).

Implementation of the White Avenue mitigation measure (LTR-9) would result in impacts to visual character due to the removal of trees and landscaping in sidewalk planter strips adjacent to the roadway. However, the level of impact is considered slight because a large number and variety of existing trees on parcels next to the street would be unaffected. The continued presence of these trees would ensure that White Avenue retains a substantial degree of its visual character in the City of La Verne. Additionally, the Project would not result in screening of views toward the San Gabriel Mountains, a key scenic resource along the roadway. Overall visual quality would remain moderately high. In addition, Mitigation Measure VIS-1 would reduce impacts to affected specimen and heritage trees. With implementation of the proposed mitigation and taking into account the localized nature of the White Avenue mitigation measure (LTR-9), visual impacts would be less than significant. No new or more severe significant impacts would result.

City of Pomona

The site previously analyzed for a Pomona Station parking facility in the 2013 FEIR, Section 3.13, was a location northeast of the Gold Line station and west of Garey Avenue. The 2013 FEIR determined that visual impacts associated with a parking facility constructed in this location would be less than significant. With approval of the Project Modifications, a parking facility would not be built on the originally proposed site; therefore, no impacts to visual resources would occur at that location.

Long-term changes to the visual environment near the site of the proposed Pomona Station parking facility south of the station include: demolition of the warehouse that currently stands on the parcel; construction of a parking facility that contains 725 parking spaces; removal of existing trees and landscaping, as necessary; and installation of new landscaping. The new parking facility would be nearly the same size as the existing warehouse structure. Dimensions of the existing warehouse and proposed facility are provided in Table 3.10-2. Based on the land use analysis provided in Section 3.7.3.4, a parking facility of this size in the proposed location would not conflict with City of Pomona land use and zoning regulations.

Table 3.10-2. Dimensions of the Existing Warehouse and Proposed Pomona Station Parking Facility

	Length (north-south)	Width (east-west)	Height
Existing Warehouse	400-430 feet	240-290 feet	30 feet
Proposed Pomona Station Parking Facility	400 feet	260 feet	30 feet

Construction of the proposed parking facility would have a negligible effect on visual quality for the industrial and transit-oriented land uses in the vicinity. The proposed changes to the visual environment are minimal and not out of place in an industrial district, and viewer concern is not expected to be high. Additionally, mitigation measures VIS-1 and VIS-5 will ensure that the facility design and landscaping are appropriate for the site and fit the surrounding community.

Visual impacts would be greater for the residential neighborhood to the south and southwest of the proposed parking facility site. The change in structure type from a warehouse to a parking facility would introduce visual impacts related to lighting and privacy. These potential impacts would be compounded if the trees along the southern property line are removed during construction. Mitigation measures VIS-2, VIS-3, and VIS-4, which were included in the 2013 FEIR, would remain valid and would reduce many of the impacts associated with facility lighting; however, an additional and new mitigation measure, VIS-7, is proposed to ensure the privacy of the neighboring residences and further reduce impacts from facility lighting. VIS-7 would require that the south-facing façade of the parking facility be solid, with no openings or windows.

Current views from many parts of the residential neighborhood toward the San Gabriel Mountains are partially to fully screened by the existing warehouse structure or by the large warehouse on the property west of the proposed site. The footprint and height of the new facility would be nearly the same as the existing warehouse, limiting the chance that the parking facility would cause additional screening of views from residences toward the San Gabriel Mountains.

Shadows cast by the proposed parking facility would not be significantly different than those cast by the existing warehouse, given the similar footprints and heights of the two structures, Additionally, sensitive users in the vicinity are limited to the residences south of the parcel, and areas south of the parking facility could only be affected by its shadows for short periods during the early morning and late afternoon hours for a few months on either side of the summer solstice.

With implementation of the proposed mitigation measures and taking into account the localized nature of the Pomona Station refinement, visual impacts would be less than significant.

3.10.3.5 Cumulative Impacts

Visual impacts associated with the proposed design refinement and mitigation measure would only occur at two specific locations and be highly localized. Changes to the visual environment would not be out of place or scale in the urbanized settings of La Verne and Pomona. Implementation of the mitigation measures identified in the 2013 FEIR, Section 3.13.4, will reduce impacts to a less than significant level and ensure that the project would not make a substantial contribution to a cumulatively significant effect.

3.10.4 Mitigation Measures

3.10.4.1 Short-Term Construction Mitigation Measures

Mitigation measures VIS-1, VIS-2, and VIS-3 would be incorporated from the 2013 FEIR as follows:

- **VIS-1.** As determined by a qualified arborist, specimen trees within the existing right-of-way shall be relocated. The relocated trees shall be incorporated into the landscape plan or along adjacent public right-of-way where space permits wherever feasible. In cooperation with the cities, landscape guidelines and design strategies shall be prepared prior to the start of construction or any action to trim or remove heritage trees and implemented during the construction phase to minimize the loss of deodar cedars and incorporate new landscaping of commensurate quality when called for, consistent with the MRDC and in compliance with local jurisdictions' tree preservation ordinances. The MRDC state that landscaping for new facilities shall be designed in conformance with local landscape ordinances and existing plant material shall be preserved, as appropriate.
- **VIS-2.** Temporary construction area screening shall be considered in areas adjacent to roadways, residences, and businesses.
- **VIS-3.** If lighting is required during construction, lighting shall be shielded and directed downward and away from adjacent residential and commercial uses.

No additional mitigation for short-term impacts is required.

3.10.4.2 Long-Term Mitigation Measures

Mitigation measures VIS-4 and VIS-5 would be incorporated from the 2013 FEIR. Measure VIS-6 from the 2013 FEIR remains valid but is not applicable to the Project Modifications. Measure VIS-7 is new and would reduce visual impacts on neighboring residences resulting from construction of the Pomona Station parking facility.

- **VIS-4.** All lighting at the parking facilities and station locations shall utilize best available technology to reduce spillover to adjacent land uses and shall be directed away from adjacent residences. In addition, landscaping, fences, or other measures to shield adjacent residences from light and glare shall be provided where applicable. All lighting will conform to ANSI-IESNA standards.
- **VIS-5.** All walls, structures, and fences shall be properly screened or incorporate design features to improve appearance and reduce visual intrusion pursuant to the standards established in the MRDC. The goal of the MRDC is to create site-adapted designs that reflect the specific urban context of each station and that enhance the neighborhood context in which the project is proposed. The MRDC include artwork, signage, advertising, landscaping, and guidelines for the selection of materials and finishes. Station design shall feature materials, landscaping, art, and other elements consistent with MRDC and developed by the station design team that includes architects, landscape architects, and lighting experts. Surface treatments shall be provided at the face of safety walls and at roadway/pedestrian portals, and landscaping along safety walls outside of the LRT portal shall be provided where feasible to provide wall screening. Per MRDC, artwork will be provided at each station and will be designed by professional artists. According to the MRDC, careful consideration must be given to station compatibility with proposed future development in the neighborhood of each station, and where applicable, future extensions and/or connecting line transfers. Neighborhood culture and character shall be emphasized through artwork. The Designer should become familiar with the general aspects of the entire system in order to determine how his individual project relates to the whole. The Landscape Architect shall coordinate design and production of construction drawings with Designers and Metro Art to ensure that landscaping, facilities architecture, site engineering and station art are visually and functionally compatible. Coordination is particularly important with regard to the design of lighting, paved surfaces, walls and site furnishings. The Authority shall coordinate with Metro Facilities Maintenance group in the review and comment stage of landscape design review submittals.

- **VIS-6.** The final design of the Towne Avenue flyover structure shall include considerations of materials and design refinements to reduce the height of the flyover structure above the surrounding grade to the lowest height feasible.
- **VIS-7 (new).** To further reduce light spillover and increase privacy for adjacent residential parcels, the south-facing façade of the Pomona Station parking facility shall be solid, with no openings or windows, to the extent feasible.

3.10.5 Level of Impact after Mitigation

With two exceptions, short- and long-term impacts to visual resources that were described in the 2013 FEIR and four subsequent addenda would be unchanged by the Project Modifications. All previously identified mitigation measures remain valid. The White Avenue mitigation measure (LTR-9) is a new project component that would result in visual impacts in the City of La Verne. The Pomona Station refinement would move the site of the proposed parking facility to a new location southwest of the Gold Line station platform. Visual impacts related to the parking facility in the vicinity of the original location west of Garey Avenue would no longer occur; however, new impacts would be introduced in the vicinity of the proposed site west of Supply Street.

Implementation of the mitigation measures identified in the 2013 FEIR and the inclusion of a new mitigation measure (VIS-7) would ensure that the Project Modifications would not result in significant short- or long-term impacts to visual resources and visual quality.

3.11 Water Resources

3.11.1 Regulatory Setting

The regulatory setting described in the 2013 FEIR and its subsequent addenda provides the basis for the current analysis and is incorporated here by reference. Where the regulatory setting has changed since the 2013 FEIR, the changes are described and provided below.

3.11.1.1 Federal and State Regulations

National Pollutant Discharge Elimination System

Section 402 of the Clean Water Act established the National Pollutant Discharge Elimination System (NPDES) permit program to control discharges of pollutants from point-source and nonpoint-source discharges, including stormwater, to waters of the U.S. EPA has approved California's program to implement Section 402 in the state. The state program is administered by the State Water Resources Control Board (SWRCB) and regional water quality control boards (RWQCBs). The SWRCB has the delegated responsibility to issue and regulate these NPDES permits. NPDES permits are discussed in Section 3.11.1.2 below. The California Water Code provides additional authority to the SWRCB and regional boards to protect water quality.

3.11.1.2 Regional Regulations

National Pollutant Discharge Elimination System and California Water Code Permits

The SWRCB and RWQCBs issue various permits to regulate stormwater discharges pursuant to Section 402 of the federal Clean Water Act and state law. These permits are summarized below.

The SWRCB approved the NPDES General Permit for Storm Water Discharges Associated with Industrial Activities (Order No. 2014-0057-DWQ) in 2014 (SWRCB, 2014). This permit, also known as the Industrial General Permit (IGP), regulates industrial stormwater discharges (and authorized non-stormwater discharges [NSWDs]) from transportation facilities involved in vehicle maintenance. Metro is be required to obtain coverage under the IGP for this project's industrial activities. To obtain coverage, Metro would submit a Notice of Intent and an Industrial Stormwater Pollution Prevention Plan (SWPPP). The SWPPP would include source reduction and stormwater treatment controls to avoid or minimize contaminant discharges in stormwater. Compliance with the IGP would constitute "best practicable treatment or control for discharges from industrial storm water", and discharges would not lower water quality to a level that does not achieve water quality objectives or beneficial uses (SWRCB, 2014).

Construction activities resulting in one acre or more of total ground disturbance are required to obtain coverage under the NPDES General Permit for Discharges of Stormwater Associated with Construction Activity (Construction General Permit Order 2009-009-DWQ, with amendments [SWRCB, 2009]). To obtain coverage, a Notice of Intent must be filed with the RWQCB, which administers and enforces the general permit. As part of this process, a SWPPP must be prepared. The SWPPP includes pollution prevention measures (erosion and sediment control measures and measures to control NSWDs and hazardous spills), demonstration of compliance with all applicable local and regional erosion and sediment control standards, identification of responsible parties, a detailed construction timeline, and a best management practices (BMPs) monitoring and maintenance schedule. A Notice of Termination must be filed with the RWQCB when construction is completed.

The RWQCBs issue permits that regulate dewatering activities during construction. In Los Angeles County, General Dewatering Permit (Order No. R4-2013-0095; Los Angeles Regional Water Quality Control Board [LARWQCB], 2013) would apply to this project. This permit is currently being reviewed for renewal by the LARWQCB, and an updated permit is expected to be in place prior to construction of the project. In San Bernardino County, the General Waste Discharge Requirements for Discharges to

Surface Waters Permit (Order No. R8-2009-0003; Santa Ana Regional Water Quality Control Board [SARWQCB], 2009) would apply to this project. These permits include limits on the amount of certain substances that may be discharged, including oil and grease, sulfides, residual chlorine, suspended solids, and petroleum hydrocarbons, and requires monitoring to ensure that the terms of the permit are met. Dischargers must apply to the RWQCB for approval to discharge.

The Pomona Station design refinement and new traffic mitigation measure (LTR-9) White Avenue widening would each result in land disturbing activity, resulting in the replacement of 5,000 square feet or more of impervious surface on an already developed site and are therefore considered redevelopment projects. The project would result in new development and redevelopment that would also result in stormwater discharges to publicly owned storm drains. The RWQCBs issue NPDES "Municipal Separate Storm Sewer System" (MS4) permits to regulate these discharges. Two MS4 permits would apply to this project: the Los Angeles County MS4 Permit (Order No. R4-2012-0175, with amendments; LARWQCB, 2012) and the San Bernardino County MS4 Permit (Order No. R8-2010-0036; SARWQCB, 2010). To comply with these permits, in Los Angeles County the Project would prepare a Standard Urban Stormwater Mitigation Plan, and in San Bernardino County, the Project would prepare a Water Quality Management Plan. These documents would identify strategies to implement source control, site design, and structural and nonstructural stormwater controls to the "maximum extent practicable." Compliance with these MS4 permits would implement stormwater quality management programs, achieve water-quality-based effluent limitations, and effectively prohibit NSWDs through the MS4.

3.11.1.3 Local Regulations

The local regulations presented in Section 3.14.1.3 of the 2013 FEIR (Authority, 2013) are adopted here and incorporated by reference without change.

3.11.2 Existing Conditions

The existing conditions described in the 2013 FEIR and its subsequent addenda provide the basis for the current analysis and are incorporated here.

3.11.2.1 Regional Setting

Climate

The Project Modifications study area is within the Los Angeles region where the climate is Mediterranean, with dry, warm summers and wet, mild winters. The Pacific Ocean influences precipitation, which is normally negligible from spring to late October, but begins to increase during November as the storm track (Jet Stream) from the Pacific Ocean begins to shift toward Southern California. Most of the region's approximately 15-inch annual average rainfall occurs between November and March.

Topography

The study area is located along the southern foothills of the San Gabriel Mountains. Slopes in this area tend to become milder to the east. Topography includes southwest and southeast trending slopes, which range from very mild slopes (an approximate 40 feet to every 0.5 mile) to areas that are nearly flat. Table 3.14-1 of the 2013 FEIR summarizes topographic characteristics of each city within the study area.

Surface Hydrology

Surface hydrology considerations include sediment and contaminant input into local water bodies from runoff. Sediment and contaminant source locations in urban areas include parking lots, streets, rooftops, landscaped areas, and exposed earth at construction sites. Typical contaminants in urban runoff include hydrocarbons, metals, pesticides, bacteria, nutrients, and trash. Typical construction site-related contaminants include fuels, hydraulic fluid, coolant, solvents, and paints. Construction-site sediment runoff results from unprotected areas of exposed soil. The study area is located within an area developed primarily with urban uses—residential, commercial, and industrial.

Study Area Drainages

The channels and drainages in the study area drain either into the San Gabriel River or Santa Ana River. The channels and their characteristics are summarized in Table 3.14-2 of the 2013 FEIR. These channels and drainages are classified on USGS 7.5-minute quadrangle maps as blue line streams; blue line streams are characterized by year-round water flow. There are no channels or drainages designated as blue line streams within the Claremont portion of the study area.

Beneficial Uses of Surface Waters When discussing channels, drainages, and groundwater basins (see Groundwater Hydrology section below) the Los Angeles RWQCB and Santa Ana RWQCB assign beneficial use designations to each water body. Table 3.14-3 of the 2013 FEIR shows the beneficial use designations for the channels and drainages in the study area. These designations include:

- **Agricultural Supply (AGR)**—Waters used for farming, horticulture, or ranching, including irrigation, stock watering, or support of vegetation for range grazing.
- **Cold Freshwater Habitat (COLD)**—Waters that support cold water ecosystems that may include preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.
- **Fresh Water Replenishment (FRSH)**—Waters used for natural or artificial maintenance of surface water quantity or quality (i.e., salinity).
- **Groundwater Recharge (GWR)**—Waters used for natural or artificial recharge of groundwater for purposes of future extraction, maintenance of water quality, or halting saltwater intrusion into freshwater aquifers.
- **Industrial Service Supply (IND)**—Waters used for industrial activities, including mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, and oil well re-pressurization.
- **Municipal and Domestic Supply (MUN)**—Waters used for community, military or individual water supply systems, including drinking water supply.
- **Hydropower Generation (POW)**—Waters used for hydroelectric power generation.
- **Industrial Process Supply (PROC)**—Waters used for industrial activities and processes.
- **Rare, Threatened, or Endangered Species (RARE)**—Waters that support habitats necessary for the survival and successful maintenance of plant or animal species designated under state or federal law as rare, threatened, or endangered.
- **Water Contact Recreation (REC-1)**—Waters used for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These activities include swimming, wading, water-skiing, skin and scuba diving, surfing, white-water activities, fishing, and use of natural hot springs.
- **Non-Contact Water Recreation (REC-2)**—Waters used for recreational activities in proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These include picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment included with these activities.
- **Warm Freshwater Habitat (WARM)**—Waters that support warm water ecosystems, including preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
- **Wetland Habitat (WET)**—Waters that support wetlands ecosystems, including preservation or enhancement of wetland habitats, vegetation, fish, shellfish, or wildlife, and other unique wetland functions that enhance water quality, such as providing flood and erosion control, stream bank stabilization, and filtration and purification of naturally occurring contaminants.

- **Wildlife Habitat (WILD)**—Waters that support terrestrial ecosystems, including preservation and enhancement of terrestrial habitats, vegetation, wildlife (mammals, birds, reptiles, amphibians, and invertebrates), or wildlife water and food sources. This designation does not mean the use by the special status species.

Impaired Surface Water Bodies

In addition to listing beneficial uses for each water body, the SWRCB prepares a list of impaired water bodies. According to a listing of impaired water bodies in the 2016 *Section 303(d) and 305(b) Integrated Report* (SWRCB, 2016), the Puddingstone Reservoir, Walnut Creek, and San Antonio Creek Channel have impairments (Table 3.11-1). The Puddingstone Reservoir is the terminus of the Puddingstone Channel, Marshall Creek, Live Oak Wash, and Walnut Creek. With the exception of Live Oak Wash, these channels or drainages are located underground of the Proposed Project right-of-way.

Table 3.11-1. Impaired Surface Water Bodies

Water Body	Impairments
Direct Receiving Water Bodies	
Puddingstone Reservoir	• Chlordane • DDT (Dichlorodiphenyltrichloroethane) • Mercury • Organic Enrichment/Low Dissolved Oxygen • PCBs (polychlorinated biphenyls)
Walnut Creek Wash (Drains from Puddingstone Reservoir)	• Benthic Community Effects (TMDL Required) • Indicator Bacteria (TMDL Required) • pH (TMDL Required)
San Antonio Creek Channel	pH

Source: SWRCB, 2016.
TMDL = total maximum daily load

Groundwater Hydrology

Groundwater is found in subsurface water-bearing formations. The elevation of groundwater varies with the amount of withdrawal and the amount of recharge. Groundwater basins may be recharged naturally through filtrating precipitation, or artificially with imported or reclaimed water. The study area, from west to east, traverses the Glendora, Way Hill, San Dimas, Pomona, and Chino Sub-Basins of the Upper Santa Ana Valley groundwater basins. Table 3.14-4 of the 2013 FEIR summarizes characteristics of these basins.

Glendora Groundwater Basin

The portion of the study area from approximately Barranca Avenue in Glendora to the approximate location of the intersection of Alosta Avenue (Route 66) and the existing rail alignment in Glendora lies atop the Glendora Groundwater Basin. The depth to groundwater in this basin near the proposed Glendora Station is approximately 260 feet below grade.

Way Hill Groundwater Basin

The portion of the study area from the approximate location of the intersection of Alosta Avenue (Route 66) and the existing rail alignment in Glendora to the approximate location of the I-210 over-crossing of the rail alignment in San Dimas lies atop the Way Hill Groundwater Basin. The average depth to groundwater in this basin near the existing rail alignment is approximately 100 feet below grade.

San Dimas Groundwater Basin

The portion of the study area from the approximate location of the I-210 over-crossing of the Metro Rail in San Dimas to the approximate location of the Puddingstone Channel over-crossing of the Metro Rail in La Verne lies atop the San Dimas Groundwater Basin. The depth to groundwater in this basin near the proposed San Dimas Station is approximately 350 feet below grade.

Pomona Groundwater Basin

The portion of the study area from the approximate location of the Puddingstone Channel over-crossing of the Metro Rail in La Verne to the approximate location of the Metro Rail crossing at Indian Hill Boulevard in Claremont lies atop of the Pomona Groundwater Basin. The depths to groundwater in this basin near the proposed La Verne and Pomona Stations are approximately 440 and 480 feet below grade, respectively. The westerly portion of the Pomona Groundwater Basin contains high levels of nitrates. A plume of volatile organic compounds (VOCs) is present in the southern portion of the basin. Pomona has VOC treatment/removal facilities in the Pomona Groundwater Basin (Metropolitan Water District of Southern California, 2007).

Chino Sub-Basin of the Upper Santa Ana Valley Groundwater Basin

The portion of the study area from the approximate location of the Metro Rail crossing at Indian Hill Boulevard in Claremont to the east end of the study area lies atop the Chino Sub-Basin of the Upper Santa Valley Ana Groundwater Basin. The depths to groundwater in this basin near the proposed Claremont and Montclair stations are approximately 510 and 600 feet below grade, respectively.

Floodplains and Flooding

The Federal FEMA administers the National Flood Insurance Program to provide subsidized flood insurance to communities that comply with FEMA regulations that limit development in floodplains. The 100-year flood was adopted as the national standard by the Federal Insurance Administration for floodplain management and insurance purposes.

FEMA issues Flood Insurance Rate Maps (FIRM) for communities participating in the National Flood Insurance Program. These maps delineate flood hazard zones in the community. According to FIRMs, no mapped areas within the study area are located within a 100-year flood zone.

3.11.3 Environmental Impacts

The environmental impacts described in the 2013 FEIR and its subsequent addenda provide the basis for the current analysis and are incorporated here by reference. Where the environmental impacts have changed since the 2013 FEIR, the changes, including any potential new or more severe impacts, are described below.

3.11.3.1 Evaluation Methodology

The evaluation methodology described here is consistent with the methodology described in the 2013 FEIR and its subsequent addenda. As discussed in Section 3.14.3.1 of the 2013 FEIR, the impacts are evaluated qualitatively based on standard professional practice. Construction activities with the potential to have an impact on water quality include:

- Soil-disturbing activities (e.g., excavation and grading), which can lead to erosion and sedimentation
- Use of construction-related hazardous materials, which could result in spills that would impact surface waters
- Excavation in areas of high groundwater, which could result in impacts to groundwater quality or quantity from dewatering activities and direct exposure of groundwater to sediment and other contaminants
- Construction within a designated flood zone, which could pose a risk to workers

Operational impacts to water resources could result from either ongoing activities of the railroad or the physical impact of project facilities on the landscape, including stations, traction power supply substations, and parking areas. For the project, actions that could lead to an impact include:

- Increases in impervious surfaces as a result of the project, leading to changes in the timing and volume of water runoff
- Changes or interruptions in the local drainage infrastructure as a result of project design, potentially leading to localized or regional drainage impacts (e.g., flooding)
- Creation of significant new sources of pollutants, such as from parking lot sand maintenance facilities, leading to new sources of contaminated runoff
- Location of project facilities below the naturally occurring water table, with potential impacts related to flooding and changes in groundwater quality and/or quantity
- Location of project facilities within a designated floodplain, exposing the project to risks related to flooding, as well as subjecting other areas to impacts resulting from changes in the location and or direction of flood flows
- Location of project facilities within areas subject to inundation by seiches (standing waves), tsunamis, or mudflows, resulting in potential damage to such facilities

For each area of impact, the level of impact was compared against the significance criteria provided below.

3.11.3.2 Impact Criteria

As outlined in Section 3.14.3.2 of the 2013 FEIR, an impact on water resources is considered to be a significant impact if the project would:

- Violate any water quality standards or waste discharge requirements
- Substantially deplete groundwater supplies or 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 (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or offsite
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or offsite

- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff or otherwise substantially degrade water quality
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map
- Place structures within a 100-year flood hazard area that would impede or redirect flood flows or expose people or structures to a significant risk or loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam
- Place structures within an area vulnerable to inundation by seiches (standing waves), tsunamis, or mudflows
- Require or result in the construction of new water treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects
- Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects
- Require new or expanded entitlements of water supplies to serve the project

Compliance with these thresholds means that the project would have a less than significant impact to water quality and flooding because 1) waste discharges to surface and groundwater resources during construction and operations would meet established water quality standards; 2) flooding and risk for loss of life and property would not increase; 3) drainage patterns would be preserved and downstream drainage systems would not be overburdened; and 4) water supply entitlements would not expand. Compliance also means that there would be no cumulative impacts associated with the Project Modifications.

3.11.3.3 Short-term Construction Impacts

Impacts Due to Proposed Changes to Construction Phasing

Short-term construction impacts would be slightly greater than the 2013 FEIR, because construction impacts are dependent on the construction schedule and footprint. Phasing the project would result in a longer overall construction schedule. A longer construction schedule increases the time that disturbed soil is exposed to wind and rain and increases the duration that pollutants associated with construction activities could be exposed to rainfall. Construction duration is used to determine a construction site's project risk level. Risk levels are identified as 1, 2, or 3 ranging from lowest to greatest risk to water quality. The project risk level governs the applicable minimum BMPs, monitoring requirements, reporting requirements, and the effluent standards used to assess monitoring data and project compliance.

Also, because each phase of construction would partially overlap the previous phase, there would be a minor increase in total construction footprint. These impacts would be incurred at the temporary interim terminus stations in La Verne (Phase 1), Pomona (Phase 2), and Claremont (Phase 3).

These impacts would be addressed during each phase of construction through compliance with Construction General Permit Order 2009-009-DWQ as described in Section 3.11.1 above. Compliance would be mandatory and would include preparation of the Construction SWPPP and deployment of stormwater BMPs such as those listed below and described in Section 3.14.1.2 of the 2013 FEIR:

- Installing check dams and filter berms to protect drainage ways
- Placing chemical stabilizers, mulch, seed, or sod over exposed soils. Using geotextiles and gradient terraces to protect slopes
- Using silt fences and temporary diversion dikes to protect construction area perimeters
- Using onsite dust control (such as watering and covering areas prone to wind dispersion with plastic)

- Stabilizing construction area entrances (using aggregate or vehicle rinse mechanisms to minimize the amount of soil on roadways from construction-related trucks)
- Adhering to the appropriate county measures guiding/governing the use of fertilizers, pesticides, and soil amendments

Implementation of those BMPs would avoid or minimize contaminant discharges and NSWDs, and would result in impacts to water quality at a level less than significant. No new or more severe short-term significant impacts would result from the phasing modification.

Impacts Due to the Proposed Design Refinement

The Pomona Station parking facility relocation would require a footprint, construction activities, and materials similar to the original parking facility on the north side of the existing railroad tracks and adjacent to Garey Avenue. The original parking facility lot was approximately 3.9 acres and the proposed new location has a lot size of 5.1 acres. However, the design refinement would incur short-term construction-related impacts similar to those described by the 2013 FEIR. These impacts would be addressed during construction through compliance with NPDES permits described in Section 3.11.1 above. Compliance would be mandatory and would include preparation of the Construction SWPPP and deployment of stormwater BMPs such as those described in Section 3.14.1.2 of the FEIR. Implementation of these BMPs would avoid or minimize contaminant discharges and NSWDs and would result in impacts to water quality at a level less than significant consistent with the 2013 FEIR and four subsequent addenda. Therefore, no new or more severe significant impacts would result from the Pomona Station design refinement.

Impacts Due to the Proposed Mitigation Measure

The construction footprint for the White Avenue Mitigation Measure (LTR-9) is approximately 3.5 acres. The roadway widening would increase the overall construction activities, materials, and staging areas compared to the 2013 FEIR; therefore, White Avenue would incur minor additional short-term construction-related impacts beyond those identified in the 2013 FEIR. These impacts would be addressed during construction through compliance with NPDES permits described in Section 3.11.1 above. Compliance would again be mandatory and would include preparation of the Construction SWPPP and deployment of stormwater BMPs those described in Section 3.14.1.2 of the FEIR. Implementation of these BMPs would avoid or minimize contaminant discharges and NSWDs, and would result in impacts to water quality at a level less than significant. Therefore, no new or more severe significant impacts would result from the White Avenue widening (LTR-9).

Overall, short-term construction impacts from the Project Modifications would be equal to the impacts identified in the 2013 FEIR for similar facilities. No impact thresholds for Water Resource would be exceeded by the proposed design refinement or new mitigation measure.

3.11.3.4 Long-Term Impacts

Impacts Due to Proposed Changes to Operational Phasing

Following construction, the operations and maintenance activities and the identified impacts from the Proposed Project facilities would be similar to the impacts and determinations described in the 2013 FEIR. Operational and maintenance activities at the Proposed Project's rail facilities in subsequent phases (Phases 2, 3, and 4) would occur with some anticipated overlap between them due to the changes in construction and operation phasing. Therefore, long-term impacts from the operational phasing would be less than those identified in the 2013 FEIR, and no new or more severe significant impacts would result.

Impacts Due to Proposed Design Refinement

The proposed Pomona Station parking facility would be designed to comply with existing regulations (see Section 3.11.1). New drainage facilities would preserve existing drainage patterns and discharge downstream to lined channels or existing storm drains. Stormwater controls and BMPs would be implemented to ensure stormwater is treated in compliance with state and federal water quality standards prior to discharge. Operation and maintenance of the Pomona station parking facility would be similar at the new parking facility location to the location described in the 2013 FEIS. Therefore, long-term impacts from this design refinement would be no greater than those identified by the 2013 FEIR, and no new or more severe significant impacts would result

Impacts Due to the Proposed Mitigation Measure

The widening of White Avenue, as a part of LTR-9, would result in a minor increase in impervious surface area; however, this would not cause a substantial increase in runoff as compared to the runoff volumes calculated and documented in the 2013 FEIR and four subsequent addenda. New drainage facilities such as curbs and gutters would preserve existing drainage patterns and discharge downstream to lined channels or existing storm drains. Compliance with existing state and federal water quality regulations and standards (see Section 3.11.1) would ensure that stormwater controls are implemented and that impacts are less than significance. With this compliance, there would be no significant impacts on operation of storm drainage facilities. Thus, long-term water quality impacts from the widening of White Avenue (LTR-9) would be no greater than those identified by the 2013 FEIR, and no new or more severe significant impacts would result.

Overall, long-term impacts from the Proposed Project would be similar to the impacts identified in the 2013 FEIR for similar facilities.

3.11.3.5 Cumulative Impacts

The Project Modifications would not have a significant impact on water quality and therefore would not substantially contribute to a significant cumulative impacts. Cumulative impacts from the Project Modifications, including the changes to construction phasing, the design refinement, and the new mitigation measure, would be no greater than the cumulative impacts identified in the 2013 FEIR. No new or more severe cumulative impacts would result.

3.11.4 Mitigation Measures

3.11.4.1 Short-Term Construction Mitigation Measures

As discussed in Section 3.11.3.3, compliance with NPDES permits during construction would reduce short-term construction impacts to a level less than significant; therefore, short-term construction mitigation measures are not required.

3.11.4.2 Long-Term Mitigation Measures

As discussed in Section 3.11.3.4, compliance with NPDES permits during project operations and maintenance would reduce long-term water resources impacts to be equal to or less than those described in the 2013 FEIR; therefore, long-term mitigation measures are not required.

3.11.5 Level of Impact after Mitigation

Compliance with existing regulatory requirements, including compliance with state and federal water quality regulations and standards and implementation of construction and post-construction BMPs, would reduce impacts to a less than significant level.

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3.12 Growth-Inducing Impacts

The CEQA Guidelines (Section 15126[d]) require a discussion of "…ways in which the project could foster economic or population growth, either directly or indirectly, in the surrounding environment…", including the project's potential to remove obstacles to population growth. For example, the extension of infrastructure may encourage or facilitate other activities that could significantly affect the environment.

The Project Modifications would not introduce the potential for new induced growth beyond that which was already identified for the project in the 2013 FEIR and the four subsequent addenda. The proposed widening of White Avenue in the City of La Verne, as part of the new traffic mitigation measure (LTR-9) represents a minor street improvement and would not modify the already identified transit service improvements or reductions in traffic congestion near the La Verne Station. The relocation of the new parking facility for the Pomona Station is also not expected to introduce any changes to the already analyzed and approved evaluation of growth-inducing impacts provided in the approved 2013 FEIR and addenda. The Project Modifications do not include the development of employment-generating uses that might otherwise provide direct or indirect growth-inducing impacts.

The corridor cities' land use plans recognize and account for the approved 2013 FEIR, and any future new development would be consistent with each city's land use plans and regulations. No new or increased significant impacts would occur; therefore, the growth-inducing impacts would remain less than significant.

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3.13 Irreversible and Irretrievable Commitments of Resources

The purpose of this section is to identify irreversible and irretrievable commitments of environmental resources required to implement the Project Modifications' design refinement and new mitigation measure.

Similar to the approved 2013 FEIR Project and addenda, the Project Modifications (including specifically widening of White Avenue in La Verne, as part of the new traffic mitigation measure (LTR-9) and the change in the location of the Pomona Station parking facility) would involve a negligible addition to certain commitments of resources, including but not limited to natural, physical, human, and fiscal resources.

As described above, the Project Modifications would involve only a negligible addition to the irreversible or irretrievable commitment of resources beyond that already identified in the 2013 FEIR and the four subsequent addenda. No new or increased significant impacts would occur; therefore, the impacts due to the irreversible and irretrievable commitments of resources would be less than significant.

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4. Public and Agency Outreach

4.1 Introduction

The Authority's environmental review, analysis, and documentation process included public and agency engagement in the context of the proposed Project Modifications and this SEIR. The referenced engagement involved formal noticing through the SEIR NOP (CEQA §15082), which is provided in Appendix A, and comprehensive information sharing through a range of different media types. A detailed discussion of the engagement efforts conducted is provided in this section, and the summary materials from these efforts can be found in Appendix B.

4.2 Scoping Meeting for Supplemental EIR

A public scoping meeting was held in the City of La Verne's Community Center located at 3680 D Street La Verne, California 91750. The meeting was organized in an open house format that allowed attendees to arrive any time between 5:30 and 7:30 PM, engage the Project team, and review all of the Project-related materials (fact sheet, display boards). The scoping meeting attendees were encouraged to ask questions to the attending Project staff and also provide formal comments; over 80 attendees signed in at the meeting. Formal comments were accepted via written comment cards at the meeting, verbally to a court reporter present during the meeting, or through written comments provided via mail or e-mail. In concert with the NOP's 30-day timeline, all comments were due to the Authority by January 4, 2019.

Detailed documentation of scoping activities can be found in the Scoping Report (Appendix B). The report's appendixes, which are available on the Authority's website (www.foothillextension.org), include meeting attendee sign-in sheets, meeting notifications, written comments, and transcripts of oral comments.

4.3 Scoping Meetings Notification for Supplemental Environmental Impact Report

The Authority notified stakeholders of the SEIR scoping meeting and encouraged their involvement and attendance. This section contains a summary of the scoping meeting notification efforts. Appendix B contains more details and additional documentation.

4.3.1 Notice of Preparation

In accordance with CEQA (Section 15082) and the Office of Planning and Research, State Clearinghouse, an NOP was mailed to the following agencies:

- California State Clearing House
- California Air Resources Board
- California Department of Fish and Game
- California Department of Fish and Wildlife – Region 5
- California Department of Fish and Wildlife – Region 6
- California Department of Toxic Substances Control
- California Department of Conservation
- California Department of Water Resources
- California Department of Parks and Recreation
- California Energy Commission
- California Natural Resources Agency
- California Public Utilities Commission
- California State Lands Commission
- California Water Boards – Los Angeles - R4

- California Water Boards – State Water Resources Control Board
- California Department of Transportation – District 7
- California Department of Transportation – District 8
- California Health Care Services
- Los Angeles County Metropolitan Transportation Authority
- Native American Heritage Commission
- Office of Historic Preservation
- San Bernardino County Transportation Authority
- Southern California Regional Rail Authority
- City of Glendora
- City of La Verne
- City of San Dimas
- City of Pomona
- City of Claremont
- City of Montclair

4.3.2 Scoping Meeting Notice

Consistent with the Authority's engagement efforts, outreach e-mails were sent to the following agencies and community organizations between December 4 through December 10, 2018:

- City of Glendora
- Glendora Chamber of Commerce
- Glendora City Public Library
- Glendora Rotary Club
- Glendora Lions Club
- Glendora Kiwanis Club
- Glendora Unified School District
- City of San Dimas
- San Dimas Chamber of Commerce
- San Dimas Library
- San Dimas Rotary Club
- City of La Verne
- La Verne Chamber of Commerce
- La Verne Library
- La Verne Rotary Club
- Bonita Unified School District (San Dimas and La Verne)
- University of La Verne – Wilson Library
- City of Pomona
- Pomona Chamber of Commerce
- Pomona City Public Library
- Pomona Rotary Club
- Pomona Unified School District
- Pomona Kiwanis Club
- Pomona Host Lions
- Pomona Public Library Foundation
- Pomona Breakfast Optimist Club
- City of Claremont
- Claremont Chamber of Commerce
- Claremont Library
- Claremont Unified School District
- Sustainable Claremont
- Active Claremont

- City of Montclair
- Montclair Chamber of Commerce
- Ontario-Montclair Unified School District
- Willie White Neighborhood Group

4.3.3 Agency Coordination

In addition to the NOP and scoping meeting, the Authority coordinated with the six corridor cities and their respective chambers of commerce to ensure the local agencies, businesses, and residential communities were well informed of the upcoming and proposed Project Modifications. To facilitate this effort, the Authority created an Outreach Tool Kit that was distributed on November 21, 2018. The Outreach Tool Kit provided a brief background of the Project status, information regarding the scoping meeting's purpose, and relevant information on the Project Modifications. The text was formatted to fit various pre-established forms of communication such as e-mail, social media, websites, newsletters, and/or public counter distribution in city halls, and senior and community centers. In addition, follow-up scoping meeting reminders were also sent to those same entities between December 7 and December 10, 2018.

Legal meeting notices were published on December 4, 2018 in the following newspapers:

- *The Daily Bulletin*
- *San Gabriel Valley Tribune*

In addition to the legal notices published, consumer display ads were placed in the following publications:

- *San Gabriel Valley Examiner* (December 6, 2018)
- *Claremont Courier* (December 7, 2018)
- *Foothills Reader* (December 9, 2018)
- *San Gabriel Valley Tribune* (December 9, 2018)

4.3.4 Project Website

The Authority's website is designed to provide the latest Project information as well as background on the Authority and earlier Project phases. On November 21, 2018, the scoping meeting notice was placed on the Authority's website under the "What's New" and "Meeting/Events Calendar" sections. Visitors could easily click on the scoping meeting link to read meeting details and instructions on how to submit scoping comments to the Authority. It is estimated that 2,404 people visited the Authority's website from November 21 to December 10.

4.3.5 E-news

The scoping meeting invitation was also e-mailed via the Foothill Gold Line's E-News starting on November 21, 2018. The e-mail was sent to the approximately 12,050 people in the Authority's database. The scoping meeting E-News was e-mailed on the following three dates: November 21, December 5, and December 10, 2018.

4.3.6 Social Media

The scoping meeting invitation was also published on the Authority's social media platforms, including Facebook, Twitter, and I Will Ride blog, on November 21, 2018. The Facebook post also included meetings added as "events" on the Project page and was posted between December 4 to December 9, 2018.

4.3.7 Media Advisory and Earned Media

The Authority released a Scoping Meeting Media Advisory to over 150 representatives of local and regional media, including newspapers, television, radio, and online news outlets. The members of the media attended the scoping meeting and published stories in the following newspapers:

- *Inland Valley Daily Bulletin* (December 7, 2018)
- *Foothill Reader* (December 9, 2018)
- *Claremont Courier* (December 13, 2018)

5. Agencies and Persons Consulted

5.1 Cities

City of Claremont

Maria Tipping, Acting City Engineer
Colin Tudor, Assistant City Manager

City of Glendora

Dave Davies, Director of Public Works
Alison Sweet, City Engineer
Steven Mateer, Transportation Superintendent
Bridget Amaya, Acting Community Services Director

City of La Verne

Dan Keesey, Public Works Director
Candice Bowcock, Senior Planner

City of Montclair

Noel Castillo, Public Works Director/City Engineer
Marilyn, Staats, Executive Director, Office of Economic and Community Development

City of Pomona

Meg McWade, Director of Public Works
Mari Suarez, Development Services Director
Rene Guerrero, City Engineer
Matt Pilarz, Senior Civil Engineer

City of San Dimas

Krishna Patel, Public Works Director
Lawrence Stevens, Assistant City Manager for Community Development

5.2 Regional Agencies

Los Angeles Metropolitan Transportation

Rick Meade, Executive Officer, Project Management

San Bernardino County Transportation Authority

Andres Ramirez, Chief of Transit and Rail Programs

5.3 State Agencies

California Water Boards – Los Angeles District 4

Deborah Smith, Executive Officer

California Department of Transportation, District 7
John Bulinski, District Director

California Health Care Services
Jennifer Kent, Director

Native American Heritage Commission
Christina Snider, Executive Secretary

Office of Historic Preservation
Julianne Polanco, State Historic Preservation Officer

California Natural Resources Agency
John Laird, Secretary

California Water Boards – State Water Resources Control
Eileen Sobeck, Executive Director

California Department of Toxic Substances Control
Barbara Lee, Director

California Department of Water Resources
Karla Nemeth, Director

California Air Resources Board
Richard Corey, Executive Officer

California Department of Conservation
David Bunn, Director

California Energy Commission
Melissa Jones, Executive Director

California Department of Parks and Recreation
Lisa Mangat, Director

California Transportation Commission
Susan Bransen, Executive Director

California Department of Transportation, District 8
Janice Benton, District Director

California Public Utilities Commission
Michael Picker, President

California State Lands Commission
Jennifer Lucchesi, Executive Officer

Southern California Regional Rail Authority

Justin Fornelli, Director of Engineering and Construction

Southern California Regional Rail Authority /Metrolink

Mathieu Ron, Planning Department/Environmental Reviews

California State Clearing House

Scott Morgan, Director

California Department of Fish and Game

Charlton Bonham, Director

California Department of Fish and Wildlife – Region 5

Brock Warmuth, Environmental Scientist
Betty Courtney, Environmental Program Manager

California Department of Fish and Wildlife – Region 6

Kim Romich, Environmental Scientist
Joanna Gibson, Senior Environmental Scientist (Specialist)

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6. Preparers of the Supplemental Environmental Impact Report

6.1 Lead Agency

Metro Gold Line Foothill Extension Construction Authority
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Contact Person: Lisa Levy Buch
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Email: llevybuch@foothillgoldline.org

6.2 Consultants to the Lead Agency

6.2.1 Jacobs Engineering Group Inc.

Environmental Documentation, Project Management, Air Quality, Energy, Climate Change, Cultural Resources, Engineering, GIS, Land Use and Planning, Traffic and Transportation, Safety and Security, Visual Impacts, Water Quality

Jacobs Engineering Group
402 West Broadway, Suite 1450
San Diego, CA 92101

Loren Bloomberg, P.E., Traffic Engineer
M.S./M.E. Civil Engineering (Transportation). 26 years of experience in traffic engineering and transportation planning.
Kevin Grant, GIS Specialist and Environmental Planner
B.A. Geography. 12 years of experience in GIS and visual resource analysis.

Emily Gulick, Environmental Planner
B.A. Environmental Studies, B.A. Geography. 2 years of experience in CEQA/NEPA documentation.

Amanda Heise, Water Engineer
B.S. Civil Engineering. 7 years of experience in water resource engineering.

Robert Henderson, PE, QSD
M.S. Civil and Environmental Engineering, B.S. Environmental Studies. 20 years of experience in water resources engineering and transportation planning

Jose Herrera, EIT, Traffic Designer/Analyst
B.S. Civil Engineering. 7 years of experience in traffic engineering and transportation planning.

Jeremy Hollins, Cultural Resources Specialist
M.A. Public History. 15 years of experience in cultural resources, architectural history, tribal coordination, and CEQA/NEPA documentation.

Daniel P. Jankly, PG, CEG, Senior Engineer Geologist
B.S. Geological Sciences. 20 years of experience in engineering geology.

Jason Reynolds, Senior Environmental Manager
B.S. in City and Regional Planning. 25 years of experience in environmental planning.

Yassaman Sarvian, Environmental Planner
B.S. Environmental Policy Analysis and Planning. 5 years of experience in CEQA/NEPA documentation

Hong Zhuang, Senior Environmental Engineer
M.S. Environmental Science and Engineering, Mphil. Chemical Engineering. 23 years of experience in air quality compliance and impact analysis.

6.2.2 ATS Consulting

Noise and Vibration

Christopher Layman, Principal Associate
Ph.D. Materials Science. 15 years of experience in noise and vibration, 4 years in transportation planning.

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7.3.10 Section 3.11, Water Resources

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State Water Resources Control Board (SWRCB). 2009. National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ, as amended by Order No. 2012-0006-DWQ and Order No. 2010-0014-DWQ. Adopted September 2, 2009.

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Appendix A
Notice of Preparation

Attachment B – Notice of Preparation Package and Recipient List

Notice of Preparation

Notice of Preparation

To: State Clearinghouse	From: Mr. Habib F. Balian
P.O Box 3044	406 E. Huntington Drive, Suite 202
Sacramento, CA 95812-3044 (Address)	Monrovia, CA 91016 (Address)

Subject: Notice of Preparation of a Draft Environmental Impact Report

Metro Gold Line Foothill Extension Construction Authority will be the Lead Agency and will prepare a Supplemental Environmental Impact Report for the project identified below. We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects are contained in the attached materials. A copy of the Initial Study (☐ is ☒ is not) attached.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice.

Please send your response to Lisa Levy Buch, Chief Communications Officer at the address shown above. We will need the name for a contact person in your agency.

Project Title: Metro Gold Line Foothill Extension Phase 2B – Supplemental EIR

Project Applicant, if any: Metro Gold Line Foothill Extension Construction Authority

Date 11/29/2018

Signature

Title Chief Executive Officer

Telephone 626-471-9050

Reference: California Code of Regulations, Title 14, (CEQA Guidelines) Sections 15082(a), 15103, 15375.

Print Form

Summary Form for Electronic Document Submittal

Form F

Lead agencies may include 15 hardcopies of this document when submitting electronic copies of Environmental Impact Reports, Negative Declarations, Mitigated Negative Declarations, or Notices of Preparation to the State Clearinghouse (SCH). The SCH also accepts other summaries, such as EIR Executive Summaries prepared pursuant to CEQA Guidelines Section 15123. Please include one copy of the Notice of Completion Form (NOC) with your submission and attach the summary to each electronic copy of the document.

SCH #: ______________________

Project Title: Metro Gold Line Foothill Extension Phase 2B - Supplemental EIR

Lead Agency: Metro Gold Line Foothill Extension Construction Authority

Contact Name: Lisa Levy Buch, Chief Communications Officer

Email: llevybuch@foothillgoldline.org Phone Number: 626-305-7004

Project Location: Azusa, Glendora, San Dimas, La Verne, Pomona, Claremont, Montclair (*City*) Los Angeles, San Bernardino (*County*)

Project Decription (Proposed actions, location, and/or consequences).

Phase 2B of the Metro Gold Line Foothill Extension (Project) is a 12.3-mile extension of the existing Metro Gold Line Light Rail Transit line from its current terminus in the City of Azusa, located in Los Angeles County, to the Montclair Transcenter, located in San Bernardino County. See map of project location in Exhibit NOP-1. In 2013, the Metro Gold Line Foothill Extension Construction Authority ("Authority") certified a Final Environmental Impact Report ("FEIR") and approved the Project. A detailed description of the Project is included in the FEIR and four addenda thereto adopted by the Authority (State Clearinghouse No. 2010121069).

The Authority proposes to modify the Project to allow for the potential to construct and operate the Project in four phases (instead of two phases, as previously approved). In addition, the Authority is proposing a change to the parking facility at the Pomona North Station to relocate the parking from the north side of the station to the south side of the station as shown on Figure NOP-2. In response to these proposed changes, the Authority will be initiating the preparation of a Supplemental Environmental Impact Report (SEIR) to evaluate the potential for significant impacts that may result from the different potential construction and operation phasing options under review, including: Phase 1 – to the La Verne/Pomona Fairplex Station; Phase 2 – to the Pomona North Station; Phase 3 – to the Claremont Station; and Phase 4 – to the Montclair Station; and the changes to the location of the Pomona North Station parking. The proposed possible construction and operation phasing is necessary to match with both existing funding and pending/future funding and provides the Authority the flexibility to build the phases as funding becomes available. The purpose of this NOP is to solicit input on potential issues to be considered and addressed, as applicable, in the SEIR.

Identify the project's significant or potentially significant effects and briefly describe any proposed mitigation measures that would reduce or avoid that effect.

The probable environmental effects of the proposed Project modifications include: traffic/transportation, air quality, energy, land use and cumulative effects. The proposed modification to allow for possible construction and operation of the Project in four phases may change the duration of construction impacts and may result in additional or different traffic and transportation effects at the three Phase 1 stations and pending the construction completion of Phases 2, 3 and 4.

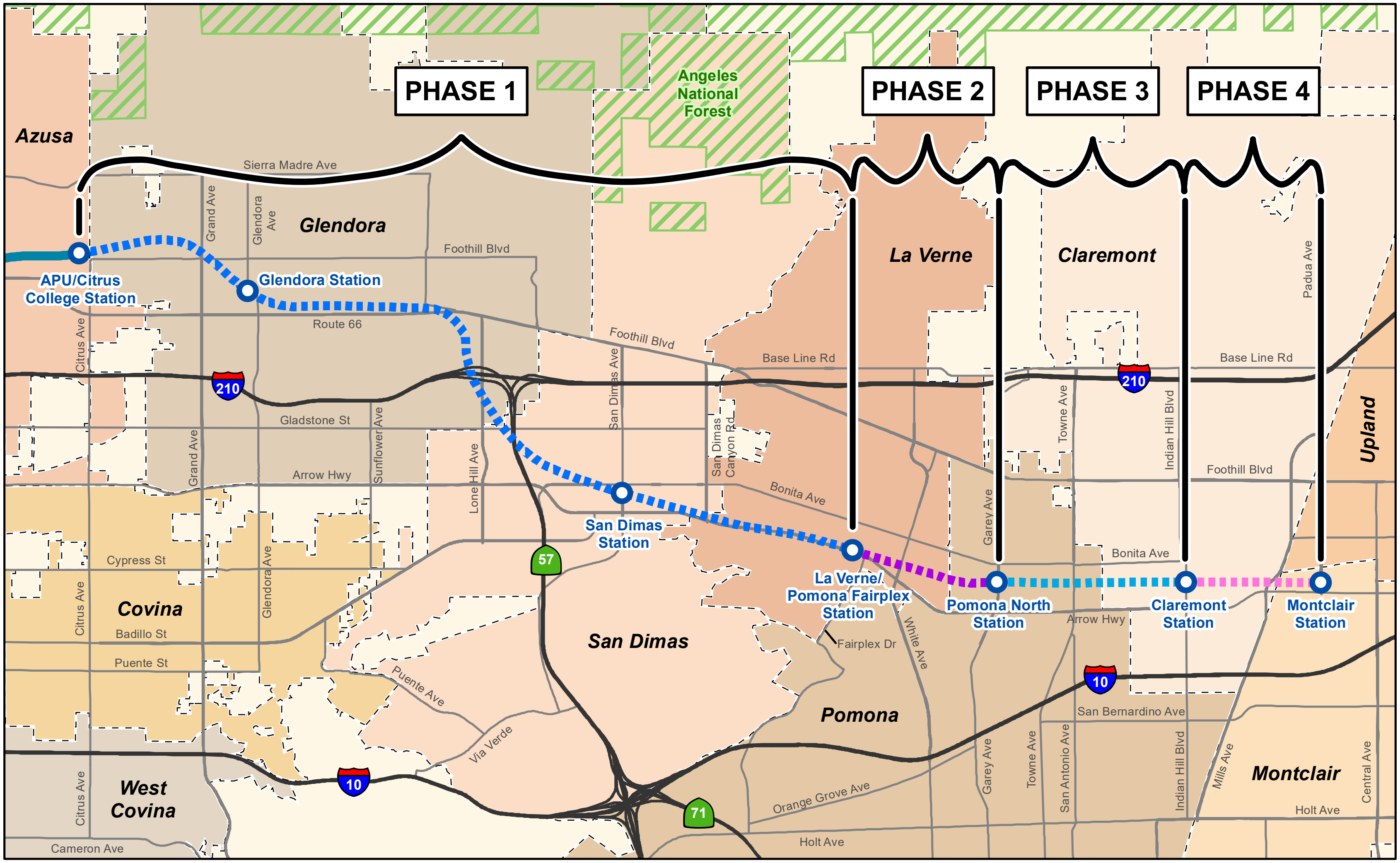
If applicable, describe any of the project's areas of controversy known to the Lead Agency, including issues raised by agencies and the public.

Not applicable.

Provide a list of the responsible or trustee agencies for the project.

Metro Gold Line Foothill Extension Construction Authority (Lead Agency/Project Proponent) Los Angeles County Metropolitan Transportation Authority
Southern California Regional Rail Authority
San Bernardino County Transportation Authority
California Department of Fish and Wildlife

Figure NOP-1: Project Corridor Proposed Possible Construction and Operation Phasing



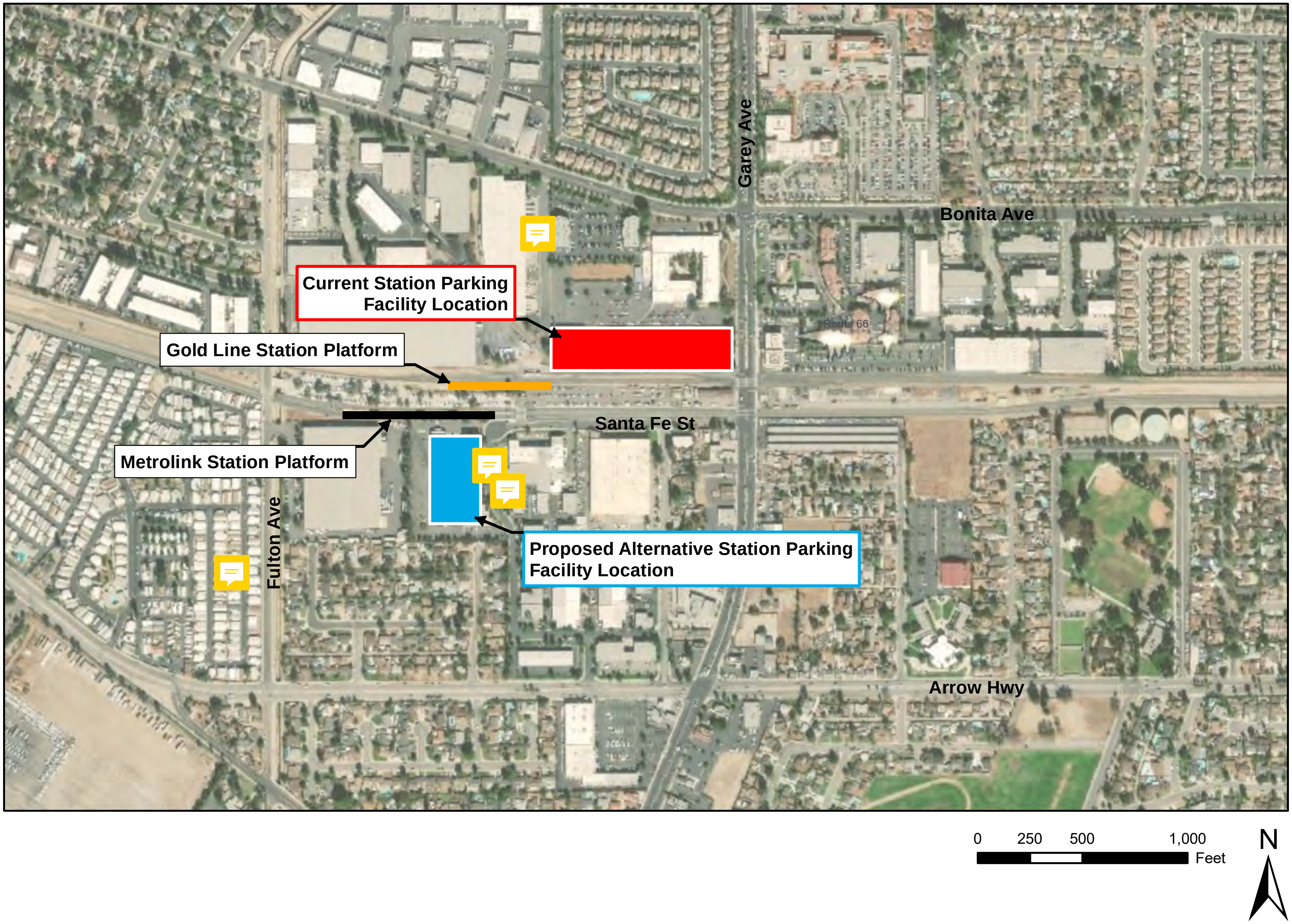
Existing Alignment
Station

Foothill Extension – Proposed Alignment Anticipated Construction Timelines

Phase 1 – La Verne/Pomona Fairplex – August 2019 to November 2024
Phase 2 – Pomona North – August 2019 to August 2025 subject to availability of funding from Metro
Phase 3 – Claremont – August 2021 to August 2028 subject to availability of funding from Metro
Phase 4 – Montclair – August 2021 to August 2028 subject to availability of funding from SBCTA for the portion from Claremont to Montclair

0 0.5 1 2 Miles
N

Figure NOP-2: Proposed Alternative Gold Line Pomona North Station Parking Location



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Appendix B
Scoping Material Summary Report

Foothill Gold Line
Supplemental Environmental Impact Report
Public Scoping Meeting
DRAFT Notification Summary

The Metro Gold Line Foothill Extension Construction Authority (Construction Authority) initiated a Supplemental Environmental Impact Report (SEIR) for the Metro Gold Line Foothill Extension Phase 2B Project (Project) and hosted a public Scoping Meeting on Monday, December 10, 2018 from 5:30 – 7:30pm.

The purpose of the Scoping Meeting was to discuss a proposed modification to the possible phasing of construction and operation for the 12.3-mile, six-station Glendora to Montclair Project, and a proposed modification to the location of the future parking facility at the Pomona Station.

The Scoping Meeting was held at the La Verne Community Center, located at 3680 D Street, La Verne CA 91750. The meeting was organized in an open house format to allow members of the public to arrive anytime between 5:30 - 7:30pm and review over 20 display boards. Members of the public were encouraged to ask questions from project staff, provide comments via comment cards and/or verbally to the certified court reporter; all comments were due to the Construction Authority by January 4, 2019. Over 80 attendees signed-in at the Scoping Meeting (Attachment A provides a copy of sign-in sheets).

The initiation of the SEIR and Scoping Meeting were publicized using a variety of methods including, direct outreach to project stakeholders, media and social media outreach, and outreach through partner agencies and community organizations. Below provides details on the different outreach activities undertaken to inform the public about the SEIR and Scoping Meeting.

- Notice of Preparation
- Scoping Meeting Notice
- Agency Coordination
- Advertisements
- Project Website
- E-News
- Media Advisory and Earned Media

Notice of Preparation

In accordance with to the California Environmental Quality Act, a Notice of Preparation (NOP) was mailed on December 5, 2018 to the California State Clearinghouse in Sacramento and the Project's Responsible Agencies. The NOP package included: Form F, Figure NOP-1 Project Corridor Proposed Possible Construction and Operation Phasing, NOP-2 Aerial of Proposed Alternative Gold Line Pomona North Parking Location as well as a Scoping Meeting notice. The following table lists the NOP recipient agencies; to see a detailed list of recipients and a copy of the NOP, please see Attachment B.

Table 1 – NOP Recipient Agencies

CA State Clearing House	CA Air Resources Board
CA Department of Fish and Game	CA Department of Fish and Wildlife – Regions 5 and 6
CA Department of Toxic Substances Control	CA Department of Conservation
CA Department of Water Resources	CA Department of Parks and Recreation
CA Natural Resources Agency	CA Department of Transportation, District 7- Office
CA State Lands Commission	CA Energy Commission
CA Water Boards-LA #4	CA Public Utilities Commission
CA Water Boards-State Water Resources Control Board	CA Transportation Commission
CA Department of Transportation, District 8	Native American Heritage Commission
CA Health Care Services	Southern California Regional Rail Authority
Los Angeles County Metropolitan Transportation Authority	San Bernardino County Transportation Authority
City of Glendora	Office of Historic Preservation (CA State Parks)
City of La Verne	City of Claremont
City of San Dimas	City of Montclair
City of Pomona	

Scoping Meeting Notice

The public Scoping Meeting notice was distributed as follows:

- Emailed to the Construction Authority's database, consisting of 12,050 people on November 21, 2018.
- Shared via Construction Authority's social media outlets on November 21, 2018, including:
    - Facebook
    - Twitter
    - I Will Ride blog
- Printed and mailed or emailed to the following libraries for public counter distribution on December 4, 2019:

Table 2 – Public Information Counter Distribution at Corridor Libraries

Glendora City Public Library	San Dimas – LA County Library
La Verne – LA County Library	Wilson Library- University of La Verne
Claremont – LA County Library	Pomona City Public Library

- Emailed to the agencies and community organizations listed in Table 3 as an invitation and encouraged to share with their respective membership and constituents:

Table 3 – Invitation to Local Clubs and Memberships

San Dimas Rotary Club	La Verne Rotary Club
Pomona Rotary Club	Glendora Lions Club
Pomona Kiwanis Club	Glendora Rotary Club
Pomona Host Lions	Glendora Kiwaniannes
Sustainable Claremont	Glendora Kiwanis Club
Active Claremont	Pomona Breakfast Optimist Club
Willie White Neighborhood Group	San Dimas Rotary Club
Pomona Public Library Foundation	Claremont Unified School District
Glendora Unified School District	Ontario-Montclair Unified School District
Bonita Unified School District (San Dimas and La Verne)	Pomona Unified School District

Please see Attachment C for a copy of the Scoping Meeting Notice and screen shots of the meeting notice/event on Facebook, Twitter and I Will Ride blog.

Outreach Tool Kit - Agency Coordination

To maximize the notification of the public Scoping Meeting, the Construction Authority coordinated with the six corridor cities and chambers of commerce to ensure the local business and residential communities were well informed of the upcoming Scoping Meeting and SEIR. To help facilitate the distribution of information through established methods of communication, the Construction Authority created and distributed an Outreach Tool Kit to corridor cities and chambers of commerce on November 21, 2018.

The Outreach Tool Kit provided a brief background of the project status, information regarding the Scoping Meeting, its purpose and relevant information. The text was formatted to fit various established forms of communication, such as: email, social media, websites, newsletters and/or public counter distribution in City Halls, Senior and Community Centers.

Table 4 provides a list of the Outreach Tool Kit recipients.

Table 4 – Outreach Tool Kit Distribution List

City of Glendora	Glendora Chamber of Commerce
City of San Dimas	San Dimas Chamber of Commerce
City of La Verne	La Verne Chamber of Commerce
City of Pomona	Pomona Chamber of Commerce
City of Claremont	Claremont Chamber of Commerce
City of Montclair	Montclair Chamber of Commerce

Starting December 4, 2018, corridor cities and chambers of commerce distributed the Scoping Meeting notice and/or meeting details using their respective communication platforms, including:

- Websites
- E-Newletters
- Eblasts
- Social Media (Facebook and Twitter)
- Public Counters

In addition, Scoping Meeting reminders were emailed in the form of eblast and newsletters by the six corridor chambers of commerce to their membership starting December 7 through December 10, 2018.

Please see Attachment D for a copy of the Outreach Tool Kit and samples of the extended outreach completed by the corridor cities and chambers of commerce.

Advertisements

In accordance with the California Environmental Quality Act and to encourage participation at the December 10, 2018 SEIR public Scoping Meeting, the Construction Authority chose the following local and regional newspapers to place the following legal advertisements and display advertisements.

Table 5 – Public Scoping Meeting Advertisements and Dates

Legal Advertisements	
The Daily Bulletin Legal Ad (Tuesday)	12/04/18
San Gabriel Valley Tribune Legal Ad (Tuesday)	12/04/18
Display Advertisements	
San Gabriel Valley Examiner Display Ad (Thursday)	12/06/18
Claremont Courier Display Ad (Friday)	12/07/18
Foothills Reader Display Ad (Sunday)	12/09/18
San Gabriel Valley Tribune Display Ad (Sunday)	12/09/18
Other Advertisements	
Facebook Ad	12/04 – 12/9

Please see Attachment F for copies of advertisement tear sheets.

Construction Authority Website - www.foothillgoldline.org

The Construction Authority's Website is designed to provide the latest Glendora to Montclair Project information as well as background on the Construction Authority and earlier project phases. On November 21, 2018 the Scoping Meeting notice was placed on the Construction Authority website's "What's New" and "Meeting/Events Calendar" sections. Visitors could easily click on the Scoping Meeting link and read meeting details and how to submit comments. It is estimated that 2,404 people visited the Construction Authority's website from

November 21 to December 10. To see a screen shot of the project website and calendar page, please see Attachment G.

E-News

The Scoping Meeting invitation was distributed through the Foothill Gold Line's E-News starting on November 21, 2018. This electronic medium of sharing information has been used to keep the project database (over 12,000 members) up to date with all major milestones, developments and construction updates. E-News featured the Scoping Meeting details on three occasions to invite and remind project stakeholders of the upcoming Scoping Meeting. E-News were emailed on the three following dates nearing the Scoping Meeting date:

- November 21, 2018
- December 5, 2018
- December 10, 2018

To see a copy of the E-News, please see Attachment H.

Media Advisory

The Construction Authority prepared and released a Media Advisory regarding the Scoping Meeting details to over 150 representatives of local and regional media, including: newspapers, television, radio and online news outlets. Members of the media attended the Scoping Meeting and published stories in the following newspapers:

- Inland Valley Daily Bulletin – 12/7/18
- Foothill Reader – 12/9/18
- Claremont Courier – 12/13/18

To see a copy of the Media Advisory and copies of the published articles, please see Attachment I.

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Attachment A – Sign-In Sheets

SEIR Scoping Meeting
Monday, December 10, 2018
5:30 – 7:30 PM

SEIR Scoping Meeting 1

Metro Gold Line Foothill Extension Phase 2B
Monday December 10, 2018 from 5:30 – 7:30 PM
La Verne Community Center

Sign-in Sheet

Name	*E-Mail	Address/City/Zip	Phone Number	✓ Interested in a Gold Line Tour
~~Stamos~~ Jo				
GARY Hunter	garyAHunter@verizon	4316 Chelsea Dr L.V.	909-9363772	
Lynnelle Sanchez	Lynnelles@mayacinemas.com	Pasadena, CA 91101 150 S. Arroyo Pkwy, #102	213.805.5333	✓
Taylor Valmores	taylor.Valmores@asm.ca.gov			
Meg McWade	meg_mcwade@ci.pomona.ca.us			
Colin Tudor	ctudor@ci.claremont.ca.us			
Peter Duyshart	pduyshart@sgvcog.org			

SEIR Scoping Meeting

HHH III

Metro Gold Line Foothill Extension Phase 2B
Monday December 10, 2018 from 5:30 – 7:30 PM
La Verne Community Center

Sign-in Sheet

Name	*E-Mail	Address/City/Zip	Phone Number	✓ Interested in a Gold Line Tour
John CLIFFORD	john.Clifford@Verizon.net	182 Monroe, Pomona 91767	909 576-5795	✓
MATTHEW LYONS	matthew.lyons@asm.ca.gov			
BILL KNOERGEN	WILLIAM.KNOERGEN@AECOM.COM		310 294 9577	
RENE GUERRERO	rene_guerrero@ci.pomona.ca.us		(909) 620-2440	
Sharon Johnson-May	sharon.johnsonmay@gmail.com		909.260.4436	
Dean Owens	dowens@mbimedia.com		626.221.0085	
Yolanda Fuquay	yfuquay@bos.lacounty.gov	2468 2nd st, LaVerne, CA	909-593-3661	✓
Rubio Gonzalez	rubio_ramiro@yahoo.com	924 Casa Hermosa Dr, Pomona, CA	909-575-9375	
Edsel Soriano	edsellshomes25@gmail.com	3334 Cobblestone La Verne CA	909.524.7328	✓

SEIR Scoping Meeting

Metro Gold Line Foothill Extension Phase 2B
Monday December 10, 2018 from 5:30 – 7:30 PM
La Verne Community Center

\\\

Sign-in Sheet

Name	*E-Mail	Address/City/Zip	Phone Number	✓ Interested in a Gold Line Tour
BRIAN PATKOS	b.patkos@outlook.com			✓
TERRY KISTLER	[illegible]			
ROBERT MARSHALL	—		9092824325	✓
Julyet Seber	—			✓
RANDY + SUSAN KEHR	rkehr2@gmail.com			
Dominic Milano	DMILANO@RKAGROUP.COM			
Steven Mateer	E smateer@ci.glendora.ca.gov			
Mayor [illegible]	[illegible]		[illegible]	
[illegible]	JLantz5821@aol.com			
Michael Wangler	mwangler@citruscollege.edu			✓

SEIR Scoping Meeting

Metro Gold Line Foothill Extension Phase 2B
Monday December 10, 2018 from 5:30 – 7:30 PM
La Verne Community Center

Sign-in Sheet

Name	*E-Mail	Address/City/Zip	Phone Number	✓ Interested in a Gold Line Tour
NANCY ADCOX		340 S. SAN DIMAS CYN RD SAN DIMAS		
ELAINE MICHAELS				
Rick Hofmans		611 N. Florham Ave San Dimas		
JORREL VERELLA	jorrel.verella@asm.ca.gov		(916)893-2855	✓
DALE Sotero	SoteroD@metro.net	One Gateway PLZA	213-922-3007	
Kirk Kranzer	Kirkkranzer@yahoo.com	128 W. 3rd St SAN DIMAS		✓
Matt Plaz	matt_plaz@ci.pomona.ca.us	505 S. Garey Ave Pomona	909.620.3652	
Peter Duyshart	pduyshart@sgvcog.org	1423 E. Dalton Ave., Glendora	626-390-8114	✓
ANDY ALTHORP	ALTHORPA@SCRRA.NET	566 BISHOP PLACE, CLAREMONT CA 91711	213 494 8080	
Jill Reiff	JREIFF@myWS.Com	5749 Via Barcelona La Verne CA 91750	626 625-0004	✓

SEIR Scoping Meeting

Metro Gold Line Foothill Extension Phase 2B
Monday December 10, 2018 from 5:30 – 7:30 PM
La Verne Community Center

Sign-in Sheet

Name	*E-Mail	Address/City/Zip	Phone Number	✓ Interested in a Gold Line Tour
Bruce Campbell	Brucetresults@Verizon.net			
Jessica Karthekar	sjesseber@yahoo.com			
Council Ontiveros-Cole	City of Pomona		9)837-8677	
Steve Henderson	stevehenderson976@gmail.com			
Hal Fredericksen	plandude@gmail.com			
Loree Masonis	calgalriding@yahoo.com			
Mark R. Johnston	canammj@Yahoo.com.			
Jack Waldron	jack.waldron@aecom.com			
Nathan Burgess	nathan.burgess@parsons.com			
Ruben Soto	rsoto800@hotmail.com			

SEIR Scoping Meeting

Metro Gold Line Foothill Extension Phase 2B
Monday December 10, 2018 from 5:30 – 7:30 PM
La Verne Community Center

Sign-in Sheet

Name	*E-Mail	Address/City/Zip	Phone Number	✓ Interested in a Gold Line Tour
Doug Strange	dStrangeRider@gmail.com	1037 Rosemary Lane,	951-833-387	✓
Liset Márquez	Lmarquez@scng.com		909-483-8556	
Chris Naticchia	cnaticch@icloud.com	143 Chestnut Hill Pl.	909 624 7511	
Andrew Petteruto	andrew@MBIMedia.com	957 S. Village Oaks Dr. Covina, CA 91724	(626) 967-1510	
Debbie Richey	DRICHEY127600@gmail	437 N Marcile Ave Glendora	626-715-3711	
Alfredo Camacho-Gonzalez	Alfredo@GDayOne.org	854. W. Monterey Ave. Pomona CA 91768	(424) 333-1442	✓
Eric J. Nobriga Sr.	ejnobrigasr@gmail.com	1012 Nashport St, La Verne	909 996-4190	✓
M. Joyce Bakersmith	mjbakersmith1@verizon.net		(626) 806-8501	
Ron Kranzer	ARKSD@verizon.net	508 N San Dimas Ave S.P.	909 5995642	
Adam Nguyen	Adamnguyen2520@gmail.com	1076 Horseshoe Bend Walnut CA 91789	909-643-4461	

SEIR Scoping Meeting

Metro Gold Line Foothill Extension Phase 2B
Monday December 10, 2018 from 5:30 – 7:30 PM
La Verne Community Center

Sign-in Sheet

Name	*E-Mail	Address/City/Zip	Phone Number	✓ Interested in a Gold Line Tour
Jonathan Hofert	hofertJ@metro.net		213.418.3229	
Ron Lozano	rxlozano@verizon.net			
Bob Lundy	neoncruise66@gmail.com			
Joseph Gonzales	plogojr@gmail.com			
Brian Platt	bplatt@g3quality.com			
STEVE GOLDNER	stephenegoldner@verizon.net			
Mike M. [illegible]	mstrmcy@yahoo.com			
Otis Greer	ogreer@gosbeta.com			
Marisha Morris	marishamorris@bhhscaprops.com	PO Box 131 claremont 91711	909 741 0008	

SEIR Scoping Meeting

Metro Gold Line Foothill Extension Phase 2B
Monday December 10, 2018 from 5:30 – 7:30 PM
La Verne Community Center

Sign-in Sheet

Name	*E-Mail	Address/City/Zip	Phone Number	✓ Interested in a Gold Line Tour
Steve Mccuen	sjmccuen61@gmail.com			✓
Andrew Schick Magnar Const. Mgmt.	aschick@magnerco.com	5055 Wilshire Blvd. Ste 333 Los Angeles CA 90036	323-900-0030	
Joe Cruz	joe@glendora-chamber.org		(6)967-4128	
Roy Kim	rkim@PacRimEngineering.com			
JOAN SOECIVAY	YOU HAVE IT		909(376)6575	✓
CandiceBowcock	cbowcock@cityoflaverne.org		909 5968706	
Carrie Coulbourn				
JEFF Kugel				
STEVE LUSTRO	Steve_Lustro@ci.pomona.ca.us	CITY OF POMONA	909/802-7717	✓

SEIR Scoping Meeting

Metro Gold Line Foothill Extension Phase 2B
Monday December 10, 2018 from 5:30 – 7:30 PM
La Verne Community Center

Sign-in Shee

Name	*E-Mail	A	Phone Number	✓ Interested in a Gold Line Tour
Tim Maurier	Timothy.Maurier@AECOM		9498927929	

San Dimas
Krishna Patel
Director of Public Works
(909) 394-6245
Dept. Line (909) 394-6240
FAX (909) 267-7710
E-mail: kpatel@ci.san-dimas.ca.us
345 EAST BONITA AVE. 91773

PACIFIC PLAZA
Professional Business And Retail Center
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Retail & Office Space For Lease
On-Site Leasing Office
1135 E. Route 66, Suite 205
GLENDORA, CA 91740
Corner of Lorraine & Route 66
TEL: (626) 963-0918
Fax: (626) 963-9390

THE CITY OF GLENDORA
"Pride of the Foothills"
116 E. Foothill Blvd.
Glendora, CA 91741
(626) 914-8246
(626) 914-9053 FAX
email: asweet@cityofglendora.org
www.cityofglendora.org
ALISON SWEET, P.E.
Assistant Public Works Director; City Engineer

THE CITY OF GLENDORA
"Pride of the Foothills"
116 E. Foothill Blvd.
Glendora, CA 91741
(626) 852-4885
(626) 914-8234 FAX
email: bamaya@cityofglendora.org
www.cityofglendora.org
BRIDGET AMAYA
Assistant Community Services Director

Barry S. FONG
ALSTOM

CITY OF CLAREMONT
City Hall
207 Harvard Avenue • P.O. Box 880
Claremont, CA 91711-0880
Larry Schroeder
Mayor
Lschroeder@ci.claremont.ca.us
www.ci.claremont.ca.us
City Hall (909) 399-5444
Fax (909) 399-5492
Cell (909) 942-1115

Community Development Department
CITY OF LAVERNE
ERIC SCHERER, AICP
Community Development Director
CITY HALL
3660 "D" Street
La Verne, California 91750
909/596-8706
Fax 909/596-8737
escherer@cityoflaverne.org

San Dimas
Lawrence L. Stevens
AICP
Assistant City Manager
for Community Development
(909) 394-6250
FAX (909) 394-6249
E-mail: lstevens@ci.san-dimas.ca.us
345 EAST BONITA AVE. 91773

Attachment B – Notice of Preparation Package and Recipient List

Notice of Preparation

Notice of Preparation

To: State Clearinghouse
P.O Box 3044
Sacramento, CA 95812-3044
(Address)

From: Mr. Habib F. Balian
406 E. Huntington Drive, Suite 202
Monrovia, CA 91016
(Address)

Subject: Notice of Preparation of a Draft Environmental Impact Report

Metro Gold Line Foothill Extension Construction Authority will be the Lead Agency and will prepare a Supplemental Environmental Impact Report for the project identified below. We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects are contained in the attached materials. A copy of the Initial Study (☐ is ☒ is not) attached.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice.

Please send your response to Lisa Levy Buch, Chief Communications Officer at the address shown above. We will need the name for a contact person in your agency.

Project Title: Metro Gold Line Foothill Extension Phase 2B – Supplemental EIR

Project Applicant, if any: Metro Gold Line Foothill Extension Construction Authority

Date 11/29/2018

Signature

Title Chief Executive Officer

Telephone 626-471-9050

Reference: California Code of Regulations, Title 14, (CEQA Guidelines) Sections 15082(a), 15103, 15375.

Print Form

Summary Form for Electronic Document Submittal

Form F

Lead agencies may include 15 hardcopies of this document when submitting electronic copies of Environmental Impact Reports, Negative Declarations, Mitigated Negative Declarations, or Notices of Preparation to the State Clearinghouse (SCH). The SCH also accepts other summaries, such as EIR Executive Summaries prepared pursuant to CEQA Guidelines Section 15123. Please include one copy of the Notice of Completion Form (NOC) with your submission and attach the summary to each electronic copy of the document.

SCH #: ______________________

Project Title: Metro Gold Line Foothill Extension Phase 2B - Supplemental EIR

Lead Agency: Metro Gold Line Foothill Extension Construction Authority

Contact Name: Lisa Levy Buch, Chief Communications Officer

Email: llevybuch@foothillgoldline.org Phone Number: 626-305-7004

Project Location: Azusa, Glendora, San Dimas, La Verne, Pomona, Claremont, Montclair (*City*) Los Angeles, San Bernardino (*County*)

Project Decription (Proposed actions, location, and/or consequences).

Phase 2B of the Metro Gold Line Foothill Extension (Project) is a 12.3-mile extension of the existing Metro Gold Line Light Rail Transit line from its current terminus in the City of Azusa, located in Los Angeles County, to the Montclair Transcenter, located in San Bernardino County. See map of project location in Exhibit NOP-1. In 2013, the Metro Gold Line Foothill Extension Construction Authority ("Authority") certified a Final Environmental Impact Report ("FEIR") and approved the Project. A detailed description of the Project is included in the FEIR and four addenda thereto adopted by the Authority (State Clearinghouse No. 2010121069).

The Authority proposes to modify the Project to allow for the potential to construct and operate the Project in four phases (instead of two phases, as previously approved). In addition, the Authority is proposing a change to the parking facility at the Pomona North Station to relocate the parking from the north side of the station to the south side of the station as shown on Figure NOP-2. In response to these proposed changes, the Authority will be initiating the preparation of a Supplemental Environmental Impact Report (SEIR) to evaluate the potential for significant impacts that may result from the different potential construction and operation phasing options under review, including: Phase 1 – to the La Verne/Pomona Fairplex Station; Phase 2 – to the Pomona North Station; Phase 3 – to the Claremont Station; and Phase 4 – to the Montclair Station; and the changes to the location of the Pomona North Station parking. The proposed possible construction and operation phasing is necessary to match with both existing funding and pending/future funding and provides the Authority the flexibility to build the phases as funding becomes available. The purpose of this NOP is to solicit input on potential issues to be considered and addressed, as applicable, in the SEIR.

Identify the project's significant or potentially significant effects and briefly describe any proposed mitigation measures that would reduce or avoid that effect.

The probable environmental effects of the proposed Project modifications include: traffic/transportation, air quality, energy, land use and cumulative effects. The proposed modification to allow for possible construction and operation of the Project in four phases may change the duration of construction impacts and may result in additional or different traffic and transportation effects at the three Phase 1 stations and pending the construction completion of Phases 2, 3 and 4.

Revised September 2011

If applicable, describe any of the project's areas of controversy known to the Lead Agency, including issues raised by agencies and the public.

Not applicable.

Provide a list of the responsible or trustee agencies for the project.

Metro Gold Line Foothill Extension Construction Authority (Lead Agency/Project Proponent) Los Angeles County Metropolitan Transportation Authority
Southern California Regional Rail Authority
San Bernardino County Transportation Authority
California Department of Fish and Wildlife

Figure NOP-1: Project Corridor Proposed Possible Construction and Operation Phasing

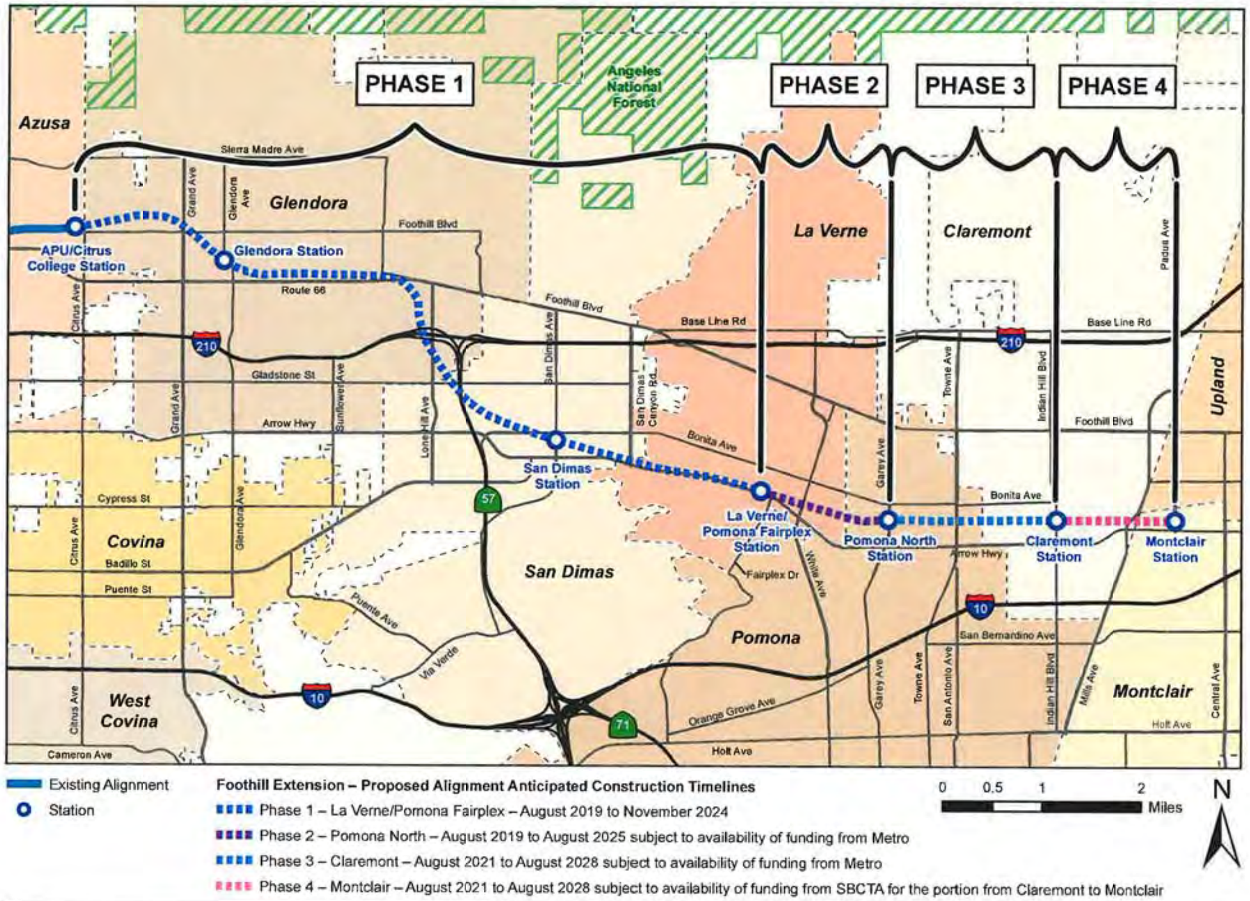
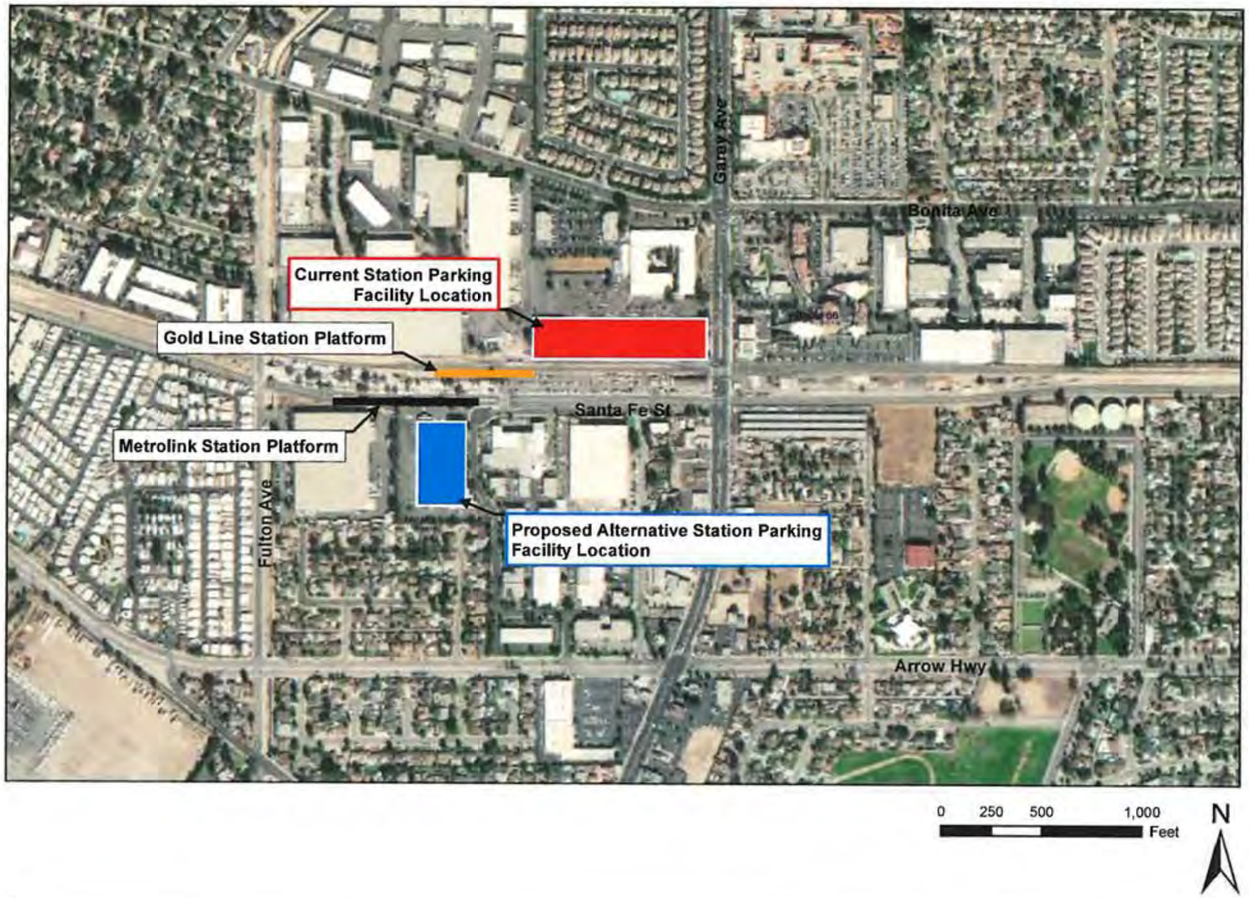


Figure NOP-2: Proposed Alternative Gold Line Pomona North Station Parking Location



Foothill Gold Line

Notice of Public Scoping Meeting

This notice is being provided to announce and solicit input on proposed project changes to the Metro Gold Line Foothill Extension Phase 2B (Project), also known as the Foothill Gold Line light rail project from Glendora to Montclair.

You are invited to attend a Public Scoping Meeting hosted by the Metro Gold Line Foothill Extension Construction Authority (also known as the Foothill Gold Line Construction Authority). The purpose of this meeting is to discuss a proposed modification to the possible phasing of construction and operation for the 12.3-mile, six-station Glendora to Montclair Project, and a proposed modification to the location of the future parking facility at the Pomona North Station.

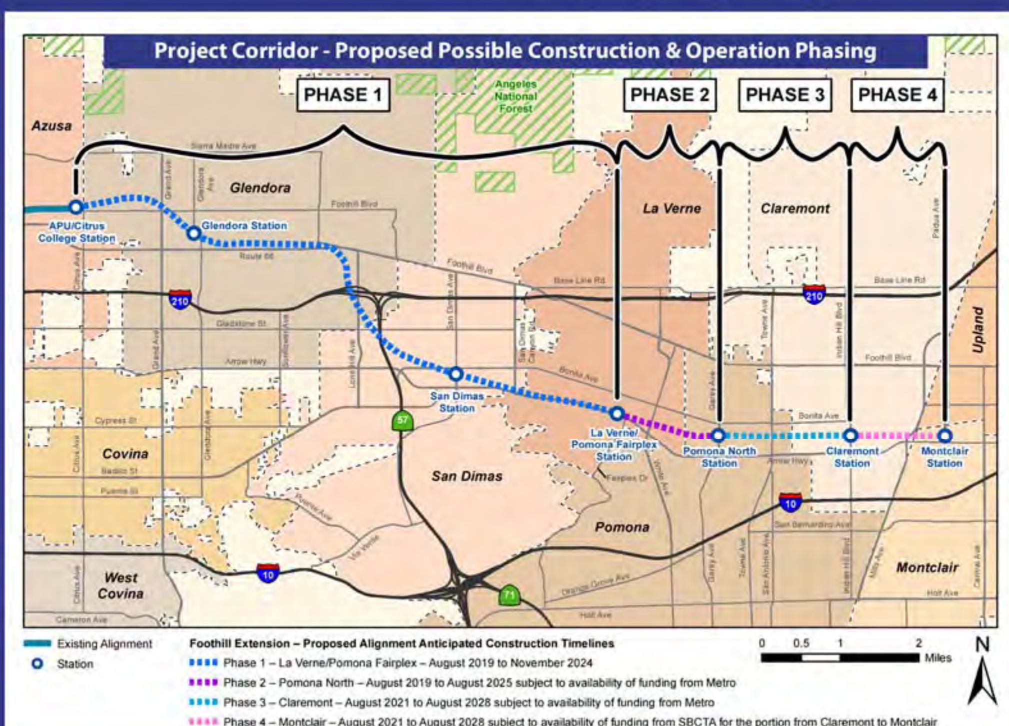
PUBLIC SCOPING MEETING:
Monday, December 10, 2018
5:30 PM – 7:30 PM
La Verne Community Center
3680 D Street, La Verne CA 91750

The Construction Authority proposes to modify the Glendora to Montclair Project to allow for the potential to construct and operate the Project in four phases (instead of two phases, as previously approved). See map below for details. In response to this proposed change, the Construction Authority will be initiating the preparation of a Supplemental Environmental Impact Report (SEIR) to evaluate the potential for significant impacts that may result from the different potential construction and operation phasing options under review, including: Phase 1-to La Verne/Pomona Fairplex Station; Phase 2-to Pomona North Station; Phase 3-to Claremont Station; and Phase 4-to Montclair Station. The SEIR will also evaluate the potential for significant impacts that may result from relocating the future parking facility at the Pomona North Station from the north side of the station to the south side.

The proposed possible construction and operation phasing is necessary to match with both existing funding and pending/future funding and provides the Construction Authority the flexibility to build and operate the phases as funding becomes available. The purpose of this public scoping meeting is to solicit input on potential issues to be considered and addressed, as applicable, in the SEIR.

If you are unable to attend the scoping meeting in person, written comments will be accepted if received on or before January 4, 2019. Please address written comments to:

Lisa Levy Buch, Chief Communications Officer
Metro Gold Line Foothill Extension Construction Authority
406 East Huntington Drive, Suite 202
Monrovia, California 91016-3633
Email: LLevyBuch@foothillgoldline.org



Questions: (626) 471-9050 Learn more: www.foothillgoldline.org

NOP – List of Recipients

Notice of Preparation - Phase 2B Supplemental EIR - Mailing List (December 5, 2019)

State Agencies

Last Name	First Name	Job Title	Agency	Address	City	State	Zip	Phone	Email
Smith	Deborah	Executive Officer	California Water Boards-Los Angeles #4	320 West Fourth Street, Suite 200	Los Angeles	CA	90013		
Bulinski	John	District Director	California Department of Transportation, District 7- Office	100 South Main St.	Los Angeles	CA	90012		
Kent	Jennifer	Director	California Health Care Services	P.O. Box 227413, MS 0000	Sacramento	CA	95899-7413		
Snider	Christina	Executive Secretary	Native American Heritage Commission	915 Capital Mall, Room 364	Sacramento	CA	95814		
Polanco	Julianne	State Historic Preservation Officer	Office of Historic Preservation (CA State Parks)	1725 23rd Street, Suite 100	Sacramento	CA	95816		
Laird	John	Secretary	California Natural Resources Agency	1416 ninth Street, Suite 1311	Sacramento	CA	95814		
Soback	Eileen	Executive Director	CA Water Boards-State Water Resources Control Board	1001 I Street	Sacramento	CA	95814		
Lee	Barbara	Director	CA Department of Toxic Substances Control	1001 I Street	Sacramento	CA	95814-2828		
Nemeth	Karla	Director	CA Department of Water Resources	1416 9th Street	Sacramento	CA	95814		
Corey	Richard	Executive Officer	California Air Resources Board	1001 I Street	Sacramento	CA	95814		
Bunn	David	Director	California Department of Conservation	801 K St, MS 24-01	Sacramento	CA	95814		
Jones	Melissa	Executive Director	California Energy Commission	1516 9th St., MS-29	Sacramento	CA	95814-5512		
Mangat	Lisa	Director	California Department of Parks and Recreation	P.O. Box 942896	Sacramento	CA	94296-0001		
Bransen	Susan	Executive Director	California Transportation Commission	1120 N Street, MS-52	Sacramento	CA	95814		
Benton	Janice	District Director	California Department of Transportation, District 8	464 West 4th Street	San Bernardino	CA	92401		
Picker	Michael	President	California Public Utilities Commission	505 Van Ness Ave.	San Francisco	CA	94102		
Lucchesi	Jennifer	Executive Officer	CA State Lands Commission	100 Howe Avenue, Suite 100	South Sacramento	CA	95825		
Fornelli	Justin	Director, Engineering & Construction	Southern California Regional Rail Authority	2558 Supply Street, Bldg A	Pomona	CA	91767	(909) 593-4291	Fornellij@scrra.net
Ron	Mathieu	Planning Department/Environmental Reviews	SCRRA/Metrolink	900 Wilshire Blvd., Suite 1500	Los Angeles	CA	90017		MATHIEUR@scrra.net
Morgan	Scott	Director	California State Clearing House	1400 Tenth Street	Sacramento	CA	95814		
Bonham	Charlton	Director	California Department of Fish and Game	1416 9th Street, 12th Floor	Sacramento	CA	95814		
Warmuth	Brock	Environmental Scientist	Department of Fish and Wildlife-Region 5	1933 Cliff Drive, #9	Santa Barbara	CA	93109	(805) 962-4698	Brock.Warmuth@wildlife.ca.gov
Courtney	Betty	Environmental Program Manager	Department of Fish and Wildlife-Region 5	3883 Ruffin Road	San Diego	CA	92123	(858) 467-4201	Betty.courtney@wildlife.ca.gov
Romich	Kim	Environmental Scientist	Department of Fish and Wildlife-Region 6	3602 Inland Empire Blvd., Suite C-220	Ontario	CA	91764	(909) 980-3818	Kimberly.Romich@wildlife.ca.gov
Gibson	Joanna	Senior Environmental Scientist (Specialist)	California Department of Fish and Wildlife--Region 6	3602 Inland Empire Blvd., Suite C-220	Ontario	CA	91764	(909) 987-7449	Joanna.Gibson@wildlife.ca.gov

Regional Agencies

Last Name	First Name	Job Title	Agency	Address	City	State	Zip	Phone	Email
Meade	Rick	Executive Officer, Project Management	Los Angeles County Metropolitan Transportation Authority	1 Gateway Plaza, MS 99-16-1	Los Angeles	CA	90012-2952		
Ramirez	Andres	Chief of Transit & Rail Programs	San Bernardino County Transportation Authority	1170 West Third Street, 2nd Floor	San Bernardiono	CA	92410	(909) 884-8276	aramirez@gosbcta.com

Local Agencies

Last Name	First Name	Job Title	Agency	Address	City	State	Zip	Phone	Email

Other Non-Governmental Organizations

Last Name	First Name	Job Title	Agency	Address	City	State	Zip	Phone	Email

Local Cities Non Government Agencies

Last Name	First Name	Job Title	Agency	Address	City	State	Zip	Phone	Email
Tipping	Maria	Acting City Engineer	City of Claremont	207 Harvard Avenue	Claremont	CA	91711		
Tudor	Colin	Assistant City Manager	City of Claremont	207 Harvard Avenue	Claremont	CA	91711		
Davies	Dave	Director of Public Works	City of Glendora	116 E. Foothill Blvd.	Glendora	CA	91741		
Sweet	Alison	City Engineer	City of Glendora	116 E. Foothill Blvd.	Glendora	CA	91741		
Mateer	Steven	Transportation Superintendent	City of Glendora	116 E. Foothill Blvd.	Glendora	CA	91741		
Amaya	Bridget	Acting Community Services Director	City of Glendora	116 E. Foothill Blvd.	Glendora	CA	91741		
Carnahan	Mark	City Planner	City of Glendora	116 E. Foothill Blvd.	Glendora	CA	91741		
Keesey	Dan	Public Works Director	City of La Verne	3660 "D" Street	La Verne	CA	91750		
Bowcock	Candice	Senior Planner	City of La Verne	3660 "D" Street	La Verne	CA	91750		
Castillo	Noel	Public Works Director/City Engineer	City of Montclair	5111 Benito St.	Montclair	CA	91763		
Staats	Marilyn	Executive Director, Office of Economic & Community Development	City of Montclair	5111 Benito St.	Montclair	CA	91763		
McWade	Meg	Director of Public Works	City of Pomona	505 S. Garey Ave.	Pomona	CA	91766		
Suarez	Mario	Development Services Director	City of Pomona	505 S. Garey Ave.	Pomona	CA	91766		
Guerrero	Rene	City Engineer	City of Pomona	505 S. Garey Ave.	Pomona	CA	91766		
Pilarz	Matt	Senior Civil Engineer	City of Pomona	505 S. Garey Ave.	Pomona	CA	91766		
Patel	Krishna	Public Works Director	City of San Dimas	245 East Bonita Ave	San Dimas	CA	91773		
Stevens	Lawrence	Assistant City Manager for Community Development	City of San Dimas	245 East Bonita Ave	San Dimas	CA	91773		

Attachment C – Public Meeting Notice and Social Media Posts

Foothill Gold Line

Notice of Public Scoping Meeting

This notice is being provided to announce and solicit input on proposed project changes to the Metro Gold Line Foothill Extension Phase 2B (Project), also known as the Foothill Gold Line light rail project from Glendora to Montclair.

You are invited to attend a Public Scoping Meeting hosted by the Metro Gold Line Foothill Extension Construction Authority (also known as the Foothill Gold Line Construction Authority). The purpose of this meeting is to discuss a proposed modification to the possible phasing of construction and operation for the 12.3-mile, six-station Glendora to Montclair Project, and a proposed modification to the location of the future parking facility at the Pomona Station.

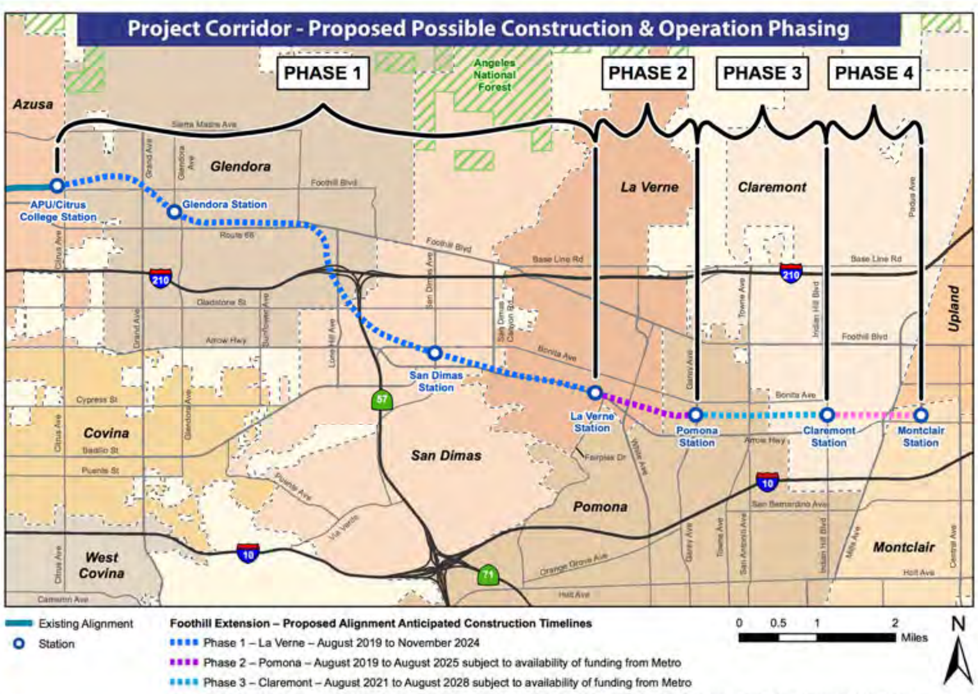
PUBLIC SCOPING MEETING:
Monday, December 10, 2018
5:30 PM – 7:30 PM
La Verne Community Center
3680 D Street, La Verne CA 91750

The Construction Authority proposes to modify the Glendora to Montclair Project to allow for the potential to construct and operate the Project in four phases (instead of two phases, as previously approved). See map below for details. In response to this proposed change, the Construction Authority will be initiating the preparation of a Supplemental Environmental Impact Report (SEIR) to evaluate the potential for significant impacts that may result from the different potential construction and operation phasing options under review, including: Phase 1-to La Verne Station; Phase 2-to Pomona Station; Phase 3-to Claremont Station; and Phase 4-to Montclair Station. The SEIR will also evaluate the potential for significant impacts that may result from relocating the future parking facility at the Pomona Station from the north side of the station to the south side.

The proposed possible construction and operation phasing is necessary to match with both existing funding and pending/future funding and provides the Construction Authority the flexibility to build and operate the phases as funding becomes available. The purpose of this public scoping meeting is to solicit input on potential issues to be considered and addressed, as applicable, in the SEIR.

If you are unable to attend the scoping meeting in person, written comments will be accepted if received on or before January 4, 2019. Please address written comments to:

Lisa Levy Buch, Chief Communications Officer
Metro Gold Line Foothill Extension Construction Authority
406 East Huntington Drive, Suite 202
Monrovia, California 91016-3633
Email: LLevyBuch@foothillgoldline.org



Questions: (626) 471-9050 Learn more: www.foothillgoldline.org

Facebook Post and Event Post

I Will Ride - Foothill Gold Line added an event.

November 21, 2018 ·

You are invited to attend a Public Scoping Meeting hosted by the Metro Gold Line Foothill Extension Construction Authority (also known as the Foothill Gold Line Construction Authority). The purpose of this meeting is to discuss a proposed modification to the possible phasing of construction and operation for the 12.3-mile, six-station Foothill Gold Line light rail extension from Glendora to Montclair (Project), and a proposed modification to the location of the future parking... See More

Figure NOP-1: Project Corridor Proposed Possible Construction and Operation Phasing

MON, DEC 10, 2018

Public Scoping Meeting: Proposed Project Changes

★ Interested

You like I Will Ride - Foothill Gold Line

Search

Rod Home Find Friends

Event Insights

Edit ···

Events

Events

Calendar

Birthdays

Discover

Hosting

+ Create Event

Figure NOP-1: Project Corridor Proposed Possible Construction and Operation Phasing

DEC
10

Public Scoping Meeting: Proposed Project Changes

Public · Hosted by I Will Ride - Foothill Gold Line

Interested ✓ Going ···

Monday, December 10, 2018 at 5:30 PM – 7:30 PM
about 1 month ago

La Verne Community Center
3680 D Street, La Verne, California 91750

Show Map

About Discussion

Write Post | Add Photo/Video | Create Poll

Write something...

33 Went · 287 Interested
Share this event with your followers

INSIGHTS See More

19.1K
People Reached
+1 last 7 days

320
Responses
+0 last 7 days

Track ticket sales on your next event by adding a ticket link

Audience

Men 35-44
15% of total responses

English (US) · Español · Português (Brasil) · Français (France) · Deutsch

+

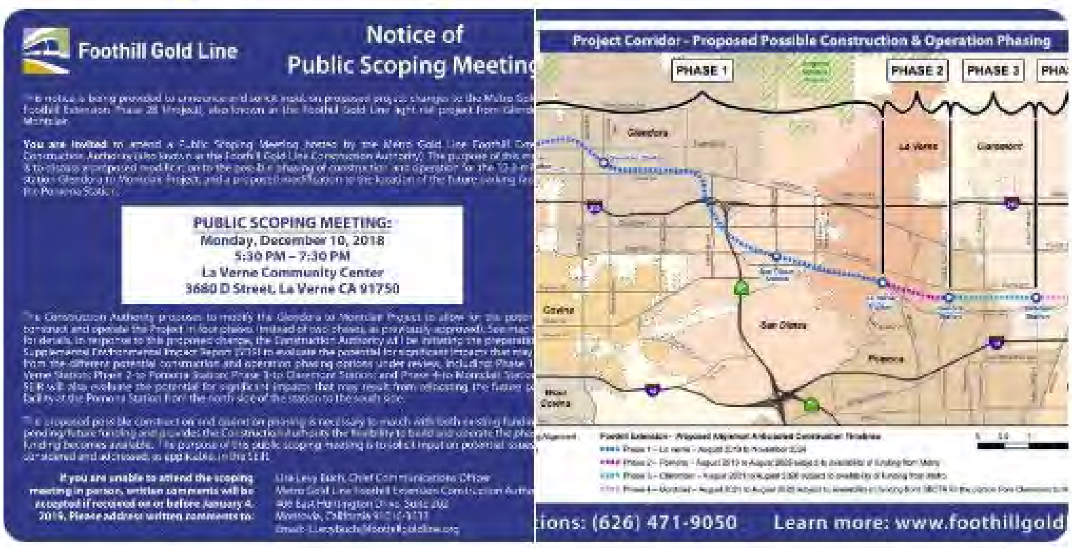
Twitter Post

Foothill Gold Line
@IWillRide

TONIGHT: Public Scoping Meeting to Discuss Proposed Foothill Gold Line from Glendora to Montclair Construction & Operation Phasing

When: TONIGHT - December 10, 2018. 5:30 PM to 7:30 PM.
Where: La Verne Community Center, 3680 D Street, La Verne CA 91750

foothillgoldline.org



1:19 PM - 10 Dec 2018

I Will Ride Post

I will ride
Foothill Gold Line

Where Will You Ride? Archives About Sign-up for Updates

WHERE WILL YOU RIDE? ary W from Azusa I Will Ride to Union Station/Flyaway - Leigh R from San Dimas I Will Ride to Pasadena, Downtown or West Los

NOVEMBER 21, 2018
SHARE TWITTER FACEBOOK

YOU'RE INVITED: Public Scoping Meeting to Discuss Proposed Glendora to Montclair Construction & Operation Phasing (Dec. 10)

You are invited to attend a Public Scoping Meeting hosted by the Metro Gold Line Foothill Extension Construction Authority (also known as the Foothill Gold Line Construction Authority). The purpose of this meeting is to discuss a proposed modification to the possible phasing of construction and operation for the 12.3-mile, six-station Foothill Gold Line light rail extension from Glendora to Montclair (Project), and a proposed modification to the location of the future parking facility at the Pomona Station.

PUBLIC SCOPING MEETING
Monday, December 10, 2018
5:30 PM – 7:30 PM
La Verne Community Center
3680 D Street, La Verne CA 91750

The Construction Authority proposes to modify the Glendora to Montclair Project to allow for the potential to construct and operate the Project in four phases (instead of two phases, as previously approved). See map below for details. In response to this proposed change, the Construction Authority will be initiating the preparation of a Supplemental Environmental Impact Report (SEIR) to evaluate the potential for significant impacts that may result from the different potential construction and operation phasing options under review, including: Phase 1-to La Verne Station; Phase 2-to Pomona Station; Phase 3-to Claremont Station; and Phase 4-to Montclair Station. The SEIR will also evaluate the potential for significant impacts that may result from relocating the future parking facility at the Pomona Station from the north side of the station to the south side.

The proposed possible construction and operation phasing is necessary to match with both existing funding and

Get 'I will ride' in Your Inbox

email address

Submit

Follow Us

Foothill Gold Line

Visit Foothill Gold Line Website

Twitter @iwillride

"But it's not just an annoying time waster — there's a case that it's a public health issue." via @nytimes https://t.co/8CZyKJlCIZ
18 mins ago Retweet

Foothill Gold Line E-News Update - January 2019: - Foothill Gold Line Board Welcomes New Leadership - Project Fundi… https://t.co/jtenfaZghe
5 days ago Retweet

Attachment D- Outreach Tool Kit

Foothill Gold Line Glendora to Montclair
Supplemental Environmental Impact Report
Notice of Public Scoping Meeting
Extended Outreach

Toolkit

Dear Foothill Gold Line Partner,

Earlier this month, the Construction Authority announced a proposed plan to deliver nearly 70% of the Foothill Gold Line light rail extension from Glendora to Montclair at least two years ahead of schedule and avoid tens of millions of dollars annually in market escalation and risk money proposed by the four design-build teams competing for the Glendora to Montclair Alignment contract; while increasing the budget for the 12.3-mile, six station light rail project by $570 million to a total project budget of $2.1 billion.

The need for the proposed plan follows receipt of bids by the four teams competing for the design-build contract. All four bids reflected a significant unfavorable shift in market conditions since the agency completed the project estimate two years ago. When added with current unknowns and risk within the construction industry locally and nationally, these factors resulted in bids for the long-term construction project coming in hundreds of millions of dollars over the project estimate and secured funding available.

With the proposed plan, the Construction Authority proposes to modify the Glendora to Montclair Project to allow for the potential to construct and operate the Project in four phases (instead of two phases, as previously approved) and a proposed modification to the location of the future parking facility at the Pomona North Station. In response to this proposed change, the Construction Authority will be hosting scoping meeting and initiating the preparation of a Supplemental Environmental Impact Report (SEIR) to evaluate the potential for significant impacts that may result from the different potential construction and operation phasing options under review, including: Phase 1-to La Verne/Pomona Fairplex Station; Phase 2-to Pomona North Station; Phase 3-to Claremont Station; and Phase 4-to Montclair Station. The SEIR will also evaluate the potential for significant impacts that may result from relocating the future parking facility at the Pomona North Station from the north side of the station to the south side.

The proposed possible construction and operation phasing is necessary to match with both existing funding and pending/future funding and provides the Construction Authority the flexibility to build and operate the phases as funding becomes available. The purpose of this public scoping meeting is to solicit input on potential issues to be considered and addressed, as applicable, in the SEIR. Below are the meeting details.

PUBLIC SCOPING MEETING
Monday, December 10, 2018
5:30 PM – 7:30 PM
La Verne Community Center
3680 D Street, La Verne CA 91750

We would like to request your help with promoting the upcoming scoping meeting to your community. There are multiple ways that you can help, including:

- Posting the information on your website
- Sharing it on Facebook, Twitter, community newsletter and/or e-blast
- Placement of print notices on public counters

If you choose to help with the scoping meeting notification, we have listed the available methods and information below. Please select the method(s) that best work for you and use the information below and attached images/documents to share the information with your stakeholders.

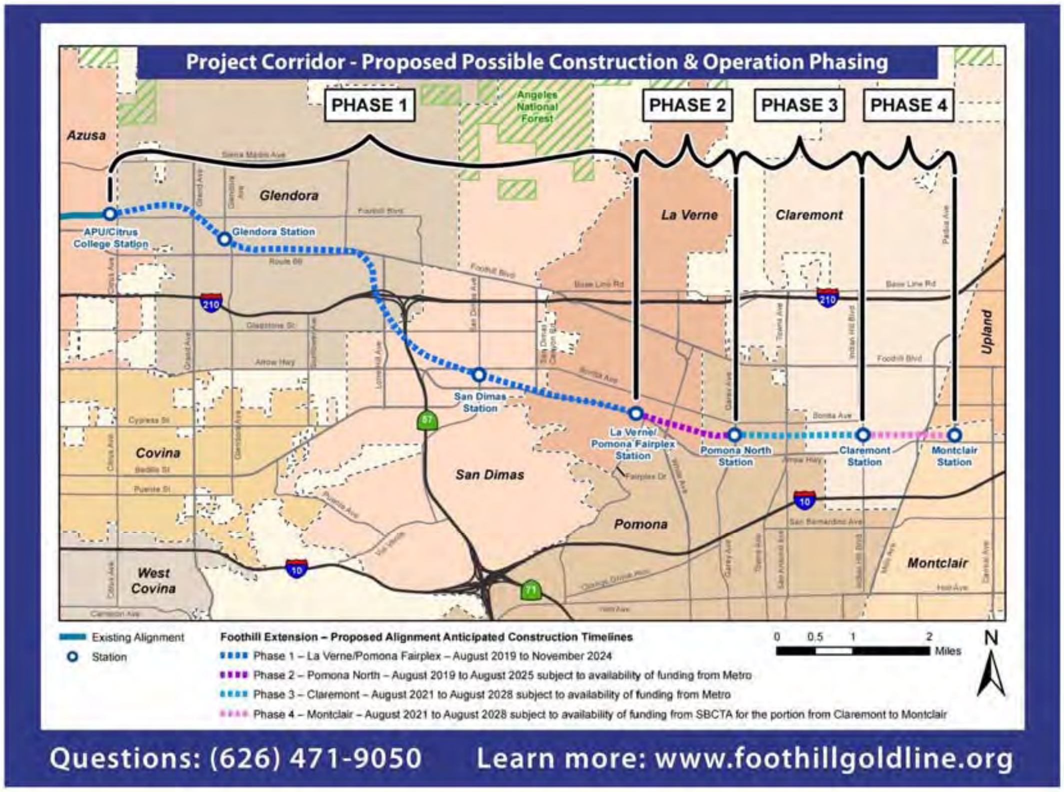
1. **Website :**

   – *Text*:

   You are invited to attend a Public Scoping Meeting hosted by the Foothill Gold Line Construction Authority. The purpose of this meeting is to discuss a proposed modification to the possible phasing of construction and operation for the 12.3-mile, six-station Glendora to Montclair Project, and a proposed modification to the location of the future parking facility at the Pomona North Station.

   <u>Public Scoping Meeting</u>
   Monday, December 10, 2018
   5:30 PM – 7:30 PM
   La Verne Community Center
   3680 D Street, La Verne CA 91750

   The Construction Authority proposes to modify the Glendora to Montclair Project to allow for the potential to construct and operate the Project in four phases (instead of two phases, as previously approved). See map below for details. In response to this proposed change, the Construction Authority will be initiating the preparation of a Supplemental Environmental Impact Report (SEIR) to evaluate the potential for significant impacts that may result from the different potential construction and operation phasing options under review, including: Phase 1-to La Verne/Pomona Fairplex Station; Phase 2-to Pomona North Station; Phase 3-to Claremont Station; and Phase 4-to Montclair Station. The SEIR will also evaluate the potential for significant impacts that may result from relocating the future parking facility at the Pomona North Station from the north side of the station to the south side.



The proposed possible construction and operation phasing is necessary to match with both existing funding and pending/future funding and provides the Construction Authority the flexibility to build and operate the phases as funding becomes available.

The purpose of this public scoping meeting is to solicit input on potential issues to be considered and addressed, as applicable, in the SEIR.

If you are unable to attend the scoping meeting in person, written comments will be accepted if received on or before January 4, 2019. Please address written comments to:

Lisa Levy Buch
Chief Communications Officer
Metro Gold Line Foothill Extension Construction Authority
406 East Huntington Drive, Suite 202
Monrovia, CA 91016-3633
Email: LLevyBuch@foothillgoldline.org

– *Link*:

For more information on the Supplemental Environmental Impact Report public scoping meeting or to learn more about the Foothill Gold Line light rail project: http://www.foothillgoldline.org/

Follow the Foothill Gold Line on:

facebook.com/iwillride

@iwillride

iwillride.org

Link to notice:

https://foothillgoldline.org/wp-content/uploads/2018/12/ScopingMeetingNoticeLongRev6.pdf

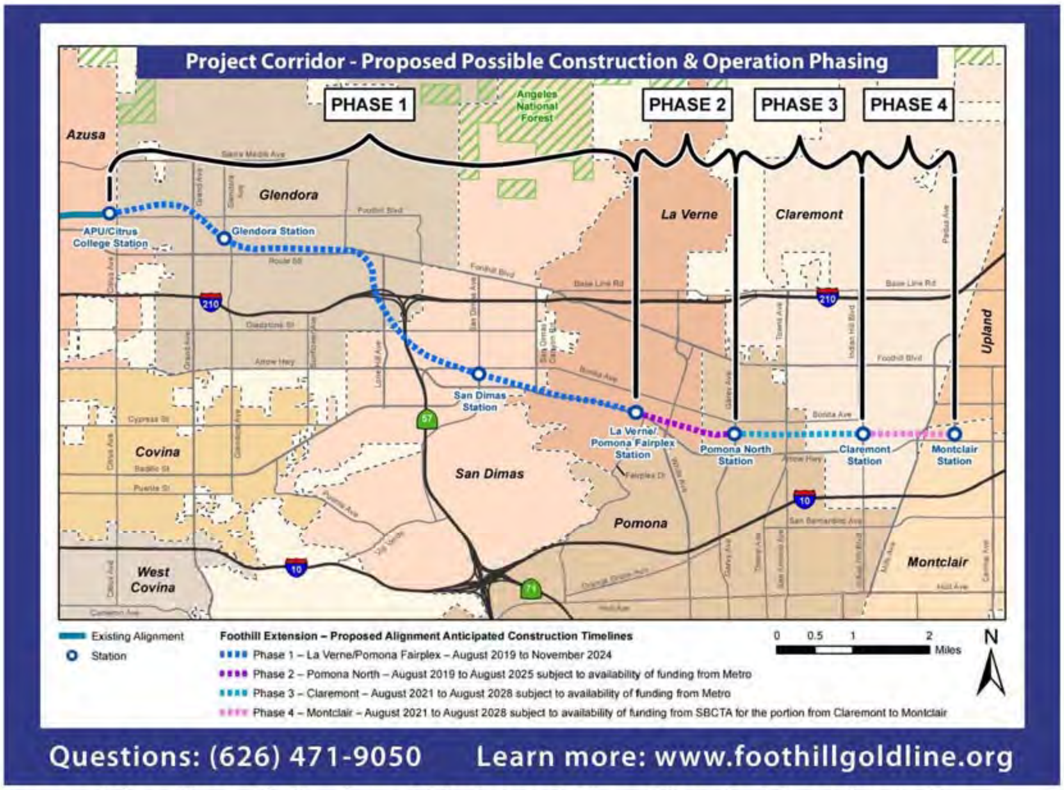
2. **Facebook:**

- *Share event link with text below: https://www.facebook.com/events/730790253933510/*

– *Text:*

You are invited to attend a Public Scoping Meeting hosted by the Foothill Gold Line Construction Authority. The purpose of this meeting is to discuss a proposed modification to the possible phasing of construction and operation for the 12.3-mile, six-station Glendora to Montclair Project, and a proposed modification to the location of the future parking facility at the Pomona North Station.

The Foothill Gold Line Construction Authority is initiating the preparation of a Supplemental Environmental Impact Report (SEIR) to evaluate the potential for significant impacts that may result from the different potential construction and operation phasing options under review, including: Phase 1-to La Verne/Pomona Fairplex Station; Phase 2-to Pomona North Station; Phase 3-to Claremont Station; and Phase 4-to Montclair Station. The SEIR will also evaluate the potential for significant impacts that may result from relocating the future parking facility at the Pomona North Station from the north side of the station to the south side.



For more information on the Supplemental Environmental Impact Report public scoping meeting, how to provide input if you are not able to attend the meeting, or to learn more about the Foothill Gold Line light rail project:
http://www.foothillgoldline.org/

3. **Twitter:**

– *Text:*
YOU'RE INVITED: Public Scoping Meeting to Discuss Proposed project changes to the Foothill Gold Line (@IWillRide) from Glendora to Montclair

When: December 10, 2018. 5:30 PM to 7:30 PM.
Where: La Verne Community Center, 3680 D Street, La Verne CA 91750

foothillgoldline.org

- Attach both images:

Foothill Gold Line

Notice of Public Scoping Meeting

This notice is being provided to announce and solicit input on proposed project changes to the Metro Gold Line Foothill Extension Phase 2B (Project), also known as the Foothill Gold Line light rail project from Glendora to Montclair.

You are invited to attend a Public Scoping Meeting hosted by the Metro Gold Line Foothill Extension Construction Authority (also known as the Foothill Gold Line Construction Authority). The purpose of this meeting is to discuss a proposed modification to the possible phasing of construction and operation for the 12.3-mile, six-station Glendora to Montclair Project, and a proposed modification to the location of the future parking facility at the Pomona North Station.

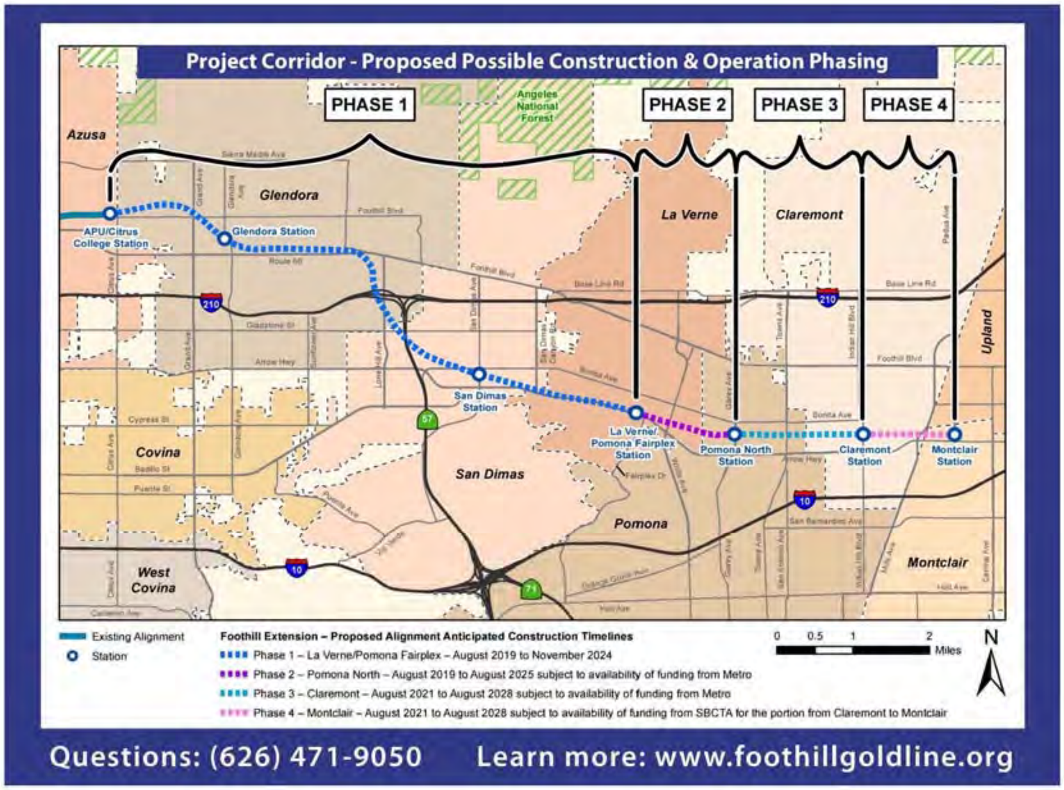
PUBLIC SCOPING MEETING:
Monday, December 10, 2018
5:30 PM – 7:30 PM
La Verne Community Center
3680 D Street, La Verne CA 91750

The Construction Authority proposes to modify the Glendora to Montclair Project to allow for the potential to construct and operate the Project in four phases (instead of two phases, as previously approved). See map below for details. In response to this proposed change, the Construction Authority will be initiating the preparation of a Supplemental Environmental Impact Report (SEIR) to evaluate the potential for significant impacts that may result from the different potential construction and operation phasing options under review, including: Phase 1-to La Verne/Pomona Fairplex Station; Phase 2-to Pomona North Station; Phase 3-to Claremont Station; and Phase 4-to Montclair Station. The SEIR will also evaluate the potential for significant impacts that may result from relocating the future parking facility at the Pomona North Station from the north side of the station to the south side.

The proposed possible construction and operation phasing is necessary to match with both existing funding and pending/future funding and provides the Construction Authority the flexibility to build and operate the phases as funding becomes available. The purpose of this public scoping meeting is to solicit input on potential issues to be considered and addressed, as applicable, in the SEIR.

If you are unable to attend the scoping meeting in person, written comments will be accepted if received on or before January 4, 2019. Please address written comments to:

Lisa Levy Buch, Chief Communications Officer
Metro Gold Line Foothill Extension Construction Authority
406 East Huntington Drive, Suite 202
Monrovia, California 91016-3633
Email: LLevyBuch@foothillgoldline.org



4. **E-blast/E-Newsletter:**
   If you would like an article for an upcoming publication, please let us know. We would gladly provide you with one detailing the information included in this Tool Kit.

   Link to notice:
   https://foothillgoldline.org/wp-content/uploads/2018/12/ScopingMeetingNoticeLongRev6.pdf

   Print Notices: Let us know if you would like to receive hard copy notices for placement on your public counters. Our team will be happy to deliver a stack of 50 notices.

Thank you in advance for your help to promote the Supplemental Environmental Impact Report Scoping Meeting for the Foothill Gold Line from Glendora to Montclair.

If you have questions about this toolkit, please contact Yesenia Arias, Community Relations Manager, Foothill Gold Line Construction Authority at (626) 305-7012 or yarias@foothillgoldline.org

###

Website Posting –

City of San Dimas

City of La Verne

City of Claremont

City of Pomona

City of Arcadia

Glendora Chamber of Commerce

San Dimas Chamber of Commerce

Claremont Chamber of Commerce

HOW DO I | DEPARTMENTS | RESIDENTS | BUSINESSES

Foothill Goldline Public Scope Meeting – 12/10

DECEMBER, 2018

11 CITY COUNCIL MEETING

Residents are invited to attend a Public Scoping Meeting hosted by the Foothill Gold Line Construction Authority. The purpose of this meeting is to discuss a proposed modification to the possible phasing of construction and operation for the 12.3-mile, six-station Foothill Gold Line light rail project from Glendora to Montclair.

Public Scoping Meeting

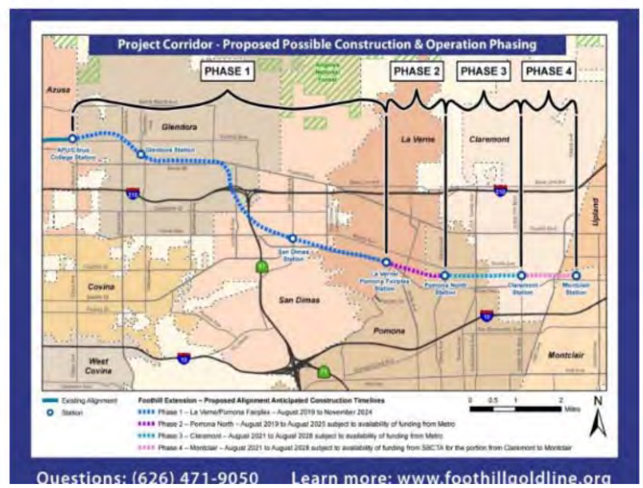
Monday, December 10, 2018

5:30 PM – 7:30 PM

La Verne Community Center

3680 D Street, La Verne CA 91750

The Construction Authority proposes to modify the Glendora to Montclair Project to allow for the potential to construct and operate the Project in four phases (instead of two phases, as previously approved). In response to this proposed change, the Construction Authority will be initiating the preparation of a Supplemental Environmental Impact Report (SEIR) to evaluate the potential for significant impacts that may result from the different potential construction and operation phasing options under review, including Phase 1-to La Verne/Pomona Fairplex Station; Phase 2-to Pomona North Station; Phase 3-to Claremont Station; and Phase 4-to Montclair Station.



HOME | BENEFITS OF MEMBERSHIP | FAQ | CITY OF GLENDORA | VISITING GLENDORA? | CONTACT US

Join THE CHAMBER! | login TO MY CHAMBER!

CYPRESS HEATING & AIR CONDITIONING INC 626-963-9810

Glendora CHAMBER OF COMMERCE

CHAMBER + | DIRECTORY + | ORGANIZATION + | RESOURCES + | EVENTS +

Glendora Chamber

Public Scoping Meeting hosted by the Foothill Gold Line Construction Authority

November 30 2018

Chamber, Community, Economic, Education, Events, General News Article, Legislative, Press Release

You are invited to attend a **Public Scoping Meeting** hosted by the **Foothill Gold Line Construction Authority**. The purpose of this meeting is to discuss a proposed modification to the possible phasing of construction and operation for the 12.3-mile, six-station Foothill Gold Line light rail project from Glendora to Montclair.

Public Scoping Meeting
Monday, December 10, 2018
5:30 PM – 7:30 PM
La Verne Community Center
3680 D Street, La Verne CA 91750

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The proposed possible construction and operation phasing is necessary to match with both existing funding and pending/future funding and provides the Construction Authority the flexibility to build and operate the phases as funding becomes available.

The purpose of this public scoping meeting is to solicit input on potential issues to be considered and addressed, as applicable, in the SEIR.

If you are unable to attend the scoping meeting in person, written comments will be accepted if received on or before January 4, 2019. Please address written comments to:

Lisa Levy Buch
Chief Communications Officer
Metro Gold Line Foothill Extension Construction Authority
406 East Huntington Drive, Suite 202
Monrovia, CA 91016-3633
Email: **LLevyBuch@foothillgoldline.org**

Directory Search

Enter name, category, or keyword

Search

What are members saying?

New Members

The Grand LLC

Prominence Business & Wealth Mgmt

Glendora Florist

Brookdale San Dimas

$3.99 Pizza Co #5

Competitive Edge Education & Business Services

ShopGlendora APP

Exclusive — Wine Down W...
Clubhouse 66 Restaura...
Glendora - 8.69 miles
Starts in about 7 hours
0 50% off

Exclusive — Weekly Special
Village Vault Restaurant
Glendora - 7.31 miles
Ends in 6 days
0/1

Exclusive — 10% OFF your...
The Broken Yolk Cafe
Glendora - 7.01 miles
Ends in 36 hrs
0/1

Exclusive — No Party Too ...

E-Newsletters

La Verne's City Manager's Monthly Newsletter

Claremont's City Manager Weekly Update

Glendora Chamber of Commerce - The Bulletin

San Dimas Chamber of Commerce

La Verne Chamber of Commerce

Pomona Chamber of Commerce

Montclair Chamber of Commerce

CITY MANAGER

WEEKLY

UPDATE

December 6, 2018

Last week, staff from Tri City Wellness led students in a mindfulness exercise at the Youth Activity Center. Youth were asked to think about their support systems, strengths, and

Calendar

LA Metro Board Approves Motion Reaffirming Commitment to Completion of Gold Line

On Thursday, December 6, the LA Metro Board of directors approved a motion to reaffirm their commitment to funding and completing the Glendora to Montclair project. This action comes after the Construction Authority announced last month that bids by the four teams competing for the project came in millions above the project estimate and secured funding. As a result, the Construction Authority is proposing to possibly phase construction and operation of the project – completing the first phase from Glendora to La Verne/Pomona Fairplex in 2024 and the phase from La Verne/Pomona Fairplex to Montclair by 2028 (assuming additional funding is secured in time).

The LA Metro board took the following actions with their motion:

- Reaffirmed the Foothill Gold Line as a first priority project.
- Opposed any action or proposal that would reduce the project's secured funding and/or hinder the ability of the Construction Authority to complete the extension.
- Directed LA Metro CEO Phil Washington to identify funding sources and approaches to fill the funding gap.
- Directed LA Metro CEO to report back to the board in January 2019 with options for initial funding to extend the first phase beyond La Verne/Fairplex to Pomona North, with a strategy to fund the second phase consisting of Claremont and Montclair.

Claremont City officials attended the Metro Board meeting to express their support for construction of the Claremont Gold Line station. For over 15 years, the City of Claremont has worked to bring the line to Claremont. Our community has supported the construction of the line and contributes to the funding of the line through our sales tax dollars. Staff will continue to work with the Foothill Gold Line Construction Authority on the project and assist with identifying funding to complete the line.

Public Scoping Meeting for Gold Line – Monday, December 10

Residents are invited to attend a Public Scoping Meeting hosted by the Foothill Gold Line Construction Authority. The purpose of this meeting is to discuss a proposed modification to the possible phasing of construction and operation for the 12.3-mile, six-station Foothill Gold Line light rail project from Glendora to Montclair.

Monday, December 10, 2018
5:30 PM – 7:30 PM
La Verne Community Center
3680 D Street, La Verne

The Construction Authority proposes to modify the Glendora to Montclair Project to allow for the potential to construct and operate the Project in four phases (instead of two phases, as previously approved). In response to this proposed change, the Construction Authority will be initiating the preparation of a Supplemental Environmental Impact Report (SEIR) to evaluate the potential for significant impacts that may result from the different potential construction and operation phasing options under review, including: Phase 1-to La Verne/Pomona Fairplex Station; Phase 2-to Pomona North Station; Phase 3-to Claremont Station; and Phase 4-to Montclair Station.

CITY MANAGER'S

MONTHLY

NEWSLETTER

December 2018

December

CALENDAR

December 3 - 6:30 PM
City Council Meeting
City Hall Council Chambers

December 3 - 6:30 PM
Tree Lighting Ceremony
City Hall

December 8 - 9:00 AM - 1:00 PM
Winter Wonderland Event
Heritage Park

December 15 - 9:00 AM - 3:00 P
Household Hazardous Waste
Roundup at Bracket Field

December 17 - 6:30 PM
City Council Meeting
City Hall Council Chambers

December 24 - All Day
Christmas Eve Observed
City Yard closed

CITY MANAGER'S MESSAGE

Happy Holidays to our residents and business owners!

This time of year is spent in the company of family and friends. There are many holiday inspired activities in La Verne such as the annual Christmas tree lighting at City Hall and Winter Wonderland at Heritage Park. Please enjoy the festivities throughout the City in the month of December.

The holiday season brings shopping, traveling and delicious baked treats! This issue provides helpful tips to use while doing all of the activitites this month entails. We hop

All tl

Bob

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e-su

COMMUNITY DEVELOPMENT

Ribbon Cutting Ceremonies

Three new businesses were welcomed to La Verne in November with the La Verne Chamber of Commerce hosting a ribbon cutting ceremony at each one. On November 2nd, Golden Peach Café an Asian Fusion restaurant and tea room had their ribbon cutting ceremony at 2855 Foothill Blvd. On November 9th, Broken Yolk Cafe held their ribbon cutting at 2488 Foothill Blvd. near Target, specializing in a wide range of breakfast and lunch items. Then on November 29th, a ribbon cutting was held for the new owners of Pappas Artisanal in Old Town La Verne at 2232 D Street. Pappas is a great place to grab a specialty pizza, sandwich, salad, or try their incredible weekend brunch.

Gold Line Light Rail Public Scoping Meeting - December 10th

The La Verne Community Center will be the site of a Public Scoping Meeting on Monday, December 10th, 2018 from 5:30 p.m. - 7:30 p.m. The purpose of this meeting is to discuss a proposed modification to the phasing of construction for the 12.3 mile, six station Foothill Gold Line light rail extension from Glendora to Montclair.

The Construction Authority proposes to modify the Project to construct and operate the project in three phases (instead of two phases). In response to this proposed change, the Construction Authority will be initiating the preparation of a Supplemental Environmental Impact Report (SEIR) to evaluate potential for significant impacts that may result from the three construction phasing options under review, including: Phase 1 – to the La Verne/Pomona Fairplex Station; Phase 2 – to the Claremont Station, and Phase 3 – to the Montclair Station. The proposed construction phasing is necessary to match up with both existing encumbered funding and pending/future funding sources. The purpose of the public scoping meeting is to solicit input on potential issues to be considered and addressed, as applicable, in the SEIR.

FIRE DEPARTMENT

Spark of Love Toy Drive

The La Verne Fire Department is again participating in ABC7 News' Spark of Love Toy Drive this year. The drive began on November 14th, and we will continue accepting toys through Christmas Day. New, unwrapped toys, board games, or sports equipment for any ages, toddler to teenager can be dropped off for donation at any of the three LVFD stations, City Hall or the Community Center. The donated toys are distributed to the children of La Verne families who might otherwise go without any gifts this holiday season, as well as La Verne non-profit youth organizations such as David & Margaret Youth and Family Services, the LeRoy Haynes Center, Sowing Seeds for Life, and local church preschools. Last year, the La Verne Fire Department's Spark of Love Toy Drive collected roughly 1,500 toys to help provide holiday cheer to the children of 50 La Verne families in need, as well as the local youth non-profits mentioned above.

If you are a La Verne family in need of assistance with toys for your child(ren) for the holiday, please call the La Verne Fire Department at (909)596-5991, or stop by at 2061 Third Street to apply for toy donations

The Bulletin

Official E-News of the Glendora Chamber of Commerce

The mission of the Glendora Chamber is

PROMOTE... CONNECT... GROW...

December 2018 Vol 10- Issue 12

Greetings!

Happy December 2018!

Below you will find MANY events, articles and different ways to get your message to the community and even have some fun!

Enjoy your day and hope to see you soon you later in the week!

Joe Cina
President/CEO
Glendora Chamber

CHAMBER DECEMEBR CALENDAR

Community Events & Mixers

Thu
Cou
Frid
125
Non
Frid
Satu

Ribl
Frid
10:0
Tue
1:00
PM)
Wed
10:3
2:00

Please check out our calendar for more.

Foothill Gold Line

Notice of Public Scoping Meeting

This notice is being provided to announce and solicit input on proposed project changes to the Metro Gold Line Foothill Extension Phase 2B (Project), also known as the Foothill Gold Line light rail project from Glendora to Montclair.

You are invited to attend a Public Scoping Meeting hosted by the Metro Gold Line Foothill Extension Construction Authority (also known as the Foothill Gold Line Construction Authority). The purpose of this meeting is to discuss a proposed modification to the possible phasing of construction and operation for the 12.3-mile, six-station Glendora to Montclair Project, and a proposed modification to the location of the future parking facility at the Pomona North Station.

PUBLIC SCOPING MEETING:
Monday, December 10, 2018
5:30 PM – 7:30 PM
La Verne Community Center
3680 D Street, La Verne CA 91750

The Construction Authority proposes to modify the Glendora to Montclair Project to allow for the potential to construct and operate the Project in four phases (instead of two phases, as previously approved). See map below for details. In response to this proposed change, the Construction Authority will be initiating the preparation of a Supplemental Environmental Impact Report (SEIR) to evaluate the potential for significant impacts that may result from the different potential construction and operation phasing options under review, including: Phase 1-to La Verne/Pomona Fairplex Station; Phase 2-to Pomona North Station; Phase 3-to Claremont Station; and Phase 4-to Montclair Station. The SEIR will also evaluate the potential for significant impacts that may result from relocating the future parking facility at the Pomona North Station from the north side of the station to the south side.

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If you are unable to attend the scoping meeting in person, written comments will be accepted if received on or before January 4, 2019. Please address written comments to:

Lisa Levy Buch, Chief Communications Officer
Metro Gold Line Foothill Extension Construction Authority
406 East Huntington Drive, Suite 202
Monrovia, California 91016-3633
Email: LLevyBuch@foothillgoldline.org

"Shop Glendora"
this holiday season and WIN!!!

This holiday season when you Shop Glendora you can enter to win great prizes for yourself or a loved one.

Get 1 entry for every $50 you spend in

La Verne Chamber of Commerce

THE eEXCHANGE DECEMBER, 4 2018

The Mission of the La Verne Chamber is to Grow Business, Build Community and Improve Quality of Life as we advocate for, educate and support our businesses.

Hot News

Belle Musique to perform at Annual Holiday Luncheon

Foothill Gold Line - November/December 2018 Update

In November, the Foothill Gold Line Construction Authority announced a proposed plan to deliver nearly 70% of the Foothill Gold Line light rail extension from Glendora to Montclair at least two years ahead of schedule and avoid ...**read more**

New initiative calls on consumers to take steps to conserve natural gas during peak periods

To help lower the risk of possible natural gas and electricity shortages this winter, Southern California Gas Co. (SoCalGas) today announced the launch of a new energy conservation alert program designed to raise awareness about ways Southern Californians can..**read more**

Household Hazardous & Electronic Waste Roundup

There will be a FREE collection event in La Verne! The Household Hazardous Waste (HHW) Collection Program gives Los Angeles County residents a legal and cost free way to dispose of unwanted household chemicals that cannot be disposed of in the regular trash ...**read more**

E-blast Reminders

Pomona Chamber of Commerce

Glendora Chamber of Commerce

La Verne Chamber of Commerce

Montclair Chamber of Commerce

Pomona Chamber of Commerce <info@pomonachamber.org> | Yesenia Arias

Foothill Gold Line Meeting and Support

Greetings Chamber Members,

You are invited to attend a ***Public Scoping Meeting*** hosted by the Foothill Gold Line Construction Authority. The purpose of this meeting is to discuss a proposed modification to the possible phasing of construction and operation for the 12.3-mile, six-station Foothill Gold Line light rail project from Glendora to Montclair. In addition, the Pomona Chamber of Commerce has voted to recommend and endorse the motion regarding the completion of the Foothill Gold Line as planned and promised to the voters. *Read our letter of support below for further details.*

Public Scoping Meeting
Monday, December 10th, 2018
5:30 PM - 7:30 PM
La Verne Community Center
3680 D Street, La Verne CA 91750

The Construction Authority proposes to modify the Glendora to Montclair Project to allow for the potential to construct and operate the Project in four phases (instead of the two phases, as previously approved). In response to this proposed change, the Construction Authority will be initiating the preparation of a Supplemental Environmental Impact Report (SEIR) to evaluate the potential for significant impacts that may result from the different potential construction and operation phasing options under review, including: Phase 1-to La Verne/Pomona Fairplex Station; Phase 2-to Pomona North Station; Phase 3-to Claremont Station; and Phase 4-to Montclair Station.

For all questions regarding the project please contact:
(626) 471-9050 or visit www.foothillgoldline.org

A letter of support from the Pomona Chamber of Commerce is presented below:

Public Scoping Meeting hosted by the Foothill Gold Line Construction Authority (Mond...

Joe Cina <joe@glendora-chamber.org> Yesenia Arias 12/6/2018

Public Scoping Meeting hosted by the Foothill Gold Line Construction Authority (Monday)

Event Invitation
Public Scoping Meeting hosted by the Foothill Gold Line Construction Authority

You are invited to attend a Public Scoping Meeting hosted by the Foothill Gold Line Construction Authority. The purpose of this meeting is to discuss a proposed modification to the possible phasing of construction and operation for the 12.3-mile, six-station Glendora to Montclair Project, and a proposed modification to the location of the future parking facility at the Pomona North Station.

Public Scoping Meeting
Monday, December 10, 2018
5:30 PM – 7:30 PM
La Verne Community Center
3680 D Street, La Verne CA 91750
Event Page

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Lisa Levy Buch
Chief Communications Officer
Metro Gold Line Foothill Extension Construction Authority
406 East Huntington Drive, Suite 202
Monrovia, CA 91016-3633
Email: LLevyBuch@foothillgoldline.org

Foothill Gold Line

Notice of Public Scoping Meeting

This notice is being provided to announce and solicit input on proposed project changes to the Metro Gold Line Foothill Extension Phase 2B (Project), also known as the Foothill Gold Line light rail project from Glendora to Montclair.

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Joe Cina RE: 2019-01-28 Foothill Gold Line Update - UPDATED

Facebook Posts –

Arcadia's Best

Glendora City News

City of La Verne

City of Pomona

City of Claremont

City of Glendora

City of San Dimas

La Verne Chamber of Commerce

Pomona Chamber of Commerce

Claremont Chamber of Commerce

San Dimas Chamber of Commerce

Twitter-

City of Claremont

City of Glendora

City of San Dimas

Pomona Chamber

BikeSGV

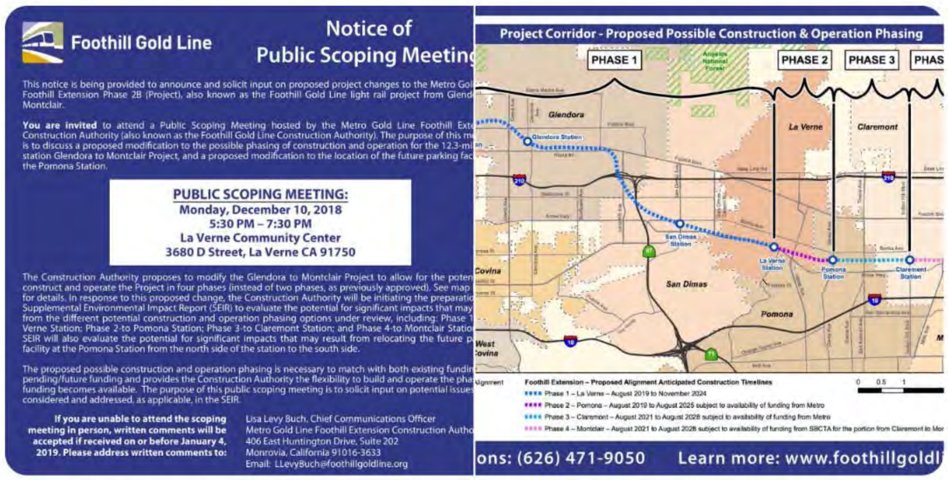
City of Glendora Retweeted

Foothill Gold Line @IWillRide · 10 Dec 2018

TONIGHT: Public Scoping Meeting to Discuss Proposed Foothill Gold Line from Glendora to Montclair Construction & Operation Phasing

When: TONIGHT - December 10, 2018. 5:30 PM to 7:30 PM.
Where: La Verne Community Center, 3680 D Street, La Verne CA 91750

foothillgoldline.org



City of Glendora, City of Montclair, City of Claremont Ca and 2 others

1

Attachment F – Advertisements

Legal Advertisement - Inland Valley Daily Bulletin

Inland Valley Daily Bulletin
(formerly The Daily Report)
9616 Archibald Avenue Suite 100
Rancho Cucamonga, CA 91730
909-987-6397
legals@inlandnewspapers.com

(Space below for use of County Clerk Only)

PROOF OF PUBLICATION
(2015.5 C.C.P.)

STATE OF CALIFORNIA
County of San Bernardino

I am a citizen of the United States. I am over the age of eighteen years, and not a party to or interested in the above-entitled matter. I am the principal clerk of the printer of INLAND VALLEY DAILY BULLETIN, a newspaper of general circulation printed and published daily for the City of Ontario, County of San Bernardino, and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of San Bernardino, State of California, on the date of August 24, 1951, Case Number 70033. The notice, of which the annexed is a true printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to wit:

12/4/18

I declare under the penalty of perjury that the foregoing is true and correct.

Executed at Rancho Cucamonga, San Bernardino Co. California

This 4 Day of December, 20 18

Signature

METRO GOLD LINE FOOTHILL EXTENSION CONSTRUCTION AUTHORITY (ALSO KNOWN AS FOOTHILL GOLD LINE CONSTRUCTION AUTHORITY)

NOTICE OF PUBLIC MEETING TO DETERMINE SCOPE OF A SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT (SEIR) TO THE GOLD LINE PHASE 2B PROJECT

Notice is hereby given of a public scoping meeting being held per the requirements of Title 14 Chapter 3, Article 7, Section 15082(c)(1) for an SEIR for the proposed modification to the possible phasing of construction and operation for the 12.3-mile, six-station Foothill Gold Line light rail extension from Glendora to Montclair and for a proposed modification to the location of the future parking facility at the Pomona North station. The purpose of the public scoping meeting is to solicit input on potential issues to be considered and addressed, as applicable, in the SEIR.

If you have special needs (ADA or language), please contact the Authority within 5 days of meeting.

PUBLIC SCOPING MEETING:
Monday, December 10, 2018
5:30 PM – 7:30 PM
La Verne Community Center
3680 D Street, La Verne, CA 91750

If you are unable to attend the scoping meeting in person, written comments will be accepted if received on or before January 4, 2019. Please address written comments to:

Lisa Levy Buch
Chief Communications Officer
Metro Gold Line Foothill Extension Construction Authority
406 East Huntington Drive, Suite 202
Monrovia, CA 91016-3633
Email: LLevyBuch@foothillgoldline.org
Phone: 626/305-7004

Published: December 4, 2018 #11208323

Legal Advertisement – San Gabriel Valley Tribune

Display Advertisements

Display Advertisement - San Gabriel Valley Examiner

International Cultural Club of San Dimas Holds Board Meeting

Those attending the Board Meeting were Roger Poole, Pearl Poole, Gladys Dyo, Victoria Lopez (President), David Aston, Hemant Shah, Vara King, Gustavo Hernandez, Gisela Pickens, and Marianne Goodman.

By Jayam Rutnam

SAN DIMAS - The International Cultural Club held their Board Meeting at the Senior Center in San Dimas. Attended by the President Victoria Lopez and her Committee of very active members, it was a spirited and enthusiastic meeting filled with ideas for the future and also upcoming functions. They discussed the Annual Christmas Party which will be held on December 8th at 2 p.m. at Lupe Karady in Azusa, Ca. and also the 7th Anniversary Party Gala to be held on Saturday January 19th at the La Verne Mobile Country Club in La Verne, Ca.

They also discussed the possibility of planning a two night bus trip to Yosemite, Ca. and also the screening of a movie which is entered in the Best Picture category for the Academy Awards. The screening of "According to Matthew" will be at the Laemmle Theater in Glendale from December 14th to December 20th.

The International Country Club of San Dimas was founded in the year 2012 by President Victoria Lopez.

Ardent Group Raises Funds And Awareness For Shepherd's Pantry

GLENDORA - The ARDENT Group hosted the 5th Annual "Gathering" event- an annual fundraising event benefiting Shepherd's Pantry. Shepherd's Pantry provides emergency food, clothing, resource assistance and educational programs to families in need during times of crisis. They provide the necessary tools and resources to help families become self-sufficient.

On Thursday, November 8th, community enthusiasts gathered together at the beautiful Glendora Gardens Nursery to enjoy music, giveaways from all ARDENT businesses, delicious food and guest speakers from Shepherd's Pantry.

The event was a huge success. Awareness and compassion was raised for the families that Shepherd's Pantry services and over $7,000 was raised and truckloads of food and clothing was donated.

The ARDENT Group's mission is to empower women by providing them with unique products, services, experiences and by supporting local community efforts benefiting women and their families. The ARDENT businesses include: Fiorina, Visiting Angels, Spin 360 Core Fitness, Glendora Gardens Nursery, Luxe Salon, Glendora Gardens Nursery, Simpson Portraits and Glendora Employment Agency.

For more information, visit www.facebook.com/theardentgroup, and Shepherd's Pantry website at www.shepherdspantry.com

Five Tips For Safety

For many of us, this season is a time to celebrate the holidays with family and friends. Unfortunately, thieves take advantage of the holidays to steal packages containing gifts for loved ones or supplies needed for holiday celebrations.

The Postal Service™ looks forward to delivering a great deal of holiday cheer along with more than 15 billion mail pieces. The United States Postal Inspection Service®, the federal law enforcement arm of the Postal Service, is working around-the-clock to keep your important shipments safe and prevent mail and parcel theft.

What can you do to ensure your gifts and cards are safe? Postal Inspectors are offering FIVE tips to help ensure your important packages reach their destination, and brighten the lives of friends and loved ones this holiday season.

1. Don't leave delivered mail and packages unattended. Just as you would not leave your wallets and purses on the front seat of an unlocked car overnight, mail and packages should not be left sitting in mailboxes or on front porches for any length of time.

2. Going out of town? Hold Mail at the local Post Office®. If you plan on going out of town or know you won't be able to check your mail for a few days, consider using the Request Hold Mail service on USPS.com®. Letters and packages will be held securely at the local Post Office until you pick them up or request delivery.

3. Plan ahead. Ship using Hold for Pickup. When shipping packages, you can choose the Hold for Pickup option and the recipients can collect the packages at their local Post Office. If you are expecting a package, you can redirect it to your local Post Office by selecting Hold for Pickup using USPS Package Intercept®.

4. Customize the delivery. If you know the package will not fit in your mailbox and you won't be home to receive it, you can authorize the carrier to leave it in a specified location. Visit usps.com, enter the tracking number and select Delivery Instructions.

5. Secure the shipment using USPS Special Services. Signature Confirmation helps ensure the package ends up in the right hands by requiring a signature at the time of delivery. For your most valuable packages, you can opt for Registered Mail® service. Registered Mail receives special handling from the time it's mailed until the time it's delivered, with documentation every step of the way. (NAPSI)

Display Advertisement – Claremont Courier

CALENDAR
Your week in 9 days

To have an event listed, email Mick Rhodes at calendar@claremont-courier.com.

Mick Rhodes covers the calendar, arts and entertainment. Submission deadline is 5 p.m. Thursday, one week before publication. Please include date, time, address, phone, web address, email address and cover charge (if applicable).

FRIDAY, DECEMBER 7

GYPSY SIBLINGS' HOLIDAY SALE Long-running art collective the Gypsy Sisters, now with their male cohorts the Gypsy Brothers in tow, will be selling their handmade art and gifts from 4 to 8 p.m. (and tomorrow from 10 a.m. to 2 p.m.) at Claremont United Church of Christ, 233 W. Harrison Ave., Claremont. The show features pottery, colorful quilts, decorative boxes, jewelry, paintings, weaving, handmade woolly items, clothing, dolls, glass and more.

QUARTET EUPHORIA Scripps College's free Friday Noon Concert series continues at 12:15 p.m. at Balch Auditorium, Scripps College, 1030 Columbia St., Claremont, Quartet Euphoria: Rachel V. Huang and Jonathan Wright, violins; Cynthia Fogg, viola; Tom Flaherty, cello; performing Belá Bartók's String Quartet No. 2. The weekly concerts are a joint production of Scripps and the Pomona College Music Department. More info is at collegescalendar.org or (909) 607-3266.

GARDEN ALIGHT WITH LUMINARIAS, MUSIC From 6 to 8:30 p.m. on Friday and Saturday December 7, 8, 14 and 15, Rancho Santa Ana Botanic Garden will glow with more than 1,000 luminarias in a cherished holiday event, Luminaria Nights. Special for this year, the Garden will transform venues with Japanese lantern installations and traditional Japanese music to celebrate the ongoing Origami in the Garden 2 exhibition, which features large-scale metal origami sculptures. The artworks each originated with a single piece of folded paper created by some of the world's most noted origami artists. Luminaria-lit paths guide visitors through the illuminated sculptures of the exhibition. Along the journey, Japanese lantern installations and live music will set the mood. Local musician and composer Steve Rushingwind will appear Friday, December 7 with Minyo Station. On Saturday, December 8, 14 and 15, Mr. Rushingwind returns with Yuki Yasuda. Non-member admission is $12 for adults, and $8 for seniors, students and kids ages 3 to 12. Member pricing is $10/$6. More info is at rsabg.org or (909) 625-8767.

POMONA ORCHESTRA, ACCLAIMED PIANIST Pomona College Orchestra, with pianist Genevieve Feiwen Lee, play a free and open to the public 8 p.m. concert at Bridges Hall of Music, 150 E. Fourth St., Claremont. The show repeats at 3 p.m. Sunday, December 9. Conductor Eric Lindholm will lead the orchestra in Brahms' Piano Concerto No. 1 in D Minor with acclaimed pianist Ms. Lee. A member of the Music Department faculty, the Grammy-nominated pianist has thrilled audiences in New York, Paris, Amsterdam, Sao Paulo, Brazil, and Changsha, China with her "melting lyricism" and "singing melodies" (*New Classic LA*). Also on the program is Stravinsky's 1919 suite from The Firebird. More info is at pomona.edu.

SATURDAY, DECEMBER 8

FINE BOOK SALE AT REVAMPED LIBRARY The Friends of the Claremont Library's annual holiday Fine Book Sale takes place from 9 a.m. to 4 p.m. at the newly renovated Claremont Library Meeting Room. The refreshed library is located at 208 N. Harvard Ave. Book lovers will find highly discounted books; rare, old, first editions; fine early and later classics in nearly all academic fields; a large number of autographed works; specialty printers; and works finely illustrated. The sale also includes a special assortment of high quality art books published by US and international presses; pre-1920 antique books; and an assortment of book sets. All purchases help the Friends of the Claremont Library to support this valuable community space. Cash, checks, and credit cards are accepted. Friends members receive 10 percent off all purchases. More information is at claremontlibrary.org.

HOLIDAY MUSIC IN THE VILLAGE Starting today the Village Marketing Group will be sponsor afternoon holiday music throughout the Village with Nick Cassillas and Friends from noon to 2 p.m. and the Claremont High School band from 2:30 to 4 p.m. in Laemmle Plaza; Holiday Cellos from 11 a.m. to 1 p.m. and Mike's Guitar World from 1:30 to 4 p.m. at the chamber of commerce; and Inland Valley Repertory Theater carolers strolling throughout the Village. On Sunday, December 9, The Moultrie Academy of Music, Voice and Dance appears at Laemmle Plaza from 2 to 4 p.m.

FOURTH WAVE FEMINIST Pitzer College hosts a free and open to the public lecture by Tomorrow Girls Troop at 1:30 p.m. at Broad Performance Space, 1050 N. Mills Ave., Claremont. Self-described as a "worldwide fourth-wave feminist art collective," Tomorrow Girls Troop was established in 2015 and comprises 50 artists and activists from around the world. Focusing on gender equality issues, "TGT strives to create a positive world for all sexualities and genders in East Asia through art, social action, education and pop culture." Then at 2:30 p.m., in conjunction with its exhibition, "Elana Mann: Instruments of Accountability," Pitzer College Art Galleries will publish a songbook of scores/compositions/chants/songs specifically created for Ms. Mann's sculptural instruments. More info is at pitzer.edu/event.

CONCERT ACROSS FIVE CONTINENTS Windsong Southland Chorale presents Joyeux Noël: Carols 'Cross the Continents, a holiday-themed concert at 4 p.m. at 1040 Base Line Rd., La Verne. Advance tickets, $15 for adults, $10 for students and $30 for families, are available at windsongsouthlandchorale.org or by calling (909) 983-9879. All tickets are $20 at the door. Founder and artistic director Janet Harms will take the audience on a musical tour of five continents: Asia, Australia, Europe, North America and South America. The audience will also be invited to join in on a few well-known carols. For reservations, go to windsongsouthlandchorale.org or call (909) 983-9879.

JOHN YORK PLAYS FOR PRISON LIBRARY Tickets are $15 for John York's annual benefit concert for the Prison Library Project, which takes place at 7 p.m. at the Claremont Forum, 568 W. First St. Reservations can be made by calling. Tickets and reservations are available

NINE-DAY CALENDAR/next page

Display Advertisement - Foothills Reader

COMMUNITY CALENDAR

tantalizing the senses and broadening our awareness.

Through Jan. 27
Line Gallery: Over the Years. Through Jan. 27. Chaffey Community Museum of Art was founded in the spring of 1941. The Museum's collection spans almost a century of art from the 1920s to artwork created in 2017. Share with us the art that was conceived for our enjoyment from each of the last 10 decades.

Through Feb. 2
South Gallery: Transition Zone. Through Feb. 2. In the Transition Zone, we see how nature and culture navigate within one space.

PASADENA

May 18-19, 2019
Light Bringer Project and Sci-Fest L.A. invite you to submit your original short science fiction stories to our science fiction competitions. The winners will receive cash prizes and all finalists' stories will be read on stage by celebrity guests at LitFest Pasadena, May 18-19. Open to Los Angeles County high school students and adults. Submissions due Feb. 18 and Jan. 28, respectively. For more information, visit lightbringerproject.org/science-fiction-contests.

POMONA

Dec. 14
The Pomona Concert Band presents its annual Christmas concert, The Sounds of Christmas, 7:30 p.m., Dec. 14, Palomares Park Community Center, 499 E. Arrow Highway, Pomona. For more information, visit pomonaconcertband.org or call (626) 824-0001.

Ongoing
Inland Valley Hope Partners Pomona Valley Certified Farmers' Market, 7:30 a.m. to 11:30 a.m., Saturdays, corner of Pearl and Garey, Pomona. The Farmers' Market brings together family farmers, social service agencies, and food vendors from throughout the Pomona-Inland Valley to provide the community with fresh produce at reasonable prices.

Pomona Meals on Wheels is designed to assist not only those who are unable to prepare their own meals because of a recent surgery or accident, but also those who physically cannot shop and cook. There is no age restriction on who can receive a meal. Volunteers are the heart of the program and provide both a meal and a friendly visit. Volunteers are needed for packing, driving, navigating, clerical, and management. For more information, please call (909) 621-9900.

AMOCA

American Museum of Ceramic Art is open noon to 5 p.m. Wednesday through Sunday; 399 N. Garey Ave., Pomona. For more information, please call (909) 865-3146 or visit amoca.org.

Exhibition Schedule
Through Jan. 20
The Incongruous Body. Curator: Tim Berg, Through Jan. 20, 2019.

Through March 31, 2019

John Toki: Fault Lines. Through March 31. *Reception: 2 p.m. to 5 p.m., Oct. 7. Artist talk: 3 p.m., Oct. 7.*

Ongoing
Every month on the second Saturday, Art Walk brings big crowds to the streets of Pomona, 6 p.m. to 9 p.m. Dozens of galleries host artist receptions for their latest exhibits. Many shops, studios and restaurants stay open late. There is no better way to get a feel for the lively community that hundreds of artists have built here. Experience the diverse array of top quality artwork, ceramics, fiber, jewelry, mixed media, painting and photography.

dA CENTER FOR THE ARTS

dA Center for the Arts, 252-D Main St., Pomona, in the Pomona Arts Colony. Hours of operation are noon to 4 p.m. Wednesday, noon to 9 p.m. Thursday, and noon to 4 p.m. Friday and Saturday. For more information, please call (909) 397-9716.

Ongoing
Drawing: 3:30 p.m. to 5 p.m., Thursdays, for beginners to intermediate artists.

Saturdays - Clay: Adults 16 and older: 10 a.m. to 12:30 p.m.; children 6-15: 1 p.m. to 2 p.m. Students learn what clay is and how it has been used throughout history and in today's world. They will also create projects using various building methods such as slab construction, pinch-pot and coil building.

Saturday Painting: The painting course is designed with flexibility and individual artistic growth in mind. The studio provides an instruction-based painting environment in which students can choose and carry out their own assignments. No previous painting experience required.

RANCHO CUCAMONGA

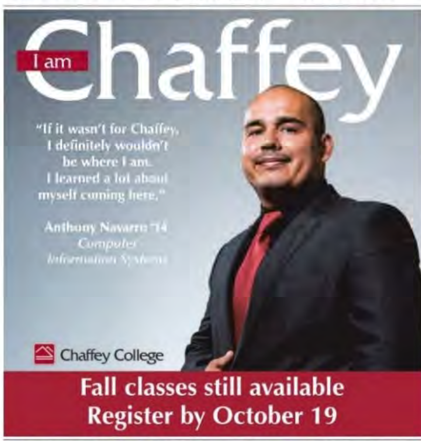
Dec. 12

Aleta Jacobson will demonstrate printing without a press during the Associated Artists of the Inland Empire meeting, 9:30 a.m., Dec. 12, Rancho Cucamonga Community Center, 11200 Baseline Road, Rancho Cucamonga. Jacobson is an award-winning collage, acrylic and mixed media artist. The public is invited. For more information, visit associatedartists inlandempire.org.

Ongoing

Associated Artists of the Inland Empire meets 9:30 a.m., second Wednesday of each month, Rancho Cucamonga Community Center, 11200 Baseline Road, Rancho Cucamonga. The purpose of AAIE is to promote the creative talent of its members, provide an exchange of ideas between area artists, and to generate public interest in fine arts. The public is invited. For more information, visit associatedartists inlandempire.org.

Cucamonga Service Station, a Route 66 historic location, is open as a museum and gift shop, 10 a.m. to 3 p.m., Thursday to Sunday, 9670 Foothill Blvd, Rancho Cucamonga. It was built in 1915 and later restored by the Route 66 Inland Empire California Association. Cucamonga Service Station reopened as a museum in 2015, winning the 2016



Display Advertisement - San Gabriel Valley Tribune

Policy

FROM PAGE 1

quests for comment.

Board chair David Poole said Washington and Dias' assessment have it wrong.

"We respectfully disagree with their assertion that Azusa Pacific has strayed from its Christian foundation and focus," Poole wrote in a letter to students, faculty and the broader community. "We are actively engaged in stewarding our biblical and orthodox evangelical Christian identity."

The board is now comprised of 19 people with varied backgrounds in business and religion.

LGBTQ relationships

In time for the Aug. 27 start of the fall semester and following months of discussions between students and university leaders, Azusa Pacific had removed a section from its student conduct policy that outlawed LGBTQ relationships on campus. The altered language referenced a standing ban on pre-marital sex but without mentioning orientation.

But the university announced a month later that because the policy change was never approved by its Board of Trustees, it was reinstating the ban.

Students held a prayer demonstration the following week in protest of the board's decision, and both the student government and Brave Commons, a nonprofit organization that supports LGBTQ students at Christian colleges across the country, filed grievances against the university over the reversal.

Deep division

Washington and Dias' resignations are indicative of a deep division within Azusa Pacific's leadership, said Erin Green, who graduated from APU in May and is now co-executive director of Brave Commons. Green was part of the discussions with university administrators last school

> **"This is a clear demonstration of the dissonance occurring within Azusa Pacific's own leadership."**
> *— Erin Green, co-executive director of Brave Commons*

year that led to the ban's removal.

"There is a tremendous amount of division, agendas and ideologies within the board, and we were caught up in that," Green said. "We (students) didn't approach the administration to drop this policy — they approached us.

"This is the aftermath of something they desired."

In a statement, Poole referred to Washington's and Dias' concerns as "disagreements."

Goals and convictions

"We recognize that disagreements can arise even between people who share the same goals and convictions," Poole said in the statement.

Brave Commons had demanded a response to its grievance, which was undersigned by several current APU students, by Nov. 30 and warned that students would demonstrate on campus if the university did not meet the deadline, Green said. The university has not responded, she added.

The grievance asked for the ban to be removed and for the university to apologize for trauma caused to the LGBTQ community at APU. An online petition demanding the ban's removal had more than 5,600 signatures as of Friday afternoon.

"This is a clear demonstration of the dissonance occurring within Azusa Pacific's own leadership," Green said. "The students ultimately were the victims of that and deserve an apology for that, but the school has refused to do that."

CALIFORNIA

Spy satellite launch called off again

By The Associated Press

VANDENBERG AIR FORCE BASE » The planned launch of a spy satellite from a California coastal base has been called off.

A United Launch Alliance rocket carrying a classified National Reconnaissance Office satellite was poised to blast off Saturday night from Vandenberg Air Force Base northwest of Lompoc.

Just seven seconds before its planned 8:15 p.m. liftoff, the launch was put on hold and then scrubbed altogether.

United Launch Alliance initially said during the launch's webcast that the sequencer that controls the countdown had detected a problem. No other details were given.

This was the second attempt after the launch was postponed Friday night because of a communication problem between the control center and the launch site.

National Reconnaissance Office satellites gather intelligence information for U.S. national security and an array of other purposes including assessing impacts of natural disasters.

The alliance has carried out 27 launches for the National Reconnaissance Office over the past 12 years.

CAMP FIRE

Burn victims 'live that nightmare every day'

By Sarah Maslin Nir
The New York Times

LOS MOLINOS, CALIF. » Bill Blevins had pulled himself out of homelessness and addiction with a job as an alarm systems repairman, dexterous work with tiny electrical components that he enjoyed.

But last week he was forced to confront a new hurdle: His left pinkie finger was amputated. It was his third surgery since his hands were ravaged by the wildfire that devastated the town of Paradise, California, last month.

Those who were burned but survived are only beginning to deal with the consequences of the wildfire, which killed 85 people with 10 still unaccounted for, according to the Butte County sheriff, and consumed more than 18,000 structures. For the people burned in the Camp Fire, the battle is far from over; many are still hospitalized, facing yearslong journeys of surgeries and rehabilitation.

"Long after people forget that the fire ever happened, across the U.S., there are still people here that live that nightmare every day," Blevins' fiancee, Mary Sykes, said. "Our lives will never be the same again. Every time he looks at his hands he will be back in that fire."

The number of people burned by wildfires is not tracked, according to the American Burn Association, but hospitals in areas prone to fire are girding for future influxes of such patients as wildfires occur more frequently.

"We are worried about the increase in fires that we get; it seems like they come fast and furious," said Dr. David Greenhalgh, who leads the burn division of University of California, Davis, where the Camp Fire victims are being treated. "In terms of taking care of a massive burn, it's not only the initial care, it's the weeks and months of skin grafts and dealing with sepsis."

To deal with the possibility of a large increase in fire burn patients, UC Davis has formed a consortium with 25 hospitals across eight Western states, Greenhalgh said, with procedures in place and medevac helicopters on standby to transfer patients to those burn centers around the region.

Facebook Advertisement

I Will Ride - Foothill Gold Line shared an event.
Sponsored ·

You are invited to attend a Public Scoping Meeting hosted by the Foothill Gold Line Construction Authority. The purpose of this meeting is to discuss a proposed modification to the possible phasing of construction and operation for the 12.3-mile, six-station Foothill Gold Line light rail extension from Glendora to Montclair, and a proposed modification to the location of the future parking facility at the Pomona North Station.

Project Corridor – Proposed Construction Phasing

MON, DEC 10, 2018

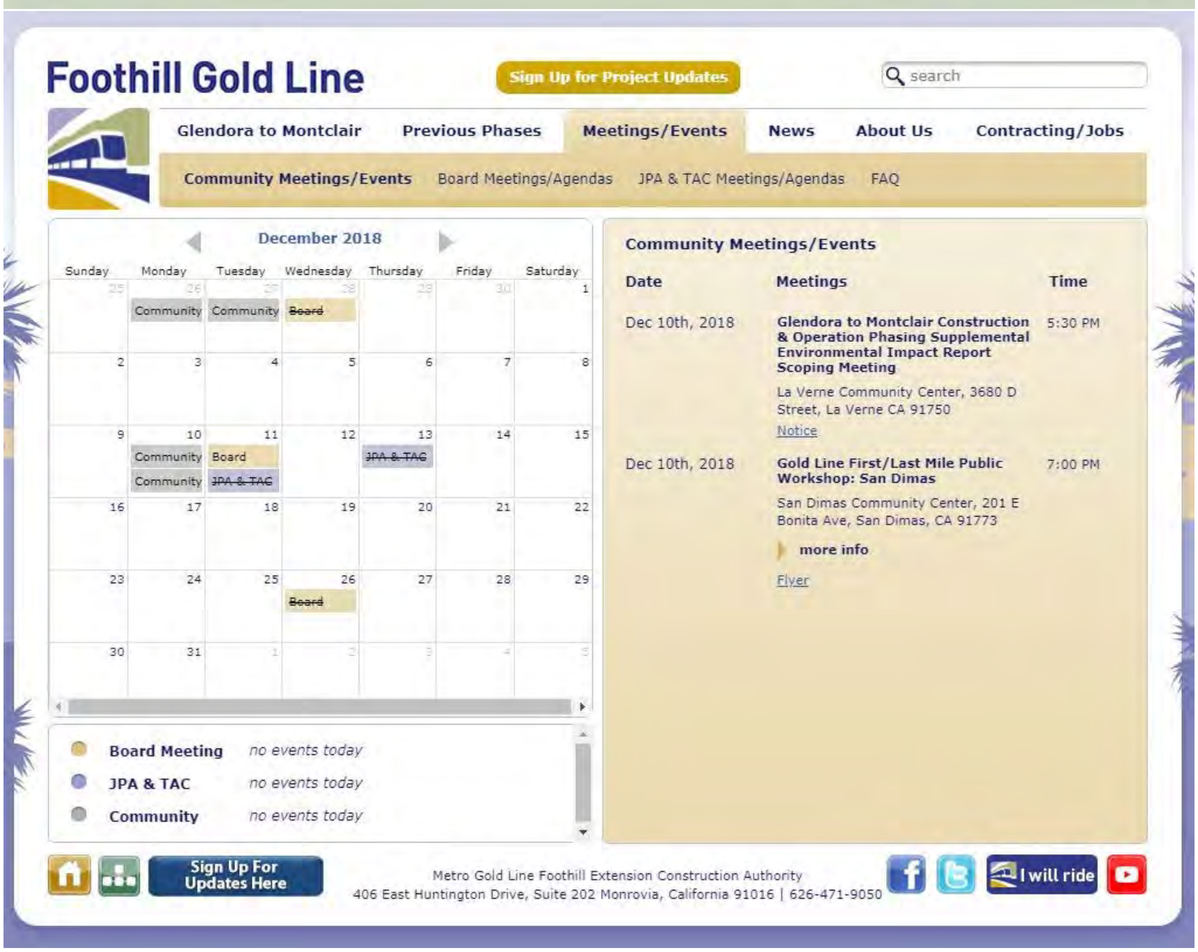
Public Scoping Meeting: Proposed Project Changes

★ Interested

287 people interested · 33 people going

Like Comment

Attachment G - Project Website - www.foothillgoldline.org and Calendar Page



Attachment H – E-News

E-News – November 21, 2018

Foothill Gold Line

E-NEWS UPDATE

November 21, 2018

YOU'RE INVITED: Public Scoping Meeting to Discuss Proposed Glendora to Montclair Construction Phasing (Dec. 10)

You are invited to attend a Public Scoping Meeting hosted by the Construction Authority. The purpose of this meeting is to discuss and solicit input on a proposed modification to the phasing of construction for the 12.3-mile, six-station Foothill Gold Line light rail extension from Glendora to Montclair (Project).

PUBLIC SCOPING MEETING
Monday, December 10, 2018
5:30 PM – 7:30 PM
La Verne Community Center
3680 D Street, La Verne CA 91750

The Construction Authority proposes to modify the Project to construct and operate the project in three phases (instead of two phases) as shown on the map below. In response to this proposed change, the Construction Authority will be initiating the preparation of a Supplemental Environmental Impact Report (SEIR) to evaluate potential for significant impacts that may result from the three construction phasing options under review, including: Phase 1 – to the La Verne/Pomona Fairplex Station; Phase 2 - to the Claremont Station, and Phase 3 - to the Montclair Station. The proposed construction phasing is necessary to match up with both existing encumbered funding and pending/future funding sources. The purpose of the public scoping meeting is to solicit input on potential issues to be considered and addressed, as applicable, in the SEIR.

(click the map to enlarge)

If you are unable to attend the scoping meeting in person, written comments will be accepted if received on or before January 4, 2019. Please address written comments to:

Lisa Levy Buch
Chief Communications Officer
Metro Gold Line Foothill Extension Construction Authority
406 East Huntington Drive, Suite 202
Monrovia, California 91016-3633
Email: LLevyBuch@foothillgoldline.org

IN CASE YOU MISSED IT:

E-News Content

Foothill Gold Line Construction Authority Headquarters
406 E. Huntington Drive
Suite 202
Monrovia, CA 91016

Phone: (626) 471-9050

(Hours: M-Th 7 a.m. - 5 p.m., Fridays - closed)

PROJECT FUNDING:

Project funding in Los Angeles County is mostly from Measure M; with additional funding from Measure R and the State of California Transit and Intercity Rail Capital Program (including funds from SB1).

San Bernardino County funds will be used to extend the line from Claremont to Montclair (with TIRCP and SB1 funds).

QUESTIONS ABOUT GOLD LINE SERVICE (INCLUDING TRAIN SCHEDULES, FARES, PARKING, DISCOUNTS, ETC) SHOULD BE DIRECTED TO METRO:

Metro Customer Service can be reached at 1-323-466-3876 (1-323-Go Metro)
or customerrelations@metro.net

E-News – December 5, 2018

Foothill Gold Line

E-NEWS UPDATE

December 5, 2018

TOMORROW: LA Metro Board to Consider Motion Reaffirming Commitment to Completing Foothill Gold Line to Montclair

Tomorrow (Thursday, December 6), at their regular board meeting (agenda link), the LA Metro board of directors will consider a motion to reaffirm their commitment to funding and completing the Glendora to Montclair project as a first priority project.

This action comes after the Construction Authority announced last month that bids by the four teams competing for the Alignment Design-Build Contract came in hundreds of millions of dollars above the project estimate and secured funding; and as a result, the Construction Authority is proposing to possibly phase construction and operation of the project – completing the first phase from Glendora to La Verne/Pomona Fairplex in 2024 and the phase from La Verne/Pomona Fairplex to Montclair by 2028 (assuming additional funding is secured in time to allow the winning design-build team to build the entire project within the currently ongoing procurement).

The LA Metro board will consider the following actions from the motion:

- Reaffirm the Foothill Gold Line as a first priority project
- Oppose any action or proposal that would reduce the project's secured funding and/or hinder the ability of the Construction Authority to complete the extension
- Direct LA Metro CEO Phil Washington to identify funding sources and approaches to fill the funding gap
- Direct LA Metro CEO to report back to the board in January 2019 with options for initial funding to extend the first phase beyond La Verne/Fairplex to Pomona North, with a strategy to fund the second phase consisting of Claremont and Montclair

The public is invited to attend this meeting and provide feedback.

If you would like to make a public comment to the Metro board regarding this motion, you may do so in person tomorrow at the board meeting (details below).

METRO BOARD MEETING:
Thursday, December 6, 2018
Meeting Starts: 9:30 AM
(NOTE: the time for the item to be discussed is unknown)
One Gateway Plaza
3rd Floor, Metro Board Room
Los Angeles, CA 90012

Los Angeles, CA 90012

YOU'RE INVITED: Public Scoping Meeting to Discuss Proposed Glendora to Montclair Construction and Operation Phasing (Dec. 10)

You are invited to attend a Public Scoping Meeting hosted by the Construction Authority. The purpose of this meeting is to discuss proposed modifications to the Glendora to Montclair project, including possible phasing of construction and operation and the possible relocation of the future parking facility at the Pomona North Station.

PUBLIC SCOPING MEETING:
Monday, December 10, 2018
5:30 PM – 7:30 PM
La Verne Community Center
3680 D Street, La Verne CA 91750

The Construction Authority proposes to modify the Glendora to Montclair Project to allow for the potential to construct and operate the Project in four phases (instead of two phases, as previously approved) - see map below for details; as well as relocate the future parking location for the Pomona North Station from the north side of the station to the south side.

In response to these proposed changes, the Construction Authority will be initiating the preparation of a Supplemental Environmental Impact Report (SEIR) to evaluate the potential for significant impacts that may result.

As discussed in the previous article above and in recent E-News Updates, the proposed possible construction and operation phasing is necessary to match with both existing funding and pending/future funding and provides the Construction Authority the flexibility to build and operate the phases as funding becomes available.

The purpose of this public scoping meeting is to solicit input on potential issues to be considered and addressed, as applicable, in the SEIR.

If you are unable to attend the scoping meeting in person, written comments will be accepted if received on or before January 4, 2019. Please address written comments to:

Lisa Levy Buch
Chief Communications Officer
Metro Gold Line Foothill Extension Construction Authority
406 East Huntington Drive, Suite 202
Monrovia, CA 91016-3633
Email: LLevyBuch@foothillgoldline.org

(click the map to enlarge)

San Dimas Station First/Last Mile Public Workshop (Hosted by LA Metro - not the Foothill Gold Line)

As a follow-up to the Community Walk Audit that took place in September, LA Metro and the city of San Dimas are hosting a First/Last Mile Public Workshop to explore how to help you walk and bike to the future San Dimas Gold Line station. Similar Public Workshops recently took place in Glendora, Pomona and Claremont.

In this Public Workshop, LA Metro will present their initial ideas for improving station access and listen to your feedback and ideas.

San Dimas Station First/Last Mile Workshop:
Monday, December 10, 2018
7 PM – 9 PM
San Dimas Community Center
201 E Bonita Ave, San Dimas, CA 91773

Note: This event is hosted by LA Metro and the city of San Dimas, not the Foothill Gold Line Construction Authority. For more information or questions about these events: firstlastmile@metro.net

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Thank you for your continued interest in the Foothill Gold Line,

Lisa Levy Buch, Chief Communications Officer
and the Public Affairs Team

E-News Content

Foothill Gold Line Construction Authority Headquarters
406 E. Huntington Drive
Suite 202
Monrovia, CA 91016

Phone: (626) 471-9050

(Hours: M-Th 7 a.m. - 5 p.m.; Fridays - closed)

PROJECT FUNDING:

Project funding in Los Angeles County is mostly from Measure M; with additional funding from Measure R and the State of California Transit and Intercity Rail Capital Program (including funds from SB1).

San Bernardino County funds will be used to extend the line from Claremont to Montclair (with TIRCP and SB1 funds).

QUESTIONS ABOUT GOLD LINE SERVICE (INCLUDING TRAIN SCHEDULES, FARES, PARKING, DISCOUNTS, ETC) SHOULD BE DIRECTED TO

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METRO:

Metro Customer Service can be reached at 1-323-466-3876 (1-323-Go Metro)
or customerrelations@metro.net

E-News – December 10, 2018

Foothill Gold Line

E-NEWS UPDATE

December 10, 2018

TONIGHT: Public Scoping Meeting to Discuss Proposed Glendora to Montclair Project Modifications

You are invited to attend a Public Scoping Meeting, taking place tonight and hosted by the Construction Authority. The purpose of this meeting is to discuss proposed modifications to the Glendora to Montclair project, including possible phasing of construction and operation and the possible relocation of the future parking facility at the Pomona Station.

PUBLIC SCOPING MEETING:
TONIGHT - Monday, December 10, 2018
5:30 PM – 7:30 PM
La Verne Community Center
3680 D Street, La Verne CA 91750

The Construction Authority proposes to modify the Glendora to Montclair Project to allow for the potential to construct and operate the Project in four phases (instead of two phases, as previously approved) - see map below for details; as well as relocate the future parking location for the Pomona Station from the north side of the station to the south side.

In response to these proposed changes, the Construction Authority will be initiating the preparation of a Supplemental Environmental Impact Report (SEIR) to evaluate the potential for significant impacts that may result.

The purpose of this public scoping meeting is to solicit input on potential issues to be considered and addressed, as applicable, in the SEIR.

If you are unable to attend the scoping meeting in person, written comments will be accepted if received on or before January 4, 2019. Please address written comments to:

Lisa Levy Buch
Chief Communications Officer
Metro Gold Line Foothill Extension Construction Authority
406 East Huntington Drive, Suite 202
Monrovia, CA 91016-3633

Thank you for your continued interest in the Foothill Gold Line.

Lisa Levy Buch, Chief Communications Officer
and the Public Affairs Team

E-News Content

TONIGHT: Public Scoping Meeting to Discuss Proposed Glendora to Montclair Project Modifications

Foothill Gold Line Construction Authority Headquarters
406 E. Huntington Drive
Suite 202
Monrovia, CA 91016

Phone: (626) 471-9050

(Hours: M-Th 7 a.m. - 5 p.m.; Fridays - closed)

PROJECT FUNDING:

Project funding in Los Angeles County is mostly from Measure M, with additional funding from Measure R and the State of California Transit and Intercity Rail Capital Program (including funds from SB1).

San Bernardino County funds will be used to extend the line from Claremont to Montclair (with TIRCP and SB1 funds).

QUESTIONS ABOUT GOLD LINE SERVICE (INCLUDING

METRO:

Metro Customer Service can be reached at 1-323-466-3876 (1-323-Go Metro)
or customerrelations@metro.net

Attachment I – Media Advisory and Articles

Lisa Levy Buch
Chief Communications Officer
(626) 305-7004 and (909) 267-0161
llevybuch@foothillgoldline.org
FOR IMMEDIATE RELEASE

MEDIA ADVISORY

Public Scoping Meeting for Proposed Modifications to the Foothill Gold Line Light Rail Project from Glendora to Montclair Meeting: Monday, December 10, 2018 (La Verne Community Center)

WHO: Residents / Businesses / Future Riders / Local Stakeholders in cities of Glendora, San Dimas, La Verne, Pomona, Claremont and Montclair

WHEN/WHERE:

PUBLIC SCOPING MEETING
Monday, December 10, 2018
5:30 p.m. to 7:30 p.m.
La Verne Community Center
3680 D Street, La Verne CA 91750

WHAT: The Foothill Gold Line Construction Authority (Construction Authority) will be hosting a Public Scoping Meeting to solicit input on proposed modifications to the Foothill Gold Line light rail project from Glendora to Montclair, including possible phasing of construction and operation for the 12.3-mile, six-station Project, and a proposed modification to the location of the future parking facility at the Pomona Station.

The Construction Authority proposes to modify the Glendora to Montclair Project to allow for the potential to construct and operate the Project in four phases (instead of two phases, as previously approved). See map below for details. In response to this proposed change, the Construction Authority will be initiating the preparation of a Supplemental Environmental Impact Report (SEIR) to evaluate the potential for significant impacts that may result from the different potential construction and operation phasing options under review, including: Phase 1-to La Verne Station; Phase 2-to Pomona Station; Phase 3-to Claremont Station; and Phase 4-to Montclair Station. The SEIR will also evaluate the potential for significant impacts that may result from relocating the future parking facility at the Pomona Station from the north side of the station to the south side.

The proposed possible construction and operation phasing is necessary to match with both existing funding and pending/future funding and provides the Construction Authority the flexibility to build and operate the phases as funding becomes available. The purpose of this public scoping meeting is to solicit input on potential issues to be considered and addressed, as applicable, in the SEIR.

For those who are unable to attend the scoping meeting in person, written comments will be accepted if received on or before January 4, 2019. Please address written comments to:

Lisa Levy Buch
Chief Communications Officer
Metro Gold Line Foothill Extension Construction Authority
406 East Huntington Drive, Suite 202
Monrovia, CA 91016-3633
Email: LLevyBuch@foothillgoldline.org

MAP OF PROJECT CORRIDOR - PROPOSED POSSIBLE CONSTRUCTION & OPERATION PHASING:

FOR MORE INFORMATION:
Visit www.foothillgoldline.org

# # #

About the Foothill Gold Line - The Foothill Gold Line Construction Authority is an independent transportation planning and construction agency created in 1998 by the California State Legislature to plan, design and build the Metro Gold Line light rail system from Union Station to Montclair, along the Foothills of the San Gabriel Valley. The agency completed the first segment from Union Station to Pasadena in 2003 and the Pasadena to Azusa segment in 2015; both on time and under budget. The agency began work on the Foothill Gold Line from Glendora to Montclair in 2003. The Glendora to Montclair project was environmentally cleared in March 2013 under the California Environmental Quality Act (CEQA) and completed advanced conceptual engineering in 2016. When completed, the extension will add new light rail stations in the cities of Glendora, San Dimas, La Verne, Pomona, Claremont and Montclair.

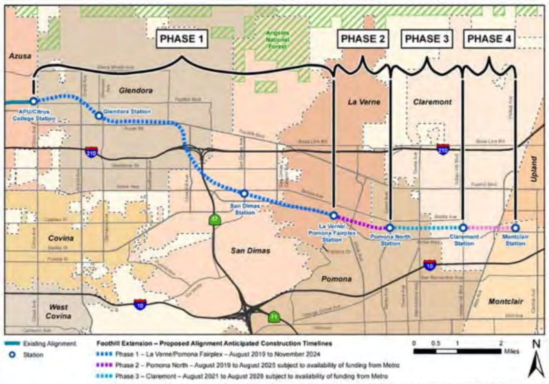
The project is being built in Los Angeles and San Bernardino Counties. The Los Angeles County portion will be funded mostly by Measure M, with residual funds from Measure R not used to complete the Pasadena to Azusa segment. San Bernardino County is responsible to fund their portion of the project from Claremont (in Los Angeles County) to Montclair (in San Bernardino County). The State of California is also providing funding for the project; which was awarded a $290 million TIRCP grant earlier this year.

Inland Valley Daily Bulletin – December 7, 2018

LOCAL NEWS

Construction of the Gold Line extension now could be staggered into even more phases

Here's the latest twist on Metro's plans



Rendering courtesy the Foothill Gold Line Construction Authority

By LISET MÁRQUEZ | lmarquez@scng.com | Inland Valley Daily Bulletin
PUBLISHED: December 7, 2018 at 12:15 pm | UPDATED: December 7, 2018 at 1:47 pm

Rather than building out the future Foothill Gold Line in two phases, the construction authority wants to gather public input about the possibility of spreading out the construction of the 12.3-mile extension over even more phases.

The Foothill Gold Line Construction Authority is holding a meeting Monday in La Verne to discuss plans that could modify the Glendora to Montclair extension and allow the transportation agency the ability to construct and operate the project in four phases.

The original plan was for all the stations to finish more or less simultaneously in 2026, but a recently revised time table would mean that – assuming all the plans pass through environmental reviews – expansion into La Verne would be finished in 2024. Pomona, Claremont and Montclair wouldn't receive Gold Line service until 2028 — if at all.

In November, the construction authority announced the extension — which planned for six new stations stretching into San Bernardino County — needs to be built in two phases because anticipated costs have risen 38 percent, from $1.5 billion to $2.1 billion. That leaves the second phase — including the Pomona, Claremont and Montclair stations — in possible limbo.

That also makes the La Verne station the temporary and possibly permanent terminus.

Monday's meeting will also discuss proposal to move to the future parking facility in Pomona from the north side of the station to the south side, according to a release from the agency.

The four proposed phases are:

1. Glendora to La Verne with construction anticipated to last from August 2019 to November 2024
2. La Verne to Pomona North with construction anticipated to last from August 2019 to August 2025 (subject to availability of funding from Metro)
3. Pomona North to Claremont with construction anticipated to last from August 2021 to August 2028 (subject to availability of funding from Metro)
4. Claremont to Montclair with construction anticipated to last from 2021 to August 2028 (subject to available to of funding from San Bernardino County Transportation Authority for the portion from Claremont to Montclair)

The Monday, Dec. 10 public meeting will be from 5:30 p.m. to 7:30 p.m. at the La Verne Community Center, 3680 D St.

The construction authority is preparing a supplemental report which will evaluate any potential significant impacts if the construction and operation phasing plan is altered. It will also evaluate the potential significant impacts that may result from relocating the future parking facility at the Pomona North Station, the release stated.

The public is being encouraged to attend Monday's meeting to voice any concerns about the proposals. For those who can't attend, people may send comments to the construction authority until Jan. 4, to Lisa Levy Buch, chief communications officer, Metro Gold Line Foothill Extension Construction Authority, at LLevyBuch@foothillgoldline.org or 406 E. Huntington Drive, Suite 202, Monrovia, CA 91016.

MORE ON THE GOLD LINE

Gold Line extension delayed because of steel tariffs, runaway construction costs, authority says

Gold Line extension to arrive early in La Verne, but delays expected in Pomona, Claremont and Montclair

MOST POPULAR

1. Grammys 2019 red carpet fashion: See photos of the stars' best and worst looks
2. The Disneyland Resort's World of Color show will return next week
3. Scandia fun park in Ontario sold, will not reopen as an amusement park
between Ben Simmons, Lakers following Magic Johnson's comments
5. Tim Salter retires from Upland football
6. A big beautiful State of the Union: Political Cartoons
7. Judges sniff, sip out the best extra virgin olive oils for Los Angeles international competition
8. Second freeway shooting in 2 days reported in San Bernardino County
9. Diners flee Ontario Applebee's in panic over false shooting threat
10. This early Ontario, Upland developer stood up to the powerful Santa Fe Railroad and won
11. Toys R Us says it will be back by the next holiday season
12. Cal Poly Pomona adds a new color to the Green and Gold, unveils new logo, seal

Foothills Reader – December 9, 2018

FOOTHILLS READER FACES PLACES SHOPPING

CHINO | CHINO HILLS | CLAREMONT | FONTANA | GLENDORA | LA VERNE | MONTCLAIR
ONTARIO | POMONA | SAN DIMAS | RANCHO CUCAMONGA | UPLAND

Dec. 23: CSO 'Messiah'

Continuing its 36-year tradition, the Claremont Symphony Orchestra invites everyone to participate in its annual "Messiah" Sing-along, 1:30 p.m. and 4 p.m. Sunday, Dec. 23, at Bridges Hall of Music on the Pomona College campus in Claremont.

Audience members choose whether to sit in the soprano, alto, tenor, or baritone sections, where they will join in to sing all of the choruses.

The orchestra will offer Part I of Handel's beloved oratorio at both times. Music Director Robert Sage advises, "It's a good idea to arrive early, since we have had full houses for these programs in recent years."

The concert is free and no tickets are needed. Attendees may rent the lyrics for $5, purchase them for $10, or bring their own. More information is available at www.ClaremontSO.org.

Monday: Gold Line meeting, La Verne

The Foothill Gold Line Construction Authority on Monday will host a Public Scoping Meeting to discuss and solicit input on proposed modifications to the Foothill Gold Line light rail project from Glendora to Montclair.

The purpose of the public meeting is to solicit input on potential issues to be considered and addressed in a Supplemental Environmental Impact Report.

The public meeting will be 5:30 p.m. to 7:30 p.m. tomorrow, Dec. 10, at the La Verne Community Center, 3680 D Street, La Verne.

The Construction Authority proposes to modify the Glendora to Montclair Project to allow for the potential to construct and operate the project in four phases, instead of two phases, as previously approved.

Discussion includes possible phasing of construction and operation for the 12.3-mile, six-station project, and a proposed modification to the location of the future parking facility at the Pomona North Station.

The proposed phasing is necessary to match with both existing funding and pending/future funding and provides the Construction Authority the flexibility to build and operate the phases as funding becomes available.

For those who are unable to attend the scoping meeting in person, written comments will be accepted if received on or before Jan. 4, 2019. Please address written comments to:

Lisa Levy Buch, Metro Gold Line Foothill Extension Construction Authority, 406 East Huntington Drive, Suite 202; Monrovia, CA 91016-3633. Email can be sent to LLevyBuch@foothillgoldline.org.

– Contributed by Foothill Gold Line Construction Authority

Mountainside Master Chorale will present "Noel! A Holiday Celebration."

SOUNDS of the SEASON

A week of **great music** in the Foothills

ONTARIO CHAFFEY Community Show Band

The Ontario/Chaffey Community Show Band and the Ortiz Family will present "The Wonder of the Holidays," Monday Dec. 10 at the Ontario Convention Center.

Early concert goers are invited to come at 6:45 p.m. to hear "The Woodwind Celebration," an ensemble of musicians from the Show Band. A pre-concert of Christmas music by the ARISE Joy Ringers bell choir will be at 7:15 p.m. The concert begins at 7:30 p.m.

The performance will be narrated by Ontario City Councilman Alan Wapner and Inland Valley Daily Bulletin columnist David Allen.

Pomona Concert Band

The Pomona Concert Band will present the annual Christmas Concert titled "The Sounds of Christmas," 7:30 p.m. Friday, Dec. 14.

The concert will be in Palomares Park Community Center, 499 E. Arrow Hwy in Pomona and is sponsored by the City of Pomona. The concert is free. Refreshments will be served at intermission.

The concert will feature favorite Christmas melodies including *"The Sounds of Christmas"* by James Swearingen, and *"Gesu Bambino"* with vocalists Isaac Gonzalez and Mary Stone.

The La Verne Youth Ensemble will perform.

Mountainside Master Chorale

Join Mountainside Master Chorale for a celebration of the holiday season.

Noel! A Holiday Celebration features beloved classics such as "Deck the Halls" and "Carol of the Bells" and many other selections that will lift holiday spirits.

The performance features special guests from the LA Master Chorale and Hour of Power Choirs.

Concert dates are 7:30 p.m. Saturday, Dec. 15 and 3:30 p.m. Sunday, Dec. 16 at the Morgan Auditorium, University of La Verne, 1950 Third St.

Purchase tickets online at www.mountainsidemasterchorale.org or at the door.

Holiday Security: leave no gifts for wretched burglars

Tis the season when families bring home the hottest electronics and gifts — and then go on vacation. Home burglaries spike over the holidays, so if you are headed out of town take a few extra precautions to keep your home and valuables safe.

Start by making your property unattractive to burglars. Thieves want to get in and out quickly, they don't want to be seen, and they don't want trouble in the form of barking dogs, tricky entrances and noisy alarms.

The easiest way for an intruder to gain entry is through a door or open window.

Fortify doors by using a deadbolt in addition to a door knob. And don't forget the garage door. Burglars frequently gain entry to a house via a flimsy garage door.

Use the same care on your garage access door and reinforce hinges, make sure the frame is secure, and install a dead bolt. Disable the garage door opener and lock it when on vacation.

Put a long dowel or bar into the track of any sliding door or install a foot lock that clicks a bolt into the track.

Burglars are known to drive around neighborhoods on trash day after big gift holidays to check empty boxes on the curb that reveal what wonderful new toys you have.

Adriana Donofrio
Real Estate

Don't put the boxes for your new laptop or big screen TV out front and center. Break down boxes and conceal them in the recycling or trash bin.

Keep up landscape maintenance and put a vacation hold on newspapers and mail. Ask a neighbor to help keep unwanted flyers and clutter from piling up on the front porch.

Scare burglars away with noise and light. Install motion sensors on outdoor lights. If you have a home security system let thieves know it by displaying the sign prominently in the yard or by the front door. Display a "Beware of Dog" sign…whether you have one or not.

Timers on interior lights can make it appear someone is always home. Trick potential intruders with tech devices like FakeTV, a small LED gismo that simulates the light output of television programming.

It uses the same energy as a nightlight, and has a built in light sensor and timer that turns on at dusk and off at a predetermined bedtime.

Watch what you post on social media. Thieves look through posts seeking information on what you got for Christmas and when you plan to leave on vacation.

Adriana Donofrio
Podley Properties Glendora
(626) 926-9700
adrianad@podley.com

Claremont Courier- December 13, 2018

Claremont Courier
claremont-courier.com

More funding needed to get Gold Line to Pomona

December 13, 2018 4:39 PM

The public got a glimpse of the future for the Gold Line at a scoping meeting in La Verne on Monday night.

The meeting signaled the start of creating a supplemental environmental impact report (SEIR), which will examine the effects of building the light rail project from Glendora to Montclair.

In November, the Foothill Gold Line Construction Authority revealed it was aiming to split the project into two parts—from Glendora to La Verne by 2024 and La Verne to Montclair by 2028.

But now, the Construction Authority is proposing to split the project into four phases, and is hoping to move the goal posts just a little bit more eastward.

The Construction Authority is, "currently working with Metro to get a little further, not just to La Verne, but to Pomona as well," said Construction Authority CEO Habib Balian.

That plan comes with a hefty price tag with a small window to get it. Mr. Balian told the COURIER that the authority needs an extra $200 million by Spring 2019 to make that move happen.

The Construction Authority is looking at different ways to cut costs in order to meet that goal. Part of it includes working with Metro to lower its 15 percent contingency, but another part of it includes "deviations in design," Mr. Balian said. Those deviations might mean tweaking certain parts of the design to save money, but would not be noticeable by riders.

"They designed it for a Cadillac, but maybe a Chevy will do," Mr. Balian said.

If the funds are secured, the Pomona station could be open by August 2025, nearly a year after La Verne's scheduled opening of November 2024.

The SEIR should be completed by November 2019, according to a timeline provided by the Construction Authority.

The new plan still leaves Claremont without a station until 2028. Under the plan, the City of Trees will be part of phase three, which will involve construction of the line from the Pomona station to Claremont. Phase four will involve construction from Claremont to Montclair.

Both the Claremont and Montclair phases would be completed by August 2028, but only if the requisite funds are in place. Construction Authority CCO Lisa Levy Buch told the COURIER that they have until mid-2021 to secure the needed funds.

With the full length of the project uncertain, representatives from the San Bernardino County Transit Authority (SBCTA) are looking at alternative ways to connect the two counties. SBCTA is currently working with Metro to build the Gold Line into Montclair.

What that could look like is the possibility of a station used as a transfer point from the Metrolink to the Gold Line, and vice versa, utilizing both train lines and connecting them via a shared fare system.

But the top brass in Los Angeles has made it clear that they want to see the Gold Line fully built.

The Metro board of directors reaffirmed their intention to keep the Gold Line a priority and to build the project to its intended Montclair destination at their meeting on December 6, Mr. Balian said in an email. The board also moved to identify available funding sources to fill the nearly $600 million gap to complete the project.

A number of Claremont city councilmembers, both new and old, attended the meeting, including former councilmembers Larry Schroeder and Sam Pedroza and new councilmembers Jennifer Stark, Jed Leano and Ed Reece. City Manager Tara Schultz also attended the meeting.

Mr. Pedroza also stepped down as vice chair of the Foothill Gold Line board on Tuesday, leaving Claremont without a seat on the board. Pomona mayor Tim Sandoval will replace him, Ms. Buch said.

She noted that Claremont would still have a presence on the joint powers authority (JPA) board, which advises the board.

Throughout Monday evening, city officials and residents milled in and out of the La Verne Community Center, with Gold Line representatives offering information about certain phases of the project.

Comments from the community were received on Monday as part of the scoping process, and will continue to be received through January 4.

—Matthew Bramlett

news@claremont-courier.com

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Appendix C
Traffic Analysis Technical Summary

Task R: Metro Gold Line Foothill Extension – Ada Avenue Circulation Analysis

AECOM
300 S Grand Ave
Los Angeles, CA 90071
www.aecom.com

213 330 7200 tel
213 330 7201 fax

Memorandum

Date:	October 19, 2016
To:	Denis Cournoyer, Metro Gold Line Foothill Extension Construction Authority
From:	Rob Hertz and Vamshi Akkinepally, AECOM
Cc:	Ray Sosa, AECOM
Subject:	Task R: Metro Gold Line Foothill Extension –Ada Avenue Circulation Analysis

Introduction

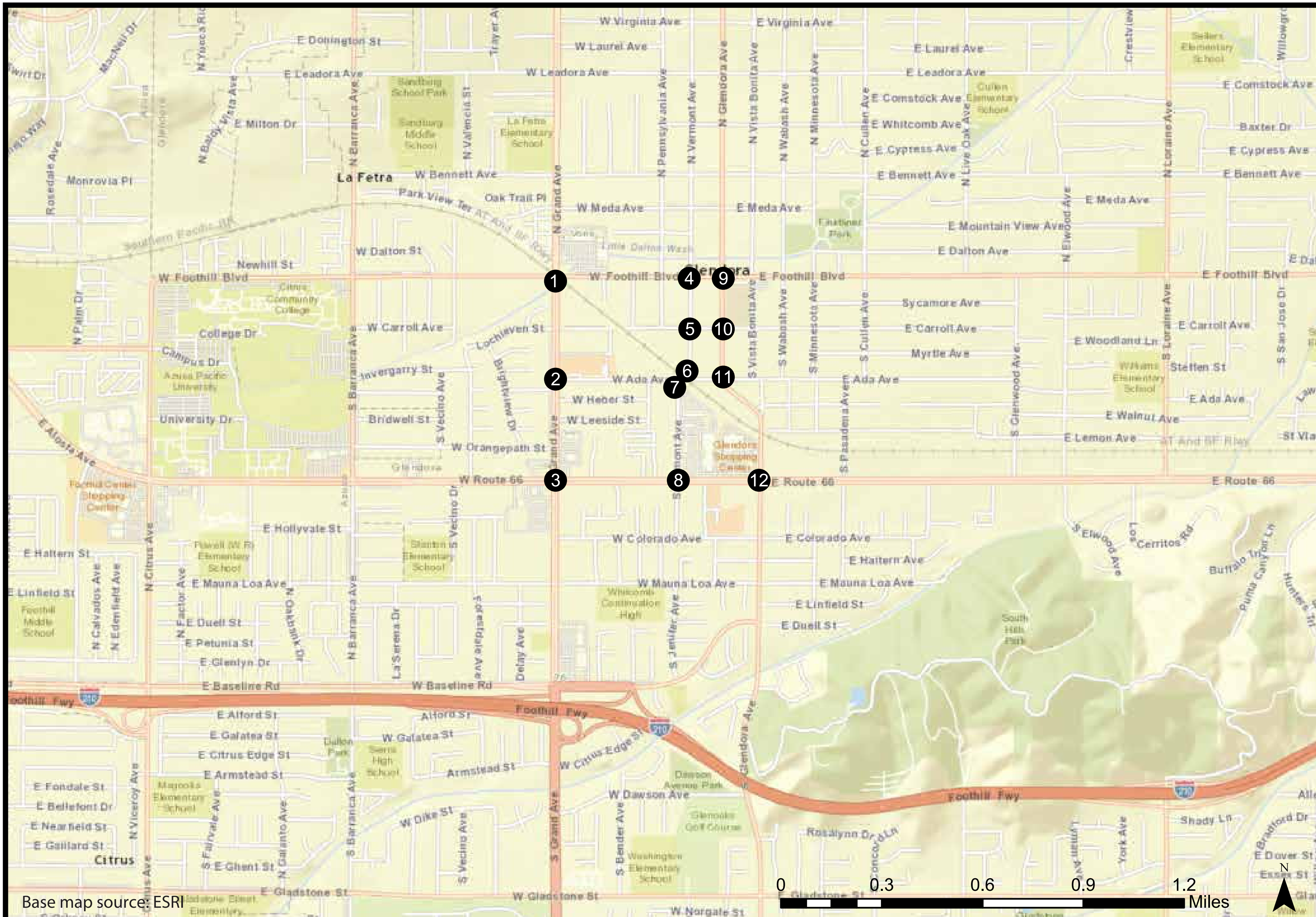
The purpose of this technical memorandum is to analyze the potential impact on traffic of closing the west leg of Ada Avenue at Vermont Avenue in the City of Glendora. It is understood that the current Authority concept for this location includes closing the west leg of Ada Avenue at Vermont Avenue. This study evaluated the impacts of four circulation alternatives for the east leg of Ada Avenue, in combination with the proposed closure of the west leg of the intersection. The proposed alternatives include:

- Alternative 1: Signalization of the Vermont Avenue & East Ada Avenue intersection
- Alternative 2: Restricting westbound movements on East Ada Avenue to right-turn-only at the intersection
- Alternative 3: Restricting westbound movements on East Ada Avenue to right-turn-only and prohibiting southbound left-turns at the intersection
- Alternative 4: Converting the east leg of Ada Avenue into an eastbound one-way street

Traffic impacts were assessed at the following twelve intersections. Figure 1 illustrates the study area, which includes the following study intersections:

1. Grand Avenue & Foothill Boulevard
2. Grand Avenue & Ada Avenue
3. Grand Avenue & Route 66
4. Vermont Avenue & Foothill Boulevard
5. Vermont Avenue & Carroll Avenue
6. Vermont Avenue & East Ada Avenue
7. Vermont Avenue & West Ada Avenue
8. Vermont Avenue & Route 66
9. Glendora Avenue & Foothill Boulevard
10. Glendora Avenue & Carroll Avenue
11. Glendora Avenue & Ada Avenue
12. Glendora Avenue & Route 66

New AM (7-9 AM) and PM (4-6 PM) peak period turning movement counts were conducted at the study intersections on November 18, 2015. Existing AM and PM peak hour volumes at the study intersections are illustrated in Figure 2. Traffic volumes for the four proposed circulation alternatives were developed by manually redistributing the existing peak hour volumes.



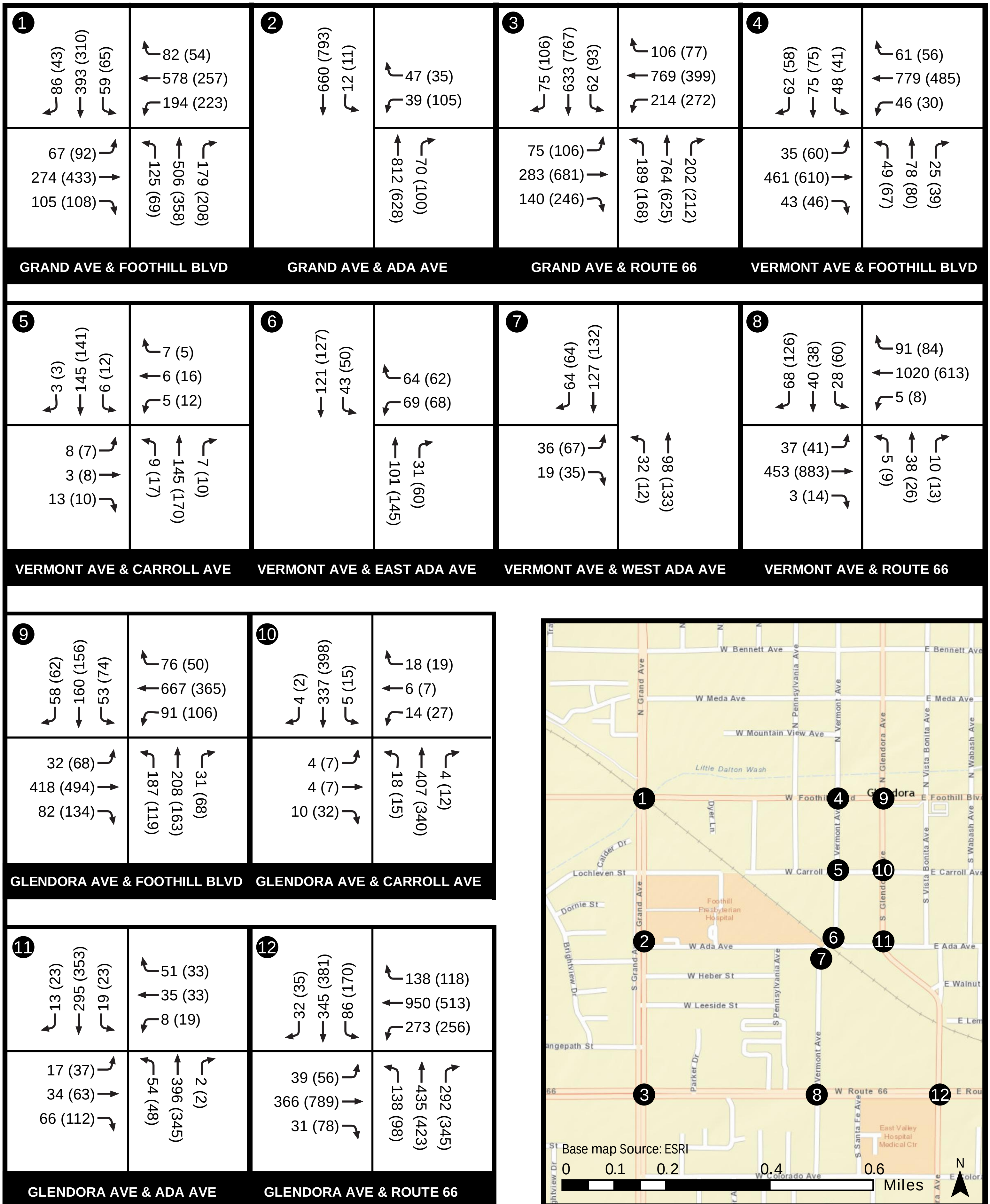
AECOM

Legend:

Study Intersection

Figure 1: Study Area

Metro Gold Line Foothill Extension - Ada Avenue Circulation Analysis



AECOM

Legend:
\# Study Intersection
XX(YY) AM (PM) Peak Hour Volume

Figure 2: Existing Peak Hour Intersection Volumes

Metro Gold Line Foothill Extension - Ada Avenue Circulation Analysis

Level of Service Methodology

Peak hour traffic operations at the study intersections were analyzed using the *Highway Capacity Manual* (HCM 2010) operations methodology. With the HCM methodology, Level of Service (LOS) thresholds are based on the average delay incurred by vehicles traveling through the intersection. Analysis was conducted using Synchro 9 software.

Intersection Significant Impact Criteria

The methodology used to determine significant impacts at the study intersections due to the proposed circulation options is consistent with that used in the Final Environmental Impact Report (FEIR). The significant impact criteria of Los Angeles County state that an intersection is considered to be significantly impacted by the proposed alternatives if the change in delay from the existing conditions (No Project) is equal or greater than the values listed in Table 1.

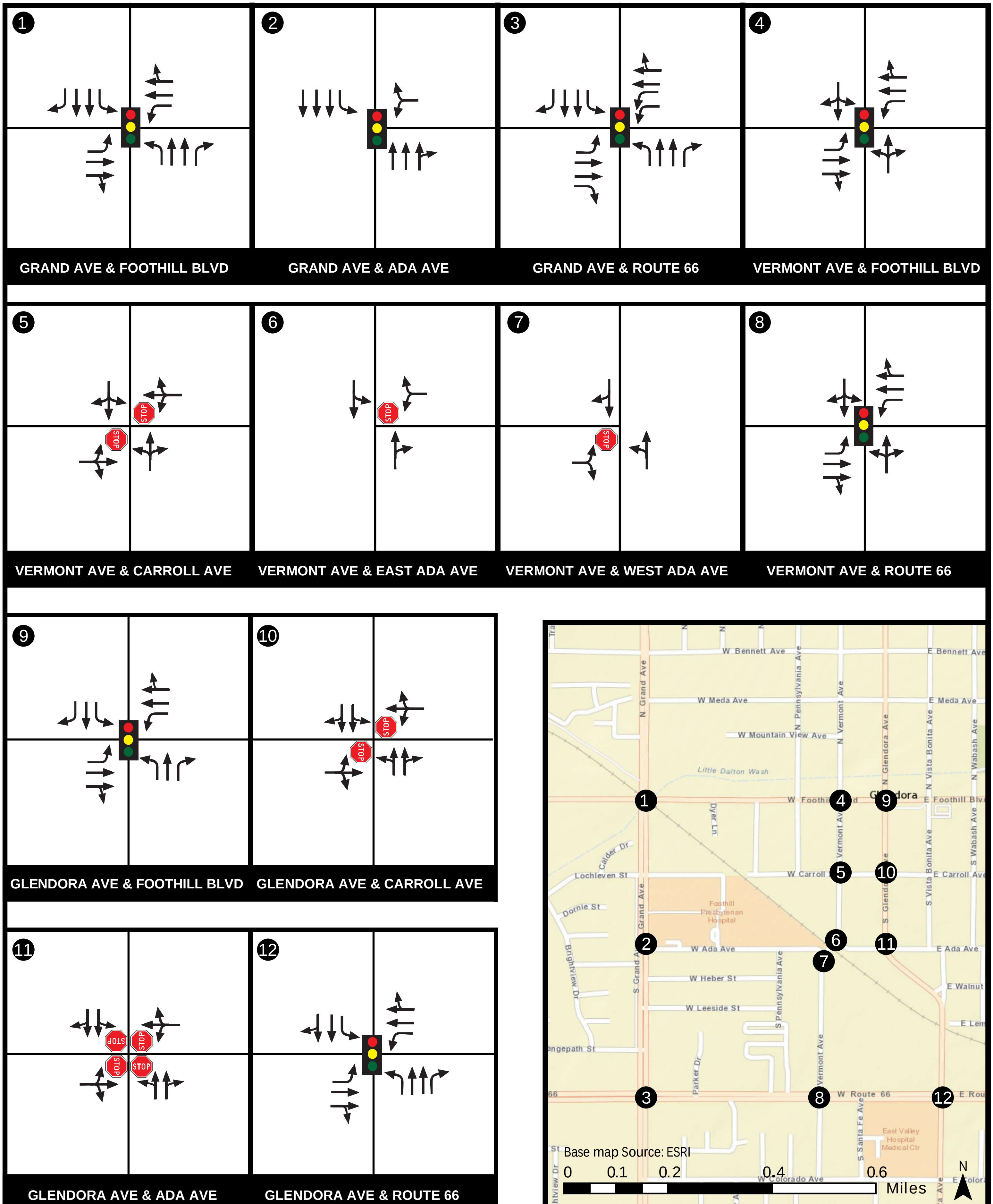
Table 1: Los Angeles County Intersection Impact Thresholds

Control Type	Final LOS with Project	Significant Increase in Delay from the No Project (seconds/vehicle)
Unsignalized	LOS C	≥ 4.0
	LOS D	≥ 2.0
	LOS E/F	≥ 1.5
Signalized	LOS C	≥ 6.0
	LOS D	≥ 4.0
	LOS E/F	≥ 2.5

Source: Los Angeles County Traffic Impact Analysis Study Guidelines, 1997.

Existing Conditions

Existing lane configurations at the study intersections are illustrated in Figure 3. A level of service (LOS) analysis was conducted at the study intersections using the methodology described above. The results show that all study intersections are currently operating at LOS D or better. Table 2 summarizes the existing LOS at study intersections.



AECOM

Legend:

Study Intersection

XX(YY) AM (PM) Peak Hour Volume

Figure 3: Existing Intersection Lane Configuration

Metro Gold Line Foothill Extension - Ada Avenue Circulation Analysis

Table 2: Existing (2015) Intersection Levels of Service

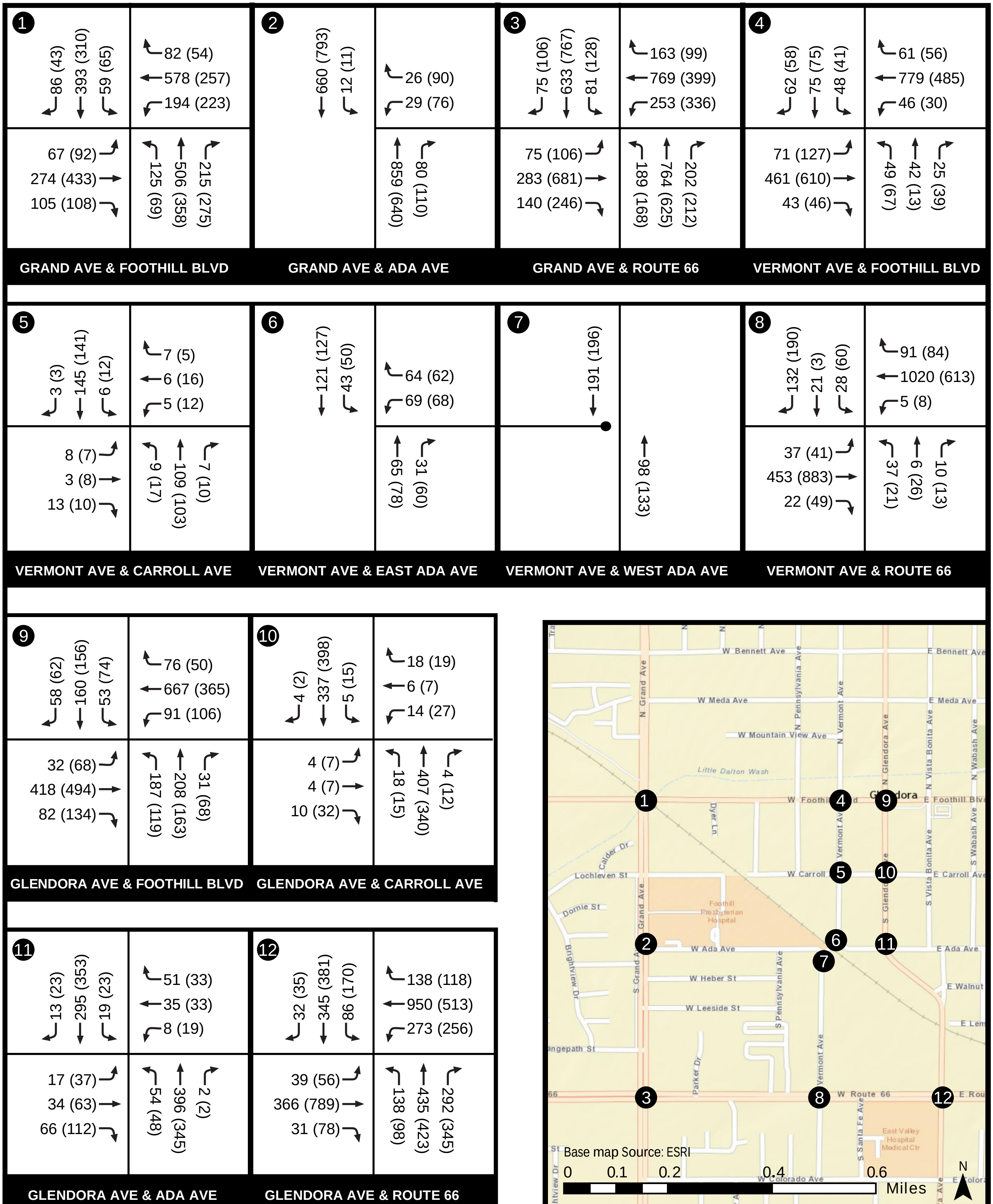
INTERSECTIONS		Control Type	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	Grand Ave & Foothill Blvd	Signal	31.2	C	29.8	C
2	Grand Ave & Ada Ave	Signal	5.0	A	6.4	A
3	Grand Ave & Route 66	Signal	31.8	C	31.7	C
4	Vermont Ave & Foothill Blvd	Signal	8.7	A	9.0	A
5	Vermont Ave & Carroll Ave	TWSC	10.6	B	11.9	B
6	Vermont Ave & East Ada Ave	1WSC	11.2	B	11.7	B
7	Vermont Ave & West Ada Ave	1WSC	10.9	B	11.1	B
8	Vermont Ave & Route 66	Signal	9.8	A	11.6	B
9	Glendora Ave & Foothill Blvd	Signal	19.9	B	20.1	C
10	Glendora Ave & Carroll Ave	TWSC	14.5	B	15.8	C
11	Glendora Ave & Ada Ave	AWSC	11.5	B	13.2	B
12	Glendora Ave & Route 66	Signal	32.2	C	43.7	D

TWSC = Two-Way Stop Controlled; 1WSC = One-Way Stop Controlled; AWSC = All-Way Stop Controlled;
Delay = Average Vehicle Delay (seconds)

Alternative 1

As described earlier, the proposed Alternative 1 would include the signalization of the Vermont Avenue & East Ada Avenue intersection, in addition to the closure of the west leg of Ada Avenue. No other circulation modifications are included in this alternative. AM and PM peak hour traffic volumes for Alternative 1 conditions were calculated by manually redistributing the existing peak hour volumes to reflect the closure of the west leg of Ada Avenue. AM and PM peak hour volumes at the study intersections for Alternative 1 are illustrated in Figure 4. A level of service analysis using previously described methodologies was conducted at the study intersections to evaluate Alternative 1 conditions. The AM and PM peak hour intersection levels of service for Alternative 1 are summarized in Table 3 and Table 4, respectively. As shown in the table, all study intersections are expected to operate at LOS D or better, and no significant impact at any of the intersections is anticipated due to the proposed Alternative 1.

Peak hour signal warrants were performed for this intersection using existing (2015) PM peak hour volumes and 2035 Build PM peak hour traffic volumes contained in the 2013 FEIR. PM peak hour volumes were used for this analysis because they were higher than the AM peak hour volumes. The results show that the intersection does not meet the peak hour signal warrants for existing or 2035 Build conditions.



Legend:
Study Intersection
XX(YY) AM (PM) Peak Hour Volume

Figure 4: Alternative 1 Peak Hour Intersection Volumes

Metro Gold Line Foothill Extension - Ada Avenue Circulation Analysis

Table 3: Alternative 1 Intersection LOS Summary – AM Peak Hour

INTERSECTIONS		Control Type	Existing		Alternative 1		Change in Delay	Significant Impact
			Delay	LOS	Delay	LOS		
1	Grand Ave & Foothill Blvd	Signal	31.2	C	31.1	C	-0.1	No
2	Grand Ave & Ada Ave	Signal	5.0	A	3.9	A	-1.1	No
3	Grand Ave & Route 66	Signal	31.8	C	34.1	C	2.3	No
4	Vermont Ave & Foothill Blvd	Signal	8.7	A	8.2	A	-0.5	No
5	Vermont Ave & Carroll Ave	TWSC	10.6	B	10.3	B	-0.3	No
6	Vermont Ave & East Ada Ave	Signal	11.2	B	6.0	A	-5.2	No
7	Vermont Ave & West Ada Ave		10.9	B	Intersection Does Not Exist			
8	Vermont Ave & Route 66	Signal	9.8	A	11.5	B	1.7	No
9	Glendora Ave & Foothill Blvd	Signal	19.9	B	19.9	B	0.0	No
10	Glendora Ave & Carroll Ave	TWSC	14.5	B	14.5	B	0.0	No
11	Glendora Ave & Ada Ave	AWSC	11.5	B	11.5	B	0.0	No
12	Glendora Ave & Route 66	Signal	32.2	C	32.2	C	0.0	No

TWSC = Two-Way Stop Controlled; AWSC = All-Way Stop Controlled; Delay = Average Vehicle Delay (seconds)

Table 4: Alternative 1 Intersection LOS Summary – PM Peak Hour

INTERSECTIONS		Control Type	Existing		Alternative 1		Change in Delay	Significant Impact
			Delay	LOS	Delay	LOS		
1	Grand Ave & Foothill Blvd	Signal	29.8	C	30.0	C	0.2	No
2	Grand Ave & Ada Ave	Signal	6.4	A	7.3	A	0.9	No
3	Grand Ave & Route 66	Signal	31.7	C	33.6	C	1.9	No
4	Vermont Ave & Foothill Blvd	Signal	9.0	A	8.2	A	-0.8	No
5	Vermont Ave & Carroll Ave	TWSC	11.9	B	11.2	B	-0.7	No
6	Vermont Ave & East Ada Ave	Signal	11.7	B	5.8	A	-5.9	No
7	Vermont Ave & West Ada Ave		11.1	B	Intersection Does Not Exist			
8	Vermont Ave & Route 66	Signal	11.6	B	12.8	B	1.2	No
9	Glendora Ave & Foothill Blvd	Signal	20.1	C	20.1	C	0.0	No
10	Glendora Ave & Carroll Ave	TWSC	15.8	C	15.8	C	0.0	No
11	Glendora Ave & Ada Ave	AWSC	13.2	B	13.2	B	0.0	No
12	Glendora Ave & Route 66	Signal	43.7	D	43.7	D	0.0	No

TWSC = Two-Way Stop Controlled; AWSC = All-Way Stop Controlled; Delay = Average Vehicle Delay (seconds)

Alternative 2

As described earlier, the proposed Alternative 2 would restrict westbound movements to right-turn-only at the Vermont Avenue & East Ada Avenue intersection. AM and PM peak hour traffic volumes for Alternative 2 conditions were calculated by manually redistributing the existing peak hour volumes. AM and PM peak hour volumes at the study intersections for Alternative 2 are illustrated in Figure 5. A level of service analysis using previously described methodologies was conducted at the study intersections to evaluate Alternative 2 conditions. The AM and PM peak hour intersection levels of service for Alternative 2 are summarized in Table 5 and Table 6, respectively. As shown in the table, all study intersections are expected to operate at LOS D or bette,r and no significant impact at any of the intersections is anticipated due to the proposed Alternative 2.

Table 5: Alternative 2 Intersection LOS Summary – AM Peak Hour

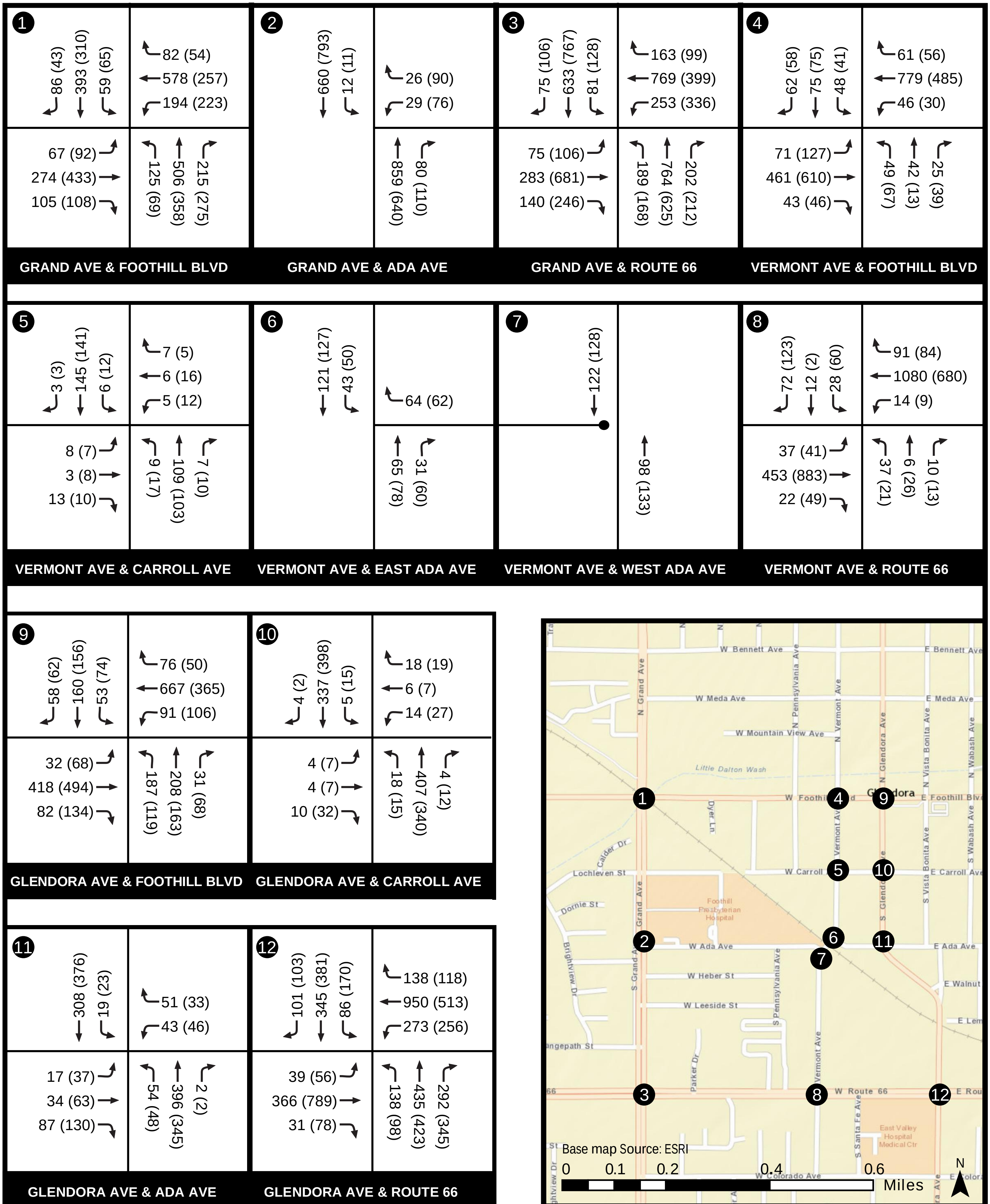
INTERSECTIONS		Control Type	Existing		Alternative 2		Change in Delay	Significant Impact
			Delay	LOS	Delay	LOS		
1	Grand Ave & Foothill Blvd	Signal	31.2	C	31.1	C	-0.1	No
2	Grand Ave & Ada Ave	Signal	5.0	A	3.9	A	-1.1	No
3	Grand Ave & Route 66	Signal	31.8	C	34.1	C	2.3	No
4	Vermont Ave & Foothill Blvd	Signal	8.7	A	8.2	A	-0.5	No
5	Vermont Ave & Carroll Ave	TWSC	10.6	B	10.3	B	-0.3	No
6	Vermont Ave & East Ada Ave	1WSC	11.2	B	9.0	A	-2.2	No
7	Vermont Ave & West Ada Ave		10.9	B	Intersection Does Not Exist			
8	Vermont Ave & Route 66	Signal	9.8	A	9.3	A	-0.5	No
9	Glendora Ave & Foothill Blvd	Signal	19.9	B	19.9	B	0.0	No
10	Glendora Ave & Carroll Ave	TWSC	14.5	B	14.5	B	0.0	No
11	Glendora Ave & Ada Ave	AWSC	11.5	B	11.9	B	0.4	No
12	Glendora Ave & Route 66	Signal	32.2	C	32.4	C	0.2	No

TWSC = Two-Way Stop Controlled; 1WSC = One-Way Stop Controlled; AWSC = All-Way Stop Controlled;
Delay = Average Vehicle Delay (seconds)

Table 6: Alternative 2 Intersection LOS Summary – PM Peak Hour

INTERSECTIONS		Control Type	Existing		Alternative 2		Change in Delay	Significant Impact
			Delay	LOS	Delay	LOS		
1	Grand Ave & Foothill Blvd	Signal	29.8	C	30.0	C	0.2	No
2	Grand Ave & Ada Ave	Signal	6.4	A	7.3	A	0.9	No
3	Grand Ave & Route 66	Signal	31.7	C	33.6	C	1.9	No
4	Vermont Ave & Foothill Blvd	Signal	9.0	A	8.2	A	-0.8	No
5	Vermont Ave & Carroll Ave	TWSC	11.9	B	11.2	B	-0.7	No
6	Vermont Ave & East Ada Ave	1WSC	11.7	B	9.1	A	-2.6	No
7	Vermont Ave & West Ada Ave		11.1	B	Intersection Does Not Exist			
8	Vermont Ave & Route 66	Signal	11.6	B	10.7	B	-0.9	No
9	Glendora Ave & Foothill Blvd	Signal	20.1	C	20.1	C	0.0	No
10	Glendora Ave & Carroll Ave	TWSC	15.8	C	15.8	C	0.0	No
11	Glendora Ave & Ada Ave	AWSC	13.2	B	13.8	B	0.6	No
12	Glendora Ave & Route 66	Signal	43.7	D	43.7	D	0.0	No

TWSC = Two-Way Stop Controlled; 1WSC = One-Way Stop Controlled; AWSC = All-Way Stop Controlled;
Delay = Average Vehicle Delay (seconds)



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Legend:
Study Intersection
XX(YY) AM (PM) Peak Hour Volume

Figure 5: Alternative 2 Peak Hour Intersection Volumes

Metro Gold Line Foothill Extension - Ada Avenue Circulation Analysis

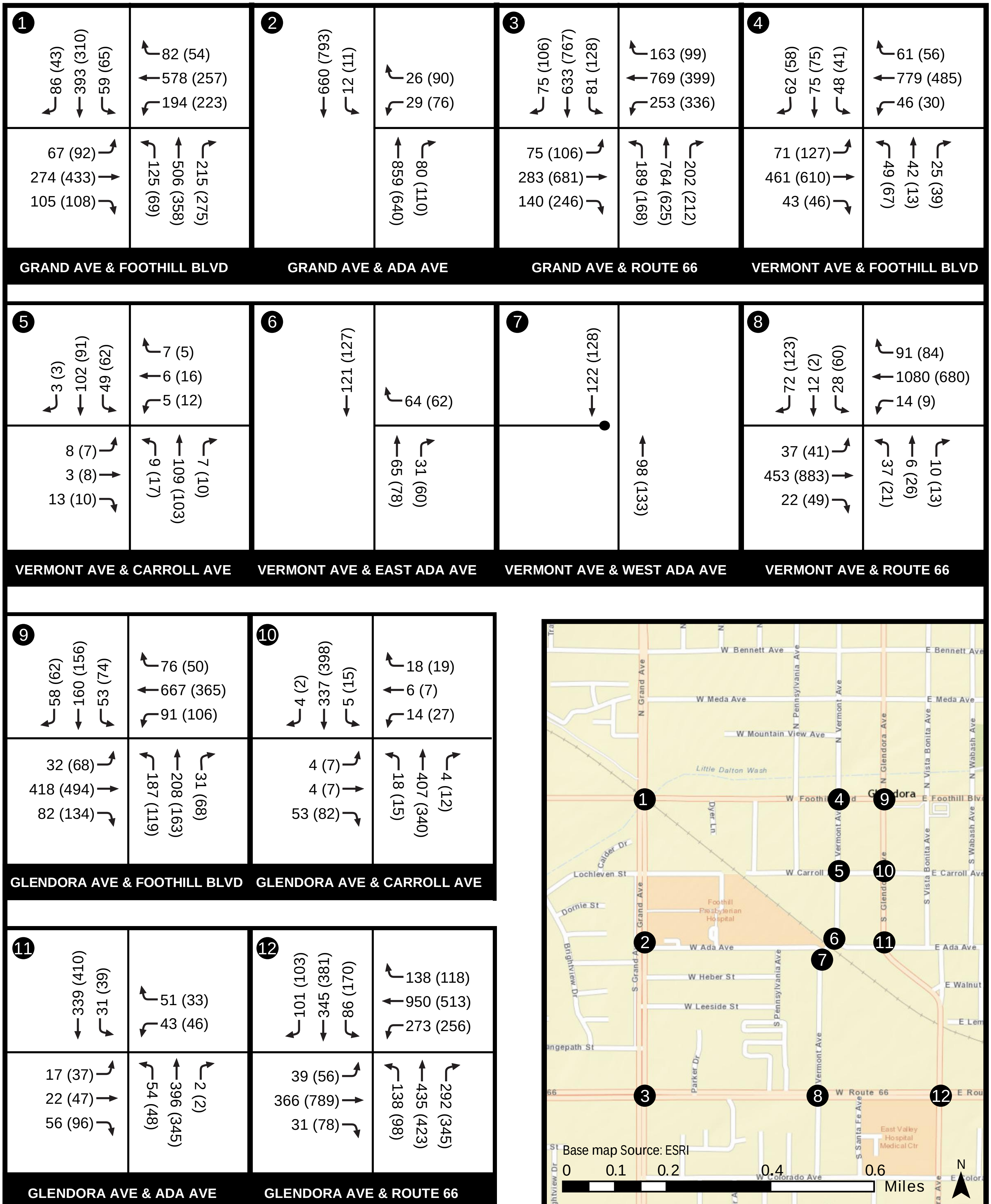
Alternative 3

The proposed Alternative 3 would restrict westbound movements to right-turn-only and prohibit southbound left-turn movements at the Vermont Avenue & East Ada Avenue intersection. AM and PM peak hour traffic volumes for Alternative 3 conditions were calculated by manually redistributing the existing peak hour volumes. AM and PM peak hour volumes at the study intersections for Alternative 3 are illustrated in Figure 6. A level of service analysis using previously described methodologies was conducted at the study intersections to evaluate Alternative 3 conditions. The AM and PM peak hour intersection levels of service for Alternative 3 are summarized in Table 7 and Table 8, respectively. As shown in the table, all study intersections are expected to operate at LOS D or better, and no significant impact at any of intersections is anticipated due to the proposed Alternative 3.

Table 7: Alternative 3 Intersection LOS Summary – AM Peak Hour

INTERSECTIONS		Control Type	Existing		Alternative 3		Change in Delay	Significant Impact
			Delay	LOS	Delay	LOS		
1	Grand Ave & Foothill Blvd	Signal	31.2	C	31.1	C	-0.1	No
2	Grand Ave & Ada Ave	Signal	5.0	A	3.9	A	-1.1	No
3	Grand Ave & Route 66	Signal	31.8	C	34.1	C	2.3	No
4	Vermont Ave & Foothill Blvd	Signal	8.7	A	8.2	A	-0.5	No
5	Vermont Ave & Carroll Ave	TWSC	10.6	B	10.7	B	0.1	No
6	Vermont Ave & East Ada Ave	1WSC	11.2	B	9.0	A	-2.2	No
7	Vermont Ave & West Ada Ave		10.9	B	Intersection Does Not Exist			
8	Vermont Ave & Route 66	Signal	9.8	A	9.3	A	-0.5	No
9	Glendora Ave & Foothill Blvd	Signal	19.9	B	19.9	B	0.0	No
10	Glendora Ave & Carroll Ave	TWSC	14.5	B	14.8	B	0.3	No
11	Glendora Ave & Ada Ave	AWSC	11.5	B	11.7	B	0.2	No
12	Glendora Ave & Route 66	Signal	32.2	C	32.4	C	0.2	No

TWSC = Two-Way Stop Controlled; 1WSC = One-Way Stop Controlled; AWSC = All-Way Stop Controlled;
Delay = Average Vehicle Delay (seconds)



AECOM

Legend:
Study Intersection
XX(YY) AM (PM) Peak Hour Volume

Figure 6: Alternative 3 Peak Hour Intersection Volumes

Metro Gold Line Foothill Extension - Ada Avenue Circulation Analysis

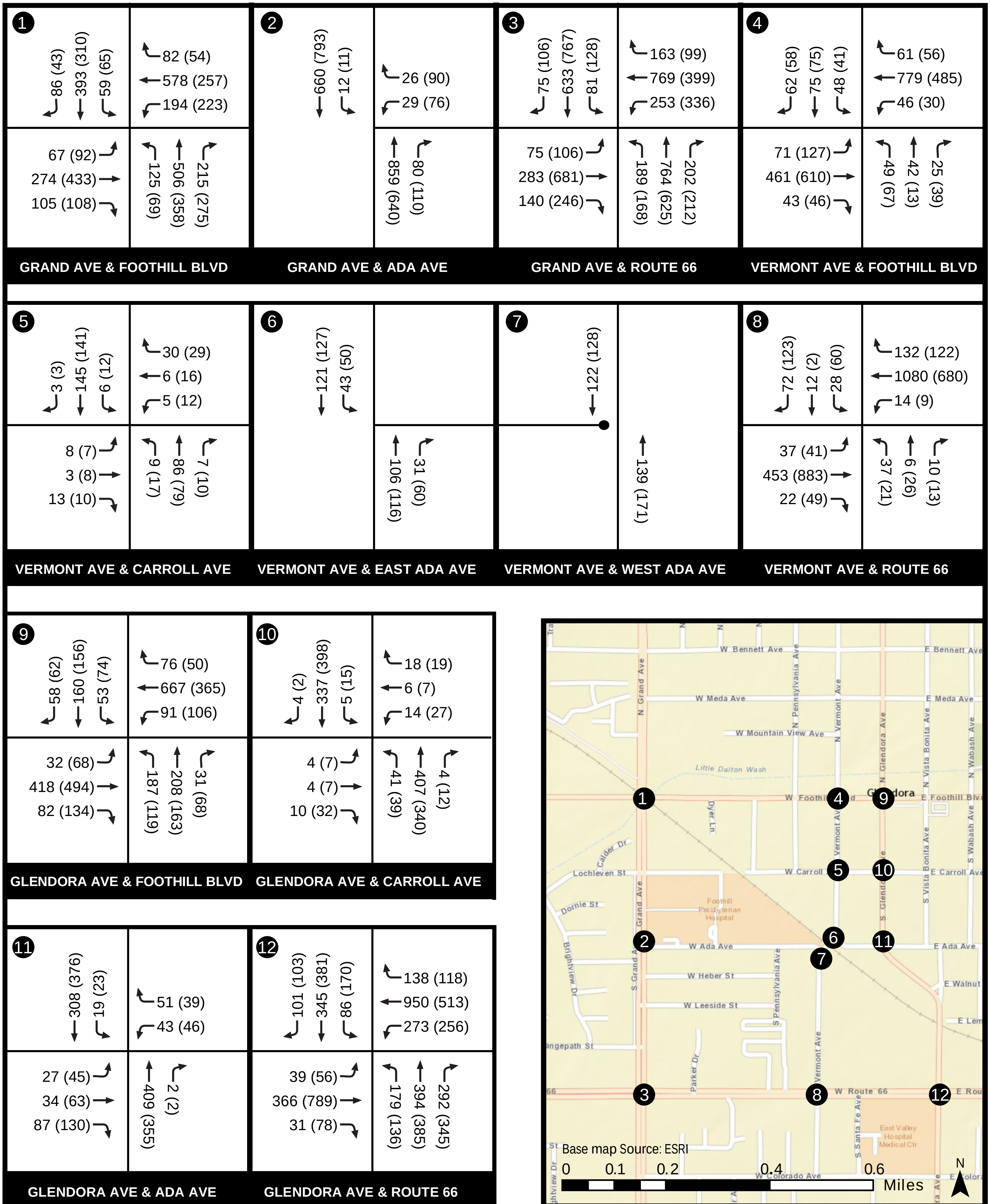
Table 8: Alternative 3 Intersection LOS Summary – PM Peak Hour

INTERSECTIONS		Control Type	Existing		Alternative 3		Change in Delay	Significant Impact
			Delay	LOS	Delay	LOS		
1	Grand Ave & Foothill Blvd	Signal	29.8	C	30.0	C	0.2	No
2	Grand Ave & Ada Ave	Signal	6.4	A	7.3	A	0.9	No
3	Grand Ave & Route 66	Signal	31.7	C	33.6	C	1.9	No
4	Vermont Ave & Foothill Blvd	Signal	9.0	A	8.2	A	-0.8	No
5	Vermont Ave & Carroll Ave	TWSC	11.9	B	11.9	B	0.0	No
6	Vermont Ave & East Ada Ave	1WSC	11.7	B	9.1	A	-2.6	No
7	Vermont Ave & West Ada Ave		11.1	B	Intersection Does Not Exist			
8	Vermont Ave & Route 66	Signal	11.6	B	10.7	B	-0.9	No
9	Glendora Ave & Foothill Blvd	Signal	20.1	C	20.1	C	0.0	No
10	Glendora Ave & Carroll Ave	TWSC	15.8	C	16.4	C	0.6	No
11	Glendora Ave & Ada Ave	AWSC	13.2	B	13.5	B	0.3	No
12	Glendora Ave & Route 66	Signal	43.7	D	43.7	D	0.0	No

TWSC = Two-Way Stop Controlled; 1WSC = One-Way Stop Controlled; AWSC = All-Way Stop Controlled;
Delay = Average Vehicle Delay (seconds)

Alternative 4

The proposed Alternative 4 would convert the east leg of Ada Avenue into an eastbound one-way street. AM and PM peak hour traffic volumes for Alternative 4 conditions were calculated by manually redistributing the existing peak hour volumes. AM and PM peak hour volumes at the study intersections for Alternative 4 are illustrated in Figure 7. A level of service analysis using previously described methodologies was conducted at the study intersections to evaluate Alternative 4 conditions. The AM and PM peak hour intersection levels of service for Alternative 4 are summarized in Table 9 and Table 10, respectively. As shown in the table, all study intersections are expected to operate at LOS D or better and no significant impact at any of intersections is anticipated due to the proposed Alternative 4.



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Legend:

Study Intersection

XX(YY) AM (PM) Peak Hour Volume

Figure 7: Alternative 4 Peak Hour Intersection Volumes

Metro Gold Line Foothill Extension - Ada Avenue Circulation Analysis

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Table 9: Alternative 4 Intersection LOS Summary – AM Peak Hour

INTERSECTIONS		Control Type	Existing		Alternative 4		Change in Delay	Significant Impact
			Delay	LOS	Delay	LOS		
1	Grand Ave & Foothill Blvd	Signal	31.2	C	31.1	C	-0.1	No
2	Grand Ave & Ada Ave	Signal	5.0	A	3.9	A	-1.1	No
3	Grand Ave & Route 66	Signal	31.8	C	34.1	C	2.3	No
4	Vermont Ave & Foothill Blvd	Signal	8.7	A	8.2	A	-0.5	No
5	Vermont Ave & Carroll Ave	TWSC	10.6	B	10.1	B	-0.5	No
6	Vermont Ave & East Ada Ave		11.2	B	Intersection Does Not Exist			
7	Vermont Ave & West Ada Ave		10.9	B	Intersection Does Not Exist			
8	Vermont Ave & Route 66	Signal	9.8	A	9.5	A	-0.3	No
9	Glendora Ave & Foothill Blvd	Signal	19.9	B	19.9	B	0.0	No
10	Glendora Ave & Carroll Ave	TWSC	14.5	B	15.3	C	0.8	No
11	Glendora Ave & Ada Ave	AWSC	11.5	B	11.9	B	0.4	No
12	Glendora Ave & Route 66	Signal	32.2	C	33.2	C	1.0	No

TWSC = Two-Way Stop Controlled; AWSC = All-Way Stop Controlled; Delay = Average Vehicle Delay (seconds)

Table 10: Alternative 4 Intersection LOS Summary – PM Peak Hour

INTERSECTIONS		Control Type	Existing		Alternative 4		Change in Delay	Significant Impact
			Delay	LOS	Delay	LOS		
1	Grand Ave & Foothill Blvd	Signal	29.8	C	30.0	C	0.2	No
2	Grand Ave & Ada Ave	Signal	6.4	A	7.3	A	0.9	No
3	Grand Ave & Route 66	Signal	31.7	C	33.6	C	1.9	No
4	Vermont Ave & Foothill Blvd	Signal	9.0	A	8.2	A	-0.8	No
5	Vermont Ave & Carroll Ave	TWSC	11.9	B	10.5	B	-1.4	No
6	Vermont Ave & East Ada Ave		11.7	B	Intersection Does Not Exist			
7	Vermont Ave & West Ada Ave		11.1	B	Intersection Does Not Exist			
8	Vermont Ave & Route 66	Signal	11.6	B	10.7	B	-0.9	No
9	Glendora Ave & Foothill Blvd	Signal	20.1	C	20.1	C	0.0	No
10	Glendora Ave & Carroll Ave	TWSC	15.8	C	17.0	C	1.2	No
11	Glendora Ave & Ada Ave	AWSC	13.2	B	13.7	B	0.5	No
12	Glendora Ave & Route 66	Signal	43.7	D	44.4	D	0.7	No

TWSC = Two-Way Stop Controlled; AWSC = All-Way Stop Controlled; Delay = Average Vehicle Delay (seconds)

Conclusion

The intersection level of service analysis for the four proposed alternatives demonstrates that all study intersections are expected to operate at LOS D or better during both the AM and PM peak hours under all four alternatives and that none of the alternatives would result in significant impact at any of the study intersections.

As described earlier, the peak hour volumes at the Vermont Avenue & East Ada Avenue intersection do not meet the warrant for installing a signal at the intersection. As part of a separate task order, AECOM is preparing a conceptual improvement plan for this location, and the design concept includes a raised median in Vermont Avenue that restricts the east leg of Ada Avenue to right-in and right-out at the intersection. The raised median enhances safety by discouraging motorists from trying to drive around the crossing gates. Therefore, AECOM recommends installing a raised median on Vermont Avenue through the intersection, thereby prohibiting left-turns on southbound Vermont Avenue and restricting westbound movements to right-turn-only on East Ada Avenue (Alternative 3).

EXISTING (2015) CONDITIONS

AM PEAK HOUR

LOS CALCULATION WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	274	105	194	578	82	125	506	179	59	393	86
Future Volume (veh/h)	67	274	105	194	578	82	125	506	179	59	393	86
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	78	319	122	226	672	95	145	588	208	69	457	100
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	1
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	110	568	213	258	962	136	176	1329	595	98	1175	526
Arrive On Green	0.06	0.23	0.22	0.15	0.31	0.30	0.10	0.38	0.38	0.06	0.33	0.33
Sat Flow, veh/h	1774	2520	946	1774	3115	440	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	78	222	219	226	381	386	145	588	208	69	457	100
Grp Sat Flow(s),veh/h/ln	1774	1770	1696	1774	1770	1785	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	3.7	9.5	9.9	10.7	16.3	16.4	6.9	10.7	8.1	3.3	8.5	3.9
Cycle Q Clear(g_c), s	3.7	9.5	9.9	10.7	16.3	16.4	6.9	10.7	8.1	3.3	8.5	3.9
Prop In Lane	1.00		0.56	1.00		0.25	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	110	399	382	258	547	552	176	1329	595	98	1175	526
V/C Ratio(X)	0.71	0.56	0.57	0.87	0.70	0.70	0.83	0.44	0.35	0.70	0.39	0.19
Avail Cap(c_a), veh/h	143	484	464	258	600	605	176	1329	595	128	1175	526
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	39.5	29.5	29.7	35.9	26.1	26.2	37.9	20.1	19.3	39.8	22.0	20.4
Incr Delay (d2), s/veh	6.4	1.7	1.9	25.7	3.7	3.7	25.0	1.1	1.6	6.2	1.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	4.8	4.8	7.1	8.5	8.6	4.6	5.4	3.8	1.8	4.3	1.8
LnGrp Delay(d),s/veh	45.9	31.2	31.6	61.6	29.8	29.9	62.9	21.1	20.9	46.0	23.0	21.2
LnGrp LOS	D	C	C	E	C	C	E	C	C	D	C	C
Approach Vol, veh/h		519			993			941			626	
Approach Delay, s/veh		33.6			37.1			27.5			25.2	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	37.2	16.0	24.3	12.0	33.5	8.8	31.5
Change Period (Y+Rc), s	4.0	5.5	4.0	5.5	4.0	5.5	4.0	5.5
Max Green Setting (Gmax), s	5.7	30.3	12.0	23.0	8.0	28.0	6.4	28.6
Max Q Clear Time (g_c+I1), s	5.3	12.7	12.7	11.9	8.9	10.5	5.7	18.4
Green Ext Time (p_c), s	0.0	10.2	0.0	7.0	0.0	10.2	0.0	6.5

Intersection Summary	
HCM 2010 Ctrl Delay	31.2
HCM 2010 LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	39	47	812	70	12	660
Future Volume (veh/h)	39	47	812	70	12	660
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1900	1863	1863
Adj Flow Rate, veh/h	45	54	933	80	14	759
Adj No. of Lanes	0	0	3	0	1	3
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	63	76	3448	295	43	4083
Arrive On Green	0.08	0.08	0.72	0.72	0.02	0.80
Sat Flow, veh/h	750	900	4940	408	1774	5253
Grp Volume(v), veh/h	100	0	662	351	14	759
Grp Sat Flow(s),veh/h/ln	1666	0	1695	1791	1774	1695
Q Serve(g_s), s	4.2	0.0	4.8	4.8	0.6	2.5
Cycle Q Clear(g_c), s	4.2	0.0	4.8	4.8	0.6	2.5
Prop In Lane	0.45	0.54		0.23	1.00	
Lane Grp Cap(c), veh/h	141	0	2450	1294	43	4083
V/C Ratio(X)	0.71	0.00	0.27	0.27	0.33	0.19
Avail Cap(c_a), veh/h	587	0	2450	1294	225	4083
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.8	0.0	3.4	3.4	34.1	1.6
Incr Delay (d2), s/veh	6.5	0.0	0.3	0.5	4.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.0	2.3	2.5	0.3	1.2
LnGrp Delay(d),s/veh	38.3	0.0	3.7	3.9	38.5	1.7
LnGrp LOS	D		A	A	D	A
Approach Vol, veh/h	100		1013			773
Approach Delay, s/veh	38.3		3.8			2.4
Approach LOS	D		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	5.7	55.3				61.0		10.0
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	8.5	43.5				56.5		24.5
Max Q Clear Time (g_c+I1), s	2.6	6.8				4.5		6.2
Green Ext Time (p_c), s	0.0	17.1				19.5		0.2

Intersection Summary		
HCM 2010 Ctrl Delay		5.0
HCM 2010 LOS		A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	283	140	214	769	106	189	764	202	62	633	75
Future Volume (veh/h)	75	283	140	214	769	106	189	764	202	62	633	75
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	82	308	152	233	836	115	205	830	220	67	688	82
Adj No. of Lanes	1	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	115	1096	490	325	1061	146	249	1266	566	96	960	429
Arrive On Green	0.06	0.31	0.31	0.09	0.34	0.33	0.14	0.36	0.36	0.05	0.27	0.27
Sat Flow, veh/h	1774	3539	1583	3442	3126	430	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	82	308	152	233	473	478	205	830	220	67	688	82
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1721	1770	1787	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	3.9	5.7	6.4	5.7	20.9	21.0	9.8	17.1	9.0	3.2	15.3	3.5
Cycle Q Clear(g_c), s	3.9	5.7	6.4	5.7	20.9	21.0	9.8	17.1	9.0	3.2	15.3	3.5
Prop In Lane	1.00		1.00	1.00		0.24	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	115	1096	490	325	601	607	249	1266	566	96	960	429
V/C Ratio(X)	0.71	0.28	0.31	0.72	0.79	0.79	0.82	0.66	0.39	0.70	0.72	0.19
Avail Cap(c_a), veh/h	139	1096	490	341	601	607	286	1271	569	149	998	447
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	39.8	22.7	22.9	38.2	25.9	25.9	36.3	23.4	20.8	40.4	28.6	24.3
Incr Delay (d2), s/veh	9.0	0.6	1.6	5.6	10.1	10.0	13.7	1.4	0.6	3.4	2.7	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	2.9	3.0	3.0	11.8	12.0	5.7	8.5	4.0	1.7	7.8	1.5
LnGrp Delay(d),s/veh	48.9	23.3	24.5	43.8	35.9	35.9	49.9	24.8	21.4	43.8	31.3	24.6
LnGrp LOS	D	C	C	D	D	D	D	C	C	D	C	C
Approach Vol, veh/h		542			1184			1255			837	
Approach Delay, s/veh		27.5			37.5			28.3			31.6	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	34.5	7.7	36.1	11.2	31.9	15.2	28.5
Change Period (Y+Rc), s	3.5	5.5	3.5	5.5	3.5	5.5	3.5	5.5
Max Green Setting (Gmax), s	6.3	28.2	6.8	30.7	8.1	26.4	13.5	24.0
Max Q Clear Time (g_c+I1), s	5.9	23.0	5.2	19.1	7.7	8.4	11.8	17.3
Green Ext Time (p_c), s	0.0	4.1	0.0	9.4	0.0	11.1	0.0	5.8

Intersection Summary	
HCM 2010 Ctrl Delay	31.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	461	43	46	779	61	49	78	25	48	75	62
Future Volume (veh/h)	35	461	43	46	779	61	49	78	25	48	75	62
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	38	496	46	49	838	66	53	84	27	52	81	67
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	482	2350	217	674	2384	188	136	170	47	120	136	97
Arrive On Green	0.72	0.72	0.71	0.72	0.72	0.71	0.17	0.17	0.16	0.17	0.17	0.16
Sat Flow, veh/h	614	3276	303	860	3324	262	407	994	276	332	792	566
Grp Volume(v), veh/h	38	267	275	49	446	458	164	0	0	200	0	0
Grp Sat Flow(s),veh/h/ln	614	1770	1809	860	1770	1817	1677	0	0	1690	0	0
Q Serve(g_s), s	1.8	3.6	3.6	1.4	6.8	6.9	0.0	0.0	0.0	1.5	0.0	0.0
Cycle Q Clear(g_c), s	8.7	3.6	3.6	5.1	6.8	6.9	6.1	0.0	0.0	7.7	0.0	0.0
Prop In Lane	1.00		0.17	1.00		0.14	0.32		0.16	0.26		0.33
Lane Grp Cap(c), veh/h	482	1269	1298	674	1269	1303	354	0	0	353	0	0
V/C Ratio(X)	0.08	0.21	0.21	0.07	0.35	0.35	0.46	0.00	0.00	0.57	0.00	0.00
Avail Cap(c_a), veh/h	482	1269	1298	674	1269	1303	749	0	0	753	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.5	3.4	3.4	4.2	3.8	3.9	27.2	0.0	0.0	27.9	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.4	0.4	0.0	0.2	0.2	0.9	0.0	0.0	1.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	1.8	1.9	0.3	3.3	3.4	3.1	0.0	0.0	3.8	0.0	0.0
LnGrp Delay(d),s/veh	5.8	3.8	3.8	4.3	4.0	4.0	28.1	0.0	0.0	29.3	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C			C		
Approach Vol, veh/h		580			953			164			200	
Approach Delay, s/veh		3.9			4.0			28.1			29.3	
Approach LOS		A			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		56.0		15.8		56.0		15.8
Change Period (Y+Rc), s		5.0		4.0		5.0		4.0
Max Green Setting (Gmax), s		51.0		30.0		51.0		30.0
Max Q Clear Time (g_c+I1), s		10.7		9.7		8.9		8.1
Green Ext Time (p_c), s		13.7		2.2		13.8		2.2

Intersection Summary	
HCM 2010 Ctrl Delay	8.7
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	8	3	13	5	6	7	9	145	7	6	145	3
Future Vol, veh/h	8	3	13	5	6	7	9	145	7	6	145	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	3	14	5	6	8	10	156	8	6	156	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	356	353	158	358	351	160	159	0	0	163	0	0
Stage 1	170	170	-	179	179	-	-	-	-	-	-	-
Stage 2	186	183	-	179	172	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	599	572	887	597	573	885	1420	-	-	1416	-	-
Stage 1	832	758	-	823	751	-	-	-	-	-	-	-
Stage 2	816	748	-	823	756	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	583	565	887	579	566	885	1420	-	-	1416	-	-
Mov Cap-2 Maneuver	583	565	-	579	566	-	-	-	-	-	-	-
Stage 1	825	754	-	816	745	-	-	-	-	-	-	-
Stage 2	796	742	-	803	752	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.2	10.6	0.4	0.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1420	-	-	712	663	1416	-	-
HCM Lane V/C Ratio	0.007	-	-	0.036	0.029	0.005	-	-
HCM Control Delay (s)	7.6	0	-	10.2	10.6	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	4.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	69	64	101	31	43	121
Future Vol, veh/h	69	64	101	31	43	121
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	78	73	115	35	49	138

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	367	132	0	0	150	0
Stage 1	132	-	-	-	-	-
Stage 2	235	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	633	917	-	-	1431	-
Stage 1	894	-	-	-	-	-
Stage 2	804	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	610	917	-	-	1431	-
Mov Cap-2 Maneuver	610	-	-	-	-	-
Stage 1	894	-	-	-	-	-
Stage 2	774	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.2	0	2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	727	1431	-
HCM Lane V/C Ratio	-	-	0.208	0.034	-
HCM Control Delay (s)	-	-	11.2	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.8	0.1	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	36	19	32	98	127	64
Future Vol, veh/h	36	19	32	98	127	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	42	22	37	114	148	74

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	373	185	222	0	-	0
Stage 1	185	-	-	-	-	-
Stage 2	188	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	628	857	1347	-	-	-
Stage 1	847	-	-	-	-	-
Stage 2	844	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	610	857	1347	-	-	-
Mov Cap-2 Maneuver	610	-	-	-	-	-
Stage 1	847	-	-	-	-	-
Stage 2	820	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.9	1.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1347	-	677	-	-
HCM Lane V/C Ratio	0.028	-	0.094	-	-
HCM Control Delay (s)	7.7	0	10.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	453	3	5	1020	91	5	38	10	28	40	68
Future Volume (veh/h)	37	453	3	5	1020	91	5	38	10	28	40	68
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	40	492	3	5	1109	99	5	41	11	30	43	74
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	62	2478	15	20	2182	195	65	176	44	92	74	105
Arrive On Green	0.03	0.69	0.68	0.01	0.66	0.66	0.13	0.13	0.12	0.13	0.13	0.12
Sat Flow, veh/h	1774	3606	22	1774	3287	293	70	1371	344	232	577	820
Grp Volume(v), veh/h	40	241	254	5	597	611	57	0	0	147	0	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1859	1774	1770	1811	1785	0	0	1629	0	0
Q Serve(g_s), s	1.5	3.4	3.4	0.2	11.9	11.9	0.0	0.0	0.0	3.4	0.0	0.0
Cycle Q Clear(g_c), s	1.5	3.4	3.4	0.2	11.9	11.9	2.0	0.0	0.0	5.9	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.16	0.09		0.19	0.20		0.50
Lane Grp Cap(c), veh/h	62	1216	1277	20	1174	1202	286	0	0	272	0	0
V/C Ratio(X)	0.65	0.20	0.20	0.25	0.51	0.51	0.20	0.00	0.00	0.54	0.00	0.00
Avail Cap(c_a), veh/h	179	1216	1277	154	1174	1202	688	0	0	642	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	33.0	3.9	3.9	34.0	5.9	5.9	27.2	0.0	0.0	29.0	0.0	0.0
Incr Delay (d2), s/veh	10.9	0.4	0.3	6.5	1.6	1.5	0.3	0.0	0.0	1.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	1.7	1.8	0.1	6.1	6.3	1.0	0.0	0.0	2.8	0.0	0.0
LnGrp Delay(d),s/veh	43.9	4.3	4.3	40.5	7.5	7.5	27.6	0.0	0.0	30.6	0.0	0.0
LnGrp LOS	D	A	A	D	A	A	C			C		
Approach Vol, veh/h		535			1213			57			147	
Approach Delay, s/veh		7.2			7.6			27.6			30.6	
Approach LOS		A			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.8	51.6		12.9	6.4	50.0		12.9
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	5.5	46.5		24.5	6.5	45.5		24.5
Max Q Clear Time (g_c+I1), s	2.2	5.4		7.9	3.5	13.9		4.0
Green Ext Time (p_c), s	0.0	16.5		1.0	0.0	14.8		1.1

Intersection Summary		
HCM 2010 Ctrl Delay		9.8
HCM 2010 LOS		A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	418	82	91	667	76	187	208	31	53	160	58
Future Volume (veh/h)	32	418	82	91	667	76	187	208	31	53	160	58
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	37	480	94	105	767	87	215	239	36	61	184	67
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	240	922	180	360	1115	126	574	730	620	505	604	514
Arrive On Green	0.03	0.31	0.31	0.06	0.35	0.34	0.11	0.39	0.39	0.04	0.32	0.32
Sat Flow, veh/h	1774	2955	576	1774	3205	363	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	37	286	288	105	423	431	215	239	36	61	184	67
Grp Sat Flow(s),veh/h/ln	1774	1770	1761	1774	1770	1799	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	1.0	9.8	10.0	2.8	15.2	15.2	5.5	6.6	1.0	1.7	5.5	2.2
Cycle Q Clear(g_c), s	1.0	9.8	10.0	2.8	15.2	15.2	5.5	6.6	1.0	1.7	5.5	2.2
Prop In Lane	1.00		0.33	1.00		0.20	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	240	552	549	360	615	626	574	730	620	505	604	514
V/C Ratio(X)	0.15	0.52	0.52	0.29	0.69	0.69	0.37	0.33	0.06	0.12	0.30	0.13
Avail Cap(c_a), veh/h	357	789	785	413	789	802	667	730	620	598	604	514
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	17.6	20.9	21.0	15.3	20.7	20.7	12.7	15.7	14.0	15.4	18.7	17.6
Incr Delay (d2), s/veh	0.3	0.8	0.8	0.4	1.7	1.7	0.4	1.2	0.2	0.1	1.3	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	4.9	4.9	1.4	7.7	7.8	2.7	3.6	0.5	0.8	3.0	1.0
LnGrp Delay(d),s/veh	17.9	21.7	21.8	15.7	22.4	22.5	13.1	16.9	14.2	15.5	20.0	18.2
LnGrp LOS	B	C	C	B	C	C	B	B	B	B	C	B
Approach Vol, veh/h		611			959			490			312	
Approach Delay, s/veh		21.5			21.7			15.0			18.7	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.1	33.0	7.8	27.1	11.1	28.0	5.1	29.7
Change Period (Y+Rc), s	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
Max Green Setting (Gmax), s	6.5	28.5	6.5	32.5	11.5	23.5	6.5	32.5
Max Q Clear Time (g_c+I1), s	3.7	8.6	4.8	12.0	7.5	7.5	3.0	17.2
Green Ext Time (p_c), s	0.0	2.7	0.0	9.5	0.2	2.5	0.0	8.0

Intersection Summary	
HCM 2010 Ctrl Delay	19.9
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	4	4	10	14	6	18	18	407	4	5	337	4
Future Vol, veh/h	4	4	10	14	6	18	18	407	4	5	337	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	4	11	16	7	20	20	452	4	6	374	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	657	885	189	695	884	228	379	0	0	457	0	0
Stage 1	388	388	-	494	494	-	-	-	-	-	-	-
Stage 2	269	497	-	201	390	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	350	282	821	329	283	775	1176	-	-	1100	-	-
Stage 1	607	607	-	526	545	-	-	-	-	-	-	-
Stage 2	713	543	-	782	606	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	327	274	821	313	275	775	1176	-	-	1100	-	-
Mov Cap-2 Maneuver	327	274	-	313	275	-	-	-	-	-	-	-
Stage 1	593	603	-	514	532	-	-	-	-	-	-	-
Stage 2	670	531	-	760	602	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.2	14.5	0.4	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1176	-	-	461	423	1100	-	-
HCM Lane V/C Ratio	0.017	-	-	0.043	0.1	0.005	-	-
HCM Control Delay (s)	8.1	0.1	-	13.2	14.5	8.3	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.3	0	-	-

Intersection	
Intersection Delay, s/veh	11.5
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	17	34	66	0	8	35	51	0	54	396	2
Future Vol, veh/h	0	17	34	66	0	8	35	51	0	54	396	2
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	19	37	73	0	9	38	56	0	59	435	2
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	10.4	10.2	12.4
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	21%	0%	15%	9%	11%	0%
Vol Thru, %	79%	99%	29%	37%	89%	92%
Vol Right, %	0%	1%	56%	54%	0%	8%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	252	200	117	94	167	161
LT Vol	54	0	17	8	19	0
Through Vol	198	198	34	35	148	148
RT Vol	0	2	66	51	0	13
Lane Flow Rate	277	220	129	103	183	176
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.447	0.348	0.209	0.169	0.302	0.285
Departure Headway (Hd)	5.816	5.7	5.84	5.903	5.933	5.818
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	620	631	613	606	606	617
Service Time	3.55	3.434	3.885	3.952	3.671	3.556
HCM Lane V/C Ratio	0.447	0.349	0.21	0.17	0.302	0.285
HCM Control Delay	13.2	11.5	10.4	10.2	11.2	10.9
HCM Lane LOS	B	B	B	B	B	B
HCM 95th-tile Q	2.3	1.6	0.8	0.6	1.3	1.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	19	295	13
Future Vol, veh/h	0	19	295	13
Peak Hour Factor	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	21	324	14
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	11.1
HCM LOS	B

Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	366	31	273	950	138	138	435	292	86	345	32
Future Volume (veh/h)	39	366	31	273	950	138	138	435	292	86	345	32
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	42	394	33	294	1022	148	148	468	314	92	371	34
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	77	792	66	345	1213	175	193	1073	480	128	874	80
Arrive On Green	0.04	0.24	0.23	0.19	0.39	0.38	0.11	0.30	0.30	0.07	0.27	0.26
Sat Flow, veh/h	1774	3308	276	1774	3104	449	1774	3539	1583	1774	3281	299
Grp Volume(v), veh/h	42	210	217	294	582	588	148	468	314	92	199	206
Grp Sat Flow(s),veh/h/ln	1774	1770	1814	1774	1770	1783	1774	1770	1583	1774	1770	1810
Q Serve(g_s), s	1.9	8.6	8.7	13.4	25.0	25.1	6.8	8.9	14.4	4.3	7.8	7.9
Cycle Q Clear(g_c), s	1.9	8.6	8.7	13.4	25.0	25.1	6.8	8.9	14.4	4.3	7.8	7.9
Prop In Lane	1.00		0.15	1.00		0.25	1.00		1.00	1.00		0.17
Lane Grp Cap(c), veh/h	77	423	434	345	691	697	193	1073	480	128	472	482
V/C Ratio(X)	0.55	0.50	0.50	0.85	0.84	0.84	0.77	0.44	0.65	0.72	0.42	0.43
Avail Cap(c_a), veh/h	119	423	434	445	739	745	254	1073	480	169	472	482
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	39.3	27.5	27.6	32.6	23.2	23.3	36.3	23.4	25.4	38.0	25.4	25.5
Incr Delay (d2), s/veh	6.0	0.9	0.9	11.9	8.3	8.3	9.8	1.3	6.8	9.5	2.8	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	4.3	4.5	7.7	13.7	13.9	3.9	4.5	7.2	2.4	4.2	4.3
LnGrp Delay(d),s/veh	45.3	28.4	28.5	44.5	31.5	31.6	46.1	24.7	32.2	47.6	28.2	28.2
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		469			1464			930			497	
Approach Delay, s/veh		29.9			34.1			30.6			31.8	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	29.4	20.3	24.0	13.1	26.3	7.6	36.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.5	24.9	20.5	19.1	11.5	20.9	5.1	34.5
Max Q Clear Time (g_c+I1), s	6.3	16.4	15.4	10.7	8.8	9.9	3.9	27.1
Green Ext Time (p_c), s	0.0	4.2	0.4	5.9	0.1	5.0	0.0	5.1

Intersection Summary		
HCM 2010 Ctrl Delay		32.2
HCM 2010 LOS		C

EXISTING (2015) CONDITIONS

PM PEAK HOUR

LOS CALCULATION WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	433	108	223	257	54	69	358	208	65	310	43
Future Volume (veh/h)	92	433	108	223	257	54	69	358	208	65	310	43
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	99	466	116	240	276	58	74	385	224	70	333	46
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	136	660	163	285	930	193	105	1228	549	100	1218	545
Arrive On Green	0.08	0.23	0.23	0.16	0.32	0.31	0.06	0.35	0.35	0.06	0.34	0.34
Sat Flow, veh/h	1774	2814	696	1774	2921	605	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	99	292	290	240	166	168	74	385	224	70	333	46
Grp Sat Flow(s),veh/h/ln	1774	1770	1740	1774	1770	1756	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	4.6	12.7	12.9	11.1	5.9	6.1	3.5	6.7	9.1	3.3	5.7	1.7
Cycle Q Clear(g_c), s	4.6	12.7	12.9	11.1	5.9	6.1	3.5	6.7	9.1	3.3	5.7	1.7
Prop In Lane	1.00		0.40	1.00		0.34	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	136	415	408	285	563	559	105	1228	549	100	1218	545
V/C Ratio(X)	0.73	0.70	0.71	0.84	0.29	0.30	0.70	0.31	0.41	0.70	0.27	0.08
Avail Cap(c_a), veh/h	223	493	485	305	575	571	126	1228	549	126	1218	545
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	38.1	29.6	29.7	34.3	21.6	21.7	38.9	20.2	20.9	39.1	20.0	18.7
Incr Delay (d2), s/veh	2.8	4.3	4.7	16.5	0.4	0.4	9.1	0.7	2.2	7.2	0.6	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	6.7	6.7	6.7	3.0	3.0	2.0	3.4	4.3	1.8	2.9	0.8
LnGrp Delay(d),s/veh	40.8	33.9	34.4	50.9	22.0	22.2	48.1	20.8	23.2	46.3	20.6	19.0
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	B
Approach Vol, veh/h		681			574			683			449	
Approach Delay, s/veh		35.1			34.1			24.6			24.4	
Approach LOS		D			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	34.2	17.0	24.8	8.5	34.0	10.0	31.8
Change Period (Y+Rc), s	4.0	5.5	4.0	5.5	4.0	5.5	4.0	5.5
Max Green Setting (Gmax), s	5.5	28.5	14.0	23.0	5.5	28.5	10.1	26.9
Max Q Clear Time (g_c+I1), s	5.3	11.1	13.1	14.9	5.5	7.7	6.6	8.1
Green Ext Time (p_c), s	0.0	7.4	0.0	4.3	0.0	8.1	0.0	7.5

Intersection Summary	
HCM 2010 Ctrl Delay	29.8
HCM 2010 LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	105	35	628	100	11	793
Future Volume (veh/h)	105	35	628	100	11	793
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1900	1863	1863
Adj Flow Rate, veh/h	121	40	722	115	13	911
Adj No. of Lanes	0	0	3	0	1	3
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	164	54	2990	472	41	3846
Arrive On Green	0.13	0.12	0.67	0.67	0.02	0.76
Sat Flow, veh/h	1287	426	4598	699	1774	5253
Grp Volume(v), veh/h	162	0	551	286	13	911
Grp Sat Flow(s),veh/h/ln	1723	0	1695	1739	1774	1695
Q Serve(g_s), s	6.2	0.0	4.3	4.4	0.5	3.7
Cycle Q Clear(g_c), s	6.2	0.0	4.3	4.4	0.5	3.7
Prop In Lane	0.75	0.25		0.40	1.00	
Lane Grp Cap(c), veh/h	220	0	2288	1174	41	3846
V/C Ratio(X)	0.74	0.00	0.24	0.24	0.32	0.24
Avail Cap(c_a), veh/h	752	0	2288	1174	232	3846
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.0	0.0	4.3	4.4	33.0	2.5
Incr Delay (d2), s/veh	4.8	0.0	0.2	0.5	4.3	0.1
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	0.0	2.1	2.2	0.3	1.7
LnGrp Delay(d),s/veh	33.7	0.0	4.6	4.9	37.3	2.6
LnGrp LOS	C		A	A	D	A
Approach Vol, veh/h	162		837			924
Approach Delay, s/veh	33.7		4.7			3.1
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	5.6	50.4				56.0		12.8
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	8.5	38.5				51.5		29.5
Max Q Clear Time (g_c+I1), s	2.5	6.4				5.7		8.2
Green Ext Time (p_c), s	0.0	15.9				18.5		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	6.4
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	106	681	246	272	399	77	168	625	212	93	767	106
Future Volume (veh/h)	106	681	246	272	399	77	168	625	212	93	767	106
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	113	724	262	289	424	82	179	665	226	99	816	113
Adj No. of Lanes	1	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	152	1061	475	382	963	185	223	1157	517	136	982	439
Arrive On Green	0.09	0.30	0.30	0.11	0.33	0.32	0.13	0.33	0.33	0.08	0.28	0.28
Sat Flow, veh/h	1774	3539	1583	3442	2963	569	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	113	724	262	289	252	254	179	665	226	99	816	113
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1721	1770	1762	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	5.4	15.5	11.9	7.0	9.6	9.8	8.4	13.4	9.6	4.7	18.6	4.8
Cycle Q Clear(g_c), s	5.4	15.5	11.9	7.0	9.6	9.8	8.4	13.4	9.6	4.7	18.6	4.8
Prop In Lane	1.00		1.00	1.00		0.32	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	152	1061	475	382	575	573	223	1157	517	136	982	439
V/C Ratio(X)	0.74	0.68	0.55	0.76	0.44	0.44	0.80	0.57	0.44	0.73	0.83	0.26
Avail Cap(c_a), veh/h	186	1061	475	408	575	573	268	1157	517	219	1028	460
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	38.4	26.5	25.3	37.1	22.8	23.0	36.6	24.0	22.7	38.9	29.2	24.2
Incr Delay (d2), s/veh	9.0	3.6	4.6	6.4	2.4	2.5	11.3	0.9	0.8	2.8	6.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	8.1	5.8	3.7	5.1	5.1	4.8	6.7	4.3	2.4	9.9	2.1
LnGrp Delay(d),s/veh	47.4	30.1	29.8	43.6	25.3	25.4	47.8	24.9	23.6	41.6	35.2	24.6
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	D	C
Approach Vol, veh/h		1099			795			1070			1028	
Approach Delay, s/veh		31.8			32.0			28.4			34.6	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.4	33.0	9.6	33.1	12.5	30.8	13.8	28.9
Change Period (Y+Rc), s	3.5	5.5	3.5	5.5	3.5	5.5	3.5	5.5
Max Green Setting (Gmax), s	8.5	26.5	10.1	26.9	9.7	25.3	12.5	24.5
Max Q Clear Time (g_c+I1), s	7.4	11.8	6.7	15.4	9.0	17.5	10.4	20.6
Green Ext Time (p_c), s	0.0	9.8	0.0	9.3	0.0	5.9	0.0	2.7

Intersection Summary	
HCM 2010 Ctrl Delay	31.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	610	46	30	485	56	67	80	39	41	75	58
Future Volume (veh/h)	60	610	46	30	485	56	67	80	39	41	75	58
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	65	663	50	33	527	61	73	87	42	45	82	63
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	634	2328	175	565	2231	257	162	151	63	119	156	104
Arrive On Green	0.70	0.70	0.69	0.70	0.70	0.69	0.18	0.18	0.17	0.18	0.18	0.17
Sat Flow, veh/h	825	3337	251	734	3198	369	485	826	344	289	857	568
Grp Volume(v), veh/h	65	351	362	33	291	297	202	0	0	190	0	0
Grp Sat Flow(s),veh/h/ln	825	1770	1818	734	1770	1798	1655	0	0	1714	0	0
Q Serve(g_s), s	2.1	5.0	5.0	1.2	4.0	4.0	0.7	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	6.1	5.0	5.0	6.2	4.0	4.0	7.1	0.0	0.0	6.4	0.0	0.0
Prop In Lane	1.00		0.14	1.00		0.21	0.36		0.21	0.24		0.33
Lane Grp Cap(c), veh/h	634	1234	1269	565	1234	1254	375	0	0	379	0	0
V/C Ratio(X)	0.10	0.28	0.29	0.06	0.24	0.24	0.54	0.00	0.00	0.50	0.00	0.00
Avail Cap(c_a), veh/h	634	1234	1269	565	1234	1254	911	0	0	936	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.8	3.8	3.8	5.0	3.6	3.7	25.2	0.0	0.0	25.0	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.6	0.6	0.0	0.1	0.1	1.2	0.0	0.0	1.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	2.5	2.6	0.2	1.9	2.0	3.6	0.0	0.0	3.3	0.0	0.0
LnGrp Delay(d),s/veh	5.1	4.4	4.4	5.0	3.7	3.8	26.4	0.0	0.0	26.0	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C			C		
Approach Vol, veh/h		778			621			202			190	
Approach Delay, s/veh		4.4			3.8			26.4			26.0	
Approach LOS		A			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		51.0		15.7		51.0		15.7
Change Period (Y+Rc), s		5.0		4.0		5.0		4.0
Max Green Setting (Gmax), s		46.0		35.0		46.0		35.0
Max Q Clear Time (g_c+I1), s		8.1		8.4		8.2		9.1
Green Ext Time (p_c), s		11.6		2.5		11.5		2.5

Intersection Summary	
HCM 2010 Ctrl Delay	9.0
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	7	8	10	12	16	5	17	170	10	12	141	3
Future Vol, veh/h	7	8	10	12	16	5	17	170	10	12	141	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	9	11	13	17	5	18	181	11	13	150	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	411	405	152	409	401	186	153	0	0	191	0	0
Stage 1	177	177	-	222	222	-	-	-	-	-	-	-
Stage 2	234	228	-	187	179	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	551	535	894	553	538	856	1428	-	-	1383	-	-
Stage 1	825	753	-	780	720	-	-	-	-	-	-	-
Stage 2	769	715	-	815	751	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	524	522	894	530	525	856	1428	-	-	1383	-	-
Mov Cap-2 Maneuver	524	522	-	530	525	-	-	-	-	-	-	-
Stage 1	813	745	-	769	710	-	-	-	-	-	-	-
Stage 2	735	705	-	788	743	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11	11.9	0.7	0.6
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1428	-	-	627	560	1383	-	-
HCM Lane V/C Ratio	0.013	-	-	0.042	0.063	0.009	-	-
HCM Control Delay (s)	7.6	0	-	11	11.9	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-

Intersection	
Int Delay, s/veh	3.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	68	62	145	60	50	127
Future Vol, veh/h	68	62	145	60	50	127
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	72	65	153	63	53	134

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	423	184	0	0	216	0
Stage 1	184	-	-	-	-	-
Stage 2	239	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	588	858	-	-	1354	-
Stage 1	848	-	-	-	-	-
Stage 2	801	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	563	858	-	-	1354	-
Mov Cap-2 Maneuver	563	-	-	-	-	-
Stage 1	848	-	-	-	-	-
Stage 2	767	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.7	0	2.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	673	1354	-
HCM Lane V/C Ratio	-	-	0.203	0.039	-
HCM Control Delay (s)	-	-	11.7	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.8	0.1	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	67	35	12	133	132	64
Future Vol, veh/h	67	35	12	133	132	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	39	13	148	147	71

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	356	182	218	0	-	0
Stage 1	182	-	-	-	-	-
Stage 2	174	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	642	861	1352	-	-	-
Stage 1	849	-	-	-	-	-
Stage 2	856	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	636	861	1352	-	-	-
Mov Cap-2 Maneuver	636	-	-	-	-	-
Stage 1	849	-	-	-	-	-
Stage 2	847	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1352	-	699	-	-
HCM Lane V/C Ratio	0.01	-	0.162	-	-
HCM Control Delay (s)	7.7	0	11.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.6	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	883	14	8	613	84	9	26	13	60	38	126
Future Volume (veh/h)	41	883	14	8	613	84	9	26	13	60	38	126
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	43	929	15	8	645	88	9	27	14	63	40	133
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	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	66	2191	35	24	1850	252	93	216	96	130	72	175
Arrive On Green	0.04	0.61	0.61	0.01	0.59	0.58	0.20	0.20	0.19	0.20	0.20	0.19
Sat Flow, veh/h	1774	3565	58	1774	3131	427	155	1103	489	324	368	893
Grp Volume(v), veh/h	43	461	483	8	364	369	50	0	0	236	0	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1853	1774	1770	1787	1746	0	0	1585	0	0
Q Serve(g_s), s	1.6	9.3	9.3	0.3	7.2	7.3	0.0	0.0	0.0	6.6	0.0	0.0
Cycle Q Clear(g_c), s	1.6	9.3	9.3	0.3	7.2	7.3	1.6	0.0	0.0	9.5	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.24	0.18		0.28	0.27		0.56
Lane Grp Cap(c), veh/h	66	1088	1139	24	1046	1056	405	0	0	378	0	0
V/C Ratio(X)	0.65	0.42	0.42	0.33	0.35	0.35	0.12	0.00	0.00	0.62	0.00	0.00
Avail Cap(c_a), veh/h	260	1088	1139	208	1046	1056	752	0	0	710	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	32.5	6.9	6.9	33.4	7.2	7.2	22.8	0.0	0.0	26.0	0.0	0.0
Incr Delay (d2), s/veh	10.3	1.2	1.2	7.9	0.9	0.9	0.1	0.0	0.0	1.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	4.9	5.1	0.2	3.7	3.9	0.8	0.0	0.0	4.4	0.0	0.0
LnGrp Delay(d),s/veh	42.8	8.1	8.0	41.3	8.1	8.1	22.9	0.0	0.0	27.6	0.0	0.0
LnGrp LOS	D	A	A	D	A	A	C			C		
Approach Vol, veh/h		987			741			50			236	
Approach Delay, s/veh		9.6			8.5			22.9			27.6	
Approach LOS		A			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.9	46.0		17.4	6.5	44.4		17.4
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	7.5	41.5		27.5	9.5	39.5		27.5
Max Q Clear Time (g_c+I1), s	2.3	11.3		11.5	3.6	9.3		3.6
Green Ext Time (p_c), s	0.0	13.8		1.5	0.0	13.8		1.8

Intersection Summary	
HCM 2010 Ctrl Delay	11.6
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	494	134	106	365	50	119	163	68	74	156	62
Future Volume (veh/h)	68	494	134	106	365	50	119	163	68	74	156	62
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	74	537	146	115	397	54	129	177	74	80	170	67
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	379	788	213	309	964	130	589	754	641	570	715	608
Arrive On Green	0.05	0.29	0.28	0.07	0.31	0.30	0.07	0.40	0.40	0.05	0.38	0.38
Sat Flow, veh/h	1774	2755	746	1774	3134	424	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	74	344	339	115	223	228	129	177	74	80	170	67
Grp Sat Flow(s),veh/h/ln	1774	1770	1731	1774	1770	1788	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	2.2	12.9	13.1	3.3	7.5	7.6	3.2	4.7	2.2	2.0	4.6	2.0
Cycle Q Clear(g_c), s	2.2	12.9	13.1	3.3	7.5	7.6	3.2	4.7	2.2	2.0	4.6	2.0
Prop In Lane	1.00		0.43	1.00		0.24	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	379	506	495	309	544	550	589	754	641	570	715	608
V/C Ratio(X)	0.20	0.68	0.68	0.37	0.41	0.41	0.22	0.23	0.12	0.14	0.24	0.11
Avail Cap(c_a), veh/h	455	684	669	441	778	786	633	754	641	646	715	608
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	17.5	23.7	23.9	17.6	20.6	20.7	11.9	14.7	13.9	12.6	15.7	14.9
Incr Delay (d2), s/veh	0.2	1.6	1.8	0.7	0.5	0.5	0.2	0.7	0.4	0.1	0.8	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	6.5	6.5	1.6	3.7	3.8	1.5	2.6	1.0	1.0	2.5	0.9
LnGrp Delay(d),s/veh	17.7	25.4	25.6	18.3	21.1	21.2	12.1	15.4	14.3	12.8	16.5	15.2
LnGrp LOS	B	C	C	B	C	C	B	B	B	B	B	B
Approach Vol, veh/h		757			566			380			317	
Approach Delay, s/veh		24.7			20.5			14.1			15.3	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.8	34.4	8.4	25.5	8.4	32.8	6.8	27.1
Change Period (Y+Rc), s	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
Max Green Setting (Gmax), s	6.5	28.5	10.5	28.5	6.7	28.3	6.5	32.5
Max Q Clear Time (g_c+I1), s	4.0	6.7	5.3	15.1	5.2	6.6	4.2	9.6
Green Ext Time (p_c), s	0.0	2.4	0.1	5.9	0.0	2.4	0.0	7.6

Intersection Summary	
HCM 2010 Ctrl Delay	20.1
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	7	7	32	27	7	19	15	340	12	15	398	2
Future Vol, veh/h	7	7	32	27	7	19	15	340	12	15	398	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	8	35	30	8	21	16	374	13	16	437	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	695	891	220	668	886	193	440	0	0	387	0	0
Stage 1	471	471	-	413	413	-	-	-	-	-	-	-
Stage 2	224	420	-	255	473	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	329	280	784	344	282	816	1116	-	-	1168	-	-
Stage 1	542	558	-	587	592	-	-	-	-	-	-	-
Stage 2	758	588	-	727	557	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	305	270	784	313	272	816	1116	-	-	1168	-	-
Mov Cap-2 Maneuver	305	270	-	313	272	-	-	-	-	-	-	-
Stage 1	532	548	-	576	581	-	-	-	-	-	-	-
Stage 2	716	577	-	672	547	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.8	15.8	0.4	0.4
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1116	-	-	513	392	1168	-	-
HCM Lane V/C Ratio	0.015	-	-	0.099	0.149	0.014	-	-
HCM Control Delay (s)	8.3	0.1	-	12.8	15.8	8.1	0.1	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.5	0	-	-

Intersection	
Intersection Delay, s/veh	13.2
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	37	63	112	0	19	33	33	0	48	345	2
Future Vol, veh/h	0	37	63	112	0	19	33	33	0	48	345	2
Peak Hour Factor	0.92	0.88	0.88	0.88	0.92	0.88	0.88	0.88	0.92	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	42	72	127	0	22	38	38	0	55	392	2
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	13.3	11.1	13.5
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	22%	0%	17%	22%	12%	0%
Vol Thru, %	78%	99%	30%	39%	88%	88%
Vol Right, %	0%	1%	53%	39%	0%	12%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	221	175	212	85	200	200
LT Vol	48	0	37	19	23	0
Through Vol	173	173	63	33	177	177
RT Vol	0	2	112	33	0	23
Lane Flow Rate	251	198	241	97	227	227
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.446	0.346	0.406	0.176	0.4	0.391
Departure Headway (Hd)	6.402	6.283	6.072	6.562	6.351	6.21
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	559	569	590	542	564	576
Service Time	4.176	4.057	4.149	4.659	4.125	3.984
HCM Lane V/C Ratio	0.449	0.348	0.408	0.179	0.402	0.394
HCM Control Delay	14.3	12.4	13.3	11.1	13.3	13
HCM Lane LOS	B	B	B	B	B	B
HCM 95th-tile Q	2.3	1.5	2	0.6	1.9	1.8

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	23	353	23
Future Vol, veh/h	0	23	353	23
Peak Hour Factor	0.92	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	26	401	26
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	13.2
HCM LOS	B

Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	789	78	256	513	118	98	423	345	170	381	35
Future Volume (veh/h)	56	789	78	256	513	118	98	423	345	170	381	35
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	60	839	83	272	546	126	104	450	367	181	405	37
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	87	905	90	314	1161	267	141	866	387	217	944	86
Arrive On Green	0.05	0.28	0.27	0.18	0.41	0.40	0.08	0.24	0.24	0.12	0.29	0.28
Sat Flow, veh/h	1774	3254	322	1774	2859	657	1774	3539	1583	1774	3281	298
Grp Volume(v), veh/h	60	456	466	272	337	335	104	450	367	181	218	224
Grp Sat Flow(s),veh/h/ln	1774	1770	1806	1774	1770	1747	1774	1770	1583	1774	1770	1810
Q Serve(g_s), s	3.0	22.5	22.6	13.4	12.6	12.7	5.2	9.9	20.5	9.0	9.0	9.1
Cycle Q Clear(g_c), s	3.0	22.5	22.6	13.4	12.6	12.7	5.2	9.9	20.5	9.0	9.0	9.1
Prop In Lane	1.00		0.18	1.00		0.38	1.00		1.00	1.00		0.16
Lane Grp Cap(c), veh/h	87	492	502	314	718	709	141	866	387	217	509	521
V/C Ratio(X)	0.69	0.93	0.93	0.87	0.47	0.47	0.74	0.52	0.95	0.83	0.43	0.43
Avail Cap(c_a), veh/h	170	492	502	316	718	709	170	866	387	217	509	521
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.1	31.6	31.6	36.0	19.6	19.7	40.5	29.4	33.4	38.6	26.0	26.1
Incr Delay (d2), s/veh	9.4	23.9	23.5	21.6	0.5	0.5	12.8	2.2	34.2	23.4	2.6	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	1.7	14.3	14.5	8.5	6.2	6.2	3.0	5.1	12.6	5.8	4.7	4.9
LnGrp Delay(d),s/veh	51.5	55.4	55.1	57.5	20.1	20.2	53.2	31.6	67.5	62.0	28.6	28.7
LnGrp LOS	D	E	E	E	C	C	D	C	E	E	C	C
Approach Vol, veh/h		982			944			921			623	
Approach Delay, s/veh		55.1			30.9			48.4			38.3	
Approach LOS		E			C			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.0	26.0	19.9	29.0	11.1	29.9	8.4	40.5				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	10.5	21.5	15.5	24.5	8.1	23.9	8.1	31.9				
Max Q Clear Time (g_c+I1), s	11.0	22.5	15.4	24.6	7.2	11.1	5.0	14.7				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	5.8	0.0	9.7				
Intersection Summary												
HCM 2010 Ctrl Delay			43.7									
HCM 2010 LOS			D									

ALTERNATIVE 1 CONDITIONS

AM PEAK HOUR

LOS CALCULATION WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	274	105	194	578	82	125	506	215	59	393	86
Future Volume (veh/h)	67	274	105	194	578	82	125	506	215	59	393	86
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	78	319	122	226	672	95	145	588	250	69	457	100
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	1
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	110	568	213	258	962	136	176	1329	595	98	1175	526
Arrive On Green	0.06	0.23	0.22	0.15	0.31	0.30	0.10	0.38	0.38	0.06	0.33	0.33
Sat Flow, veh/h	1774	2520	946	1774	3115	440	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	78	222	219	226	381	386	145	588	250	69	457	100
Grp Sat Flow(s),veh/h/ln	1774	1770	1696	1774	1770	1785	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	3.7	9.5	9.9	10.7	16.3	16.4	6.9	10.7	10.1	3.3	8.5	3.9
Cycle Q Clear(g_c), s	3.7	9.5	9.9	10.7	16.3	16.4	6.9	10.7	10.1	3.3	8.5	3.9
Prop In Lane	1.00		0.56	1.00		0.25	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	110	399	382	258	547	552	176	1329	595	98	1175	526
V/C Ratio(X)	0.71	0.56	0.57	0.87	0.70	0.70	0.83	0.44	0.42	0.70	0.39	0.19
Avail Cap(c_a), veh/h	143	484	464	258	600	605	176	1329	595	128	1175	526
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	39.5	29.5	29.7	35.9	26.1	26.2	37.9	20.1	19.9	39.8	22.0	20.4
Incr Delay (d2), s/veh	6.4	1.7	1.9	25.7	3.7	3.7	25.0	1.1	2.2	6.2	1.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	4.8	4.8	7.1	8.5	8.6	4.6	5.4	4.7	1.8	4.3	1.8
LnGrp Delay(d),s/veh	45.9	31.2	31.6	61.6	29.8	29.9	62.9	21.1	22.1	46.0	23.0	21.2
LnGrp LOS	D	C	C	E	C	C	E	C	C	D	C	C
Approach Vol, veh/h		519			993			983			626	
Approach Delay, s/veh		33.6			37.1			27.5			25.2	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	37.2	16.0	24.3	12.0	33.5	8.8	31.5
Change Period (Y+Rc), s	4.0	5.5	4.0	5.5	4.0	5.5	4.0	5.5
Max Green Setting (Gmax), s	5.7	30.3	12.0	23.0	8.0	28.0	6.4	28.6
Max Q Clear Time (g_c+I1), s	5.3	12.7	12.7	11.9	8.9	10.5	5.7	18.4
Green Ext Time (p_c), s	0.0	10.4	0.0	7.0	0.0	10.4	0.0	6.5

Intersection Summary	
HCM 2010 Ctrl Delay	31.1
HCM 2010 LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	29	26	859	80	12	660
Future Volume (veh/h)	29	26	859	80	12	660
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1900	1863	1863
Adj Flow Rate, veh/h	33	30	987	92	14	759
Adj No. of Lanes	0	0	3	0	1	3
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	50	46	3535	329	43	4210
Arrive On Green	0.06	0.05	0.75	0.74	0.02	0.83
Sat Flow, veh/h	866	788	4902	440	1774	5253
Grp Volume(v), veh/h	64	0	706	373	14	759
Grp Sat Flow(s),veh/h/ln	1680	0	1695	1785	1774	1695
Q Serve(g_s), s	2.6	0.0	4.7	4.7	0.5	2.1
Cycle Q Clear(g_c), s	2.6	0.0	4.7	4.7	0.5	2.1
Prop In Lane	0.52	0.47		0.25	1.00	
Lane Grp Cap(c), veh/h	97	0	2531	1333	43	4210
V/C Ratio(X)	0.66	0.00	0.28	0.28	0.33	0.18
Avail Cap(c_a), veh/h	576	0	2531	1333	228	4210
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.4	0.0	2.8	2.9	33.6	1.2
Incr Delay (d2), s/veh	7.3	0.0	0.3	0.5	4.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	2.3	2.5	0.3	1.0
LnGrp Delay(d),s/veh	39.7	0.0	3.1	3.4	38.0	1.3
LnGrp LOS	D		A	A	D	A
Approach Vol, veh/h	64		1079			773
Approach Delay, s/veh	39.7		3.2			2.0
Approach LOS	D		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	5.7	56.3				62.0		8.1
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	8.5	44.5				57.5		23.5
Max Q Clear Time (g_c+I1), s	2.5	6.7				4.1		4.6
Green Ext Time (p_c), s	0.0	18.3				20.9		0.1

Intersection Summary		
HCM 2010 Ctrl Delay		3.9
HCM 2010 LOS		A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	283	140	253	769	163	189	764	202	81	633	75
Future Volume (veh/h)	75	283	140	253	769	163	189	764	202	81	633	75
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	82	308	152	275	836	177	205	830	220	88	688	82
Adj No. of Lanes	1	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	115	1079	483	365	1007	213	248	1200	537	122	947	424
Arrive On Green	0.06	0.30	0.30	0.11	0.35	0.34	0.14	0.34	0.34	0.07	0.27	0.27
Sat Flow, veh/h	1774	3539	1583	3442	2908	616	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	82	308	152	275	509	504	205	830	220	88	688	82
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1721	1770	1754	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	4.0	5.8	6.5	6.8	23.3	23.3	9.9	17.9	9.4	4.3	15.6	3.5
Cycle Q Clear(g_c), s	4.0	5.8	6.5	6.8	23.3	23.3	9.9	17.9	9.4	4.3	15.6	3.5
Prop In Lane	1.00		1.00	1.00		0.35	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	115	1079	483	365	613	608	248	1200	537	122	947	424
V/C Ratio(X)	0.72	0.29	0.31	0.75	0.83	0.83	0.83	0.69	0.41	0.72	0.73	0.19
Avail Cap(c_a), veh/h	137	1079	483	375	613	608	261	1216	544	145	983	440
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.5	23.3	23.6	38.3	26.4	26.5	36.9	25.2	22.4	40.2	29.4	24.9
Incr Delay (d2), s/veh	9.7	0.7	1.7	7.2	12.3	12.4	17.0	1.9	0.7	9.9	2.9	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	3.0	3.1	3.6	13.4	13.3	6.0	9.0	4.2	2.4	7.9	1.6
LnGrp Delay(d),s/veh	50.1	24.0	25.3	45.6	38.8	39.0	53.9	27.0	23.1	50.1	32.2	25.3
LnGrp LOS	D	C	C	D	D	D	D	C	C	D	C	C
Approach Vol, veh/h		542			1288			1255			858	
Approach Delay, s/veh		28.3			40.3			30.7			33.4	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	35.6	9.1	34.9	12.3	31.9	15.3	28.6
Change Period (Y+Rc), s	3.5	5.5	3.5	5.5	3.5	5.5	3.5	5.5
Max Green Setting (Gmax), s	6.3	29.2	6.7	29.8	9.1	26.4	12.5	24.0
Max Q Clear Time (g_c+I1), s	6.0	25.3	6.3	19.9	8.8	8.5	11.9	17.6
Green Ext Time (p_c), s	0.0	3.2	0.0	8.2	0.0	11.6	0.0	5.5

Intersection Summary	
HCM 2010 Ctrl Delay	34.1
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	461	43	46	779	61	49	42	25	48	75	62
Future Volume (veh/h)	71	461	43	46	779	61	49	42	25	48	75	62
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	76	496	46	49	838	66	53	45	27	52	81	67
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	482	2351	217	674	2386	188	160	127	59	119	134	96
Arrive On Green	0.72	0.72	0.71	0.72	0.72	0.71	0.17	0.17	0.16	0.17	0.17	0.16
Sat Flow, veh/h	614	3276	303	860	3324	262	518	741	347	327	784	560
Grp Volume(v), veh/h	76	267	275	49	446	458	125	0	0	200	0	0
Grp Sat Flow(s),veh/h/ln	614	1770	1809	860	1770	1817	1606	0	0	1672	0	0
Q Serve(g_s), s	3.8	3.6	3.6	1.4	6.8	6.8	0.0	0.0	0.0	3.2	0.0	0.0
Cycle Q Clear(g_c), s	10.7	3.6	3.6	5.1	6.8	6.8	4.7	0.0	0.0	7.9	0.0	0.0
Prop In Lane	1.00		0.17	1.00		0.14	0.42		0.22	0.26		0.33
Lane Grp Cap(c), veh/h	482	1270	1299	674	1270	1304	346	0	0	349	0	0
V/C Ratio(X)	0.16	0.21	0.21	0.07	0.35	0.35	0.36	0.00	0.00	0.57	0.00	0.00
Avail Cap(c_a), veh/h	482	1270	1299	674	1270	1304	723	0	0	755	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.8	3.4	3.4	4.2	3.8	3.8	26.6	0.0	0.0	27.9	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.4	0.4	0.0	0.2	0.2	0.6	0.0	0.0	1.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	1.8	1.9	0.3	3.3	3.4	2.3	0.0	0.0	3.9	0.0	0.0
LnGrp Delay(d),s/veh	6.5	3.7	3.8	4.3	4.0	4.0	27.2	0.0	0.0	29.4	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C			C		
Approach Vol, veh/h		618			953			125			200	
Approach Delay, s/veh		4.1			4.0			27.2			29.4	
Approach LOS		A			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		56.0		15.8		56.0		15.8
Change Period (Y+Rc), s		5.0		4.0		5.0		4.0
Max Green Setting (Gmax), s		51.0		30.0		51.0		30.0
Max Q Clear Time (g_c+I1), s		12.7		9.9		8.8		6.7
Green Ext Time (p_c), s		14.1		1.9		14.5		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	8.2
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	8	3	13	5	6	7	9	109	7	6	145	3
Future Vol, veh/h	8	3	13	5	6	7	9	109	7	6	145	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	3	14	5	6	8	10	117	8	6	156	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	317	314	158	319	312	121	159	0	0	125	0	0
Stage 1	170	170	-	140	140	-	-	-	-	-	-	-
Stage 2	147	144	-	179	172	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	636	601	887	634	603	930	1420	-	-	1462	-	-
Stage 1	832	758	-	863	781	-	-	-	-	-	-	-
Stage 2	856	778	-	823	756	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	619	593	887	615	595	930	1420	-	-	1462	-	-
Mov Cap-2 Maneuver	619	593	-	615	595	-	-	-	-	-	-	-
Stage 1	825	754	-	856	775	-	-	-	-	-	-	-
Stage 2	835	772	-	803	752	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.1	10.3	0.5	0.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1420	-	-	735	699	1462	-	-
HCM Lane V/C Ratio	0.007	-	-	0.035	0.028	0.004	-	-
HCM Control Delay (s)	7.6	0	-	10.1	10.3	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	69	64	65	31	43	121
Future Volume (veh/h)	69	64	65	31	43	121
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1900	1900	1863
Adj Flow Rate, veh/h	78	73	74	35	49	138
Adj No. of Lanes	0	0	1	0	0	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	130	122	371	176	363	446
Arrive On Green	0.15	0.15	0.31	0.31	0.31	0.31
Sat Flow, veh/h	861	806	1197	566	293	1436
Grp Volume(v), veh/h	152	0	0	109	187	0
Grp Sat Flow(s),veh/h/ln	1678	0	0	1763	1729	0
Q Serve(g_s), s	1.4	0.0	0.0	0.8	0.0	0.0
Cycle Q Clear(g_c), s	1.4	0.0	0.0	0.8	1.3	0.0
Prop In Lane	0.51	0.48		0.32	0.26	
Lane Grp Cap(c), veh/h	254	0	0	547	808	0
V/C Ratio(X)	0.60	0.00	0.00	0.20	0.23	0.00
Avail Cap(c_a), veh/h	3662	0	0	4691	4720	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.6	0.0	0.0	4.2	4.4	0.0
Incr Delay (d2), s/veh	2.3	0.0	0.0	0.2	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.0	0.4	0.7	0.0
LnGrp Delay(d),s/veh	8.9	0.0	0.0	4.4	4.6	0.0
LnGrp LOS	A			A	A	
Approach Vol, veh/h	152		109			187
Approach Delay, s/veh	8.9		4.4			4.6
Approach LOS	A		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		9.7				9.7		7.0
Change Period (Y+Rc), s		4.5				4.5		4.5
Max Green Setting (Gmax), s		44.5				44.5		36.5
Max Q Clear Time (g_c+I1), s		2.8				3.3		3.4
Green Ext Time (p_c), s		1.9				1.9		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	6.0
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	453	22	5	1020	91	37	6	10	28	21	132
Future Volume (veh/h)	37	453	22	5	1020	91	37	6	10	28	21	132
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	40	492	24	5	1109	99	40	7	11	30	23	143
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	2263	110	19	2088	186	210	40	39	83	45	192
Arrive On Green	0.03	0.66	0.65	0.01	0.64	0.63	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	1774	3436	167	1774	3287	293	768	245	237	158	275	1169
Grp Volume(v), veh/h	40	253	263	5	597	611	58	0	0	196	0	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1833	1774	1770	1811	1250	0	0	1602	0	0
Q Serve(g_s), s	1.6	4.1	4.1	0.2	13.4	13.5	0.0	0.0	0.0	4.3	0.0	0.0
Cycle Q Clear(g_c), s	1.6	4.1	4.1	0.2	13.4	13.5	2.7	0.0	0.0	8.4	0.0	0.0
Prop In Lane	1.00		0.09	1.00		0.16	0.69		0.19	0.15		0.73
Lane Grp Cap(c), veh/h	61	1166	1208	19	1124	1150	290	0	0	321	0	0
V/C Ratio(X)	0.65	0.22	0.22	0.26	0.53	0.53	0.20	0.00	0.00	0.61	0.00	0.00
Avail Cap(c_a), veh/h	171	1166	1208	147	1124	1150	530	0	0	606	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	34.5	4.9	4.9	35.5	7.3	7.3	26.3	0.0	0.0	28.9	0.0	0.0
Incr Delay (d2), s/veh	11.1	0.4	0.4	6.9	1.8	1.8	0.3	0.0	0.0	1.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	2.1	2.2	0.1	7.0	7.2	1.0	0.0	0.0	3.9	0.0	0.0
LnGrp Delay(d),s/veh	45.6	5.3	5.3	42.4	9.1	9.1	26.6	0.0	0.0	30.8	0.0	0.0
LnGrp LOS	D	A	A	D	A	A	C			C		
Approach Vol, veh/h		556			1213			58			196	
Approach Delay, s/veh		8.2			9.2			26.6			30.8	
Approach LOS		A			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.8	51.7		15.9	6.5	50.0		15.9
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	5.5	46.5		24.5	6.5	45.5		24.5
Max Q Clear Time (g_c+I1), s	2.2	6.1		10.4	3.6	15.5		4.7
Green Ext Time (p_c), s	0.0	16.7		1.3	0.0	14.7		1.5

Intersection Summary	
HCM 2010 Ctrl Delay	11.5
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	418	82	91	667	76	187	208	31	53	160	58
Future Volume (veh/h)	32	418	82	91	667	76	187	208	31	53	160	58
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	37	480	94	105	767	87	215	239	36	61	184	67
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	240	922	180	360	1115	126	574	730	620	505	604	514
Arrive On Green	0.03	0.31	0.31	0.06	0.35	0.34	0.11	0.39	0.39	0.04	0.32	0.32
Sat Flow, veh/h	1774	2955	576	1774	3205	363	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	37	286	288	105	423	431	215	239	36	61	184	67
Grp Sat Flow(s),veh/h/ln	1774	1770	1761	1774	1770	1799	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	1.0	9.8	10.0	2.8	15.2	15.2	5.5	6.6	1.0	1.7	5.5	2.2
Cycle Q Clear(g_c), s	1.0	9.8	10.0	2.8	15.2	15.2	5.5	6.6	1.0	1.7	5.5	2.2
Prop In Lane	1.00		0.33	1.00		0.20	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	240	552	549	360	615	626	574	730	620	505	604	514
V/C Ratio(X)	0.15	0.52	0.52	0.29	0.69	0.69	0.37	0.33	0.06	0.12	0.30	0.13
Avail Cap(c_a), veh/h	357	789	785	413	789	802	667	730	620	598	604	514
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	17.6	20.9	21.0	15.3	20.7	20.7	12.7	15.7	14.0	15.4	18.7	17.6
Incr Delay (d2), s/veh	0.3	0.8	0.8	0.4	1.7	1.7	0.4	1.2	0.2	0.1	1.3	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	4.9	4.9	1.4	7.7	7.8	2.7	3.6	0.5	0.8	3.0	1.0
LnGrp Delay(d),s/veh	17.9	21.7	21.8	15.7	22.4	22.5	13.1	16.9	14.2	15.5	20.0	18.2
LnGrp LOS	B	C	C	B	C	C	B	B	B	B	C	B
Approach Vol, veh/h		611			959			490			312	
Approach Delay, s/veh		21.5			21.7			15.0			18.7	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.1	33.0	7.8	27.1	11.1	28.0	5.1	29.7
Change Period (Y+Rc), s	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
Max Green Setting (Gmax), s	6.5	28.5	6.5	32.5	11.5	23.5	6.5	32.5
Max Q Clear Time (g_c+I1), s	3.7	8.6	4.8	12.0	7.5	7.5	3.0	17.2
Green Ext Time (p_c), s	0.0	2.7	0.0	9.5	0.2	2.5	0.0	8.0

Intersection Summary	
HCM 2010 Ctrl Delay	19.9
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	4	4	10	14	6	18	18	407	4	5	337	4
Future Vol, veh/h	4	4	10	14	6	18	18	407	4	5	337	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	4	11	16	7	20	20	452	4	6	374	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	657	885	189	695	884	228	379	0	0	457	0	0
Stage 1	388	388	-	494	494	-	-	-	-	-	-	-
Stage 2	269	497	-	201	390	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	350	282	821	329	283	775	1176	-	-	1100	-	-
Stage 1	607	607	-	526	545	-	-	-	-	-	-	-
Stage 2	713	543	-	782	606	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	327	274	821	313	275	775	1176	-	-	1100	-	-
Mov Cap-2 Maneuver	327	274	-	313	275	-	-	-	-	-	-	-
Stage 1	593	603	-	514	532	-	-	-	-	-	-	-
Stage 2	670	531	-	760	602	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.2	14.5	0.4	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1176	-	-	461	423	1100	-	-
HCM Lane V/C Ratio	0.017	-	-	0.043	0.1	0.005	-	-
HCM Control Delay (s)	8.1	0.1	-	13.2	14.5	8.3	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.3	0	-	-

Intersection	
Intersection Delay, s/veh	11.5
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	17	34	66	0	8	35	51	0	54	396	2
Future Vol, veh/h	0	17	34	66	0	8	35	51	0	54	396	2
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	19	37	73	0	9	38	56	0	59	435	2
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	10.4	10.2	12.4
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	21%	0%	15%	9%	11%	0%
Vol Thru, %	79%	99%	29%	37%	89%	92%
Vol Right, %	0%	1%	56%	54%	0%	8%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	252	200	117	94	167	161
LT Vol	54	0	17	8	19	0
Through Vol	198	198	34	35	148	148
RT Vol	0	2	66	51	0	13
Lane Flow Rate	277	220	129	103	183	176
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.447	0.348	0.209	0.169	0.302	0.285
Departure Headway (Hd)	5.816	5.7	5.84	5.903	5.933	5.818
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	620	631	613	606	606	617
Service Time	3.55	3.434	3.885	3.952	3.671	3.556
HCM Lane V/C Ratio	0.447	0.349	0.21	0.17	0.302	0.285
HCM Control Delay	13.2	11.5	10.4	10.2	11.2	10.9
HCM Lane LOS	B	B	B	B	B	B
HCM 95th-tile Q	2.3	1.6	0.8	0.6	1.3	1.2

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	19	295	13
Future Vol, veh/h	0	19	295	13
Peak Hour Factor	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	21	324	14
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	11.1
HCM LOS	B

Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	366	31	273	950	138	138	435	292	86	345	32
Future Volume (veh/h)	39	366	31	273	950	138	138	435	292	86	345	32
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	42	394	33	294	1022	148	148	468	314	92	371	34
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	77	792	66	345	1213	175	193	1073	480	128	874	80
Arrive On Green	0.04	0.24	0.23	0.19	0.39	0.38	0.11	0.30	0.30	0.07	0.27	0.26
Sat Flow, veh/h	1774	3308	276	1774	3104	449	1774	3539	1583	1774	3281	299
Grp Volume(v), veh/h	42	210	217	294	582	588	148	468	314	92	199	206
Grp Sat Flow(s),veh/h/ln	1774	1770	1814	1774	1770	1783	1774	1770	1583	1774	1770	1810
Q Serve(g_s), s	1.9	8.6	8.7	13.4	25.0	25.1	6.8	8.9	14.4	4.3	7.8	7.9
Cycle Q Clear(g_c), s	1.9	8.6	8.7	13.4	25.0	25.1	6.8	8.9	14.4	4.3	7.8	7.9
Prop In Lane	1.00		0.15	1.00		0.25	1.00		1.00	1.00		0.17
Lane Grp Cap(c), veh/h	77	423	434	345	691	697	193	1073	480	128	472	482
V/C Ratio(X)	0.55	0.50	0.50	0.85	0.84	0.84	0.77	0.44	0.65	0.72	0.42	0.43
Avail Cap(c_a), veh/h	119	423	434	445	739	745	254	1073	480	169	472	482
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	39.3	27.5	27.6	32.6	23.2	23.3	36.3	23.4	25.4	38.0	25.4	25.5
Incr Delay (d2), s/veh	6.0	0.9	0.9	11.9	8.3	8.3	9.8	1.3	6.8	9.5	2.8	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	4.3	4.5	7.7	13.7	13.9	3.9	4.5	7.2	2.4	4.2	4.3
LnGrp Delay(d),s/veh	45.3	28.4	28.5	44.5	31.5	31.6	46.1	24.7	32.2	47.6	28.2	28.2
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		469			1464			930			497	
Approach Delay, s/veh		29.9			34.1			30.6			31.8	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	29.4	20.3	24.0	13.1	26.3	7.6	36.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.5	24.9	20.5	19.1	11.5	20.9	5.1	34.5
Max Q Clear Time (g_c+I1), s	6.3	16.4	15.4	10.7	8.8	9.9	3.9	27.1
Green Ext Time (p_c), s	0.0	4.2	0.4	5.9	0.1	5.0	0.0	5.1

Intersection Summary	
HCM 2010 Ctrl Delay	32.2
HCM 2010 LOS	C

AECOM

ALTERNATIVE 1 CONDITIONS

PM PEAK HOUR

LOS CALCULATION WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	433	108	223	257	54	69	358	275	65	310	43
Future Volume (veh/h)	92	433	108	223	257	54	69	358	275	65	310	43
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	99	466	116	240	276	58	74	385	296	70	333	46
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	136	660	163	285	930	193	105	1228	549	100	1218	545
Arrive On Green	0.08	0.23	0.23	0.16	0.32	0.31	0.06	0.35	0.35	0.06	0.34	0.34
Sat Flow, veh/h	1774	2814	696	1774	2921	605	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	99	292	290	240	166	168	74	385	296	70	333	46
Grp Sat Flow(s),veh/h/ln	1774	1770	1740	1774	1770	1756	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	4.6	12.7	12.9	11.1	5.9	6.1	3.5	6.7	12.7	3.3	5.7	1.7
Cycle Q Clear(g_c), s	4.6	12.7	12.9	11.1	5.9	6.1	3.5	6.7	12.7	3.3	5.7	1.7
Prop In Lane	1.00		0.40	1.00		0.34	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	136	415	408	285	563	559	105	1228	549	100	1218	545
V/C Ratio(X)	0.73	0.70	0.71	0.84	0.29	0.30	0.70	0.31	0.54	0.70	0.27	0.08
Avail Cap(c_a), veh/h	223	493	485	305	575	571	126	1228	549	126	1218	545
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	38.1	29.6	29.7	34.3	21.6	21.7	38.9	20.2	22.1	39.1	20.0	18.7
Incr Delay (d2), s/veh	2.8	4.3	4.7	16.5	0.4	0.4	9.1	0.7	3.8	7.2	0.6	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	6.7	6.7	6.7	3.0	3.0	2.0	3.4	6.1	1.8	2.9	0.8
LnGrp Delay(d),s/veh	40.8	33.9	34.4	50.9	22.0	22.2	48.1	20.8	25.9	46.3	20.6	19.0
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	B
Approach Vol, veh/h		681			574			755			449	
Approach Delay, s/veh		35.1			34.1			25.5			24.4	
Approach LOS		D			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	34.2	17.0	24.8	8.5	34.0	10.0	31.8
Change Period (Y+Rc), s	4.0	5.5	4.0	5.5	4.0	5.5	4.0	5.5
Max Green Setting (Gmax), s	5.5	28.5	14.0	23.0	5.5	28.5	10.1	26.9
Max Q Clear Time (g_c+I1), s	5.3	14.7	13.1	14.9	5.5	7.7	6.6	8.1
Green Ext Time (p_c), s	0.0	6.8	0.0	4.3	0.0	8.5	0.0	7.5

Intersection Summary	
HCM 2010 Ctrl Delay	30.0
HCM 2010 LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	76	90	640	110	11	793
Future Volume (veh/h)	76	90	640	110	11	793
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1900	1863	1863
Adj Flow Rate, veh/h	87	103	736	126	13	911
Adj No. of Lanes	0	0	3	0	1	3
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	114	135	2863	486	41	3735
Arrive On Green	0.15	0.14	0.65	0.65	0.02	0.73
Sat Flow, veh/h	759	899	4547	743	1774	5253
Grp Volume(v), veh/h	191	0	568	294	13	911
Grp Sat Flow(s),veh/h/ln	1666	0	1695	1732	1774	1695
Q Serve(g_s), s	7.6	0.0	4.8	4.9	0.5	4.0
Cycle Q Clear(g_c), s	7.6	0.0	4.8	4.9	0.5	4.0
Prop In Lane	0.46	0.54		0.43	1.00	
Lane Grp Cap(c), veh/h	250	0	2216	1132	41	3735
V/C Ratio(X)	0.76	0.00	0.26	0.26	0.32	0.24
Avail Cap(c_a), veh/h	744	0	2216	1132	230	3735
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	0.0	5.0	5.1	33.4	3.0
Incr Delay (d2), s/veh	4.8	0.0	0.3	0.6	4.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	0.0	2.3	2.5	0.3	1.9
LnGrp Delay(d),s/veh	33.2	0.0	5.3	5.6	37.7	3.1
LnGrp LOS	C		A	A	D	A
Approach Vol, veh/h	191		862			924
Approach Delay, s/veh	33.2		5.4			3.6
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	5.6	49.4				55.0		14.4
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	8.5	37.5				50.5		30.5
Max Q Clear Time (g_c+I1), s	2.5	6.9				6.0		9.6
Green Ext Time (p_c), s	0.0	15.8				18.7		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	7.3
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	106	681	246	326	399	99	168	625	212	128	767	106
Future Volume (veh/h)	106	681	246	326	399	99	168	625	212	128	767	106
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	113	724	262	347	424	105	179	665	226	136	816	113
Adj No. of Lanes	1	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	152	1015	454	438	926	227	223	1071	479	177	981	439
Arrive On Green	0.09	0.29	0.29	0.13	0.33	0.32	0.13	0.30	0.30	0.10	0.28	0.28
Sat Flow, veh/h	1774	3539	1583	3442	2818	692	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	113	724	262	347	265	264	179	665	226	136	816	113
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1721	1770	1741	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	5.4	16.0	12.3	8.5	10.3	10.5	8.6	14.1	10.1	6.5	18.9	4.8
Cycle Q Clear(g_c), s	5.4	16.0	12.3	8.5	10.3	10.5	8.6	14.1	10.1	6.5	18.9	4.8
Prop In Lane	1.00		1.00	1.00		0.40	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	152	1015	454	438	581	572	223	1071	479	177	981	439
V/C Ratio(X)	0.75	0.71	0.58	0.79	0.46	0.46	0.80	0.62	0.47	0.77	0.83	0.26
Avail Cap(c_a), veh/h	179	1015	454	474	581	572	254	1096	490	203	994	445
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	39.0	27.9	26.6	36.9	23.1	23.3	37.1	26.1	24.7	38.3	29.6	24.5
Incr Delay (d2), s/veh	10.3	4.3	5.3	7.4	2.6	2.7	13.1	1.2	1.0	11.8	6.3	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	8.4	6.1	4.5	5.4	5.4	5.0	7.0	4.5	3.8	10.0	2.2
LnGrp Delay(d),s/veh	49.2	32.2	31.9	44.3	25.7	25.9	50.2	27.3	25.8	50.0	35.9	25.0
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	D	C
Approach Vol, veh/h		1099			876			1070			1065	
Approach Delay, s/veh		33.8			33.2			30.8			36.6	
Approach LOS		C			C			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.5	33.6	11.7	31.4	14.1	30.0	13.9	29.2
Change Period (Y+Rc), s	3.5	5.5	3.5	5.5	3.5	5.5	3.5	5.5
Max Green Setting (Gmax), s	8.3	27.7	9.5	26.5	11.5	24.5	12.0	24.0
Max Q Clear Time (g_c+I1), s	7.4	12.5	8.5	16.1	10.5	18.0	10.6	20.9
Green Ext Time (p_c), s	0.0	10.2	0.0	8.5	0.1	5.1	0.0	2.8

Intersection Summary	
HCM 2010 Ctrl Delay	33.6
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	127	610	46	30	485	56	67	13	39	41	75	58
Future Volume (veh/h)	127	610	46	30	485	56	67	13	39	41	75	58
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	138	663	50	33	527	61	73	14	42	45	82	63
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	652	2406	181	581	2306	266	197	48	80	112	139	93
Arrive On Green	0.72	0.72	0.71	0.72	0.72	0.71	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	825	3337	251	734	3198	369	708	292	483	294	842	563
Grp Volume(v), veh/h	138	351	362	33	291	297	129	0	0	190	0	0
Grp Sat Flow(s),veh/h/ln	825	1770	1818	734	1770	1798	1483	0	0	1699	0	0
Q Serve(g_s), s	4.7	4.8	4.9	1.1	3.8	3.9	0.0	0.0	0.0	1.9	0.0	0.0
Cycle Q Clear(g_c), s	8.6	4.8	4.9	6.0	3.8	3.9	5.3	0.0	0.0	7.1	0.0	0.0
Prop In Lane	1.00		0.14	1.00		0.21	0.57		0.33	0.24		0.33
Lane Grp Cap(c), veh/h	652	1276	1311	581	1276	1296	325	0	0	344	0	0
V/C Ratio(X)	0.21	0.28	0.28	0.06	0.23	0.23	0.40	0.00	0.00	0.55	0.00	0.00
Avail Cap(c_a), veh/h	652	1276	1311	581	1276	1296	720	0	0	805	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.7	3.4	3.4	4.5	3.3	3.3	26.6	0.0	0.0	27.4	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.5	0.5	0.0	0.1	0.1	0.8	0.0	0.0	1.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	2.5	2.6	0.2	1.9	1.9	2.3	0.0	0.0	3.6	0.0	0.0
LnGrp Delay(d),s/veh	5.4	3.9	3.9	4.5	3.4	3.4	27.4	0.0	0.0	28.8	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C			C		
Approach Vol, veh/h		851			621			129			190	
Approach Delay, s/veh		4.2			3.4			27.4			28.8	
Approach LOS		A			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		55.0		15.0		55.0		15.0
Change Period (Y+Rc), s		5.0		4.0		5.0		4.0
Max Green Setting (Gmax), s		50.0		31.0		50.0		31.0
Max Q Clear Time (g_c+I1), s		10.6		9.1		8.0		7.3
Green Ext Time (p_c), s		12.5		1.9		12.7		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	8.2
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	7	8	10	12	16	5	17	103	10	12	141	3
Future Vol, veh/h	7	8	10	12	16	5	17	103	10	12	141	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	9	11	13	17	5	18	110	11	13	150	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	339	333	152	338	330	115	153	0	0	120	0	0
Stage 1	177	177	-	151	151	-	-	-	-	-	-	-
Stage 2	162	156	-	187	179	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	615	587	894	616	589	937	1428	-	-	1468	-	-
Stage 1	825	753	-	851	772	-	-	-	-	-	-	-
Stage 2	840	769	-	815	751	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	587	573	894	591	575	937	1428	-	-	1468	-	-
Mov Cap-2 Maneuver	587	573	-	591	575	-	-	-	-	-	-	-
Stage 1	813	745	-	839	761	-	-	-	-	-	-	-
Stage 2	805	758	-	788	743	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.6	11.2	1	0.6
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1428	-	-	674	617	1468	-	-
HCM Lane V/C Ratio	0.013	-	-	0.039	0.057	0.009	-	-
HCM Control Delay (s)	7.6	0	-	10.6	11.2	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	68	62	78	60	50	127
Future Volume (veh/h)	68	62	78	60	50	127
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1900	1900	1863
Adj Flow Rate, veh/h	72	65	82	63	53	134
Adj No. of Lanes	0	0	1	0	0	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	124	112	317	244	374	454
Arrive On Green	0.14	0.14	0.32	0.32	0.32	0.32
Sat Flow, veh/h	876	791	978	752	308	1399
Grp Volume(v), veh/h	138	0	0	145	187	0
Grp Sat Flow(s),veh/h/ln	1679	0	0	1730	1707	0
Q Serve(g_s), s	1.3	0.0	0.0	1.0	0.0	0.0
Cycle Q Clear(g_c), s	1.3	0.0	0.0	1.0	1.3	0.0
Prop In Lane	0.52	0.47		0.43	0.28	
Lane Grp Cap(c), veh/h	237	0	0	561	828	0
V/C Ratio(X)	0.58	0.00	0.00	0.26	0.23	0.00
Avail Cap(c_a), veh/h	3440	0	0	4776	4799	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.8	0.0	0.0	4.2	4.3	0.0
Incr Delay (d2), s/veh	2.3	0.0	0.0	0.2	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	0.5	0.7	0.0
LnGrp Delay(d),s/veh	9.0	0.0	0.0	4.4	4.4	0.0
LnGrp LOS	A			A	A	
Approach Vol, veh/h	138		145			187
Approach Delay, s/veh	9.0		4.4			4.4
Approach LOS	A		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		10.0				10.0		6.9
Change Period (Y+Rc), s		4.5				4.5		4.5
Max Green Setting (Gmax), s		46.5				46.5		34.5
Max Q Clear Time (g_c+I1), s		3.0				3.3		3.3
Green Ext Time (p_c), s		2.2				2.2		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	5.8
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	883	49	8	613	84	21	26	13	60	3	190
Future Volume (veh/h)	41	883	49	8	613	84	21	26	13	60	3	190
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	43	929	52	8	645	88	22	27	14	63	3	200
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	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	66	2034	114	24	1794	244	155	176	75	124	24	256
Arrive On Green	0.04	0.60	0.59	0.01	0.57	0.57	0.22	0.22	0.21	0.22	0.22	0.21
Sat Flow, veh/h	1774	3408	191	1774	3131	427	391	804	341	277	108	1169
Grp Volume(v), veh/h	43	482	499	8	364	369	63	0	0	266	0	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1829	1774	1770	1787	1536	0	0	1554	0	0
Q Serve(g_s), s	1.7	10.6	10.6	0.3	7.8	7.8	0.0	0.0	0.0	7.7	0.0	0.0
Cycle Q Clear(g_c), s	1.7	10.6	10.6	0.3	7.8	7.8	2.0	0.0	0.0	11.3	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.24	0.35		0.22	0.24		0.75
Lane Grp Cap(c), veh/h	66	1056	1092	24	1014	1024	406	0	0	404	0	0
V/C Ratio(X)	0.65	0.46	0.46	0.34	0.36	0.36	0.16	0.00	0.00	0.66	0.00	0.00
Avail Cap(c_a), veh/h	252	1056	1092	202	1014	1024	673	0	0	677	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	33.4	7.9	7.9	34.4	8.1	8.1	22.3	0.0	0.0	25.9	0.0	0.0
Incr Delay (d2), s/veh	10.5	1.4	1.4	8.3	1.0	1.0	0.2	0.0	0.0	1.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	5.5	5.7	0.2	4.0	4.1	1.0	0.0	0.0	5.1	0.0	0.0
LnGrp Delay(d),s/veh	43.9	9.3	9.3	42.7	9.1	9.1	22.4	0.0	0.0	27.8	0.0	0.0
LnGrp LOS	D	A	A	D	A	A	C			C		
Approach Vol, veh/h		1024			741			63			266	
Approach Delay, s/veh		10.7			9.4			22.4			27.8	
Approach LOS		B			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.9	46.0		19.4	6.6	44.3		19.4
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	7.5	41.5		27.5	9.5	39.5		27.5
Max Q Clear Time (g_c+I1), s	2.3	12.6		13.3	3.7	9.8		4.0
Green Ext Time (p_c), s	0.0	13.9		1.7	0.0	14.1		2.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.8
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	494	134	106	365	50	119	163	68	74	156	62
Future Volume (veh/h)	68	494	134	106	365	50	119	163	68	74	156	62
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	74	537	146	115	397	54	129	177	74	80	170	67
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	379	788	213	309	964	130	589	754	641	570	715	608
Arrive On Green	0.05	0.29	0.28	0.07	0.31	0.30	0.07	0.40	0.40	0.05	0.38	0.38
Sat Flow, veh/h	1774	2755	746	1774	3134	424	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	74	344	339	115	223	228	129	177	74	80	170	67
Grp Sat Flow(s),veh/h/ln	1774	1770	1731	1774	1770	1788	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	2.2	12.9	13.1	3.3	7.5	7.6	3.2	4.7	2.2	2.0	4.6	2.0
Cycle Q Clear(g_c), s	2.2	12.9	13.1	3.3	7.5	7.6	3.2	4.7	2.2	2.0	4.6	2.0
Prop In Lane	1.00		0.43	1.00		0.24	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	379	506	495	309	544	550	589	754	641	570	715	608
V/C Ratio(X)	0.20	0.68	0.68	0.37	0.41	0.41	0.22	0.23	0.12	0.14	0.24	0.11
Avail Cap(c_a), veh/h	455	684	669	441	778	786	633	754	641	646	715	608
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	17.5	23.7	23.9	17.6	20.6	20.7	11.9	14.7	13.9	12.6	15.7	14.9
Incr Delay (d2), s/veh	0.2	1.6	1.8	0.7	0.5	0.5	0.2	0.7	0.4	0.1	0.8	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	6.5	6.5	1.6	3.7	3.8	1.5	2.6	1.0	1.0	2.5	0.9
LnGrp Delay(d),s/veh	17.7	25.4	25.6	18.3	21.1	21.2	12.1	15.4	14.3	12.8	16.5	15.2
LnGrp LOS	B	C	C	B	C	C	B	B	B	B	B	B
Approach Vol, veh/h		757			566			380			317	
Approach Delay, s/veh		24.7			20.5			14.1			15.3	
Approach LOS		C			C			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.8	34.4	8.4	25.5	8.4	32.8	6.8	27.1				
Change Period (Y+Rc), s	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5				
Max Green Setting (Gmax), s	6.5	28.5	10.5	28.5	6.7	28.3	6.5	32.5				
Max Q Clear Time (g_c+I1), s	4.0	6.7	5.3	15.1	5.2	6.6	4.2	9.6				
Green Ext Time (p_c), s	0.0	2.4	0.1	5.9	0.0	2.4	0.0	7.6				
Intersection Summary												
HCM 2010 Ctrl Delay			20.1									
HCM 2010 LOS			C									

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	7	7	32	27	7	19	15	340	12	15	398	2
Future Vol, veh/h	7	7	32	27	7	19	15	340	12	15	398	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	8	35	30	8	21	16	374	13	16	437	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	695	891	220	668	886	193	440	0	0	387	0	0
Stage 1	471	471	-	413	413	-	-	-	-	-	-	-
Stage 2	224	420	-	255	473	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	329	280	784	344	282	816	1116	-	-	1168	-	-
Stage 1	542	558	-	587	592	-	-	-	-	-	-	-
Stage 2	758	588	-	727	557	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	305	270	784	313	272	816	1116	-	-	1168	-	-
Mov Cap-2 Maneuver	305	270	-	313	272	-	-	-	-	-	-	-
Stage 1	532	548	-	576	581	-	-	-	-	-	-	-
Stage 2	716	577	-	672	547	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.8	15.8	0.4	0.4
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1116	-	-	513	392	1168	-	-
HCM Lane V/C Ratio	0.015	-	-	0.099	0.149	0.014	-	-
HCM Control Delay (s)	8.3	0.1	-	12.8	15.8	8.1	0.1	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.5	0	-	-

Intersection	
Intersection Delay, s/veh	13.2
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	37	63	112	0	19	33	33	0	48	345	2
Future Vol, veh/h	0	37	63	112	0	19	33	33	0	48	345	2
Peak Hour Factor	0.92	0.88	0.88	0.88	0.92	0.88	0.88	0.88	0.92	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	42	72	127	0	22	38	38	0	55	392	2
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	13.3	11.1	13.5
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	22%	0%	17%	22%	12%	0%
Vol Thru, %	78%	99%	30%	39%	88%	88%
Vol Right, %	0%	1%	53%	39%	0%	12%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	221	175	212	85	200	200
LT Vol	48	0	37	19	23	0
Through Vol	173	173	63	33	177	177
RT Vol	0	2	112	33	0	23
Lane Flow Rate	251	198	241	97	227	227
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.446	0.346	0.406	0.176	0.4	0.391
Departure Headway (Hd)	6.402	6.283	6.072	6.562	6.351	6.21
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	559	569	590	542	564	576
Service Time	4.176	4.057	4.149	4.659	4.125	3.984
HCM Lane V/C Ratio	0.449	0.348	0.408	0.179	0.402	0.394
HCM Control Delay	14.3	12.4	13.3	11.1	13.3	13
HCM Lane LOS	B	B	B	B	B	B
HCM 95th-tile Q	2.3	1.5	2	0.6	1.9	1.8

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	23	353	23
Future Vol, veh/h	0	23	353	23
Peak Hour Factor	0.92	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	26	401	26
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	13.2
HCM LOS	B

Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	789	78	256	513	118	98	423	345	170	381	35
Future Volume (veh/h)	56	789	78	256	513	118	98	423	345	170	381	35
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	60	839	83	272	546	126	104	450	367	181	405	37
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	87	905	90	314	1161	267	141	866	387	217	944	86
Arrive On Green	0.05	0.28	0.27	0.18	0.41	0.40	0.08	0.24	0.24	0.12	0.29	0.28
Sat Flow, veh/h	1774	3254	322	1774	2859	657	1774	3539	1583	1774	3281	298
Grp Volume(v), veh/h	60	456	466	272	337	335	104	450	367	181	218	224
Grp Sat Flow(s),veh/h/ln	1774	1770	1806	1774	1770	1747	1774	1770	1583	1774	1770	1810
Q Serve(g_s), s	3.0	22.5	22.6	13.4	12.6	12.7	5.2	9.9	20.5	9.0	9.0	9.1
Cycle Q Clear(g_c), s	3.0	22.5	22.6	13.4	12.6	12.7	5.2	9.9	20.5	9.0	9.0	9.1
Prop In Lane	1.00		0.18	1.00		0.38	1.00		1.00	1.00		0.16
Lane Grp Cap(c), veh/h	87	492	502	314	718	709	141	866	387	217	509	521
V/C Ratio(X)	0.69	0.93	0.93	0.87	0.47	0.47	0.74	0.52	0.95	0.83	0.43	0.43
Avail Cap(c_a), veh/h	170	492	502	316	718	709	170	866	387	217	509	521
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.1	31.6	31.6	36.0	19.6	19.7	40.5	29.4	33.4	38.6	26.0	26.1
Incr Delay (d2), s/veh	9.4	23.9	23.5	21.6	0.5	0.5	12.8	2.2	34.2	23.4	2.6	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	1.7	14.3	14.5	8.5	6.2	6.2	3.0	5.1	12.6	5.8	4.7	4.9
LnGrp Delay(d),s/veh	51.5	55.4	55.1	57.5	20.1	20.2	53.2	31.6	67.5	62.0	28.6	28.7
LnGrp LOS	D	E	E	E	C	C	D	C	E	E	C	C
Approach Vol, veh/h		982			944			921			623	
Approach Delay, s/veh		55.1			30.9			48.4			38.3	
Approach LOS		E			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	26.0	19.9	29.0	11.1	29.9	8.4	40.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	21.5	15.5	24.5	8.1	23.9	8.1	31.9
Max Q Clear Time (g_c+I1), s	11.0	22.5	15.4	24.6	7.2	11.1	5.0	14.7
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	5.8	0.0	9.7

Intersection Summary	
HCM 2010 Ctrl Delay	43.7
HCM 2010 LOS	D

AECOM

ALTERNATIVE 2 CONDITIONS

AM PEAK HOUR

LOS CALCULATION WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	274	105	194	578	82	125	506	215	59	393	86
Future Volume (veh/h)	67	274	105	194	578	82	125	506	215	59	393	86
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	78	319	122	226	672	95	145	588	250	69	457	100
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	1
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	110	568	213	258	962	136	176	1329	595	98	1175	526
Arrive On Green	0.06	0.23	0.22	0.15	0.31	0.30	0.10	0.38	0.38	0.06	0.33	0.33
Sat Flow, veh/h	1774	2520	946	1774	3115	440	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	78	222	219	226	381	386	145	588	250	69	457	100
Grp Sat Flow(s),veh/h/ln	1774	1770	1696	1774	1770	1785	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	3.7	9.5	9.9	10.7	16.3	16.4	6.9	10.7	10.1	3.3	8.5	3.9
Cycle Q Clear(g_c), s	3.7	9.5	9.9	10.7	16.3	16.4	6.9	10.7	10.1	3.3	8.5	3.9
Prop In Lane	1.00		0.56	1.00		0.25	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	110	399	382	258	547	552	176	1329	595	98	1175	526
V/C Ratio(X)	0.71	0.56	0.57	0.87	0.70	0.70	0.83	0.44	0.42	0.70	0.39	0.19
Avail Cap(c_a), veh/h	143	484	464	258	600	605	176	1329	595	128	1175	526
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	39.5	29.5	29.7	35.9	26.1	26.2	37.9	20.1	19.9	39.8	22.0	20.4
Incr Delay (d2), s/veh	6.4	1.7	1.9	25.7	3.7	3.7	25.0	1.1	2.2	6.2	1.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	4.8	4.8	7.1	8.5	8.6	4.6	5.4	4.7	1.8	4.3	1.8
LnGrp Delay(d),s/veh	45.9	31.2	31.6	61.6	29.8	29.9	62.9	21.1	22.1	46.0	23.0	21.2
LnGrp LOS	D	C	C	E	C	C	E	C	C	D	C	C
Approach Vol, veh/h		519			993			983			626	
Approach Delay, s/veh		33.6			37.1			27.5			25.2	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	37.2	16.0	24.3	12.0	33.5	8.8	31.5
Change Period (Y+Rc), s	4.0	5.5	4.0	5.5	4.0	5.5	4.0	5.5
Max Green Setting (Gmax), s	5.7	30.3	12.0	23.0	8.0	28.0	6.4	28.6
Max Q Clear Time (g_c+I1), s	5.3	12.7	12.7	11.9	8.9	10.5	5.7	18.4
Green Ext Time (p_c), s	0.0	10.4	0.0	7.0	0.0	10.4	0.0	6.5

Intersection Summary	
HCM 2010 Ctrl Delay	31.1
HCM 2010 LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	29	26	859	80	12	660
Future Volume (veh/h)	29	26	859	80	12	660
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1900	1863	1863
Adj Flow Rate, veh/h	33	30	987	92	14	759
Adj No. of Lanes	0	0	3	0	1	3
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	50	46	3535	329	43	4210
Arrive On Green	0.06	0.05	0.75	0.74	0.02	0.83
Sat Flow, veh/h	866	788	4902	440	1774	5253
Grp Volume(v), veh/h	64	0	706	373	14	759
Grp Sat Flow(s),veh/h/ln	1680	0	1695	1785	1774	1695
Q Serve(g_s), s	2.6	0.0	4.7	4.7	0.5	2.1
Cycle Q Clear(g_c), s	2.6	0.0	4.7	4.7	0.5	2.1
Prop In Lane	0.52	0.47		0.25	1.00	
Lane Grp Cap(c), veh/h	97	0	2531	1333	43	4210
V/C Ratio(X)	0.66	0.00	0.28	0.28	0.33	0.18
Avail Cap(c_a), veh/h	576	0	2531	1333	228	4210
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.4	0.0	2.8	2.9	33.6	1.2
Incr Delay (d2), s/veh	7.3	0.0	0.3	0.5	4.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	2.3	2.5	0.3	1.0
LnGrp Delay(d),s/veh	39.7	0.0	3.1	3.4	38.0	1.3
LnGrp LOS	D		A	A	D	A
Approach Vol, veh/h	64		1079			773
Approach Delay, s/veh	39.7		3.2			2.0
Approach LOS	D		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	5.7	56.3				62.0		8.1
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	8.5	44.5				57.5		23.5
Max Q Clear Time (g_c+I1), s	2.5	6.7				4.1		4.6
Green Ext Time (p_c), s	0.0	18.3				20.9		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	3.9
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	283	140	253	769	163	189	764	202	81	633	75
Future Volume (veh/h)	75	283	140	253	769	163	189	764	202	81	633	75
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	82	308	152	275	836	177	205	830	220	88	688	82
Adj No. of Lanes	1	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	115	1079	483	365	1007	213	248	1200	537	122	947	424
Arrive On Green	0.06	0.30	0.30	0.11	0.35	0.34	0.14	0.34	0.34	0.07	0.27	0.27
Sat Flow, veh/h	1774	3539	1583	3442	2908	616	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	82	308	152	275	509	504	205	830	220	88	688	82
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1721	1770	1754	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	4.0	5.8	6.5	6.8	23.3	23.3	9.9	17.9	9.4	4.3	15.6	3.5
Cycle Q Clear(g_c), s	4.0	5.8	6.5	6.8	23.3	23.3	9.9	17.9	9.4	4.3	15.6	3.5
Prop In Lane	1.00		1.00	1.00		0.35	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	115	1079	483	365	613	608	248	1200	537	122	947	424
V/C Ratio(X)	0.72	0.29	0.31	0.75	0.83	0.83	0.83	0.69	0.41	0.72	0.73	0.19
Avail Cap(c_a), veh/h	137	1079	483	375	613	608	261	1216	544	145	983	440
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.5	23.3	23.6	38.3	26.4	26.5	36.9	25.2	22.4	40.2	29.4	24.9
Incr Delay (d2), s/veh	9.7	0.7	1.7	7.2	12.3	12.4	17.0	1.9	0.7	9.9	2.9	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	3.0	3.1	3.6	13.4	13.3	6.0	9.0	4.2	2.4	7.9	1.6
LnGrp Delay(d),s/veh	50.1	24.0	25.3	45.6	38.8	39.0	53.9	27.0	23.1	50.1	32.2	25.3
LnGrp LOS	D	C	C	D	D	D	D	C	C	D	C	C
Approach Vol, veh/h		542			1288			1255			858	
Approach Delay, s/veh		28.3			40.3			30.7			33.4	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	35.6	9.1	34.9	12.3	31.9	15.3	28.6
Change Period (Y+Rc), s	3.5	5.5	3.5	5.5	3.5	5.5	3.5	5.5
Max Green Setting (Gmax), s	6.3	29.2	6.7	29.8	9.1	26.4	12.5	24.0
Max Q Clear Time (g_c+I1), s	6.0	25.3	6.3	19.9	8.8	8.5	11.9	17.6
Green Ext Time (p_c), s	0.0	3.2	0.0	8.2	0.0	11.6	0.0	5.5

Intersection Summary	
HCM 2010 Ctrl Delay	34.1
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	461	43	46	779	61	49	42	25	48	75	62
Future Volume (veh/h)	71	461	43	46	779	61	49	42	25	48	75	62
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	76	496	46	49	838	66	53	45	27	52	81	67
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	482	2351	217	674	2386	188	160	127	59	119	134	96
Arrive On Green	0.72	0.72	0.71	0.72	0.72	0.71	0.17	0.17	0.16	0.17	0.17	0.16
Sat Flow, veh/h	614	3276	303	860	3324	262	518	741	347	327	784	560
Grp Volume(v), veh/h	76	267	275	49	446	458	125	0	0	200	0	0
Grp Sat Flow(s),veh/h/ln	614	1770	1809	860	1770	1817	1606	0	0	1672	0	0
Q Serve(g_s), s	3.8	3.6	3.6	1.4	6.8	6.8	0.0	0.0	0.0	3.2	0.0	0.0
Cycle Q Clear(g_c), s	10.7	3.6	3.6	5.1	6.8	6.8	4.7	0.0	0.0	7.9	0.0	0.0
Prop In Lane	1.00		0.17	1.00		0.14	0.42		0.22	0.26		0.33
Lane Grp Cap(c), veh/h	482	1270	1299	674	1270	1304	346	0	0	349	0	0
V/C Ratio(X)	0.16	0.21	0.21	0.07	0.35	0.35	0.36	0.00	0.00	0.57	0.00	0.00
Avail Cap(c_a), veh/h	482	1270	1299	674	1270	1304	723	0	0	755	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.8	3.4	3.4	4.2	3.8	3.8	26.6	0.0	0.0	27.9	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.4	0.4	0.0	0.2	0.2	0.6	0.0	0.0	1.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	1.8	1.9	0.3	3.3	3.4	2.3	0.0	0.0	3.9	0.0	0.0
LnGrp Delay(d),s/veh	6.5	3.7	3.8	4.3	4.0	4.0	27.2	0.0	0.0	29.4	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C			C		
Approach Vol, veh/h		618			953			125			200	
Approach Delay, s/veh		4.1			4.0			27.2			29.4	
Approach LOS		A			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		56.0		15.8		56.0		15.8
Change Period (Y+Rc), s		5.0		4.0		5.0		4.0
Max Green Setting (Gmax), s		51.0		30.0		51.0		30.0
Max Q Clear Time (g_c+I1), s		12.7		9.9		8.8		6.7
Green Ext Time (p_c), s		14.1		1.9		14.5		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	8.2
HCM 2010 LOS	A

Intersection												
Int Delay, s/veh	1.7											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	8	3	13	5	6	7	9	109	7	6	145	3
Future Vol, veh/h	8	3	13	5	6	7	9	109	7	6	145	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	3	14	5	6	8	10	117	8	6	156	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	317	314	158	319	312	121	159	0	0	125	0	0
Stage 1	170	170	-	140	140	-	-	-	-	-	-	-
Stage 2	147	144	-	179	172	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	636	601	887	634	603	930	1420	-	-	1462	-	-
Stage 1	832	758	-	863	781	-	-	-	-	-	-	-
Stage 2	856	778	-	823	756	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	619	593	887	615	595	930	1420	-	-	1462	-	-
Mov Cap-2 Maneuver	619	593	-	615	595	-	-	-	-	-	-	-
Stage 1	825	754	-	856	775	-	-	-	-	-	-	-
Stage 2	835	772	-	803	752	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.1	10.3	0.5	0.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1420	-	-	735	699	1462	-	-
HCM Lane V/C Ratio	0.007	-	-	0.035	0.028	0.004	-	-
HCM Control Delay (s)	7.6	0	-	10.1	10.3	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	2.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	0	64	65	31	43	121
Future Vol, veh/h	0	64	65	31	43	121
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	73	74	35	49	138

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	326	91	0	0	109	0
Stage 1	91	-	-	-	-	-
Stage 2	235	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	668	967	-	-	1481	-
Stage 1	933	-	-	-	-	-
Stage 2	804	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	644	967	-	-	1481	-
Mov Cap-2 Maneuver	644	-	-	-	-	-
Stage 1	933	-	-	-	-	-
Stage 2	775	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	967	1481	-
HCM Lane V/C Ratio	-	-	0.075	0.033	-
HCM Control Delay (s)	-	-	9	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	453	22	14	1080	91	37	6	10	28	12	72
Future Volume (veh/h)	37	453	22	14	1080	91	37	6	10	28	12	72
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	40	492	24	15	1174	99	40	7	11	30	13	78
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	62	2386	116	32	2241	189	198	38	34	98	30	113
Arrive On Green	0.03	0.69	0.69	0.02	0.68	0.67	0.11	0.11	0.10	0.11	0.11	0.10
Sat Flow, veh/h	1774	3436	167	1774	3305	278	977	344	309	293	273	1026
Grp Volume(v), veh/h	40	253	263	15	628	645	58	0	0	121	0	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1833	1774	1770	1814	1630	0	0	1591	0	0
Q Serve(g_s), s	1.5	3.5	3.5	0.6	12.0	12.1	0.0	0.0	0.0	2.9	0.0	0.0
Cycle Q Clear(g_c), s	1.5	3.5	3.5	0.6	12.0	12.1	2.1	0.0	0.0	4.9	0.0	0.0
Prop In Lane	1.00		0.09	1.00		0.15	0.69		0.19	0.25		0.64
Lane Grp Cap(c), veh/h	62	1229	1273	32	1200	1230	270	0	0	242	0	0
V/C Ratio(X)	0.65	0.21	0.21	0.46	0.52	0.52	0.21	0.00	0.00	0.50	0.00	0.00
Avail Cap(c_a), veh/h	183	1229	1273	151	1200	1230	630	0	0	642	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	32.4	3.7	3.7	33.0	5.5	5.5	27.8	0.0	0.0	29.2	0.0	0.0
Incr Delay (d2), s/veh	10.8	0.4	0.4	10.0	1.6	1.6	0.4	0.0	0.0	1.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	1.8	1.9	0.4	6.3	6.5	1.0	0.0	0.0	2.3	0.0	0.0
LnGrp Delay(d),s/veh	43.2	4.1	4.1	43.0	7.1	7.1	28.2	0.0	0.0	30.8	0.0	0.0
LnGrp LOS	D	A	A	D	A	A	C			C		
Approach Vol, veh/h		556			1288			58			121	
Approach Delay, s/veh		6.9			7.5			28.2			30.8	
Approach LOS		A			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.2	51.2		11.5	6.4	50.1		11.5
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	5.3	46.7		24.5	6.5	45.5		24.5
Max Q Clear Time (g_c+I1), s	2.6	5.5		6.9	3.5	14.1		4.1
Green Ext Time (p_c), s	0.0	17.9		0.9	0.0	15.8		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.3
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	418	82	91	667	76	187	208	31	53	160	58
Future Volume (veh/h)	32	418	82	91	667	76	187	208	31	53	160	58
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	37	480	94	105	767	87	215	239	36	61	184	67
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	240	922	180	360	1115	126	574	730	620	505	604	514
Arrive On Green	0.03	0.31	0.31	0.06	0.35	0.34	0.11	0.39	0.39	0.04	0.32	0.32
Sat Flow, veh/h	1774	2955	576	1774	3205	363	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	37	286	288	105	423	431	215	239	36	61	184	67
Grp Sat Flow(s),veh/h/ln	1774	1770	1761	1774	1770	1799	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	1.0	9.8	10.0	2.8	15.2	15.2	5.5	6.6	1.0	1.7	5.5	2.2
Cycle Q Clear(g_c), s	1.0	9.8	10.0	2.8	15.2	15.2	5.5	6.6	1.0	1.7	5.5	2.2
Prop In Lane	1.00		0.33	1.00		0.20	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	240	552	549	360	615	626	574	730	620	505	604	514
V/C Ratio(X)	0.15	0.52	0.52	0.29	0.69	0.69	0.37	0.33	0.06	0.12	0.30	0.13
Avail Cap(c_a), veh/h	357	789	785	413	789	802	667	730	620	598	604	514
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	17.6	20.9	21.0	15.3	20.7	20.7	12.7	15.7	14.0	15.4	18.7	17.6
Incr Delay (d2), s/veh	0.3	0.8	0.8	0.4	1.7	1.7	0.4	1.2	0.2	0.1	1.3	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	4.9	4.9	1.4	7.7	7.8	2.7	3.6	0.5	0.8	3.0	1.0
LnGrp Delay(d),s/veh	17.9	21.7	21.8	15.7	22.4	22.5	13.1	16.9	14.2	15.5	20.0	18.2
LnGrp LOS	B	C	C	B	C	C	B	B	B	B	C	B
Approach Vol, veh/h		611			959			490			312	
Approach Delay, s/veh		21.5			21.7			15.0			18.7	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.1	33.0	7.8	27.1	11.1	28.0	5.1	29.7
Change Period (Y+Rc), s	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
Max Green Setting (Gmax), s	6.5	28.5	6.5	32.5	11.5	23.5	6.5	32.5
Max Q Clear Time (g_c+I1), s	3.7	8.6	4.8	12.0	7.5	7.5	3.0	17.2
Green Ext Time (p_c), s	0.0	2.7	0.0	9.5	0.2	2.5	0.0	8.0

Intersection Summary	
HCM 2010 Ctrl Delay	19.9
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	4	4	10	14	6	18	18	407	4	5	337	4
Future Vol, veh/h	4	4	10	14	6	18	18	407	4	5	337	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	4	11	16	7	20	20	452	4	6	374	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	657	885	189	695	884	228	379	0	0	457	0	0
Stage 1	388	388	-	494	494	-	-	-	-	-	-	-
Stage 2	269	497	-	201	390	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	350	282	821	329	283	775	1176	-	-	1100	-	-
Stage 1	607	607	-	526	545	-	-	-	-	-	-	-
Stage 2	713	543	-	782	606	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	327	274	821	313	275	775	1176	-	-	1100	-	-
Mov Cap-2 Maneuver	327	274	-	313	275	-	-	-	-	-	-	-
Stage 1	593	603	-	514	532	-	-	-	-	-	-	-
Stage 2	670	531	-	760	602	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.2	14.5	0.4	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1176	-	-	461	423	1100	-	-
HCM Lane V/C Ratio	0.017	-	-	0.043	0.1	0.005	-	-
HCM Control Delay (s)	8.1	0.1	-	13.2	14.5	8.3	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.3	0	-	-

Intersection	
Intersection Delay, s/veh	11.9
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	17	34	87	0	43	0	51	0	54	396	2
Future Vol, veh/h	0	17	34	87	0	43	0	51	0	54	396	2
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	19	37	96	0	47	0	56	0	59	435	2
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	10.8	10.4	12.7
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	21%	0%	12%	46%	16%	0%
Vol Thru, %	79%	99%	25%	0%	84%	100%
Vol Right, %	0%	1%	63%	54%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	252	200	138	94	122	205
LT Vol	54	0	17	43	19	0
Through Vol	198	198	34	0	103	205
RT Vol	0	2	87	51	0	0
Lane Flow Rate	277	220	152	103	134	226
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.455	0.354	0.246	0.174	0.225	0.374
Departure Headway (Hd)	5.912	5.797	5.835	6.073	6.053	5.974
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	609	620	614	589	592	602
Service Time	3.652	3.536	3.886	4.129	3.798	3.719
HCM Lane V/C Ratio	0.455	0.355	0.248	0.175	0.226	0.375
HCM Control Delay	13.5	11.7	10.8	10.4	10.6	12.3
HCM Lane LOS	B	B	B	B	B	B
HCM 95th-tile Q	2.4	1.6	1	0.6	0.9	1.7

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	19	308	0
Future Vol, veh/h	0	19	308	0
Peak Hour Factor	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	21	338	0
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	11.7
HCM LOS	B

Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	366	31	273	950	138	138	435	292	86	345	101
Future Volume (veh/h)	39	366	31	273	950	138	138	435	292	86	345	101
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	42	394	33	294	1022	148	148	468	314	92	371	109
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	77	792	66	345	1213	175	193	1073	480	128	722	209
Arrive On Green	0.04	0.24	0.23	0.19	0.39	0.38	0.11	0.30	0.30	0.07	0.27	0.26
Sat Flow, veh/h	1774	3308	276	1774	3104	449	1774	3539	1583	1774	2708	786
Grp Volume(v), veh/h	42	210	217	294	582	588	148	468	314	92	241	239
Grp Sat Flow(s),veh/h/ln	1774	1770	1814	1774	1770	1783	1774	1770	1583	1774	1770	1724
Q Serve(g_s), s	1.9	8.6	8.7	13.4	25.0	25.1	6.8	8.9	14.4	4.3	9.7	9.9
Cycle Q Clear(g_c), s	1.9	8.6	8.7	13.4	25.0	25.1	6.8	8.9	14.4	4.3	9.7	9.9
Prop In Lane	1.00		0.15	1.00		0.25	1.00		1.00	1.00		0.46
Lane Grp Cap(c), veh/h	77	423	434	345	691	697	193	1073	480	128	472	460
V/C Ratio(X)	0.55	0.50	0.50	0.85	0.84	0.84	0.77	0.44	0.65	0.72	0.51	0.52
Avail Cap(c_a), veh/h	119	423	434	445	739	745	254	1073	480	169	472	460
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	39.3	27.5	27.6	32.6	23.2	23.3	36.3	23.4	25.4	38.0	26.1	26.3
Incr Delay (d2), s/veh	6.0	0.9	0.9	11.9	8.3	8.3	9.8	1.3	6.8	9.5	3.9	4.2
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	1.1	4.3	4.5	7.7	13.7	13.9	3.9	4.5	7.2	2.4	5.3	5.3
LnGrp Delay(d),s/veh	45.3	28.4	28.5	44.5	31.5	31.6	46.1	24.7	32.2	47.6	30.0	30.4
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		469			1464			930			572	
Approach Delay, s/veh		29.9			34.1			30.6			33.0	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	29.4	20.3	24.0	13.1	26.3	7.6	36.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.5	24.9	20.5	19.1	11.5	20.9	5.1	34.5
Max Q Clear Time (g_c+I1), s	6.3	16.4	15.4	10.7	8.8	11.9	3.9	27.1
Green Ext Time (p_c), s	0.0	4.5	0.4	5.9	0.1	4.7	0.0	5.1

Intersection Summary	
HCM 2010 Ctrl Delay	32.4
HCM 2010 LOS	C

ALTERNATIVE 2 CONDITIONS

PM PEAK HOUR

LOS CALCULATION WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	433	108	223	257	54	69	358	275	65	310	43
Future Volume (veh/h)	92	433	108	223	257	54	69	358	275	65	310	43
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	99	466	116	240	276	58	74	385	296	70	333	46
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	136	660	163	285	930	193	105	1228	549	100	1218	545
Arrive On Green	0.08	0.23	0.23	0.16	0.32	0.31	0.06	0.35	0.35	0.06	0.34	0.34
Sat Flow, veh/h	1774	2814	696	1774	2921	605	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	99	292	290	240	166	168	74	385	296	70	333	46
Grp Sat Flow(s),veh/h/ln	1774	1770	1740	1774	1770	1756	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	4.6	12.7	12.9	11.1	5.9	6.1	3.5	6.7	12.7	3.3	5.7	1.7
Cycle Q Clear(g_c), s	4.6	12.7	12.9	11.1	5.9	6.1	3.5	6.7	12.7	3.3	5.7	1.7
Prop In Lane	1.00		0.40	1.00		0.34	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	136	415	408	285	563	559	105	1228	549	100	1218	545
V/C Ratio(X)	0.73	0.70	0.71	0.84	0.29	0.30	0.70	0.31	0.54	0.70	0.27	0.08
Avail Cap(c_a), veh/h	223	493	485	305	575	571	126	1228	549	126	1218	545
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	38.1	29.6	29.7	34.3	21.6	21.7	38.9	20.2	22.1	39.1	20.0	18.7
Incr Delay (d2), s/veh	2.8	4.3	4.7	16.5	0.4	0.4	9.1	0.7	3.8	7.2	0.6	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	6.7	6.7	6.7	3.0	3.0	2.0	3.4	6.1	1.8	2.9	0.8
LnGrp Delay(d),s/veh	40.8	33.9	34.4	50.9	22.0	22.2	48.1	20.8	25.9	46.3	20.6	19.0
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	B
Approach Vol, veh/h		681			574			755			449	
Approach Delay, s/veh		35.1			34.1			25.5			24.4	
Approach LOS		D			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	34.2	17.0	24.8	8.5	34.0	10.0	31.8
Change Period (Y+Rc), s	4.0	5.5	4.0	5.5	4.0	5.5	4.0	5.5
Max Green Setting (Gmax), s	5.5	28.5	14.0	23.0	5.5	28.5	10.1	26.9
Max Q Clear Time (g_c+I1), s	5.3	14.7	13.1	14.9	5.5	7.7	6.6	8.1
Green Ext Time (p_c), s	0.0	6.8	0.0	4.3	0.0	8.5	0.0	7.5

Intersection Summary	
HCM 2010 Ctrl Delay	30.0
HCM 2010 LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	76	90	640	110	11	793
Future Volume (veh/h)	76	90	640	110	11	793
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1900	1863	1863
Adj Flow Rate, veh/h	87	103	736	126	13	911
Adj No. of Lanes	0	0	3	0	1	3
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	114	135	2863	486	41	3735
Arrive On Green	0.15	0.14	0.65	0.65	0.02	0.73
Sat Flow, veh/h	759	899	4547	743	1774	5253
Grp Volume(v), veh/h	191	0	568	294	13	911
Grp Sat Flow(s),veh/h/ln	1666	0	1695	1732	1774	1695
Q Serve(g_s), s	7.6	0.0	4.8	4.9	0.5	4.0
Cycle Q Clear(g_c), s	7.6	0.0	4.8	4.9	0.5	4.0
Prop In Lane	0.46	0.54		0.43	1.00	
Lane Grp Cap(c), veh/h	250	0	2216	1132	41	3735
V/C Ratio(X)	0.76	0.00	0.26	0.26	0.32	0.24
Avail Cap(c_a), veh/h	744	0	2216	1132	230	3735
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	0.0	5.0	5.1	33.4	3.0
Incr Delay (d2), s/veh	4.8	0.0	0.3	0.6	4.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	0.0	2.3	2.5	0.3	1.9
LnGrp Delay(d),s/veh	33.2	0.0	5.3	5.6	37.7	3.1
LnGrp LOS	C		A	A	D	A
Approach Vol, veh/h	191		862			924
Approach Delay, s/veh	33.2		5.4			3.6
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	5.6	49.4				55.0		14.4
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	8.5	37.5				50.5		30.5
Max Q Clear Time (g_c+I1), s	2.5	6.9				6.0		9.6
Green Ext Time (p_c), s	0.0	15.8				18.7		0.5

Intersection Summary		
HCM 2010 Ctrl Delay		7.3
HCM 2010 LOS		A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	106	681	246	326	399	99	168	625	212	128	767	106
Future Volume (veh/h)	106	681	246	326	399	99	168	625	212	128	767	106
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	113	724	262	347	424	105	179	665	226	136	816	113
Adj No. of Lanes	1	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	152	1015	454	438	926	227	223	1071	479	177	981	439
Arrive On Green	0.09	0.29	0.29	0.13	0.33	0.32	0.13	0.30	0.30	0.10	0.28	0.28
Sat Flow, veh/h	1774	3539	1583	3442	2818	692	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	113	724	262	347	265	264	179	665	226	136	816	113
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1721	1770	1741	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	5.4	16.0	12.3	8.5	10.3	10.5	8.6	14.1	10.1	6.5	18.9	4.8
Cycle Q Clear(g_c), s	5.4	16.0	12.3	8.5	10.3	10.5	8.6	14.1	10.1	6.5	18.9	4.8
Prop In Lane	1.00		1.00	1.00		0.40	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	152	1015	454	438	581	572	223	1071	479	177	981	439
V/C Ratio(X)	0.75	0.71	0.58	0.79	0.46	0.46	0.80	0.62	0.47	0.77	0.83	0.26
Avail Cap(c_a), veh/h	179	1015	454	474	581	572	254	1096	490	203	994	445
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	39.0	27.9	26.6	36.9	23.1	23.3	37.1	26.1	24.7	38.3	29.6	24.5
Incr Delay (d2), s/veh	10.3	4.3	5.3	7.4	2.6	2.7	13.1	1.2	1.0	11.8	6.3	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	8.4	6.1	4.5	5.4	5.4	5.0	7.0	4.5	3.8	10.0	2.2
LnGrp Delay(d),s/veh	49.2	32.2	31.9	44.3	25.7	25.9	50.2	27.3	25.8	50.0	35.9	25.0
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	D	C
Approach Vol, veh/h		1099			876			1070			1065	
Approach Delay, s/veh		33.8			33.2			30.8			36.6	
Approach LOS		C			C			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.5	33.6	11.7	31.4	14.1	30.0	13.9	29.2
Change Period (Y+Rc), s	3.5	5.5	3.5	5.5	3.5	5.5	3.5	5.5
Max Green Setting (Gmax), s	8.3	27.7	9.5	26.5	11.5	24.5	12.0	24.0
Max Q Clear Time (g_c+I1), s	7.4	12.5	8.5	16.1	10.5	18.0	10.6	20.9
Green Ext Time (p_c), s	0.0	10.2	0.0	8.5	0.1	5.1	0.0	2.8

Intersection Summary	
HCM 2010 Ctrl Delay	33.6
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	127	610	46	30	485	56	67	13	39	41	75	58
Future Volume (veh/h)	127	610	46	30	485	56	67	13	39	41	75	58
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	138	663	50	33	527	61	73	14	42	45	82	63
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	652	2406	181	581	2306	266	197	48	80	112	139	93
Arrive On Green	0.72	0.72	0.71	0.72	0.72	0.71	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	825	3337	251	734	3198	369	708	292	483	294	842	563
Grp Volume(v), veh/h	138	351	362	33	291	297	129	0	0	190	0	0
Grp Sat Flow(s),veh/h/ln	825	1770	1818	734	1770	1798	1483	0	0	1699	0	0
Q Serve(g_s), s	4.7	4.8	4.9	1.1	3.8	3.9	0.0	0.0	0.0	1.9	0.0	0.0
Cycle Q Clear(g_c), s	8.6	4.8	4.9	6.0	3.8	3.9	5.3	0.0	0.0	7.1	0.0	0.0
Prop In Lane	1.00		0.14	1.00		0.21	0.57		0.33	0.24		0.33
Lane Grp Cap(c), veh/h	652	1276	1311	581	1276	1296	325	0	0	344	0	0
V/C Ratio(X)	0.21	0.28	0.28	0.06	0.23	0.23	0.40	0.00	0.00	0.55	0.00	0.00
Avail Cap(c_a), veh/h	652	1276	1311	581	1276	1296	720	0	0	805	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.7	3.4	3.4	4.5	3.3	3.3	26.6	0.0	0.0	27.4	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.5	0.5	0.0	0.1	0.1	0.8	0.0	0.0	1.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	2.5	2.6	0.2	1.9	1.9	2.3	0.0	0.0	3.6	0.0	0.0
LnGrp Delay(d),s/veh	5.4	3.9	3.9	4.5	3.4	3.4	27.4	0.0	0.0	28.8	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C			C		
Approach Vol, veh/h		851			621			129			190	
Approach Delay, s/veh		4.2			3.4			27.4			28.8	
Approach LOS		A			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		55.0		15.0		55.0		15.0
Change Period (Y+Rc), s		5.0		4.0		5.0		4.0
Max Green Setting (Gmax), s		50.0		31.0		50.0		31.0
Max Q Clear Time (g_c+I1), s		10.6		9.1		8.0		7.3
Green Ext Time (p_c), s		12.5		1.9		12.7		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	8.2
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	7	8	10	12	16	5	17	103	10	12	141	3
Future Vol, veh/h	7	8	10	12	16	5	17	103	10	12	141	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	9	11	13	17	5	18	110	11	13	150	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	339	333	152	338	330	115	153	0	0	120	0	0
Stage 1	177	177	-	151	151	-	-	-	-	-	-	-
Stage 2	162	156	-	187	179	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	615	587	894	616	589	937	1428	-	-	1468	-	-
Stage 1	825	753	-	851	772	-	-	-	-	-	-	-
Stage 2	840	769	-	815	751	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	587	573	894	591	575	937	1428	-	-	1468	-	-
Mov Cap-2 Maneuver	587	573	-	591	575	-	-	-	-	-	-	-
Stage 1	813	745	-	839	761	-	-	-	-	-	-	-
Stage 2	805	758	-	788	743	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.6	11.2	1	0.6
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1428	-	-	674	617	1468	-	-
HCM Lane V/C Ratio	0.013	-	-	0.039	0.057	0.009	-	-
HCM Control Delay (s)	7.6	0	-	10.6	11.2	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	0	62	78	60	50	127
Future Vol, veh/h	0	62	78	60	50	127
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	65	82	63	53	134

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	353	114	0	0	145	0
Stage 1	114	-	-	-	-	-
Stage 2	239	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	645	939	-	-	1437	-
Stage 1	911	-	-	-	-	-
Stage 2	801	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	619	939	-	-	1437	-
Mov Cap-2 Maneuver	619	-	-	-	-	-
Stage 1	911	-	-	-	-	-
Stage 2	769	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	2.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	939	1437	-
HCM Lane V/C Ratio	-	-	0.07	0.037	-
HCM Control Delay (s)	-	-	9.1	7.6	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	883	49	9	680	84	21	26	13	60	2	123
Future Volume (veh/h)	41	883	49	9	680	84	21	26	13	60	2	123
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	43	929	52	9	716	88	22	27	14	63	2	129
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	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	66	2169	121	25	1948	239	142	156	64	138	21	175
Arrive On Green	0.04	0.64	0.63	0.01	0.61	0.61	0.17	0.17	0.16	0.17	0.17	0.16
Sat Flow, veh/h	1774	3408	191	1774	3174	390	406	910	376	393	122	1022
Grp Volume(v), veh/h	43	482	499	9	399	405	63	0	0	194	0	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1829	1774	1770	1794	1691	0	0	1537	0	0
Q Serve(g_s), s	1.6	9.2	9.2	0.3	7.6	7.6	0.0	0.0	0.0	5.8	0.0	0.0
Cycle Q Clear(g_c), s	1.6	9.2	9.2	0.3	7.6	7.6	2.0	0.0	0.0	8.0	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.22	0.35		0.22	0.32		0.66
Lane Grp Cap(c), veh/h	66	1127	1164	25	1086	1101	362	0	0	334	0	0
V/C Ratio(X)	0.65	0.43	0.43	0.35	0.37	0.37	0.17	0.00	0.00	0.58	0.00	0.00
Avail Cap(c_a), veh/h	263	1127	1164	210	1086	1101	714	0	0	678	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	32.1	6.1	6.1	33.0	6.5	6.5	24.1	0.0	0.0	26.6	0.0	0.0
Incr Delay (d2), s/veh	10.3	1.2	1.2	8.2	1.0	0.9	0.2	0.0	0.0	1.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	4.8	4.9	0.2	3.9	4.0	1.0	0.0	0.0	3.6	0.0	0.0
LnGrp Delay(d),s/veh	42.4	7.3	7.3	41.2	7.5	7.5	24.3	0.0	0.0	28.2	0.0	0.0
LnGrp LOS	D	A	A	D	A	A	C			C		
Approach Vol, veh/h		1024			813			63			194	
Approach Delay, s/veh		8.8			7.9			24.3			28.2	
Approach LOS		A			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.0	47.0		15.6	6.5	45.5		15.6
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	7.5	42.5		26.5	9.5	40.5		26.5
Max Q Clear Time (g_c+I1), s	2.3	11.2		10.0	3.6	9.6		4.0
Green Ext Time (p_c), s	0.0	15.2		1.4	0.0	15.1		1.5

Intersection Summary	
HCM 2010 Ctrl Delay	10.7
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	494	134	106	365	50	119	163	68	74	156	62
Future Volume (veh/h)	68	494	134	106	365	50	119	163	68	74	156	62
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	74	537	146	115	397	54	129	177	74	80	170	67
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	379	788	213	309	964	130	589	754	641	570	715	608
Arrive On Green	0.05	0.29	0.28	0.07	0.31	0.30	0.07	0.40	0.40	0.05	0.38	0.38
Sat Flow, veh/h	1774	2755	746	1774	3134	424	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	74	344	339	115	223	228	129	177	74	80	170	67
Grp Sat Flow(s),veh/h/ln	1774	1770	1731	1774	1770	1788	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	2.2	12.9	13.1	3.3	7.5	7.6	3.2	4.7	2.2	2.0	4.6	2.0
Cycle Q Clear(g_c), s	2.2	12.9	13.1	3.3	7.5	7.6	3.2	4.7	2.2	2.0	4.6	2.0
Prop In Lane	1.00		0.43	1.00		0.24	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	379	506	495	309	544	550	589	754	641	570	715	608
V/C Ratio(X)	0.20	0.68	0.68	0.37	0.41	0.41	0.22	0.23	0.12	0.14	0.24	0.11
Avail Cap(c_a), veh/h	455	684	669	441	778	786	633	754	641	646	715	608
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	17.5	23.7	23.9	17.6	20.6	20.7	11.9	14.7	13.9	12.6	15.7	14.9
Incr Delay (d2), s/veh	0.2	1.6	1.8	0.7	0.5	0.5	0.2	0.7	0.4	0.1	0.8	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	6.5	6.5	1.6	3.7	3.8	1.5	2.6	1.0	1.0	2.5	0.9
LnGrp Delay(d),s/veh	17.7	25.4	25.6	18.3	21.1	21.2	12.1	15.4	14.3	12.8	16.5	15.2
LnGrp LOS	B	C	C	B	C	C	B	B	B	B	B	B
Approach Vol, veh/h		757			566			380			317	
Approach Delay, s/veh		24.7			20.5			14.1			15.3	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.8	34.4	8.4	25.5	8.4	32.8	6.8	27.1
Change Period (Y+Rc), s	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
Max Green Setting (Gmax), s	6.5	28.5	10.5	28.5	6.7	28.3	6.5	32.5
Max Q Clear Time (g_c+I1), s	4.0	6.7	5.3	15.1	5.2	6.6	4.2	9.6
Green Ext Time (p_c), s	0.0	2.4	0.1	5.9	0.0	2.4	0.0	7.6

Intersection Summary	
HCM 2010 Ctrl Delay	20.1
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	7	7	32	27	7	19	15	340	12	15	398	2
Future Vol, veh/h	7	7	32	27	7	19	15	340	12	15	398	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	8	35	30	8	21	16	374	13	16	437	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	695	891	220	668	886	193	440	0	0	387	0	0
Stage 1	471	471	-	413	413	-	-	-	-	-	-	-
Stage 2	224	420	-	255	473	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	329	280	784	344	282	816	1116	-	-	1168	-	-
Stage 1	542	558	-	587	592	-	-	-	-	-	-	-
Stage 2	758	588	-	727	557	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	305	270	784	313	272	816	1116	-	-	1168	-	-
Mov Cap-2 Maneuver	305	270	-	313	272	-	-	-	-	-	-	-
Stage 1	532	548	-	576	581	-	-	-	-	-	-	-
Stage 2	716	577	-	672	547	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.8	15.8	0.4	0.4
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1116	-	-	513	392	1168	-	-
HCM Lane V/C Ratio	0.015	-	-	0.099	0.149	0.014	-	-
HCM Control Delay (s)	8.3	0.1	-	12.8	15.8	8.1	0.1	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.5	0	-	-

Intersection	
Intersection Delay, s/veh	13.8
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	37	63	130	0	46	6	33	0	48	345	2
Future Vol, veh/h	0	37	63	130	0	46	6	33	0	48	345	2
Peak Hour Factor	0.92	0.88	0.88	0.88	0.92	0.88	0.88	0.88	0.92	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	42	72	148	0	52	7	38	0	55	392	2
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	14	11.4	13.7
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	22%	0%	16%	54%	16%	0%
Vol Thru, %	78%	99%	27%	7%	84%	100%
Vol Right, %	0%	1%	57%	39%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	221	175	230	85	148	251
LT Vol	48	0	37	46	23	0
Through Vol	173	173	63	6	125	251
RT Vol	0	2	130	33	0	0
Lane Flow Rate	251	198	261	97	169	285
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.452	0.351	0.442	0.184	0.303	0.505
Departure Headway (Hd)	6.5	6.381	6.092	6.842	6.463	6.384
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	549	559	585	527	551	561
Service Time	4.291	4.172	4.184	4.842	4.252	4.173
HCM Lane V/C Ratio	0.457	0.354	0.446	0.184	0.307	0.508
HCM Control Delay	14.6	12.6	14	11.4	12.1	15.6
HCM Lane LOS	B	B	B	B	B	C
HCM 95th-tile Q	2.3	1.6	2.3	0.7	1.3	2.8

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	23	376	0
Future Vol, veh/h	0	23	376	0
Peak Hour Factor	0.92	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	26	427	0
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	14.3
HCM LOS	B

Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	789	78	256	513	118	98	423	345	170	381	103
Future Volume (veh/h)	56	789	78	256	513	118	98	423	345	170	381	103
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	60	839	83	272	546	126	104	450	367	181	405	110
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	87	905	90	314	1161	267	141	866	387	217	794	213
Arrive On Green	0.05	0.28	0.27	0.18	0.41	0.40	0.08	0.24	0.24	0.12	0.29	0.28
Sat Flow, veh/h	1774	3254	322	1774	2859	657	1774	3539	1583	1774	2759	742
Grp Volume(v), veh/h	60	456	466	272	337	335	104	450	367	181	258	257
Grp Sat Flow(s),veh/h/ln	1774	1770	1806	1774	1770	1747	1774	1770	1583	1774	1770	1732
Q Serve(g_s), s	3.0	22.5	22.6	13.4	12.6	12.7	5.2	9.9	20.5	9.0	10.9	11.2
Cycle Q Clear(g_c), s	3.0	22.5	22.6	13.4	12.6	12.7	5.2	9.9	20.5	9.0	10.9	11.2
Prop In Lane	1.00		0.18	1.00		0.38	1.00		1.00	1.00		0.43
Lane Grp Cap(c), veh/h	87	492	502	314	718	709	141	866	387	217	509	498
V/C Ratio(X)	0.69	0.93	0.93	0.87	0.47	0.47	0.74	0.52	0.95	0.83	0.51	0.52
Avail Cap(c_a), veh/h	170	492	502	316	718	709	170	866	387	217	509	498
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.1	31.6	31.6	36.0	19.6	19.7	40.5	29.4	33.4	38.6	26.7	26.9
Incr Delay (d2), s/veh	9.4	23.9	23.5	21.6	0.5	0.5	12.8	2.2	34.2	23.4	3.6	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	14.3	14.5	8.5	6.2	6.2	3.0	5.1	12.6	5.8	5.8	5.9
LnGrp Delay(d),s/veh	51.5	55.4	55.1	57.5	20.1	20.2	53.2	31.6	67.5	62.0	30.3	30.6
LnGrp LOS	D	E	E	E	C	C	D	C	E	E	C	C
Approach Vol, veh/h		982			944			921			696	
Approach Delay, s/veh		55.1			30.9			48.4			38.7	
Approach LOS		E			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	26.0	19.9	29.0	11.1	29.9	8.4	40.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	21.5	15.5	24.5	8.1	23.9	8.1	31.9
Max Q Clear Time (g_c+I1), s	11.0	22.5	15.4	24.6	7.2	13.2	5.0	14.7
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	5.5	0.0	9.7

Intersection Summary	
HCM 2010 Ctrl Delay	43.7
HCM 2010 LOS	D

ALTERNATIVE 3 CONDITIONS

AM PEAK HOUR

LOS CALCULATION WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	274	105	194	578	82	125	506	215	59	393	86
Future Volume (veh/h)	67	274	105	194	578	82	125	506	215	59	393	86
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	78	319	122	226	672	95	145	588	250	69	457	100
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	1
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	110	568	213	258	962	136	176	1329	595	98	1175	526
Arrive On Green	0.06	0.23	0.22	0.15	0.31	0.30	0.10	0.38	0.38	0.06	0.33	0.33
Sat Flow, veh/h	1774	2520	946	1774	3115	440	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	78	222	219	226	381	386	145	588	250	69	457	100
Grp Sat Flow(s),veh/h/ln	1774	1770	1696	1774	1770	1785	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	3.7	9.5	9.9	10.7	16.3	16.4	6.9	10.7	10.1	3.3	8.5	3.9
Cycle Q Clear(g_c), s	3.7	9.5	9.9	10.7	16.3	16.4	6.9	10.7	10.1	3.3	8.5	3.9
Prop In Lane	1.00		0.56	1.00		0.25	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	110	399	382	258	547	552	176	1329	595	98	1175	526
V/C Ratio(X)	0.71	0.56	0.57	0.87	0.70	0.70	0.83	0.44	0.42	0.70	0.39	0.19
Avail Cap(c_a), veh/h	143	484	464	258	600	605	176	1329	595	128	1175	526
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	39.5	29.5	29.7	35.9	26.1	26.2	37.9	20.1	19.9	39.8	22.0	20.4
Incr Delay (d2), s/veh	6.4	1.7	1.9	25.7	3.7	3.7	25.0	1.1	2.2	6.2	1.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	4.8	4.8	7.1	8.5	8.6	4.6	5.4	4.7	1.8	4.3	1.8
LnGrp Delay(d),s/veh	45.9	31.2	31.6	61.6	29.8	29.9	62.9	21.1	22.1	46.0	23.0	21.2
LnGrp LOS	D	C	C	E	C	C	E	C	C	D	C	C
Approach Vol, veh/h		519			993			983			626	
Approach Delay, s/veh		33.6			37.1			27.5			25.2	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	37.2	16.0	24.3	12.0	33.5	8.8	31.5
Change Period (Y+Rc), s	4.0	5.5	4.0	5.5	4.0	5.5	4.0	5.5
Max Green Setting (Gmax), s	5.7	30.3	12.0	23.0	8.0	28.0	6.4	28.6
Max Q Clear Time (g_c+I1), s	5.3	12.7	12.7	11.9	8.9	10.5	5.7	18.4
Green Ext Time (p_c), s	0.0	10.4	0.0	7.0	0.0	10.4	0.0	6.5

Intersection Summary	
HCM 2010 Ctrl Delay	31.1
HCM 2010 LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	29	26	859	80	12	660
Future Volume (veh/h)	29	26	859	80	12	660
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1900	1863	1863
Adj Flow Rate, veh/h	33	30	987	92	14	759
Adj No. of Lanes	0	0	3	0	1	3
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	50	46	3535	329	43	4210
Arrive On Green	0.06	0.05	0.75	0.74	0.02	0.83
Sat Flow, veh/h	866	788	4902	440	1774	5253
Grp Volume(v), veh/h	64	0	706	373	14	759
Grp Sat Flow(s),veh/h/ln	1680	0	1695	1785	1774	1695
Q Serve(g_s), s	2.6	0.0	4.7	4.7	0.5	2.1
Cycle Q Clear(g_c), s	2.6	0.0	4.7	4.7	0.5	2.1
Prop In Lane	0.52	0.47		0.25	1.00	
Lane Grp Cap(c), veh/h	97	0	2531	1333	43	4210
V/C Ratio(X)	0.66	0.00	0.28	0.28	0.33	0.18
Avail Cap(c_a), veh/h	576	0	2531	1333	228	4210
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.4	0.0	2.8	2.9	33.6	1.2
Incr Delay (d2), s/veh	7.3	0.0	0.3	0.5	4.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	2.3	2.5	0.3	1.0
LnGrp Delay(d),s/veh	39.7	0.0	3.1	3.4	38.0	1.3
LnGrp LOS	D		A	A	D	A
Approach Vol, veh/h	64		1079			773
Approach Delay, s/veh	39.7		3.2			2.0
Approach LOS	D		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	5.7	56.3				62.0		8.1
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	8.5	44.5				57.5		23.5
Max Q Clear Time (g_c+I1), s	2.5	6.7				4.1		4.6
Green Ext Time (p_c), s	0.0	18.3				20.9		0.1

Intersection Summary		
HCM 2010 Ctrl Delay		3.9
HCM 2010 LOS		A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	283	140	253	769	163	189	764	202	81	633	75
Future Volume (veh/h)	75	283	140	253	769	163	189	764	202	81	633	75
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	82	308	152	275	836	177	205	830	220	88	688	82
Adj No. of Lanes	1	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	115	1079	483	365	1007	213	248	1200	537	122	947	424
Arrive On Green	0.06	0.30	0.30	0.11	0.35	0.34	0.14	0.34	0.34	0.07	0.27	0.27
Sat Flow, veh/h	1774	3539	1583	3442	2908	616	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	82	308	152	275	509	504	205	830	220	88	688	82
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1721	1770	1754	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	4.0	5.8	6.5	6.8	23.3	23.3	9.9	17.9	9.4	4.3	15.6	3.5
Cycle Q Clear(g_c), s	4.0	5.8	6.5	6.8	23.3	23.3	9.9	17.9	9.4	4.3	15.6	3.5
Prop In Lane	1.00		1.00	1.00		0.35	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	115	1079	483	365	613	608	248	1200	537	122	947	424
V/C Ratio(X)	0.72	0.29	0.31	0.75	0.83	0.83	0.83	0.69	0.41	0.72	0.73	0.19
Avail Cap(c_a), veh/h	137	1079	483	375	613	608	261	1216	544	145	983	440
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.5	23.3	23.6	38.3	26.4	26.5	36.9	25.2	22.4	40.2	29.4	24.9
Incr Delay (d2), s/veh	9.7	0.7	1.7	7.2	12.3	12.4	17.0	1.9	0.7	9.9	2.9	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	3.0	3.1	3.6	13.4	13.3	6.0	9.0	4.2	2.4	7.9	1.6
LnGrp Delay(d),s/veh	50.1	24.0	25.3	45.6	38.8	39.0	53.9	27.0	23.1	50.1	32.2	25.3
LnGrp LOS	D	C	C	D	D	D	D	C	C	D	C	C
Approach Vol, veh/h		542			1288			1255			858	
Approach Delay, s/veh		28.3			40.3			30.7			33.4	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	35.6	9.1	34.9	12.3	31.9	15.3	28.6
Change Period (Y+Rc), s	3.5	5.5	3.5	5.5	3.5	5.5	3.5	5.5
Max Green Setting (Gmax), s	6.3	29.2	6.7	29.8	9.1	26.4	12.5	24.0
Max Q Clear Time (g_c+I1), s	6.0	25.3	6.3	19.9	8.8	8.5	11.9	17.6
Green Ext Time (p_c), s	0.0	3.2	0.0	8.2	0.0	11.6	0.0	5.5

Intersection Summary	
HCM 2010 Ctrl Delay	34.1
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	461	43	46	779	61	49	42	25	48	75	62
Future Volume (veh/h)	71	461	43	46	779	61	49	42	25	48	75	62
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	76	496	46	49	838	66	53	45	27	52	81	67
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	482	2351	217	674	2386	188	160	127	59	119	134	96
Arrive On Green	0.72	0.72	0.71	0.72	0.72	0.71	0.17	0.17	0.16	0.17	0.17	0.16
Sat Flow, veh/h	614	3276	303	860	3324	262	518	741	347	327	784	560
Grp Volume(v), veh/h	76	267	275	49	446	458	125	0	0	200	0	0
Grp Sat Flow(s),veh/h/ln	614	1770	1809	860	1770	1817	1606	0	0	1672	0	0
Q Serve(g_s), s	3.8	3.6	3.6	1.4	6.8	6.8	0.0	0.0	0.0	3.2	0.0	0.0
Cycle Q Clear(g_c), s	10.7	3.6	3.6	5.1	6.8	6.8	4.7	0.0	0.0	7.9	0.0	0.0
Prop In Lane	1.00		0.17	1.00		0.14	0.42		0.22	0.26		0.33
Lane Grp Cap(c), veh/h	482	1270	1299	674	1270	1304	346	0	0	349	0	0
V/C Ratio(X)	0.16	0.21	0.21	0.07	0.35	0.35	0.36	0.00	0.00	0.57	0.00	0.00
Avail Cap(c_a), veh/h	482	1270	1299	674	1270	1304	723	0	0	755	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.8	3.4	3.4	4.2	3.8	3.8	26.6	0.0	0.0	27.9	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.4	0.4	0.0	0.2	0.2	0.6	0.0	0.0	1.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	1.8	1.9	0.3	3.3	3.4	2.3	0.0	0.0	3.9	0.0	0.0
LnGrp Delay(d),s/veh	6.5	3.7	3.8	4.3	4.0	4.0	27.2	0.0	0.0	29.4	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C			C		
Approach Vol, veh/h		618			953			125			200	
Approach Delay, s/veh		4.1			4.0			27.2			29.4	
Approach LOS		A			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		56.0		15.8		56.0		15.8
Change Period (Y+Rc), s		5.0		4.0		5.0		4.0
Max Green Setting (Gmax), s		51.0		30.0		51.0		30.0
Max Q Clear Time (g_c+I1), s		12.7		9.9		8.8		6.7
Green Ext Time (p_c), s		14.1		1.9		14.5		2.0

Intersection Summary		
HCM 2010 Ctrl Delay		8.2
HCM 2010 LOS		A

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	8	3	13	5	6	7	9	109	7	49	102	3
Future Vol, veh/h	8	3	13	5	6	7	9	109	7	49	102	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	3	14	5	6	8	10	117	8	53	110	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	364	361	111	365	358	121	113	0	0	125	0	0
Stage 1	217	217	-	140	140	-	-	-	-	-	-	-
Stage 2	147	144	-	225	218	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	592	566	942	591	568	930	1476	-	-	1462	-	-
Stage 1	785	723	-	863	781	-	-	-	-	-	-	-
Stage 2	856	778	-	778	723	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	562	540	942	559	542	930	1476	-	-	1462	-	-
Mov Cap-2 Maneuver	562	540	-	559	542	-	-	-	-	-	-	-
Stage 1	780	695	-	857	776	-	-	-	-	-	-	-
Stage 2	836	773	-	733	695	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.2	10.7	0.5	2.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1476	-	-	714	654	1462	-	-
HCM Lane V/C Ratio	0.007	-	-	0.036	0.03	0.036	-	-
HCM Control Delay (s)	7.5	0	-	10.2	10.7	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	0	64	65	31	0	121
Future Vol, veh/h	0	64	65	31	0	121
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	73	74	35	0	138

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	229	91	0	0	109	0
Stage 1	91	-	-	-	-	-
Stage 2	138	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	759	967	-	-	1481	-
Stage 1	933	-	-	-	-	-
Stage 2	889	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	759	967	-	-	1481	-
Mov Cap-2 Maneuver	759	-	-	-	-	-
Stage 1	933	-	-	-	-	-
Stage 2	889	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	967	1481	-
HCM Lane V/C Ratio	-	-	0.075	-	-
HCM Control Delay (s)	-	-	9	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	453	22	14	1080	91	37	6	10	28	12	72
Future Volume (veh/h)	37	453	22	14	1080	91	37	6	10	28	12	72
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	40	492	24	15	1174	99	40	7	11	30	13	78
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	62	2386	116	32	2241	189	198	38	34	98	30	113
Arrive On Green	0.03	0.69	0.69	0.02	0.68	0.67	0.11	0.11	0.10	0.11	0.11	0.10
Sat Flow, veh/h	1774	3436	167	1774	3305	278	977	344	309	293	273	1026
Grp Volume(v), veh/h	40	253	263	15	628	645	58	0	0	121	0	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1833	1774	1770	1814	1630	0	0	1591	0	0
Q Serve(g_s), s	1.5	3.5	3.5	0.6	12.0	12.1	0.0	0.0	0.0	2.9	0.0	0.0
Cycle Q Clear(g_c), s	1.5	3.5	3.5	0.6	12.0	12.1	2.1	0.0	0.0	4.9	0.0	0.0
Prop In Lane	1.00		0.09	1.00		0.15	0.69		0.19	0.25		0.64
Lane Grp Cap(c), veh/h	62	1229	1273	32	1200	1230	270	0	0	242	0	0
V/C Ratio(X)	0.65	0.21	0.21	0.46	0.52	0.52	0.21	0.00	0.00	0.50	0.00	0.00
Avail Cap(c_a), veh/h	183	1229	1273	151	1200	1230	630	0	0	642	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	32.4	3.7	3.7	33.0	5.5	5.5	27.8	0.0	0.0	29.2	0.0	0.0
Incr Delay (d2), s/veh	10.8	0.4	0.4	10.0	1.6	1.6	0.4	0.0	0.0	1.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	1.8	1.9	0.4	6.3	6.5	1.0	0.0	0.0	2.3	0.0	0.0
LnGrp Delay(d),s/veh	43.2	4.1	4.1	43.0	7.1	7.1	28.2	0.0	0.0	30.8	0.0	0.0
LnGrp LOS	D	A	A	D	A	A	C			C		
Approach Vol, veh/h		556			1288			58			121	
Approach Delay, s/veh		6.9			7.5			28.2			30.8	
Approach LOS		A			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.2	51.2		11.5	6.4	50.1		11.5
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	5.3	46.7		24.5	6.5	45.5		24.5
Max Q Clear Time (g_c+I1), s	2.6	5.5		6.9	3.5	14.1		4.1
Green Ext Time (p_c), s	0.0	17.9		0.9	0.0	15.8		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.3
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	418	82	91	667	76	187	208	31	53	160	58
Future Volume (veh/h)	32	418	82	91	667	76	187	208	31	53	160	58
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	37	480	94	105	767	87	215	239	36	61	184	67
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	240	922	180	360	1115	126	574	730	620	505	604	514
Arrive On Green	0.03	0.31	0.31	0.06	0.35	0.34	0.11	0.39	0.39	0.04	0.32	0.32
Sat Flow, veh/h	1774	2955	576	1774	3205	363	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	37	286	288	105	423	431	215	239	36	61	184	67
Grp Sat Flow(s),veh/h/ln	1774	1770	1761	1774	1770	1799	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	1.0	9.8	10.0	2.8	15.2	15.2	5.5	6.6	1.0	1.7	5.5	2.2
Cycle Q Clear(g_c), s	1.0	9.8	10.0	2.8	15.2	15.2	5.5	6.6	1.0	1.7	5.5	2.2
Prop In Lane	1.00		0.33	1.00		0.20	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	240	552	549	360	615	626	574	730	620	505	604	514
V/C Ratio(X)	0.15	0.52	0.52	0.29	0.69	0.69	0.37	0.33	0.06	0.12	0.30	0.13
Avail Cap(c_a), veh/h	357	789	785	413	789	802	667	730	620	598	604	514
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	17.6	20.9	21.0	15.3	20.7	20.7	12.7	15.7	14.0	15.4	18.7	17.6
Incr Delay (d2), s/veh	0.3	0.8	0.8	0.4	1.7	1.7	0.4	1.2	0.2	0.1	1.3	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	4.9	4.9	1.4	7.7	7.8	2.7	3.6	0.5	0.8	3.0	1.0
LnGrp Delay(d),s/veh	17.9	21.7	21.8	15.7	22.4	22.5	13.1	16.9	14.2	15.5	20.0	18.2
LnGrp LOS	B	C	C	B	C	C	B	B	B	B	C	B
Approach Vol, veh/h		611			959			490			312	
Approach Delay, s/veh		21.5			21.7			15.0			18.7	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.1	33.0	7.8	27.1	11.1	28.0	5.1	29.7
Change Period (Y+Rc), s	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
Max Green Setting (Gmax), s	6.5	28.5	6.5	32.5	11.5	23.5	6.5	32.5
Max Q Clear Time (g_c+I1), s	3.7	8.6	4.8	12.0	7.5	7.5	3.0	17.2
Green Ext Time (p_c), s	0.0	2.7	0.0	9.5	0.2	2.5	0.0	8.0

Intersection Summary	
HCM 2010 Ctrl Delay	19.9
HCM 2010 LOS	B

Intersection												
Int Delay, s/veh	1.6											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	4	4	53	14	6	18	18	407	4	5	337	4
Future Vol, veh/h	4	4	53	14	6	18	18	407	4	5	337	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	4	59	16	7	20	20	452	4	6	374	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	657	885	189	695	884	228	379	0	0	457	0	0
Stage 1	388	388	-	494	494	-	-	-	-	-	-	-
Stage 2	269	497	-	201	390	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	350	282	821	329	283	775	1176	-	-	1100	-	-
Stage 1	607	607	-	526	545	-	-	-	-	-	-	-
Stage 2	713	543	-	782	606	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	327	274	821	295	275	775	1176	-	-	1100	-	-
Mov Cap-2 Maneuver	327	274	-	295	275	-	-	-	-	-	-	-
Stage 1	593	603	-	514	532	-	-	-	-	-	-	-
Stage 2	670	531	-	716	602	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11	14.8	0.4	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1176	-	-	667	411	1100	-	-
HCM Lane V/C Ratio	0.017	-	-	0.102	0.103	0.005	-	-
HCM Control Delay (s)	8.1	0.1	-	11	14.8	8.3	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.3	0	-	-

Intersection	
Intersection Delay, s/veh	11.7
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	17	22	56	0	43	0	51	0	54	396	2
Future Vol, veh/h	0	17	22	56	0	43	0	51	0	54	396	2
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	19	24	62	0	47	0	56	0	59	435	2
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	10.2	10.3	12.4
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	21%	0%	18%	46%	22%	0%
Vol Thru, %	79%	99%	23%	0%	78%	100%
Vol Right, %	0%	1%	59%	54%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	252	200	95	94	144	226
LT Vol	54	0	17	43	31	0
Through Vol	198	198	22	0	113	226
RT Vol	0	2	56	51	0	0
Lane Flow Rate	277	220	104	103	158	248
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.446	0.347	0.172	0.173	0.26	0.4
Departure Headway (Hd)	5.803	5.687	5.929	6.012	5.91	5.801
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	620	633	604	596	608	621
Service Time	3.537	3.421	3.974	4.058	3.647	3.538
HCM Lane V/C Ratio	0.447	0.348	0.172	0.173	0.26	0.399
HCM Control Delay	13.2	11.4	10.2	10.3	10.7	12.4
HCM Lane LOS	B	B	B	B	B	B
HCM 95th-tile Q	2.3	1.5	0.6	0.6	1	1.9

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	31	339	0
Future Vol, veh/h	0	31	339	0
Peak Hour Factor	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	34	373	0
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	11.7
HCM LOS	B

Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	366	31	273	950	138	138	435	292	86	345	101
Future Volume (veh/h)	39	366	31	273	950	138	138	435	292	86	345	101
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	42	394	33	294	1022	148	148	468	314	92	371	109
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	77	792	66	345	1213	175	193	1073	480	128	722	209
Arrive On Green	0.04	0.24	0.23	0.19	0.39	0.38	0.11	0.30	0.30	0.07	0.27	0.26
Sat Flow, veh/h	1774	3308	276	1774	3104	449	1774	3539	1583	1774	2708	786
Grp Volume(v), veh/h	42	210	217	294	582	588	148	468	314	92	241	239
Grp Sat Flow(s),veh/h/ln	1774	1770	1814	1774	1770	1783	1774	1770	1583	1774	1770	1724
Q Serve(g_s), s	1.9	8.6	8.7	13.4	25.0	25.1	6.8	8.9	14.4	4.3	9.7	9.9
Cycle Q Clear(g_c), s	1.9	8.6	8.7	13.4	25.0	25.1	6.8	8.9	14.4	4.3	9.7	9.9
Prop In Lane	1.00		0.15	1.00		0.25	1.00		1.00	1.00		0.46
Lane Grp Cap(c), veh/h	77	423	434	345	691	697	193	1073	480	128	472	460
V/C Ratio(X)	0.55	0.50	0.50	0.85	0.84	0.84	0.77	0.44	0.65	0.72	0.51	0.52
Avail Cap(c_a), veh/h	119	423	434	445	739	745	254	1073	480	169	472	460
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	39.3	27.5	27.6	32.6	23.2	23.3	36.3	23.4	25.4	38.0	26.1	26.3
Incr Delay (d2), s/veh	6.0	0.9	0.9	11.9	8.3	8.3	9.8	1.3	6.8	9.5	3.9	4.2
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	1.1	4.3	4.5	7.7	13.7	13.9	3.9	4.5	7.2	2.4	5.3	5.3
LnGrp Delay(d),s/veh	45.3	28.4	28.5	44.5	31.5	31.6	46.1	24.7	32.2	47.6	30.0	30.4
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		469			1464			930			572	
Approach Delay, s/veh		29.9			34.1			30.6			33.0	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	29.4	20.3	24.0	13.1	26.3	7.6	36.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.5	24.9	20.5	19.1	11.5	20.9	5.1	34.5
Max Q Clear Time (g_c+I1), s	6.3	16.4	15.4	10.7	8.8	11.9	3.9	27.1
Green Ext Time (p_c), s	0.0	4.5	0.4	5.9	0.1	4.7	0.0	5.1

Intersection Summary	
HCM 2010 Ctrl Delay	32.4
HCM 2010 LOS	C

ALTERNATIVE 3 CONDITIONS

PM PEAK HOUR

LOS CALCULATION WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	433	108	223	257	54	69	358	275	65	310	43
Future Volume (veh/h)	92	433	108	223	257	54	69	358	275	65	310	43
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	99	466	116	240	276	58	74	385	296	70	333	46
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	136	660	163	285	930	193	105	1228	549	100	1218	545
Arrive On Green	0.08	0.23	0.23	0.16	0.32	0.31	0.06	0.35	0.35	0.06	0.34	0.34
Sat Flow, veh/h	1774	2814	696	1774	2921	605	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	99	292	290	240	166	168	74	385	296	70	333	46
Grp Sat Flow(s),veh/h/ln	1774	1770	1740	1774	1770	1756	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	4.6	12.7	12.9	11.1	5.9	6.1	3.5	6.7	12.7	3.3	5.7	1.7
Cycle Q Clear(g_c), s	4.6	12.7	12.9	11.1	5.9	6.1	3.5	6.7	12.7	3.3	5.7	1.7
Prop In Lane	1.00		0.40	1.00		0.34	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	136	415	408	285	563	559	105	1228	549	100	1218	545
V/C Ratio(X)	0.73	0.70	0.71	0.84	0.29	0.30	0.70	0.31	0.54	0.70	0.27	0.08
Avail Cap(c_a), veh/h	223	493	485	305	575	571	126	1228	549	126	1218	545
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	38.1	29.6	29.7	34.3	21.6	21.7	38.9	20.2	22.1	39.1	20.0	18.7
Incr Delay (d2), s/veh	2.8	4.3	4.7	16.5	0.4	0.4	9.1	0.7	3.8	7.2	0.6	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	6.7	6.7	6.7	3.0	3.0	2.0	3.4	6.1	1.8	2.9	0.8
LnGrp Delay(d),s/veh	40.8	33.9	34.4	50.9	22.0	22.2	48.1	20.8	25.9	46.3	20.6	19.0
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	B
Approach Vol, veh/h		681			574			755			449	
Approach Delay, s/veh		35.1			34.1			25.5			24.4	
Approach LOS		D			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	34.2	17.0	24.8	8.5	34.0	10.0	31.8
Change Period (Y+Rc), s	4.0	5.5	4.0	5.5	4.0	5.5	4.0	5.5
Max Green Setting (Gmax), s	5.5	28.5	14.0	23.0	5.5	28.5	10.1	26.9
Max Q Clear Time (g_c+I1), s	5.3	14.7	13.1	14.9	5.5	7.7	6.6	8.1
Green Ext Time (p_c), s	0.0	6.8	0.0	4.3	0.0	8.5	0.0	7.5

Intersection Summary		
HCM 2010 Ctrl Delay		30.0
HCM 2010 LOS		C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	76	90	640	110	11	793
Future Volume (veh/h)	76	90	640	110	11	793
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1900	1863	1863
Adj Flow Rate, veh/h	87	103	736	126	13	911
Adj No. of Lanes	0	0	3	0	1	3
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	114	135	2863	486	41	3735
Arrive On Green	0.15	0.14	0.65	0.65	0.02	0.73
Sat Flow, veh/h	759	899	4547	743	1774	5253
Grp Volume(v), veh/h	191	0	568	294	13	911
Grp Sat Flow(s),veh/h/ln	1666	0	1695	1732	1774	1695
Q Serve(g_s), s	7.6	0.0	4.8	4.9	0.5	4.0
Cycle Q Clear(g_c), s	7.6	0.0	4.8	4.9	0.5	4.0
Prop In Lane	0.46	0.54		0.43	1.00	
Lane Grp Cap(c), veh/h	250	0	2216	1132	41	3735
V/C Ratio(X)	0.76	0.00	0.26	0.26	0.32	0.24
Avail Cap(c_a), veh/h	744	0	2216	1132	230	3735
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	0.0	5.0	5.1	33.4	3.0
Incr Delay (d2), s/veh	4.8	0.0	0.3	0.6	4.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	0.0	2.3	2.5	0.3	1.9
LnGrp Delay(d),s/veh	33.2	0.0	5.3	5.6	37.7	3.1
LnGrp LOS	C		A	A	D	A
Approach Vol, veh/h	191		862			924
Approach Delay, s/veh	33.2		5.4			3.6
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	5.6	49.4				55.0		14.4
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	8.5	37.5				50.5		30.5
Max Q Clear Time (g_c+I1), s	2.5	6.9				6.0		9.6
Green Ext Time (p_c), s	0.0	15.8				18.7		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	7.3
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	106	681	246	326	399	99	168	625	212	128	767	106
Future Volume (veh/h)	106	681	246	326	399	99	168	625	212	128	767	106
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	113	724	262	347	424	105	179	665	226	136	816	113
Adj No. of Lanes	1	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	152	1015	454	438	926	227	223	1071	479	177	981	439
Arrive On Green	0.09	0.29	0.29	0.13	0.33	0.32	0.13	0.30	0.30	0.10	0.28	0.28
Sat Flow, veh/h	1774	3539	1583	3442	2818	692	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	113	724	262	347	265	264	179	665	226	136	816	113
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1721	1770	1741	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	5.4	16.0	12.3	8.5	10.3	10.5	8.6	14.1	10.1	6.5	18.9	4.8
Cycle Q Clear(g_c), s	5.4	16.0	12.3	8.5	10.3	10.5	8.6	14.1	10.1	6.5	18.9	4.8
Prop In Lane	1.00		1.00	1.00		0.40	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	152	1015	454	438	581	572	223	1071	479	177	981	439
V/C Ratio(X)	0.75	0.71	0.58	0.79	0.46	0.46	0.80	0.62	0.47	0.77	0.83	0.26
Avail Cap(c_a), veh/h	179	1015	454	474	581	572	254	1096	490	203	994	445
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	39.0	27.9	26.6	36.9	23.1	23.3	37.1	26.1	24.7	38.3	29.6	24.5
Incr Delay (d2), s/veh	10.3	4.3	5.3	7.4	2.6	2.7	13.1	1.2	1.0	11.8	6.3	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	8.4	6.1	4.5	5.4	5.4	5.0	7.0	4.5	3.8	10.0	2.2
LnGrp Delay(d),s/veh	49.2	32.2	31.9	44.3	25.7	25.9	50.2	27.3	25.8	50.0	35.9	25.0
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	D	C
Approach Vol, veh/h		1099			876			1070			1065	
Approach Delay, s/veh		33.8			33.2			30.8			36.6	
Approach LOS		C			C			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.5	33.6	11.7	31.4	14.1	30.0	13.9	29.2
Change Period (Y+Rc), s	3.5	5.5	3.5	5.5	3.5	5.5	3.5	5.5
Max Green Setting (Gmax), s	8.3	27.7	9.5	26.5	11.5	24.5	12.0	24.0
Max Q Clear Time (g_c+I1), s	7.4	12.5	8.5	16.1	10.5	18.0	10.6	20.9
Green Ext Time (p_c), s	0.0	10.2	0.0	8.5	0.1	5.1	0.0	2.8

Intersection Summary	
HCM 2010 Ctrl Delay	33.6
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	127	610	46	30	485	56	67	13	39	41	75	58
Future Volume (veh/h)	127	610	46	30	485	56	67	13	39	41	75	58
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	138	663	50	33	527	61	73	14	42	45	82	63
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	652	2406	181	581	2306	266	197	48	80	112	139	93
Arrive On Green	0.72	0.72	0.71	0.72	0.72	0.71	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	825	3337	251	734	3198	369	708	292	483	294	842	563
Grp Volume(v), veh/h	138	351	362	33	291	297	129	0	0	190	0	0
Grp Sat Flow(s),veh/h/ln	825	1770	1818	734	1770	1798	1483	0	0	1699	0	0
Q Serve(g_s), s	4.7	4.8	4.9	1.1	3.8	3.9	0.0	0.0	0.0	1.9	0.0	0.0
Cycle Q Clear(g_c), s	8.6	4.8	4.9	6.0	3.8	3.9	5.3	0.0	0.0	7.1	0.0	0.0
Prop In Lane	1.00		0.14	1.00		0.21	0.57		0.33	0.24		0.33
Lane Grp Cap(c), veh/h	652	1276	1311	581	1276	1296	325	0	0	344	0	0
V/C Ratio(X)	0.21	0.28	0.28	0.06	0.23	0.23	0.40	0.00	0.00	0.55	0.00	0.00
Avail Cap(c_a), veh/h	652	1276	1311	581	1276	1296	720	0	0	805	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.7	3.4	3.4	4.5	3.3	3.3	26.6	0.0	0.0	27.4	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.5	0.5	0.0	0.1	0.1	0.8	0.0	0.0	1.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	2.5	2.6	0.2	1.9	1.9	2.3	0.0	0.0	3.6	0.0	0.0
LnGrp Delay(d),s/veh	5.4	3.9	3.9	4.5	3.4	3.4	27.4	0.0	0.0	28.8	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C			C		
Approach Vol, veh/h		851			621			129			190	
Approach Delay, s/veh		4.2			3.4			27.4			28.8	
Approach LOS		A			A			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		55.0		15.0		55.0		15.0				
Change Period (Y+Rc), s		5.0		4.0		5.0		4.0				
Max Green Setting (Gmax), s		50.0		31.0		50.0		31.0				
Max Q Clear Time (g_c+I1), s		10.6		9.1		8.0		7.3				
Green Ext Time (p_c), s		12.5		1.9		12.7		2.0				
Intersection Summary												
HCM 2010 Ctrl Delay			8.2									
HCM 2010 LOS			A									

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	7	8	10	12	16	5	17	103	10	62	91	3
Future Vol, veh/h	7	8	10	12	16	5	17	103	10	62	91	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	9	11	13	17	5	18	110	11	66	97	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	392	386	98	391	383	115	100	0	0	120	0	0
Stage 1	230	230	-	151	151	-	-	-	-	-	-	-
Stage 2	162	156	-	240	232	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	567	548	958	568	550	937	1493	-	-	1468	-	-
Stage 1	773	714	-	851	772	-	-	-	-	-	-	-
Stage 2	840	769	-	763	713	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	524	515	958	529	517	937	1493	-	-	1468	-	-
Mov Cap-2 Maneuver	524	515	-	529	517	-	-	-	-	-	-	-
Stage 1	763	680	-	840	762	-	-	-	-	-	-	-
Stage 2	806	759	-	709	679	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.9	11.9	1	3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1493	-	-	636	560	1468	-	-
HCM Lane V/C Ratio	0.012	-	-	0.042	0.063	0.045	-	-
HCM Control Delay (s)	7.4	0	-	10.9	11.9	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	0	62	78	60	0	127
Future Vol, veh/h	0	62	78	60	0	127
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	65	82	63	0	134

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	248	114	0	0	145	0
Stage 1	114	-	-	-	-	-
Stage 2	134	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	740	939	-	-	1437	-
Stage 1	911	-	-	-	-	-
Stage 2	892	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	740	939	-	-	1437	-
Mov Cap-2 Maneuver	740	-	-	-	-	-
Stage 1	911	-	-	-	-	-
Stage 2	892	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	939	1437	-
HCM Lane V/C Ratio	-	-	0.07	-	-
HCM Control Delay (s)	-	-	9.1	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	883	49	9	680	84	21	26	13	60	2	123
Future Volume (veh/h)	41	883	49	9	680	84	21	26	13	60	2	123
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	43	929	52	9	716	88	22	27	14	63	2	129
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	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	66	2169	121	25	1948	239	142	156	64	138	21	175
Arrive On Green	0.04	0.64	0.63	0.01	0.61	0.61	0.17	0.17	0.16	0.17	0.17	0.16
Sat Flow, veh/h	1774	3408	191	1774	3174	390	406	910	376	393	122	1022
Grp Volume(v), veh/h	43	482	499	9	399	405	63	0	0	194	0	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1829	1774	1770	1794	1691	0	0	1537	0	0
Q Serve(g_s), s	1.6	9.2	9.2	0.3	7.6	7.6	0.0	0.0	0.0	5.8	0.0	0.0
Cycle Q Clear(g_c), s	1.6	9.2	9.2	0.3	7.6	7.6	2.0	0.0	0.0	8.0	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.22	0.35		0.22	0.32		0.66
Lane Grp Cap(c), veh/h	66	1127	1164	25	1086	1101	362	0	0	334	0	0
V/C Ratio(X)	0.65	0.43	0.43	0.35	0.37	0.37	0.17	0.00	0.00	0.58	0.00	0.00
Avail Cap(c_a), veh/h	263	1127	1164	210	1086	1101	714	0	0	678	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	32.1	6.1	6.1	33.0	6.5	6.5	24.1	0.0	0.0	26.6	0.0	0.0
Incr Delay (d2), s/veh	10.3	1.2	1.2	8.2	1.0	0.9	0.2	0.0	0.0	1.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	4.8	4.9	0.2	3.9	4.0	1.0	0.0	0.0	3.6	0.0	0.0
LnGrp Delay(d),s/veh	42.4	7.3	7.3	41.2	7.5	7.5	24.3	0.0	0.0	28.2	0.0	0.0
LnGrp LOS	D	A	A	D	A	A	C			C		
Approach Vol, veh/h		1024			813			63			194	
Approach Delay, s/veh		8.8			7.9			24.3			28.2	
Approach LOS		A			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.0	47.0		15.6	6.5	45.5		15.6
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	7.5	42.5		26.5	9.5	40.5		26.5
Max Q Clear Time (g_c+I1), s	2.3	11.2		10.0	3.6	9.6		4.0
Green Ext Time (p_c), s	0.0	15.2		1.4	0.0	15.1		1.5

Intersection Summary		
HCM 2010 Ctrl Delay		10.7
HCM 2010 LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	494	134	106	365	50	119	163	68	74	156	62
Future Volume (veh/h)	68	494	134	106	365	50	119	163	68	74	156	62
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	74	537	146	115	397	54	129	177	74	80	170	67
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	379	788	213	309	964	130	589	754	641	570	715	608
Arrive On Green	0.05	0.29	0.28	0.07	0.31	0.30	0.07	0.40	0.40	0.05	0.38	0.38
Sat Flow, veh/h	1774	2755	746	1774	3134	424	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	74	344	339	115	223	228	129	177	74	80	170	67
Grp Sat Flow(s),veh/h/ln	1774	1770	1731	1774	1770	1788	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	2.2	12.9	13.1	3.3	7.5	7.6	3.2	4.7	2.2	2.0	4.6	2.0
Cycle Q Clear(g_c), s	2.2	12.9	13.1	3.3	7.5	7.6	3.2	4.7	2.2	2.0	4.6	2.0
Prop In Lane	1.00		0.43	1.00		0.24	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	379	506	495	309	544	550	589	754	641	570	715	608
V/C Ratio(X)	0.20	0.68	0.68	0.37	0.41	0.41	0.22	0.23	0.12	0.14	0.24	0.11
Avail Cap(c_a), veh/h	455	684	669	441	778	786	633	754	641	646	715	608
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	17.5	23.7	23.9	17.6	20.6	20.7	11.9	14.7	13.9	12.6	15.7	14.9
Incr Delay (d2), s/veh	0.2	1.6	1.8	0.7	0.5	0.5	0.2	0.7	0.4	0.1	0.8	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	6.5	6.5	1.6	3.7	3.8	1.5	2.6	1.0	1.0	2.5	0.9
LnGrp Delay(d),s/veh	17.7	25.4	25.6	18.3	21.1	21.2	12.1	15.4	14.3	12.8	16.5	15.2
LnGrp LOS	B	C	C	B	C	C	B	B	B	B	B	B
Approach Vol, veh/h		757			566			380			317	
Approach Delay, s/veh		24.7			20.5			14.1			15.3	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.8	34.4	8.4	25.5	8.4	32.8	6.8	27.1
Change Period (Y+Rc), s	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
Max Green Setting (Gmax), s	6.5	28.5	10.5	28.5	6.7	28.3	6.5	32.5
Max Q Clear Time (g_c+I1), s	4.0	6.7	5.3	15.1	5.2	6.6	4.2	9.6
Green Ext Time (p_c), s	0.0	2.4	0.1	5.9	0.0	2.4	0.0	7.6

Intersection Summary	
HCM 2010 Ctrl Delay	20.1
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	7	7	82	27	7	19	15	340	12	15	398	2
Future Vol, veh/h	7	7	82	27	7	19	15	340	12	15	398	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	8	90	30	8	21	16	374	13	16	437	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	695	891	220	668	886	193	440	0	0	387	0	0
Stage 1	471	471	-	413	413	-	-	-	-	-	-	-
Stage 2	224	420	-	255	473	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	329	280	784	344	282	816	1116	-	-	1168	-	-
Stage 1	542	558	-	587	592	-	-	-	-	-	-	-
Stage 2	758	588	-	727	557	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	305	270	784	290	272	816	1116	-	-	1168	-	-
Mov Cap-2 Maneuver	305	270	-	290	272	-	-	-	-	-	-	-
Stage 1	532	548	-	576	581	-	-	-	-	-	-	-
Stage 2	716	577	-	623	547	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.9	16.4	0.4	0.4
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1116	-	-	626	373	1168	-	-
HCM Lane V/C Ratio	0.015	-	-	0.169	0.156	0.014	-	-
HCM Control Delay (s)	8.3	0.1	-	11.9	16.4	8.1	0.1	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.5	0	-	-

Intersection	
Intersection Delay, s/veh	13.5
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	37	47	96	0	46	6	33	0	48	345	2
Future Vol, veh/h	0	37	47	96	0	46	6	33	0	48	345	2
Peak Hour Factor	0.92	0.88	0.88	0.88	0.92	0.88	0.88	0.88	0.92	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	42	53	109	0	52	7	38	0	55	392	2
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	12.6	11.2	13.4
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	22%	0%	21%	54%	22%	0%
Vol Thru, %	78%	99%	26%	7%	78%	100%
Vol Right, %	0%	1%	53%	39%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	221	175	180	85	176	273
LT Vol	48	0	37	46	39	0
Through Vol	173	173	47	6	137	273
RT Vol	0	2	96	33	0	0
Lane Flow Rate	251	198	205	97	200	311
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.443	0.344	0.351	0.178	0.349	0.533
Departure Headway (Hd)	6.366	6.247	6.179	6.643	6.29	6.177
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	564	573	579	536	569	581
Service Time	4.136	4.017	4.255	4.735	4.057	3.944
HCM Lane V/C Ratio	0.445	0.346	0.354	0.181	0.351	0.535
HCM Control Delay	14.2	12.3	12.6	11.2	12.4	15.8
HCM Lane LOS	B	B	B	B	B	C
HCM 95th-tile Q	2.3	1.5	1.6	0.6	1.6	3.1

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	39	410	0
Future Vol, veh/h	0	39	410	0
Peak Hour Factor	0.92	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	44	466	0
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	14.5
HCM LOS	B

Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	789	78	256	513	118	98	423	345	170	381	103
Future Volume (veh/h)	56	789	78	256	513	118	98	423	345	170	381	103
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	60	839	83	272	546	126	104	450	367	181	405	110
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	87	905	90	314	1161	267	141	866	387	217	794	213
Arrive On Green	0.05	0.28	0.27	0.18	0.41	0.40	0.08	0.24	0.24	0.12	0.29	0.28
Sat Flow, veh/h	1774	3254	322	1774	2859	657	1774	3539	1583	1774	2759	742
Grp Volume(v), veh/h	60	456	466	272	337	335	104	450	367	181	258	257
Grp Sat Flow(s),veh/h/ln	1774	1770	1806	1774	1770	1747	1774	1770	1583	1774	1770	1732
Q Serve(g_s), s	3.0	22.5	22.6	13.4	12.6	12.7	5.2	9.9	20.5	9.0	10.9	11.2
Cycle Q Clear(g_c), s	3.0	22.5	22.6	13.4	12.6	12.7	5.2	9.9	20.5	9.0	10.9	11.2
Prop In Lane	1.00		0.18	1.00		0.38	1.00		1.00	1.00		0.43
Lane Grp Cap(c), veh/h	87	492	502	314	718	709	141	866	387	217	509	498
V/C Ratio(X)	0.69	0.93	0.93	0.87	0.47	0.47	0.74	0.52	0.95	0.83	0.51	0.52
Avail Cap(c_a), veh/h	170	492	502	316	718	709	170	866	387	217	509	498
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.1	31.6	31.6	36.0	19.6	19.7	40.5	29.4	33.4	38.6	26.7	26.9
Incr Delay (d2), s/veh	9.4	23.9	23.5	21.6	0.5	0.5	12.8	2.2	34.2	23.4	3.6	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	14.3	14.5	8.5	6.2	6.2	3.0	5.1	12.6	5.8	5.8	5.9
LnGrp Delay(d),s/veh	51.5	55.4	55.1	57.5	20.1	20.2	53.2	31.6	67.5	62.0	30.3	30.6
LnGrp LOS	D	E	E	E	C	C	D	C	E	E	C	C
Approach Vol, veh/h		982			944			921			696	
Approach Delay, s/veh		55.1			30.9			48.4			38.7	
Approach LOS		E			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	26.0	19.9	29.0	11.1	29.9	8.4	40.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	21.5	15.5	24.5	8.1	23.9	8.1	31.9
Max Q Clear Time (g_c+I1), s	11.0	22.5	15.4	24.6	7.2	13.2	5.0	14.7
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	5.5	0.0	9.7

Intersection Summary	
HCM 2010 Ctrl Delay	43.7
HCM 2010 LOS	D

AECOM

ALTERNATIVE 4 CONDITIONS

AM PEAK HOUR

LOS CALCULATION WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	274	105	194	578	82	125	506	215	59	393	86
Future Volume (veh/h)	67	274	105	194	578	82	125	506	215	59	393	86
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	78	319	122	226	672	95	145	588	250	69	457	100
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	1
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	110	568	213	258	962	136	176	1329	595	98	1175	526
Arrive On Green	0.06	0.23	0.22	0.15	0.31	0.30	0.10	0.38	0.38	0.06	0.33	0.33
Sat Flow, veh/h	1774	2520	946	1774	3115	440	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	78	222	219	226	381	386	145	588	250	69	457	100
Grp Sat Flow(s),veh/h/ln	1774	1770	1696	1774	1770	1785	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	3.7	9.5	9.9	10.7	16.3	16.4	6.9	10.7	10.1	3.3	8.5	3.9
Cycle Q Clear(g_c), s	3.7	9.5	9.9	10.7	16.3	16.4	6.9	10.7	10.1	3.3	8.5	3.9
Prop In Lane	1.00		0.56	1.00		0.25	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	110	399	382	258	547	552	176	1329	595	98	1175	526
V/C Ratio(X)	0.71	0.56	0.57	0.87	0.70	0.70	0.83	0.44	0.42	0.70	0.39	0.19
Avail Cap(c_a), veh/h	143	484	464	258	600	605	176	1329	595	128	1175	526
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	39.5	29.5	29.7	35.9	26.1	26.2	37.9	20.1	19.9	39.8	22.0	20.4
Incr Delay (d2), s/veh	6.4	1.7	1.9	25.7	3.7	3.7	25.0	1.1	2.2	6.2	1.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	4.8	4.8	7.1	8.5	8.6	4.6	5.4	4.7	1.8	4.3	1.8
LnGrp Delay(d),s/veh	45.9	31.2	31.6	61.6	29.8	29.9	62.9	21.1	22.1	46.0	23.0	21.2
LnGrp LOS	D	C	C	E	C	C	E	C	C	D	C	C
Approach Vol, veh/h		519			993			983			626	
Approach Delay, s/veh		33.6			37.1			27.5			25.2	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	37.2	16.0	24.3	12.0	33.5	8.8	31.5
Change Period (Y+Rc), s	4.0	5.5	4.0	5.5	4.0	5.5	4.0	5.5
Max Green Setting (Gmax), s	5.7	30.3	12.0	23.0	8.0	28.0	6.4	28.6
Max Q Clear Time (g_c+I1), s	5.3	12.7	12.7	11.9	8.9	10.5	5.7	18.4
Green Ext Time (p_c), s	0.0	10.4	0.0	7.0	0.0	10.4	0.0	6.5

Intersection Summary	
HCM 2010 Ctrl Delay	31.1
HCM 2010 LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	29	26	859	80	12	660
Future Volume (veh/h)	29	26	859	80	12	660
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1900	1863	1863
Adj Flow Rate, veh/h	33	30	987	92	14	759
Adj No. of Lanes	0	0	3	0	1	3
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	50	46	3535	329	43	4210
Arrive On Green	0.06	0.05	0.75	0.74	0.02	0.83
Sat Flow, veh/h	866	788	4902	440	1774	5253
Grp Volume(v), veh/h	64	0	706	373	14	759
Grp Sat Flow(s),veh/h/ln	1680	0	1695	1785	1774	1695
Q Serve(g_s), s	2.6	0.0	4.7	4.7	0.5	2.1
Cycle Q Clear(g_c), s	2.6	0.0	4.7	4.7	0.5	2.1
Prop In Lane	0.52	0.47		0.25	1.00	
Lane Grp Cap(c), veh/h	97	0	2531	1333	43	4210
V/C Ratio(X)	0.66	0.00	0.28	0.28	0.33	0.18
Avail Cap(c_a), veh/h	576	0	2531	1333	228	4210
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.4	0.0	2.8	2.9	33.6	1.2
Incr Delay (d2), s/veh	7.3	0.0	0.3	0.5	4.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	2.3	2.5	0.3	1.0
LnGrp Delay(d),s/veh	39.7	0.0	3.1	3.4	38.0	1.3
LnGrp LOS	D		A	A	D	A
Approach Vol, veh/h	64		1079			773
Approach Delay, s/veh	39.7		3.2			2.0
Approach LOS	D		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	5.7	56.3				62.0		8.1
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	8.5	44.5				57.5		23.5
Max Q Clear Time (g_c+I1), s	2.5	6.7				4.1		4.6
Green Ext Time (p_c), s	0.0	18.3				20.9		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	3.9
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	283	140	253	769	163	189	764	202	81	633	75
Future Volume (veh/h)	75	283	140	253	769	163	189	764	202	81	633	75
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	82	308	152	275	836	177	205	830	220	88	688	82
Adj No. of Lanes	1	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	115	1079	483	365	1007	213	248	1200	537	122	947	424
Arrive On Green	0.06	0.30	0.30	0.11	0.35	0.34	0.14	0.34	0.34	0.07	0.27	0.27
Sat Flow, veh/h	1774	3539	1583	3442	2908	616	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	82	308	152	275	509	504	205	830	220	88	688	82
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1721	1770	1754	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	4.0	5.8	6.5	6.8	23.3	23.3	9.9	17.9	9.4	4.3	15.6	3.5
Cycle Q Clear(g_c), s	4.0	5.8	6.5	6.8	23.3	23.3	9.9	17.9	9.4	4.3	15.6	3.5
Prop In Lane	1.00		1.00	1.00		0.35	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	115	1079	483	365	613	608	248	1200	537	122	947	424
V/C Ratio(X)	0.72	0.29	0.31	0.75	0.83	0.83	0.83	0.69	0.41	0.72	0.73	0.19
Avail Cap(c_a), veh/h	137	1079	483	375	613	608	261	1216	544	145	983	440
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.5	23.3	23.6	38.3	26.4	26.5	36.9	25.2	22.4	40.2	29.4	24.9
Incr Delay (d2), s/veh	9.7	0.7	1.7	7.2	12.3	12.4	17.0	1.9	0.7	9.9	2.9	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	3.0	3.1	3.6	13.4	13.3	6.0	9.0	4.2	2.4	7.9	1.6
LnGrp Delay(d),s/veh	50.1	24.0	25.3	45.6	38.8	39.0	53.9	27.0	23.1	50.1	32.2	25.3
LnGrp LOS	D	C	C	D	D	D	D	C	C	D	C	C
Approach Vol, veh/h		542			1288			1255			858	
Approach Delay, s/veh		28.3			40.3			30.7			33.4	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	35.6	9.1	34.9	12.3	31.9	15.3	28.6
Change Period (Y+Rc), s	3.5	5.5	3.5	5.5	3.5	5.5	3.5	5.5
Max Green Setting (Gmax), s	6.3	29.2	6.7	29.8	9.1	26.4	12.5	24.0
Max Q Clear Time (g_c+I1), s	6.0	25.3	6.3	19.9	8.8	8.5	11.9	17.6
Green Ext Time (p_c), s	0.0	3.2	0.0	8.2	0.0	11.6	0.0	5.5

Intersection Summary		
HCM 2010 Ctrl Delay		34.1
HCM 2010 LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	461	43	46	779	61	49	42	25	48	75	62
Future Volume (veh/h)	71	461	43	46	779	61	49	42	25	48	75	62
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	76	496	46	49	838	66	53	45	27	52	81	67
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	482	2351	217	674	2386	188	160	127	59	119	134	96
Arrive On Green	0.72	0.72	0.71	0.72	0.72	0.71	0.17	0.17	0.16	0.17	0.17	0.16
Sat Flow, veh/h	614	3276	303	860	3324	262	518	741	347	327	784	560
Grp Volume(v), veh/h	76	267	275	49	446	458	125	0	0	200	0	0
Grp Sat Flow(s),veh/h/ln	614	1770	1809	860	1770	1817	1606	0	0	1672	0	0
Q Serve(g_s), s	3.8	3.6	3.6	1.4	6.8	6.8	0.0	0.0	0.0	3.2	0.0	0.0
Cycle Q Clear(g_c), s	10.7	3.6	3.6	5.1	6.8	6.8	4.7	0.0	0.0	7.9	0.0	0.0
Prop In Lane	1.00		0.17	1.00		0.14	0.42		0.22	0.26		0.33
Lane Grp Cap(c), veh/h	482	1270	1299	674	1270	1304	346	0	0	349	0	0
V/C Ratio(X)	0.16	0.21	0.21	0.07	0.35	0.35	0.36	0.00	0.00	0.57	0.00	0.00
Avail Cap(c_a), veh/h	482	1270	1299	674	1270	1304	723	0	0	755	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.8	3.4	3.4	4.2	3.8	3.8	26.6	0.0	0.0	27.9	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.4	0.4	0.0	0.2	0.2	0.6	0.0	0.0	1.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	1.8	1.9	0.3	3.3	3.4	2.3	0.0	0.0	3.9	0.0	0.0
LnGrp Delay(d),s/veh	6.5	3.7	3.8	4.3	4.0	4.0	27.2	0.0	0.0	29.4	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C			C		
Approach Vol, veh/h		618			953			125			200	
Approach Delay, s/veh		4.1			4.0			27.2			29.4	
Approach LOS		A			A			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		56.0		15.8		56.0		15.8				
Change Period (Y+Rc), s		5.0		4.0		5.0		4.0				
Max Green Setting (Gmax), s		51.0		30.0		51.0		30.0				
Max Q Clear Time (g_c+I1), s		12.7		9.9		8.8		6.7				
Green Ext Time (p_c), s		14.1		1.9		14.5		2.0				
Intersection Summary												
HCM 2010 Ctrl Delay			8.2									
HCM 2010 LOS			A									

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	8	3	13	5	6	30	9	86	7	6	145	3
Future Vol, veh/h	8	3	13	5	6	30	9	86	7	6	145	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	3	14	5	6	32	10	92	8	6	156	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	305	289	158	295	288	96	159	0	0	100	0	0
Stage 1	170	170	-	116	116	-	-	-	-	-	-	-
Stage 2	135	119	-	179	172	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	647	621	887	657	622	960	1420	-	-	1493	-	-
Stage 1	832	758	-	889	800	-	-	-	-	-	-	-
Stage 2	868	797	-	823	756	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	615	614	887	639	615	960	1420	-	-	1493	-	-
Mov Cap-2 Maneuver	615	614	-	639	615	-	-	-	-	-	-	-
Stage 1	826	755	-	883	794	-	-	-	-	-	-	-
Stage 2	826	791	-	803	753	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.1	9.5	0.7	0.3
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1420	-	-	737	840	1493	-	-
HCM Lane V/C Ratio	0.007	-	-	0.035	0.052	0.004	-	-
HCM Control Delay (s)	7.6	0	-	10.1	9.5	7.4	0	-
HCM Lane LOS	A	A	-	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	453	22	14	1080	132	37	6	10	28	12	72
Future Volume (veh/h)	37	453	22	14	1080	132	37	6	10	28	12	72
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	40	492	24	15	1174	143	40	7	11	30	13	78
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	62	2395	117	32	2163	263	196	38	34	98	30	113
Arrive On Green	0.03	0.70	0.69	0.02	0.68	0.67	0.11	0.11	0.10	0.11	0.11	0.10
Sat Flow, veh/h	1774	3436	167	1774	3178	386	973	342	308	293	273	1026
Grp Volume(v), veh/h	40	253	263	15	652	665	58	0	0	121	0	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1833	1774	1770	1795	1623	0	0	1592	0	0
Q Serve(g_s), s	1.5	3.5	3.5	0.6	12.8	13.0	0.0	0.0	0.0	2.9	0.0	0.0
Cycle Q Clear(g_c), s	1.5	3.5	3.5	0.6	12.8	13.0	2.1	0.0	0.0	5.0	0.0	0.0
Prop In Lane	1.00		0.09	1.00		0.22	0.69		0.19	0.25		0.64
Lane Grp Cap(c), veh/h	62	1234	1278	32	1204	1221	267	0	0	241	0	0
V/C Ratio(X)	0.65	0.21	0.21	0.47	0.54	0.54	0.22	0.00	0.00	0.50	0.00	0.00
Avail Cap(c_a), veh/h	170	1234	1278	150	1204	1221	613	0	0	625	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	32.8	3.7	3.7	33.4	5.6	5.6	28.2	0.0	0.0	29.5	0.0	0.0
Incr Delay (d2), s/veh	10.9	0.4	0.4	10.1	1.8	1.7	0.4	0.0	0.0	1.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	1.8	1.9	0.4	6.7	6.9	1.0	0.0	0.0	2.3	0.0	0.0
LnGrp Delay(d),s/veh	43.6	4.1	4.1	43.6	7.3	7.4	28.6	0.0	0.0	31.2	0.0	0.0
LnGrp LOS	D	A	A	D	A	A	C			C		
Approach Vol, veh/h		556			1332			58			121	
Approach Delay, s/veh		6.9			7.7			28.6			31.2	
Approach LOS		A			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.2	51.9		11.6	6.4	50.8		11.6
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	5.3	47.1		24.1	6.1	46.3		24.1
Max Q Clear Time (g_c+I1), s	2.6	5.5		7.0	3.5	15.0		4.1
Green Ext Time (p_c), s	0.0	18.8		0.9	0.0	16.4		0.9

Intersection Summary	
HCM 2010 Ctrl Delay	9.5
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	418	82	91	667	76	187	208	31	53	160	58
Future Volume (veh/h)	32	418	82	91	667	76	187	208	31	53	160	58
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	37	480	94	105	767	87	215	239	36	61	184	67
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	240	922	180	360	1115	126	574	730	620	505	604	514
Arrive On Green	0.03	0.31	0.31	0.06	0.35	0.34	0.11	0.39	0.39	0.04	0.32	0.32
Sat Flow, veh/h	1774	2955	576	1774	3205	363	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	37	286	288	105	423	431	215	239	36	61	184	67
Grp Sat Flow(s),veh/h/ln	1774	1770	1761	1774	1770	1799	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	1.0	9.8	10.0	2.8	15.2	15.2	5.5	6.6	1.0	1.7	5.5	2.2
Cycle Q Clear(g_c), s	1.0	9.8	10.0	2.8	15.2	15.2	5.5	6.6	1.0	1.7	5.5	2.2
Prop In Lane	1.00		0.33	1.00		0.20	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	240	552	549	360	615	626	574	730	620	505	604	514
V/C Ratio(X)	0.15	0.52	0.52	0.29	0.69	0.69	0.37	0.33	0.06	0.12	0.30	0.13
Avail Cap(c_a), veh/h	357	789	785	413	789	802	667	730	620	598	604	514
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	17.6	20.9	21.0	15.3	20.7	20.7	12.7	15.7	14.0	15.4	18.7	17.6
Incr Delay (d2), s/veh	0.3	0.8	0.8	0.4	1.7	1.7	0.4	1.2	0.2	0.1	1.3	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	4.9	4.9	1.4	7.7	7.8	2.7	3.6	0.5	0.8	3.0	1.0
LnGrp Delay(d),s/veh	17.9	21.7	21.8	15.7	22.4	22.5	13.1	16.9	14.2	15.5	20.0	18.2
LnGrp LOS	B	C	C	B	C	C	B	B	B	B	C	B
Approach Vol, veh/h		611			959			490			312	
Approach Delay, s/veh		21.5			21.7			15.0			18.7	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.1	33.0	7.8	27.1	11.1	28.0	5.1	29.7
Change Period (Y+Rc), s	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
Max Green Setting (Gmax), s	6.5	28.5	6.5	32.5	11.5	23.5	6.5	32.5
Max Q Clear Time (g_c+I1), s	3.7	8.6	4.8	12.0	7.5	7.5	3.0	17.2
Green Ext Time (p_c), s	0.0	2.7	0.0	9.5	0.2	2.5	0.0	8.0

Intersection Summary	
HCM 2010 Ctrl Delay	19.9
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	4	4	10	14	6	18	41	407	4	5	337	4
Future Vol, veh/h	4	4	10	14	6	18	41	407	4	5	337	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	4	11	16	7	20	46	452	4	6	374	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	709	936	189	747	936	228	379	0	0	457	0	0
Stage 1	388	388	-	546	546	-	-	-	-	-	-	-
Stage 2	321	548	-	201	390	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	321	264	821	301	264	775	1176	-	-	1100	-	-
Stage 1	607	607	-	490	516	-	-	-	-	-	-	-
Stage 2	665	515	-	782	606	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	293	249	821	280	249	775	1176	-	-	1100	-	-
Mov Cap-2 Maneuver	293	249	-	280	249	-	-	-	-	-	-	-
Stage 1	575	603	-	465	489	-	-	-	-	-	-	-
Stage 2	606	488	-	760	602	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.8	15.3	0.9	0.1
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1176	-	-	430	390	1100	-	-
HCM Lane V/C Ratio	0.039	-	-	0.047	0.108	0.005	-	-
HCM Control Delay (s)	8.2	0.2	-	13.8	15.3	8.3	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.4	0	-	-

Intersection	
Intersection Delay, s/veh	11.9
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	27	34	87	0	43	0	51	0	0	409	2
Future Vol, veh/h	0	27	34	87	0	43	0	51	0	0	409	2
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	30	37	96	0	47	0	56	0	0	449	2
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	10.9	10.4	12.8
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	0%	18%	46%	16%	0%
Vol Thru, %	100%	99%	23%	0%	84%	100%
Vol Right, %	0%	1%	59%	54%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	273	138	148	94	122	205
LT Vol	0	0	27	43	19	0
Through Vol	273	136	34	0	103	205
RT Vol	0	2	87	51	0	0
Lane Flow Rate	300	152	163	103	134	226
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.486	0.246	0.262	0.173	0.224	0.373
Departure Headway (Hd)	5.834	5.824	5.804	6.028	6.024	5.944
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	617	616	616	593	595	605
Service Time	3.575	3.564	3.858	4.088	3.768	3.689
HCM Lane V/C Ratio	0.486	0.247	0.265	0.174	0.225	0.374
HCM Control Delay	14	10.5	10.9	10.4	10.5	12.2
HCM Lane LOS	B	B	B	B	B	B
HCM 95th-tile Q	2.7	1	1	0.6	0.9	1.7

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	19	308	0
Future Vol, veh/h	0	19	308	0
Peak Hour Factor	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	21	338	0
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	11.6
HCM LOS	B

Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	366	31	273	950	138	179	394	292	86	345	101
Future Volume (veh/h)	39	366	31	273	950	138	179	394	292	86	345	101
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	42	394	33	294	1022	148	192	424	314	92	371	109
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	77	790	66	344	1210	175	240	1071	479	129	650	189
Arrive On Green	0.04	0.24	0.23	0.19	0.39	0.38	0.14	0.30	0.30	0.07	0.24	0.23
Sat Flow, veh/h	1774	3308	276	1774	3104	449	1774	3539	1583	1774	2708	786
Grp Volume(v), veh/h	42	210	217	294	582	588	192	424	314	92	241	239
Grp Sat Flow(s),veh/h/ln	1774	1770	1814	1774	1770	1783	1774	1770	1583	1774	1770	1724
Q Serve(g_s), s	1.9	8.5	8.6	13.3	24.9	25.0	8.7	7.9	14.4	4.2	10.0	10.2
Cycle Q Clear(g_c), s	1.9	8.5	8.6	13.3	24.9	25.0	8.7	7.9	14.4	4.2	10.0	10.2
Prop In Lane	1.00		0.15	1.00		0.25	1.00		1.00	1.00		0.46
Lane Grp Cap(c), veh/h	77	423	433	344	690	695	240	1071	479	129	425	414
V/C Ratio(X)	0.55	0.50	0.50	0.85	0.84	0.85	0.80	0.40	0.66	0.72	0.57	0.58
Avail Cap(c_a), veh/h	119	425	435	426	730	736	298	1071	479	219	425	414
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	39.1	27.4	27.5	32.4	23.1	23.2	35.0	23.0	25.3	37.8	27.9	28.1
Incr Delay (d2), s/veh	5.9	0.9	0.9	13.1	8.6	8.6	11.8	1.1	6.8	7.2	5.4	5.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	4.2	4.4	7.8	13.8	13.9	5.1	4.0	7.2	2.3	5.5	5.5
LnGrp Delay(d),s/veh	45.0	28.3	28.4	45.5	31.7	31.8	46.8	24.1	32.1	45.0	33.3	33.8
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		469			1464			930			572	
Approach Delay, s/veh		29.8			34.5			31.5			35.4	
Approach LOS		C			C			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	29.2	20.2	23.9	15.3	24.0	7.6	36.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.8	23.2	19.5	19.5	13.5	19.5	5.1	33.9
Max Q Clear Time (g_c+I1), s	6.2	16.4	15.3	10.6	10.7	12.2	3.9	27.0
Green Ext Time (p_c), s	0.1	3.7	0.4	6.1	0.1	3.9	0.0	5.0

Intersection Summary	
HCM 2010 Ctrl Delay	33.2
HCM 2010 LOS	C

ALTERNATIVE 4 CONDITIONS

PM PEAK HOUR

LOS CALCULATION WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	433	108	223	257	54	69	358	275	65	310	43
Future Volume (veh/h)	92	433	108	223	257	54	69	358	275	65	310	43
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	99	466	116	240	276	58	74	385	296	70	333	46
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	136	660	163	285	930	193	105	1228	549	100	1218	545
Arrive On Green	0.08	0.23	0.23	0.16	0.32	0.31	0.06	0.35	0.35	0.06	0.34	0.34
Sat Flow, veh/h	1774	2814	696	1774	2921	605	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	99	292	290	240	166	168	74	385	296	70	333	46
Grp Sat Flow(s),veh/h/ln	1774	1770	1740	1774	1770	1756	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	4.6	12.7	12.9	11.1	5.9	6.1	3.5	6.7	12.7	3.3	5.7	1.7
Cycle Q Clear(g_c), s	4.6	12.7	12.9	11.1	5.9	6.1	3.5	6.7	12.7	3.3	5.7	1.7
Prop In Lane	1.00		0.40	1.00		0.34	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	136	415	408	285	563	559	105	1228	549	100	1218	545
V/C Ratio(X)	0.73	0.70	0.71	0.84	0.29	0.30	0.70	0.31	0.54	0.70	0.27	0.08
Avail Cap(c_a), veh/h	223	493	485	305	575	571	126	1228	549	126	1218	545
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	38.1	29.6	29.7	34.3	21.6	21.7	38.9	20.2	22.1	39.1	20.0	18.7
Incr Delay (d2), s/veh	2.8	4.3	4.7	16.5	0.4	0.4	9.1	0.7	3.8	7.2	0.6	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	6.7	6.7	6.7	3.0	3.0	2.0	3.4	6.1	1.8	2.9	0.8
LnGrp Delay(d),s/veh	40.8	33.9	34.4	50.9	22.0	22.2	48.1	20.8	25.9	46.3	20.6	19.0
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	B
Approach Vol, veh/h		681			574			755			449	
Approach Delay, s/veh		35.1			34.1			25.5			24.4	
Approach LOS		D			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	34.2	17.0	24.8	8.5	34.0	10.0	31.8
Change Period (Y+Rc), s	4.0	5.5	4.0	5.5	4.0	5.5	4.0	5.5
Max Green Setting (Gmax), s	5.5	28.5	14.0	23.0	5.5	28.5	10.1	26.9
Max Q Clear Time (g_c+I1), s	5.3	14.7	13.1	14.9	5.5	7.7	6.6	8.1
Green Ext Time (p_c), s	0.0	6.8	0.0	4.3	0.0	8.5	0.0	7.5

Intersection Summary	
HCM 2010 Ctrl Delay	30.0
HCM 2010 LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	76	90	640	110	11	793
Future Volume (veh/h)	76	90	640	110	11	793
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1900	1863	1863
Adj Flow Rate, veh/h	87	103	736	126	13	911
Adj No. of Lanes	0	0	3	0	1	3
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	114	135	2863	486	41	3735
Arrive On Green	0.15	0.14	0.65	0.65	0.02	0.73
Sat Flow, veh/h	759	899	4547	743	1774	5253
Grp Volume(v), veh/h	191	0	568	294	13	911
Grp Sat Flow(s),veh/h/ln	1666	0	1695	1732	1774	1695
Q Serve(g_s), s	7.6	0.0	4.8	4.9	0.5	4.0
Cycle Q Clear(g_c), s	7.6	0.0	4.8	4.9	0.5	4.0
Prop In Lane	0.46	0.54		0.43	1.00	
Lane Grp Cap(c), veh/h	250	0	2216	1132	41	3735
V/C Ratio(X)	0.76	0.00	0.26	0.26	0.32	0.24
Avail Cap(c_a), veh/h	744	0	2216	1132	230	3735
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	0.0	5.0	5.1	33.4	3.0
Incr Delay (d2), s/veh	4.8	0.0	0.3	0.6	4.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	0.0	2.3	2.5	0.3	1.9
LnGrp Delay(d),s/veh	33.2	0.0	5.3	5.6	37.7	3.1
LnGrp LOS	C		A	A	D	A
Approach Vol, veh/h	191		862			924
Approach Delay, s/veh	33.2		5.4			3.6
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	5.6	49.4				55.0		14.4
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	8.5	37.5				50.5		30.5
Max Q Clear Time (g_c+I1), s	2.5	6.9				6.0		9.6
Green Ext Time (p_c), s	0.0	15.8				18.7		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	7.3
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	106	681	246	326	399	99	168	625	212	128	767	106
Future Volume (veh/h)	106	681	246	326	399	99	168	625	212	128	767	106
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	113	724	262	347	424	105	179	665	226	136	816	113
Adj No. of Lanes	1	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	152	1015	454	438	926	227	223	1071	479	177	981	439
Arrive On Green	0.09	0.29	0.29	0.13	0.33	0.32	0.13	0.30	0.30	0.10	0.28	0.28
Sat Flow, veh/h	1774	3539	1583	3442	2818	692	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	113	724	262	347	265	264	179	665	226	136	816	113
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1721	1770	1741	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	5.4	16.0	12.3	8.5	10.3	10.5	8.6	14.1	10.1	6.5	18.9	4.8
Cycle Q Clear(g_c), s	5.4	16.0	12.3	8.5	10.3	10.5	8.6	14.1	10.1	6.5	18.9	4.8
Prop In Lane	1.00		1.00	1.00		0.40	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	152	1015	454	438	581	572	223	1071	479	177	981	439
V/C Ratio(X)	0.75	0.71	0.58	0.79	0.46	0.46	0.80	0.62	0.47	0.77	0.83	0.26
Avail Cap(c_a), veh/h	179	1015	454	474	581	572	254	1096	490	203	994	445
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	39.0	27.9	26.6	36.9	23.1	23.3	37.1	26.1	24.7	38.3	29.6	24.5
Incr Delay (d2), s/veh	10.3	4.3	5.3	7.4	2.6	2.7	13.1	1.2	1.0	11.8	6.3	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	8.4	6.1	4.5	5.4	5.4	5.0	7.0	4.5	3.8	10.0	2.2
LnGrp Delay(d),s/veh	49.2	32.2	31.9	44.3	25.7	25.9	50.2	27.3	25.8	50.0	35.9	25.0
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	D	C
Approach Vol, veh/h		1099			876			1070			1065	
Approach Delay, s/veh		33.8			33.2			30.8			36.6	
Approach LOS		C			C			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.5	33.6	11.7	31.4	14.1	30.0	13.9	29.2
Change Period (Y+Rc), s	3.5	5.5	3.5	5.5	3.5	5.5	3.5	5.5
Max Green Setting (Gmax), s	8.3	27.7	9.5	26.5	11.5	24.5	12.0	24.0
Max Q Clear Time (g_c+I1), s	7.4	12.5	8.5	16.1	10.5	18.0	10.6	20.9
Green Ext Time (p_c), s	0.0	10.2	0.0	8.5	0.1	5.1	0.0	2.8

Intersection Summary	
HCM 2010 Ctrl Delay	33.6
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	127	610	46	30	485	56	67	13	39	41	75	58
Future Volume (veh/h)	127	610	46	30	485	56	67	13	39	41	75	58
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	138	663	50	33	527	61	73	14	42	45	82	63
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	652	2406	181	581	2306	266	197	48	80	112	139	93
Arrive On Green	0.72	0.72	0.71	0.72	0.72	0.71	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	825	3337	251	734	3198	369	708	292	483	294	842	563
Grp Volume(v), veh/h	138	351	362	33	291	297	129	0	0	190	0	0
Grp Sat Flow(s),veh/h/ln	825	1770	1818	734	1770	1798	1483	0	0	1699	0	0
Q Serve(g_s), s	4.7	4.8	4.9	1.1	3.8	3.9	0.0	0.0	0.0	1.9	0.0	0.0
Cycle Q Clear(g_c), s	8.6	4.8	4.9	6.0	3.8	3.9	5.3	0.0	0.0	7.1	0.0	0.0
Prop In Lane	1.00		0.14	1.00		0.21	0.57		0.33	0.24		0.33
Lane Grp Cap(c), veh/h	652	1276	1311	581	1276	1296	325	0	0	344	0	0
V/C Ratio(X)	0.21	0.28	0.28	0.06	0.23	0.23	0.40	0.00	0.00	0.55	0.00	0.00
Avail Cap(c_a), veh/h	652	1276	1311	581	1276	1296	720	0	0	805	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.7	3.4	3.4	4.5	3.3	3.3	26.6	0.0	0.0	27.4	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.5	0.5	0.0	0.1	0.1	0.8	0.0	0.0	1.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	2.5	2.6	0.2	1.9	1.9	2.3	0.0	0.0	3.6	0.0	0.0
LnGrp Delay(d),s/veh	5.4	3.9	3.9	4.5	3.4	3.4	27.4	0.0	0.0	28.8	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C			C		
Approach Vol, veh/h		851			621			129			190	
Approach Delay, s/veh		4.2			3.4			27.4			28.8	
Approach LOS		A			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		55.0		15.0		55.0		15.0
Change Period (Y+Rc), s		5.0		4.0		5.0		4.0
Max Green Setting (Gmax), s		50.0		31.0		50.0		31.0
Max Q Clear Time (g_c+I1), s		10.6		9.1		8.0		7.3
Green Ext Time (p_c), s		12.5		1.9		12.7		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	8.2
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	7	8	10	12	16	29	17	79	10	12	141	3
Future Vol, veh/h	7	8	10	12	16	29	17	79	10	12	141	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	9	11	13	17	31	18	84	11	13	150	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	326	308	152	313	305	89	153	0	0	95	0	0
Stage 1	177	177	-	126	126	-	-	-	-	-	-	-
Stage 2	149	131	-	187	179	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	627	606	894	640	608	969	1428	-	-	1499	-	-
Stage 1	825	753	-	878	792	-	-	-	-	-	-	-
Stage 2	854	788	-	815	751	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	584	593	894	615	595	969	1428	-	-	1499	-	-
Mov Cap-2 Maneuver	584	593	-	615	595	-	-	-	-	-	-	-
Stage 1	814	746	-	867	782	-	-	-	-	-	-	-
Stage 2	798	778	-	789	744	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.5	10.2	1.2	0.6
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1428	-	-	682	747	1499	-	-
HCM Lane V/C Ratio	0.013	-	-	0.039	0.081	0.009	-	-
HCM Control Delay (s)	7.6	0	-	10.5	10.2	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	883	49	9	680	122	21	26	13	60	2	123
Future Volume (veh/h)	41	883	49	9	680	122	21	26	13	60	2	123
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	43	929	52	9	716	128	22	27	14	63	2	129
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	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	66	2169	121	25	1842	329	142	156	64	138	21	175
Arrive On Green	0.04	0.64	0.63	0.01	0.61	0.61	0.17	0.17	0.16	0.17	0.17	0.16
Sat Flow, veh/h	1774	3408	191	1774	3001	536	406	910	376	393	122	1022
Grp Volume(v), veh/h	43	482	499	9	422	422	63	0	0	194	0	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1829	1774	1770	1768	1691	0	0	1537	0	0
Q Serve(g_s), s	1.6	9.2	9.2	0.3	8.2	8.2	0.0	0.0	0.0	5.8	0.0	0.0
Cycle Q Clear(g_c), s	1.6	9.2	9.2	0.3	8.2	8.2	2.0	0.0	0.0	8.0	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.30	0.35		0.22	0.32		0.66
Lane Grp Cap(c), veh/h	66	1127	1164	25	1086	1085	362	0	0	334	0	0
V/C Ratio(X)	0.65	0.43	0.43	0.35	0.39	0.39	0.17	0.00	0.00	0.58	0.00	0.00
Avail Cap(c_a), veh/h	263	1127	1164	210	1086	1085	714	0	0	678	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	32.1	6.1	6.1	33.0	6.6	6.7	24.1	0.0	0.0	26.6	0.0	0.0
Incr Delay (d2), s/veh	10.3	1.2	1.2	8.2	1.0	1.1	0.2	0.0	0.0	1.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	4.8	4.9	0.2	4.2	4.3	1.0	0.0	0.0	3.6	0.0	0.0
LnGrp Delay(d),s/veh	42.4	7.3	7.3	41.2	7.7	7.7	24.3	0.0	0.0	28.2	0.0	0.0
LnGrp LOS	D	A	A	D	A	A	C			C		
Approach Vol, veh/h		1024			853			63			194	
Approach Delay, s/veh		8.8			8.0			24.3			28.2	
Approach LOS		A			A			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.0	47.0		15.6	6.5	45.5		15.6				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	7.5	42.5		26.5	9.5	40.5		26.5				
Max Q Clear Time (g_c+I1), s	2.3	11.2		10.0	3.6	10.2		4.0				
Green Ext Time (p_c), s	0.0	15.7		1.4	0.0	15.5		1.5				
Intersection Summary												
HCM 2010 Ctrl Delay			10.7									
HCM 2010 LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	494	134	106	365	50	119	163	68	74	156	62
Future Volume (veh/h)	68	494	134	106	365	50	119	163	68	74	156	62
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	74	537	146	115	397	54	129	177	74	80	170	67
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	379	788	213	309	964	130	589	754	641	570	715	608
Arrive On Green	0.05	0.29	0.28	0.07	0.31	0.30	0.07	0.40	0.40	0.05	0.38	0.38
Sat Flow, veh/h	1774	2755	746	1774	3134	424	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	74	344	339	115	223	228	129	177	74	80	170	67
Grp Sat Flow(s),veh/h/ln	1774	1770	1731	1774	1770	1788	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	2.2	12.9	13.1	3.3	7.5	7.6	3.2	4.7	2.2	2.0	4.6	2.0
Cycle Q Clear(g_c), s	2.2	12.9	13.1	3.3	7.5	7.6	3.2	4.7	2.2	2.0	4.6	2.0
Prop In Lane	1.00		0.43	1.00		0.24	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	379	506	495	309	544	550	589	754	641	570	715	608
V/C Ratio(X)	0.20	0.68	0.68	0.37	0.41	0.41	0.22	0.23	0.12	0.14	0.24	0.11
Avail Cap(c_a), veh/h	455	684	669	441	778	786	633	754	641	646	715	608
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	17.5	23.7	23.9	17.6	20.6	20.7	11.9	14.7	13.9	12.6	15.7	14.9
Incr Delay (d2), s/veh	0.2	1.6	1.8	0.7	0.5	0.5	0.2	0.7	0.4	0.1	0.8	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	6.5	6.5	1.6	3.7	3.8	1.5	2.6	1.0	1.0	2.5	0.9
LnGrp Delay(d),s/veh	17.7	25.4	25.6	18.3	21.1	21.2	12.1	15.4	14.3	12.8	16.5	15.2
LnGrp LOS	B	C	C	B	C	C	B	B	B	B	B	B
Approach Vol, veh/h		757			566			380			317	
Approach Delay, s/veh		24.7			20.5			14.1			15.3	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.8	34.4	8.4	25.5	8.4	32.8	6.8	27.1
Change Period (Y+Rc), s	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
Max Green Setting (Gmax), s	6.5	28.5	10.5	28.5	6.7	28.3	6.5	32.5
Max Q Clear Time (g_c+I1), s	4.0	6.7	5.3	15.1	5.2	6.6	4.2	9.6
Green Ext Time (p_c), s	0.0	2.4	0.1	5.9	0.0	2.4	0.0	7.6

Intersection Summary	
HCM 2010 Ctrl Delay	20.1
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	7	7	32	27	7	19	39	340	12	15	398	2
Future Vol, veh/h	7	7	32	27	7	19	39	340	12	15	398	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	8	35	30	8	21	43	374	13	16	437	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	747	944	220	721	939	193	440	0	0	387	0	0
Stage 1	471	471	-	466	466	-	-	-	-	-	-	-
Stage 2	276	473	-	255	473	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	301	261	784	315	263	816	1116	-	-	1168	-	-
Stage 1	542	558	-	546	561	-	-	-	-	-	-	-
Stage 2	707	557	-	727	557	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	272	244	784	279	246	816	1116	-	-	1168	-	-
Mov Cap-2 Maneuver	272	244	-	279	246	-	-	-	-	-	-	-
Stage 1	515	548	-	519	534	-	-	-	-	-	-	-
Stage 2	646	530	-	672	547	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.3	17	1	0.4
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1116	-	-	483	357	1168	-	-
HCM Lane V/C Ratio	0.038	-	-	0.105	0.163	0.014	-	-
HCM Control Delay (s)	8.4	0.2	-	13.3	17	8.1	0.1	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.6	0	-	-

Intersection	
Intersection Delay, s/veh	13.7
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	45	63	130	0	46	0	39	0	0	355	2
Future Vol, veh/h	0	45	63	130	0	46	0	39	0	0	355	2
Peak Hour Factor	0.92	0.88	0.88	0.88	0.92	0.88	0.88	0.88	0.92	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	51	72	148	0	52	0	44	0	0	403	2
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	14.1	11.2	13.7
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	0%	19%	54%	16%	0%
Vol Thru, %	100%	98%	26%	0%	84%	100%
Vol Right, %	0%	2%	55%	46%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	237	120	238	85	148	251
LT Vol	0	0	45	46	23	0
Through Vol	237	118	63	0	125	251
RT Vol	0	2	130	39	0	0
Lane Flow Rate	269	137	270	97	169	285
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.478	0.243	0.453	0.181	0.3	0.501
Departure Headway (Hd)	6.401	6.389	6.032	6.732	6.414	6.335
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	559	558	592	536	556	564
Service Time	4.192	4.181	4.121	4.732	4.203	4.124
HCM Lane V/C Ratio	0.481	0.246	0.456	0.181	0.304	0.505
HCM Control Delay	15	11.2	14.1	11.2	12	15.4
HCM Lane LOS	B	B	B	B	B	C
HCM 95th-tile Q	2.6	0.9	2.3	0.7	1.3	2.8

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	23	376	0
Future Vol, veh/h	0	23	376	0
Peak Hour Factor	0.92	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	26	427	0
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	14.1
HCM LOS	B

Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	789	78	256	513	118	136	385	345	170	381	103
Future Volume (veh/h)	56	789	78	256	513	118	136	385	345	170	381	103
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	60	839	83	272	546	126	145	410	367	181	405	110
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	87	905	90	314	1161	267	186	866	387	217	723	194
Arrive On Green	0.05	0.28	0.27	0.18	0.41	0.40	0.11	0.24	0.24	0.12	0.26	0.26
Sat Flow, veh/h	1774	3254	322	1774	2859	657	1774	3539	1583	1774	2759	742
Grp Volume(v), veh/h	60	456	466	272	337	335	145	410	367	181	258	257
Grp Sat Flow(s),veh/h/ln	1774	1770	1806	1774	1770	1747	1774	1770	1583	1774	1770	1732
Q Serve(g_s), s	3.0	22.5	22.6	13.4	12.6	12.7	7.2	8.9	20.5	9.0	11.3	11.6
Cycle Q Clear(g_c), s	3.0	22.5	22.6	13.4	12.6	12.7	7.2	8.9	20.5	9.0	11.3	11.6
Prop In Lane	1.00		0.18	1.00		0.38	1.00		1.00	1.00		0.43
Lane Grp Cap(c), veh/h	87	492	502	314	718	709	186	866	387	217	464	454
V/C Ratio(X)	0.69	0.93	0.93	0.87	0.47	0.47	0.78	0.47	0.95	0.83	0.56	0.57
Avail Cap(c_a), veh/h	170	492	502	316	718	709	205	866	387	217	464	454
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.1	31.6	31.6	36.0	19.6	19.7	39.2	29.0	33.4	38.6	28.7	28.8
Incr Delay (d2), s/veh	9.4	23.9	23.5	21.6	0.5	0.5	15.8	1.9	34.2	23.4	4.8	5.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	14.3	14.5	8.5	6.2	6.2	4.3	4.6	12.6	5.8	6.1	6.1
LnGrp Delay(d),s/veh	51.5	55.4	55.1	57.5	20.1	20.2	55.0	30.9	67.5	62.0	33.4	33.9
LnGrp LOS	D	E	E	E	C	C	E	C	E	E	C	C
Approach Vol, veh/h		982			944			922			696	
Approach Delay, s/veh		55.1			30.9			49.2			41.0	
Approach LOS		E			C			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.0	26.0	19.9	29.0	13.4	27.6	8.4	40.5				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	10.5	21.5	15.5	24.5	9.9	22.1	8.1	31.9				
Max Q Clear Time (g_c+I1), s	11.0	22.5	15.4	24.6	9.2	13.6	5.0	14.7				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	4.6	0.0	9.7				
Intersection Summary												
HCM 2010 Ctrl Delay			44.4									
HCM 2010 LOS			D									

METRO GOLD LINE FOOTHILL EXTENSION
AZUSA TO MONTCLAIR

Transportation Technical Report
for the
Draft EIR

Prepared by:
Intueor
August 2011

Updated by:
Parsons Brinckerhoff
August 2012

Table of Contents

List of Tables

List of Figures

List of Appendices

Chapter 1 – Summary

This report prepared by Intueor Consulting, Inc. in August 2011 was updated by Parsons Brinckerhoff in August 2012, which focuses on transportation impacts, is one of a series of technical reports prepared in support of the Draft Environmental Impact Statement/Environmental Impact Report (Draft EIS/EIR) for the Metro Gold Line Foothill Extension Azusa to Montclair project. The proposed 12.6 mile east-west light rail transit (LRT) line extends from its existing terminus in the City of Azusa through the cities of Glendora, San Dimas, La Verne, Pomona, Claremont and Montclair. The proposed project would enable passengers to make a trip from Montclair to downtown Pasadena in just over 40 minutes and from Montclair to downtown Los Angeles in approximately 75 minutes. The Project includes stations in Glendora, San Dimas, La Verne, Pomona, Claremont, and Montclair as depicted on **Figure 1-1**.

Chapter 2.0 provides a project background and describes the alternatives under consideration. The analysis methodology and significance criteria are presented in Chapter 3.0 of this report. Traffic count data was collected at 90 intersection locations and 35 roadway segments. The traffic analysis methodology and impact thresholds set forth by the County of Los Angeles Department of Public Works were used in this report. An existing conditions analysis was performed for each component of the transportation environment, which consists of transit, traffic circulation, parking and other modes such as pedestrians and bicycles. Details of the affected environment are presented in Chapter 4.0. Existing transit information was collected for the operators providing services within the study area. Existing traffic operating conditions were evaluated for the project area roadway segments and intersections. The existing conditions intersection analysis shows that 6 of the 90 locations are currently operating at LOS E or F. All other intersections currently operate at LOS D or better during both the AM and PM peak hours. Parking provisions at each station would be designed to accommodate patrons using the LRT service. Also, it is anticipated that existing on-street parking spaces will not be displaced by the construction of the proposed light rail tranist project alignment.

Future conditions were developed for the No Build, TSM and the Build alternatives to determine project related impacts, mitigation measures and any residual impacts after mitigation. Impacts for each alternative being considered are detailed by each component of the transportation environment in Chapter 5.0. Greater impacts can be seen on transit, traffic circulation, parking and other modes for the No Build Alternative than the Build and TSM alternatives. For traffic circulation, **Table 1-1** summarizes the number of intersections with levels of service E and F during the AM and PM peak hours in the horizon year of 2035.

Table 1-1: Number of Intersections With Level of Service E and F In 2035

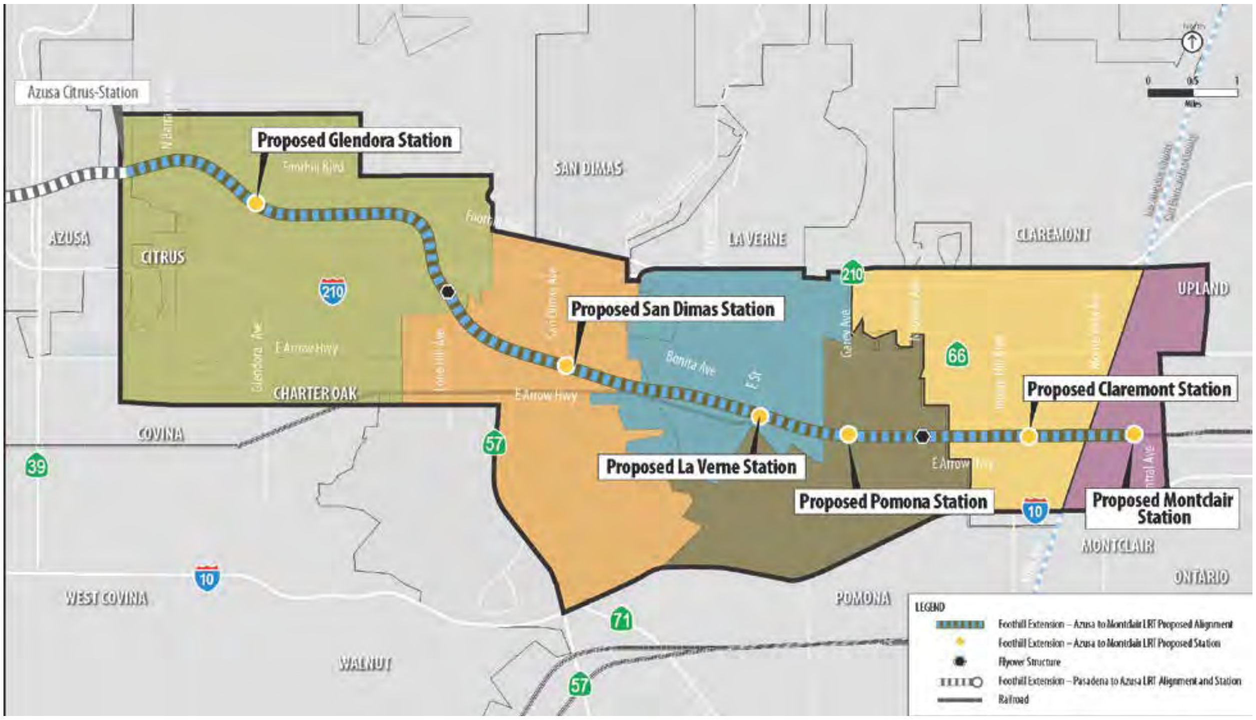
Alternative Under Consideration	AM		PM	
	LOS E	LOS F	LOS E	LOS F
No Build	1	3	2	8
TSM	1	3	3	7
Build Without Mitigation	2	2	5	6
Build With Mitigation	1	---	2	1

Intersections that exceed the significance threshold when compared to the No Build Alternative are considered to be impacted by the proposed project. The number of impacted intersections for each alternative under consideration is summarized in **Table 1-2**. mitigation measures are proposed and the number of intersections that remain impacted (residual impacts) after the implementation of the proposed mitigation measures are also shown. Details of the proposed mitigation measures for each alternative are presented in Chapter 6.0.

Table 1-2: Number of Impacted Intersections Without and With Mitigations

Alternative Under Consideration	Impacted Intersections		Impacted After Mitigations	
	AM	PM	AM	PM
No Build	---	---	---	---
TSM	2	3	0	0
Build	10	12	3	3

Chapter 7.0 presents the conclusions and findings of impacts due to the proposed build alternative. In summary, no unavoidable significant adverse impacts have been identified after mitigation measures have been implemented for transit, parking, pedestrians and bicycles. For traffic circulation, the Build alternative would have three intersections that would continue to be impacted to significant levels (residual impacts) after implementation of the proposed mitigation measures during one or both peak hours. However, it should also be noted that these three intersections will continue to operate at LOS D or better in 2035 which is an acceptable level of service for urban areas. Details of these results by alternative are presented in Chapter 7.0.



Source: Parsons Brinckerhoff 2012

Figure 1-1: Project Study Area and Proposed Alignment and Stations

Chapter 2 – Introduction

This report, which focuses on transportation impacts, is one of a series of technical reports prepared in support of the Draft Environmental Impact Statement/Environmental Impact Report (Draft EIS/EIR) for the Metro Gold Line Foothill Extension Azusa to Montclair project. Chapter 1 provides a summary of the traffic study and its findings. Chapter 2 of this report begins with a background of the project and a presentation of the alternatives being considered for evaluation. Chapter 3 presents the analysis methodology and criteria of significance. Chapter 4 evaluates the affected environment for each one of the components of the transportation environment, which consists of transit, traffic circulation, parking and other modes such as pedestrians and bicycles. Chapter 5 assesses the operational and construction impacts for each alternative being considered. Chapter 6 identifies feasible mitigation measures due to operational and construction impacts. Finally, Chapter 7 presents the findings and conclusions and identifies residual impacts.

2.1 BACKGROUND

The proposed project is a 12.6-mile[1] east-west corridor in the San Gabriel Valley of Southern California that generally follows the foothills of the San Gabriel Mountains from Azusa (Los Angeles County), east to Montclair (San Bernardino County). The project area runs along the former Atchison, Topeka & Santa Fe (ATSF) right-of-way, roughly paralleling I-210 and Arrow Highway. The right-of-way in Los Angeles County was acquired by the Los Angeles County Metropolitan Transportation Authority (Metro) and is currently under the control of the Metro Gold Line Foothill Extension Construction Authority (the Construction Authority). The right-of-way for the proposed corridor that lies within San Bernardino County is owned by the San Bernardino Associated Governments (SANBAG). The proposed project would add six new stations (west to east) in Glendora, San Dimas, La Verne, Pomona, Claremont, and Montclair. The project would enable passengers to make a trip from Montclair to downtown Pasadena in just over 40 minutes and from Montclair to downtown Los Angeles in approximately 75 minutes.

Within the study area, the I-210/SR 210 provides the main east-west highway for vehicle traffic, and is a key link in the state and regional goods movement network. From its connection with I-5 on the north side of Los Angeles County, to its connection with I-15 in Rancho Cucamonga, the freeway is the northernmost of three east-west freeways (I-210, I-10, and SR 60) that provide for goods movement from central Los Angeles to the Inland Empire with connections to I-15 and I-215. With the extension of SR 210 from San Dimas to Rancho Cucamonga, a notable portion of the truck traffic that previously used I-10 appears to have shifted to the I-210/SR 210 corridor. Since SR 210 will soon connect I-15 in Rancho Cucamonga with I-215 in San Bernardino, the volume of trucks using this northernmost route is likely to increase. Additional truck traffic would contribute to increased overall congestion, with the effects of more truck traffic being a contributor to peak-hour congestion levels and slower peak-hour speeds. In addition to this potential increase in congestion, there are no plans for substantial increases in I-210 capacity because of the substantial impacts that would occur to adjoining communities if the freeway were widened. Mobility is also affected because there are no other freeways that serve the study corridor. The closest east-west freeway is I-10—located approximately 5 to 7 miles to the south of the project

---

[1] Actual construction work in Phase 2B would begin at the end of the Phase 2A track, approximately 0.3 mile east of the Azusa Citrus Station, making the actual construction length of phase 2B approximately 12.3 miles.

depending on the route segment—does not serve many of the corridor communities. In addition, I-10 is also heavily congested as is the SR 60, which is located about 5 to 9 miles south of I-210.

An Alternatives Analysis was initiated fall 2001 by the Construction Authority and the San Gabriel Valley Council of Governments to consider transportation strategies that would address the mobility needs of the Pasadena to Montclair corridor. Seven alternatives were examined, and a Locally Preferred Alternative (LPA) (the Pasadena to Montclair Light Rail Transit [LRT] Project) was adopted by the Construction Authority in 2003 and revised in 2004. The LRT project is known as the Foothill Extension, and is an approximately 24-mile east-west light rail extension of the Metro Gold Line Phase I. Subsequent to that, Draft and Final EIS/EIR documents were prepared as well as advanced conceptual engineering for Phases 2A (Pasadena to Azusa) and 2B (Azusa to Montclair). In February 2007, the Final EIR for the Phase 2A project was approved and certified by the Construction Authority. Approval of Phase 2B and a maintenance and operations (M&O) facility was deferred. Thereafter, Phase 2B was revised and became a separate project, which will be an extension of Phase 2A. To avoid confusion, the project is now named the Metro Gold Line Foothill Extension Azusa to Montclair. The proposed horizon year for this Phase 2B project is 2035. The construction of Phase 2A is expected to be initiated sometime within the next several months.

2.1.1 No Build Alternative

The No Build Alternative as defined by FTA represents the baseline case consisting of existing and committed elements of the region’s transportation plan. The No Build Alternative includes all existing highway and transit route facilities, and the committed highway and transit projects expected to be in place by 2035, specified in Southern California Association of Governments (SCAG) 2008 Regional Transportation Plan (RTP), and Metro 2009 Long Range Transportation Plan (LRTP). The 2009 LRTP includes a balance of highway and transit improvements, including an expanded bus network. Projects within the 2009 LRTP relevant to the corridor include the following:

- **Transit projects** include countywide (Los Angeles and San Bernardino Counties) bus service improvements; commuter rail (Metrolink) improvements; and light rail and heavy rail transit improvements.
- **Freeway improvements** include projects on freeways such as the previously completed section of SR 210 between San Dimas (Foothill Boulevard) and I-15 in Rancho Cucamonga and the nearly completed section between that point and I-215 in San Bernardino.
- **Smart street projects** include improvements such as synchronized traffic signals, on-street parking removal, frontage road and grade separation construction, and key intersection improvements to improve traffic flow.
- **Arterial improvement projects** include improvements to existing arterial roadways.

2.1.2 Transportation Systems Management Alternative

The Draft EIS/EIR will evaluate transportation and environmental effects of modest improvements in the highway and transit systems beyond those in the No Build Alternative. The Transportation System Management (TSM) Alternative would include low-cost improvements to the No Build Alternative to reduce delay and enhance mobility. The proposed TSM Alternative includes intersections improvements, signal synchronization, and a rapid bus line that resembles service of the Build Alternative from Azusa to Montclair. The proposed frequency of the rapid bus service would be 10-minute headways for each direction during the peak hours, and 20-minute headways during the off-peak hours. This service would add six new TSM stations in Glendora, San Dimas, La Verne, Pomona, Claremont, and Montclair. This alternative would require minimal infrastructure improvements and could operate on the existing roadway network.

2.1.3 Build Alternative

The Build Alternative would be an LRT system that would begin at the current terminus of the Metro Gold Line Foothill Extension at the Azusa-Citrus Station and continue east to Montclair. The proposed alignment would use the existing Metro/Construction Authority and SANBAG right-of-way through the San Gabriel Valley for LRT service. The Build Alternative would extend the Metro Gold Line Foothill Extension LRT system from the eastern boundary of Azusa to the Montclair Transcenter located in Montclair, which borders Upland.

The Build Alternative would include two LRT tracks throughout and one freight track between the eastern boundary of Azusa and Pomona. In Pomona, the single freight track would then join with the double Metrolink tracks and continue to Montclair and beyond. The bus network in the study area for the Build Alternative would be similar to the No Build Alternative but would be augmented with the expected addition of community feeder service to the LRT stations when there is no local service provided by Foothill Transit, Omnitrans, or other existing bus service provider.

2.1.3.1 Light Rail Transit Operations

The proposed LRT system would have the following operational assumptions: The headways for the initial travel forecasts for the Build Alternative would consist of 10-minute peak service and 20-minute off-peak service. The peak service periods are from 6 to 9 AM and from 3 to 7 PM. It is assumed that the Regional Connector transit project will be in place and operational, which would mean that every other train would proceed from Sierra Madre Villa Station to the Montclair Transcenter. Two LRT operating lines would be coded for the Gold Line Foothill Extension service for this alternative. The coding would be (1) Line 1 from Long Beach to Sierra Madre Villa (5-minute peak/12-minute off peak); and (2) Line 2 from Long Beach to the Montclair Transcenter (10-minute peak/20-minute off peak). The travel time from Union Station to Sierra Madre Villa would be approximately 36 minutes for the 13.7 miles (current Phase I operation). The travel time from Sierra Madre Villa to the Montclair Transcenter is forecasted to be approximately 39 minutes for the 24-mile Gold Line Foothill Extension. Also, the estimated travel time from Azusa to the Montclair Transcenter is approximately 18 minutes, which equates to an average operating speed of about 42 miles per hour.

The same LRT technology and the same types of system components would be used as the existing Metro Gold Line. The LRT vehicles can be linked together to accommodate up to 500 passengers per 3-car train. They will be electrically powered by overhead wires. Eight traction power substations (TPSSs) would be constructed along the guideway (at about 1- to 1.5-mile intervals) to provide electrical power to the line. Where possible, TPSS sites would be located near a station. In addition, TPSS sites would be located within the existing rail right-of-way or within properties to be acquired for stations or parking.

The design and implementation of LRT tracks at existing freeway/railroad grade separations will be coordinated with the California Department of Transportation (Caltrans) and will comply with applicable

Caltrans standards, including required vertical and horizontal clearances, structure loadings, interchange ramp traffic control and construction traffic management plans (TMPs). The LRT alignment will cross Caltrans freeways at the following grade separate locations:

- I-210 – LRT undercrossing west of Lone Hill Avenue
- SR 57 – LRT undercrossing south of Gladstone Avenue

2.1.3.2 Stations and Parking Facilities

The Build Alternative would include six new stations, with one in each of the following cities along the corridor: Glendora, San Dimas, La Verne, Pomona, Claremont, and Montclair. Potential station locations were defined in consultation with the corridor cities. Parking facilities would be provided at each new station. It should be noted that some station parking facilities, specifically in Glendora, San Dimas, La Verne and Pomona would require some land acquisition to accommodate an adequate number of parking spaces. Parking provisions at each station would be designed to accommodate patrons using the LRT service. The estimates of parking demand and the number of parking stalls provided at each station would be partially guided by the boarding projections from the transportation modeling process. Although proposed locations for parking were developed based on the 2035 travel demand forecast, it is assumed that staged implementation of parking could occur. Staged implementation would enable existing or new surface lots or garages to serve initial ridership, with new or expanded parking structures built as ridership increases. For the purpose of this environmental analysis, the impacts of 2035 parking demand have been assessed.

2.1.3.3 Metrolink Services

A portion of the proposed LRT alignment would operate parallel to the existing San Bernardino-Los Angeles Metrolink Commuter trains, which serve three Metrolink stations: Pomona, Claremont, and Montclair. In the PM peak hour, there are four eastbound Metrolink trains (peak direction) to San Bernardino operating at 20 minutes during the peak (four trains per hour) and one westbound train to the Los Angles Union Station every hour. In the AM peak hour, there are four westbound trains and one eastbound train.

Chapter 3 – Methodology

This chapter describes the methodology and assumptions used to evaluate and analyze impacts to the transportation environment due to the proposed Metro Gold Line Foothill Extension Azusa to Montclair project. The analysis evaluated transportation impacts due to the proposed project on transit, traffic circulation, parking, and other modes such as pedestrians and bicycles. A list of roadway segments and intersection locations to be studied were identified at the beginning of the project. The list consisted of 90 intersection locations and 35 roadway segments. The daily traffic volumes along the roadway segments and the AM and PM peak period turning movement counts at each intersection were collected by traffic surveyors on a typical weekday when schools were in session.

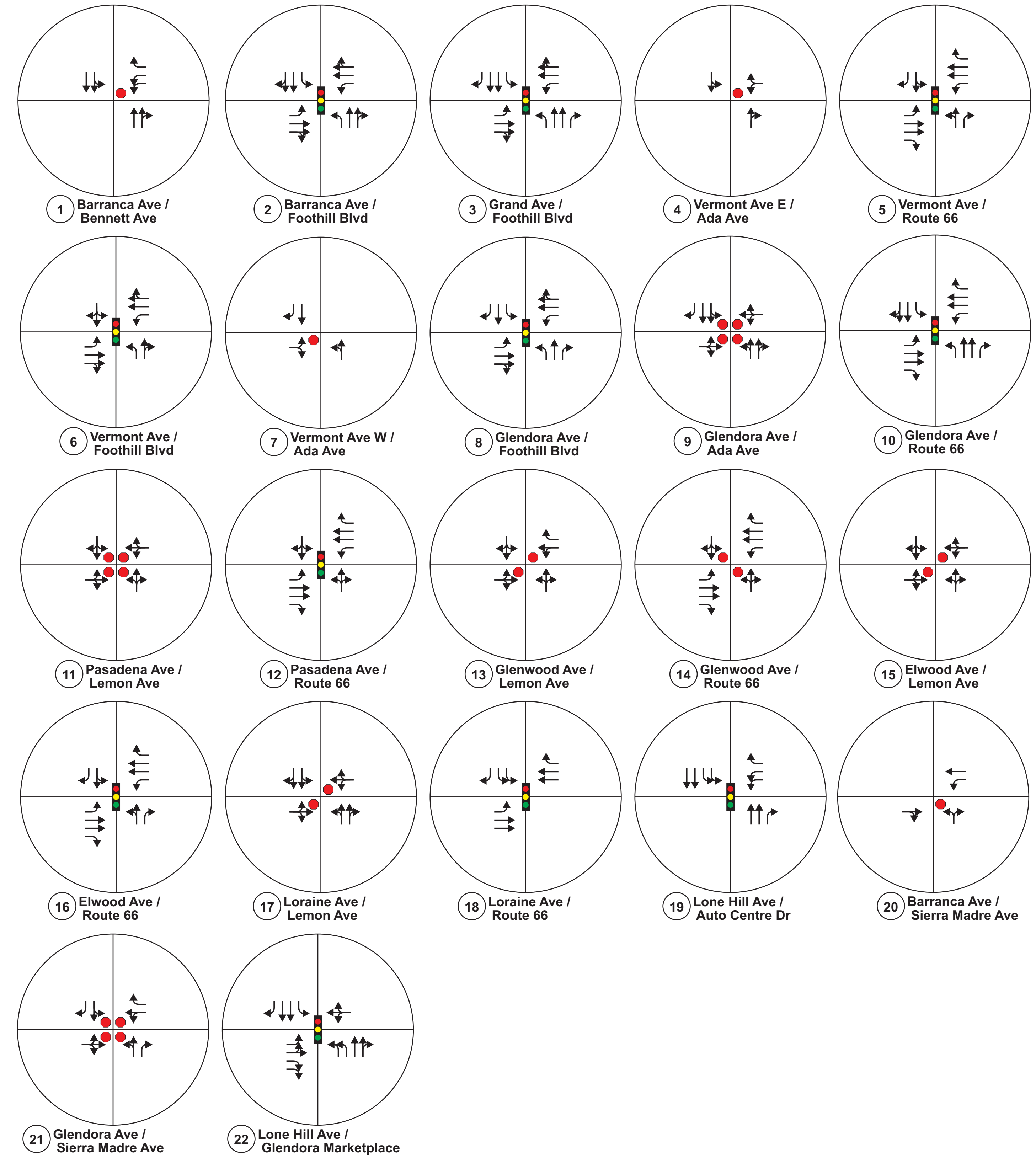
3.1 ANALYTICAL TOOLS AND DATA SOURCES

To determine the existing traffic operating conditions in the study area and conduct traffic analysis for year 2035, daily vehicle traffic volumes were taken at 35 roadway segments and manual vehicle turning movement counts were conducted at 90 intersection locations. The study area jurisdictions for the traffic analysis are Glendora, San Dimas, La Verne, Pomona, and Claremont in Los Angeles County and Upland and Montclair in San Bernardino County. The roadway segment analysis was performed using average daily traffic (ADT) volumes taken from the 24-hour machine counts. The intersections were analyzed using AM and PM peak hour intersection turning movement volumes. Data collection was conducted on a representative weekday (Tuesday, Wednesday, or Thursday) in May 2010 at the locations shown on **Figures 3-1 through 3-6**. The raw 24-hour machine count and intersection turning movement volume data are presented in **Appendix A**.

Of these count locations, one roadway segment traverses two cities, and seven intersections are located on the boundary of two or more cities. For purposes of the traffic analysis, the segment and intersections were assigned to just one jurisdiction. Their locations and assigned jurisdictions are shown in **Table 3-1**. The one roadway segment is Fulton Road between Bonita Avenue and Arrow Highway and includes the Metrolink Driveway. This segment is between La Verne on the west and Pomona on the east. For the purpose of this analysis, the assigned jurisdiction is Pomona.

Table 3-1: Intersections Located Between Two Jurisdictions

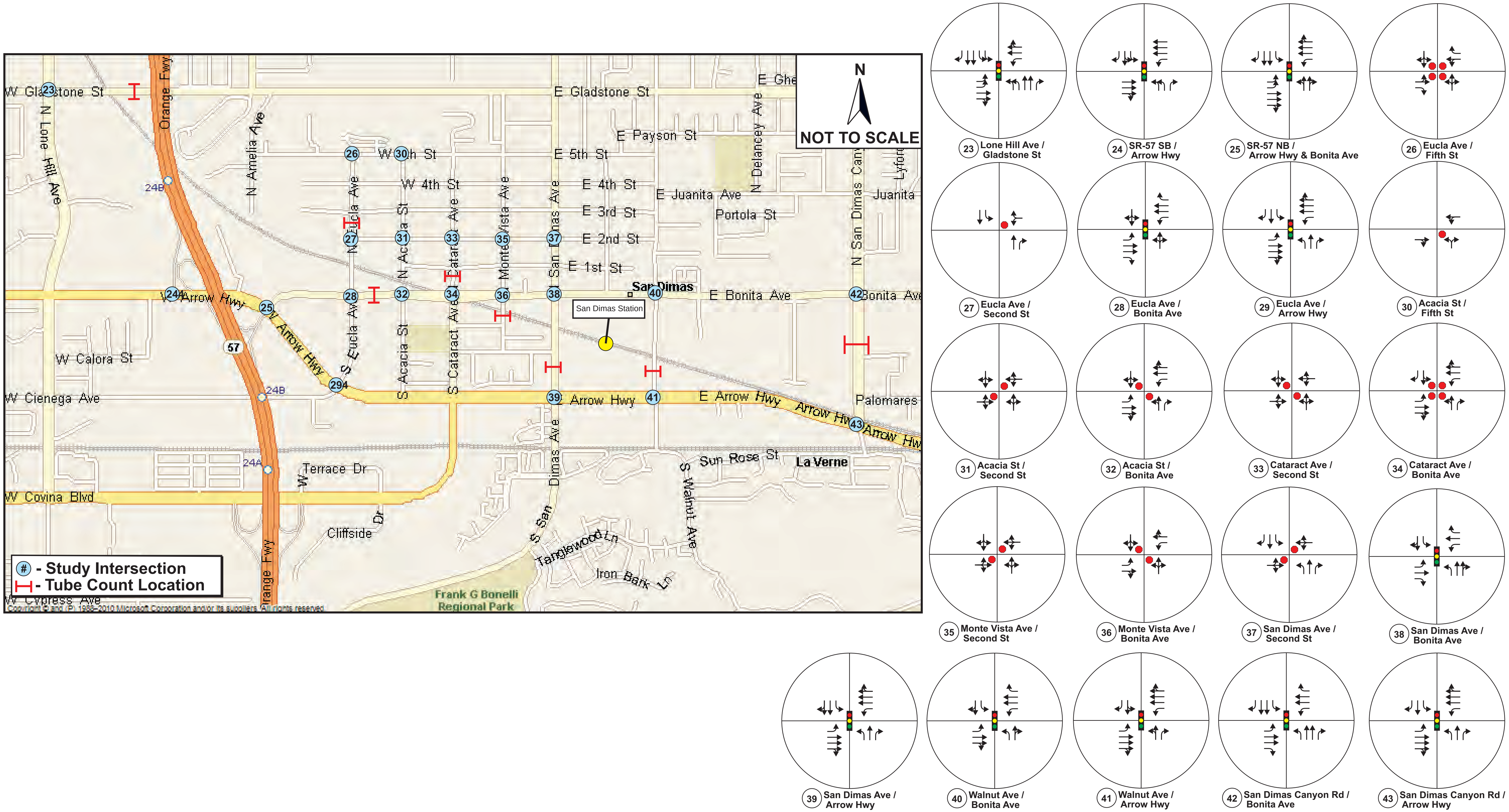
North/South Street	East/West Street	West City	East City	Assigned Jurisdiction
Lone Hill Avenue	Gladstone Street	Glendora	San Dimas	San Dimas
San Dimas Canyon Road	Bonita Avenue	San Dimas	La Verne	San Dimas
San Dimas Canyon Road	Arrow Highway	San Dimas	La Verne	San Dimas
La Verne Avenue	Arrow Highway	La Verne	Pomona	La Verne
Fulton Road	Bonita Avenue	La Verne	Pomona	Pomona
Fulton Road	Arrow Highway	La Verne	Pomona	Pomona
Claremont Boulevard	First Street	Claremont	Montclair/Upland	Claremont



INTUEOR MAXIMIZING VALUE

Metro Gold Line Foothill Extension – Azusa To Montclair

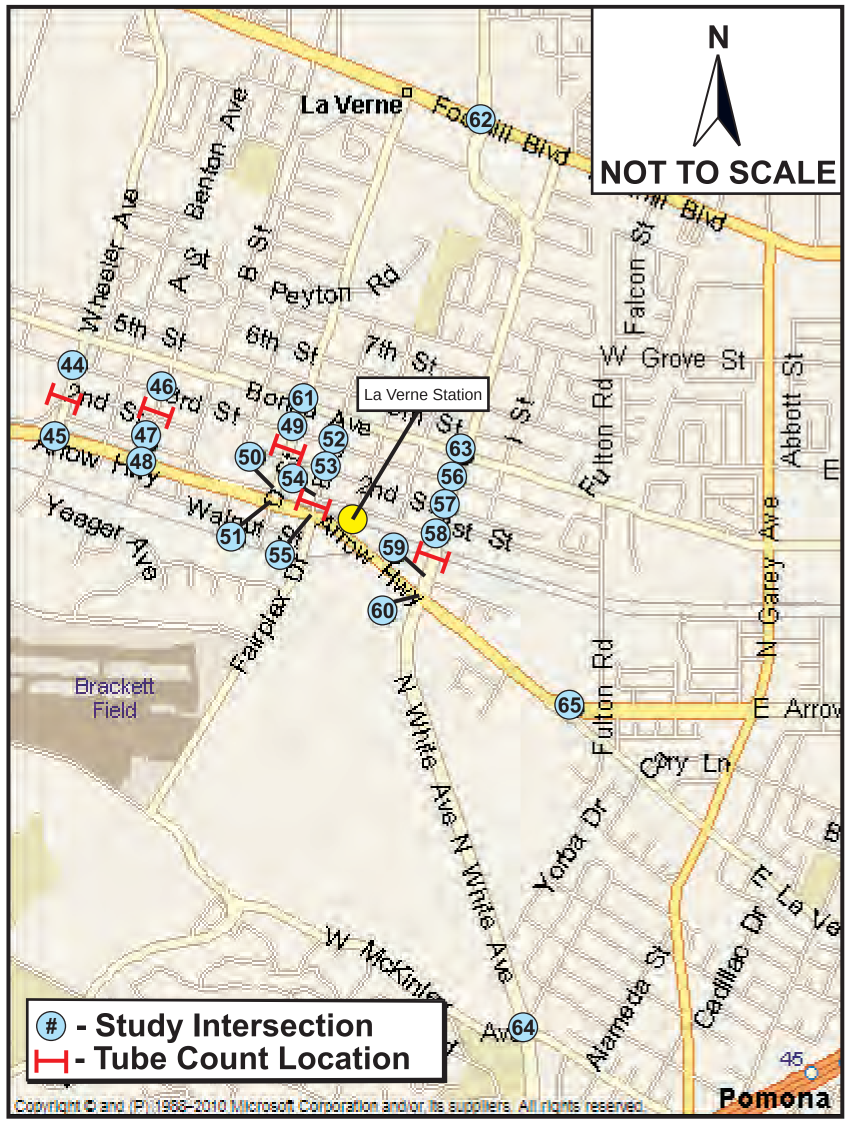
Figure 3-1: Traffic Analysis Count Locations: Glendora



INTUEOR MAXIMIZING VALUE

Metro Gold Line Foothill Extension – Azura To Montclair

Figure 3-2: Traffic Analysis Count Locations: San Dimas


N
NOT TO SCALE
La Verne
La Verne Station
Brackett Field
Pomona
- Study Intersection
- Tube Count Location
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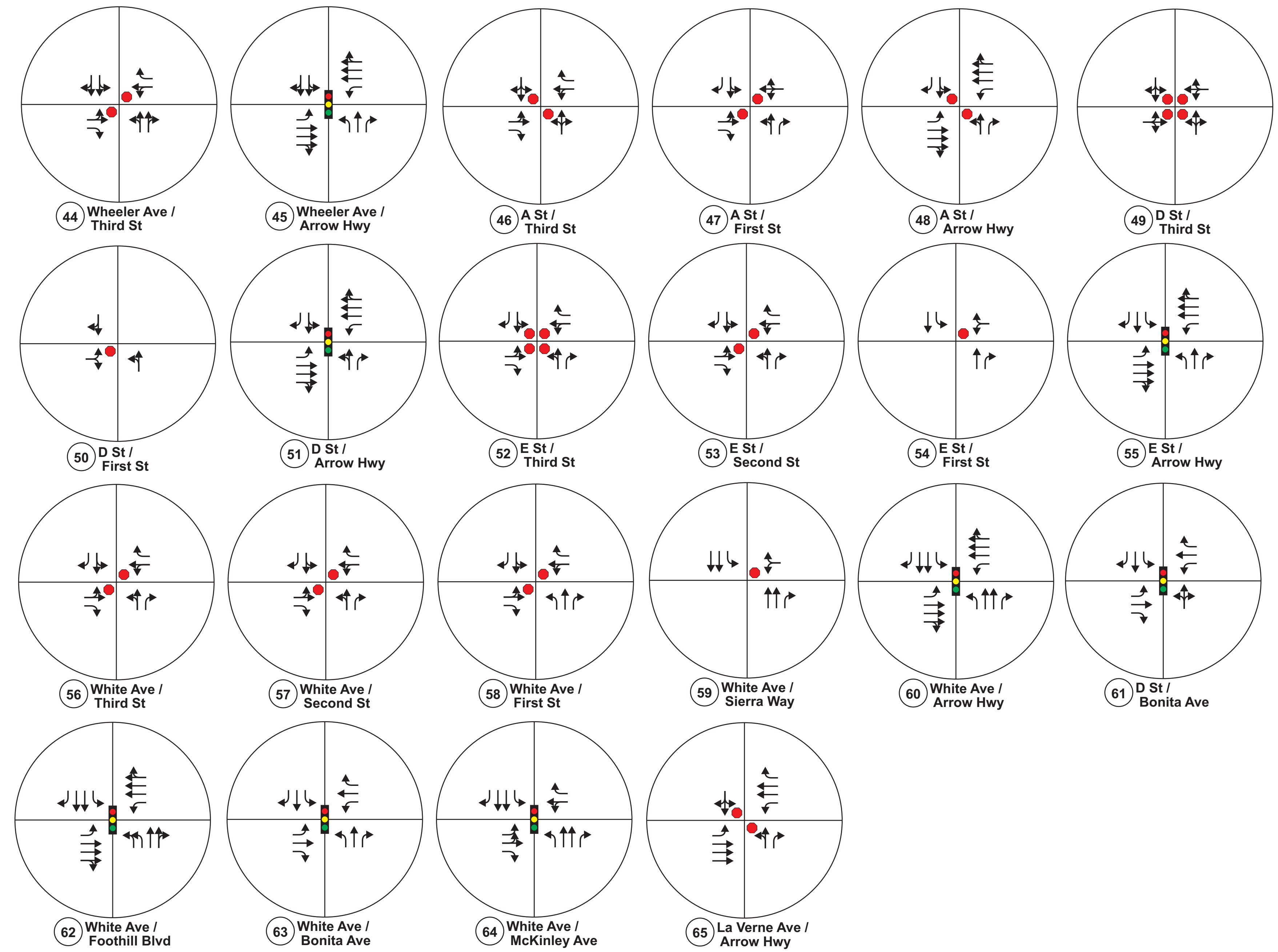
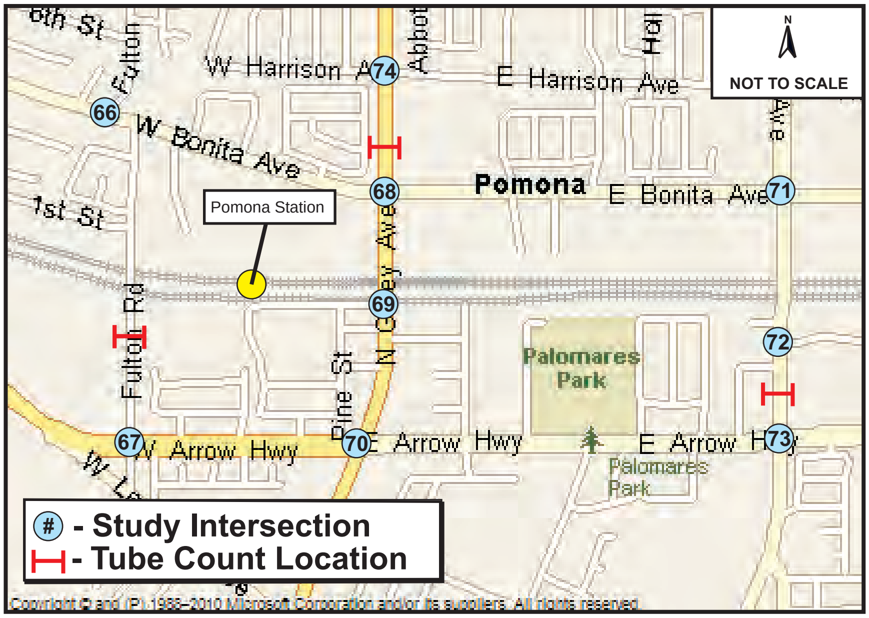

44 Wheeler Ave / Third St
45 Wheeler Ave / Arrow Hwy
46 A St / Third St
47 A St / First St
48 A St / Arrow Hwy
49 D St / Third St
50 D St / First St
51 D St / Arrow Hwy
52 E St / Third St
53 E St / Second St
54 E St / First St
55 E St / Arrow Hwy
56 White Ave / Third St
57 White Ave / Second St
58 White Ave / First St
59 White Ave / Sierra Way
60 White Ave / Arrow Hwy
61 D St / Bonita Ave
62 White Ave / Foothill Blvd
63 White Ave / Bonita Ave
64 White Ave / McKinley Ave
65 La Verne Ave / Arrow Hwy


6th St
Fulton
W Harrison Ave
Abbot
E Harrison Ave
NOT TO SCALE
66
W Bonita Ave
74
68
Pomona
E Bonita Ave
71
1st St
Pomona Station
N Garey Ave
69
Fulton Rd
72
Palomares Park
Pine St
67
W Arrow Hwy
70
E Arrow Hwy
E Arrow Hwy
73
Palomares Park
- Study Intersection
- Tube Count Location
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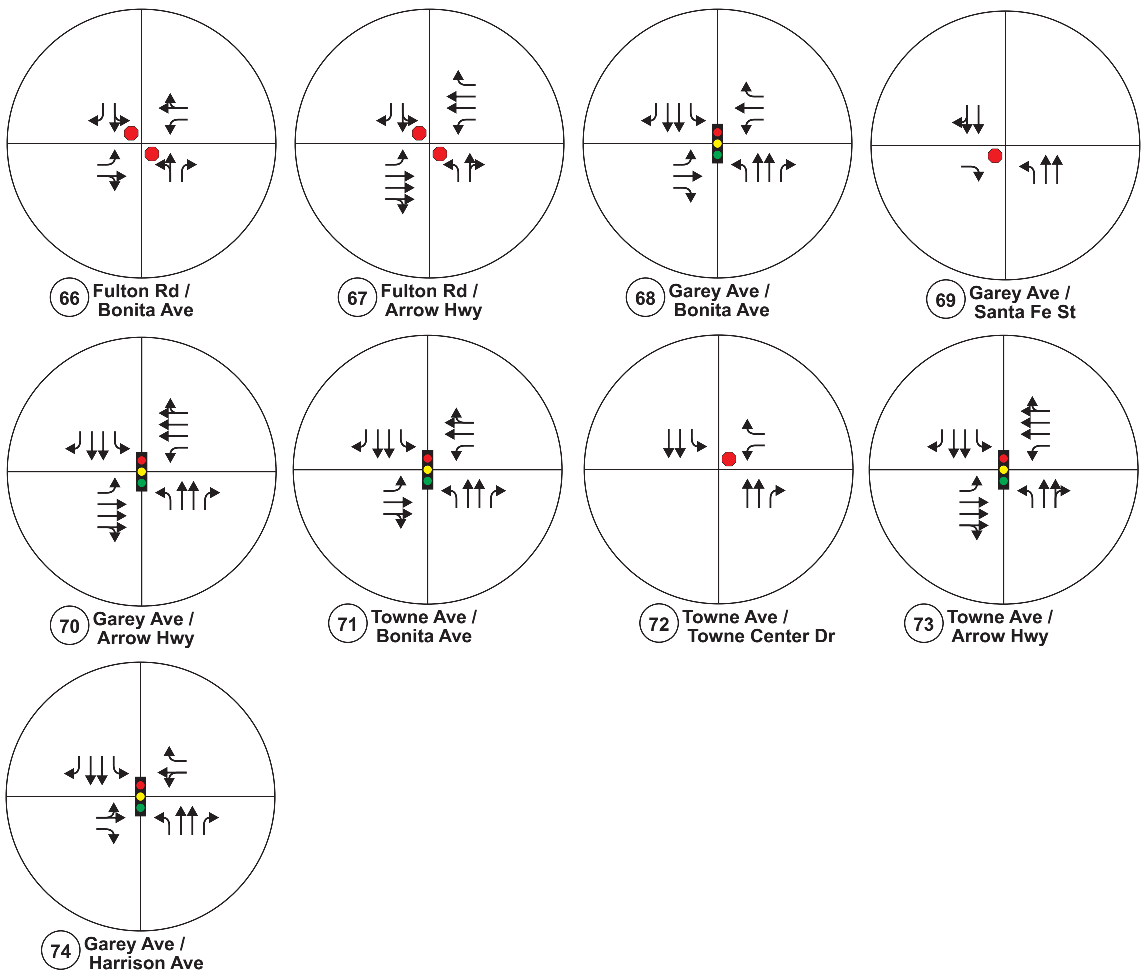
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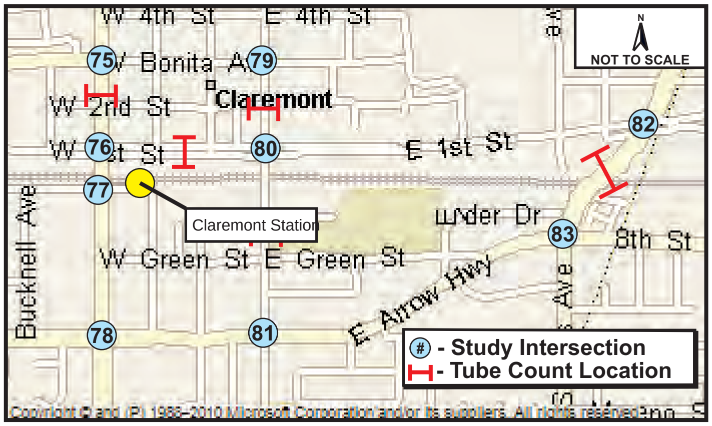
67 Fulton Rd / Arrow Hwy
68 Garey Ave / Bonita Ave
69 Garey Ave / Santa Fe St
70 Garey Ave / Arrow Hwy
71 Towne Ave / Bonita Ave
72 Towne Ave / Towne Center Dr
73 Towne Ave / Arrow Hwy
74 Garey Ave / Harrison Ave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NOT TO SCALE
Bonita
Claremont
W 2nd St
W 1st St
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Claremont Station
Bucknell Ave
W Green St
E Green St
E Arrow Hwy
8th St
75
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- Study Intersection
- Tube Count Location
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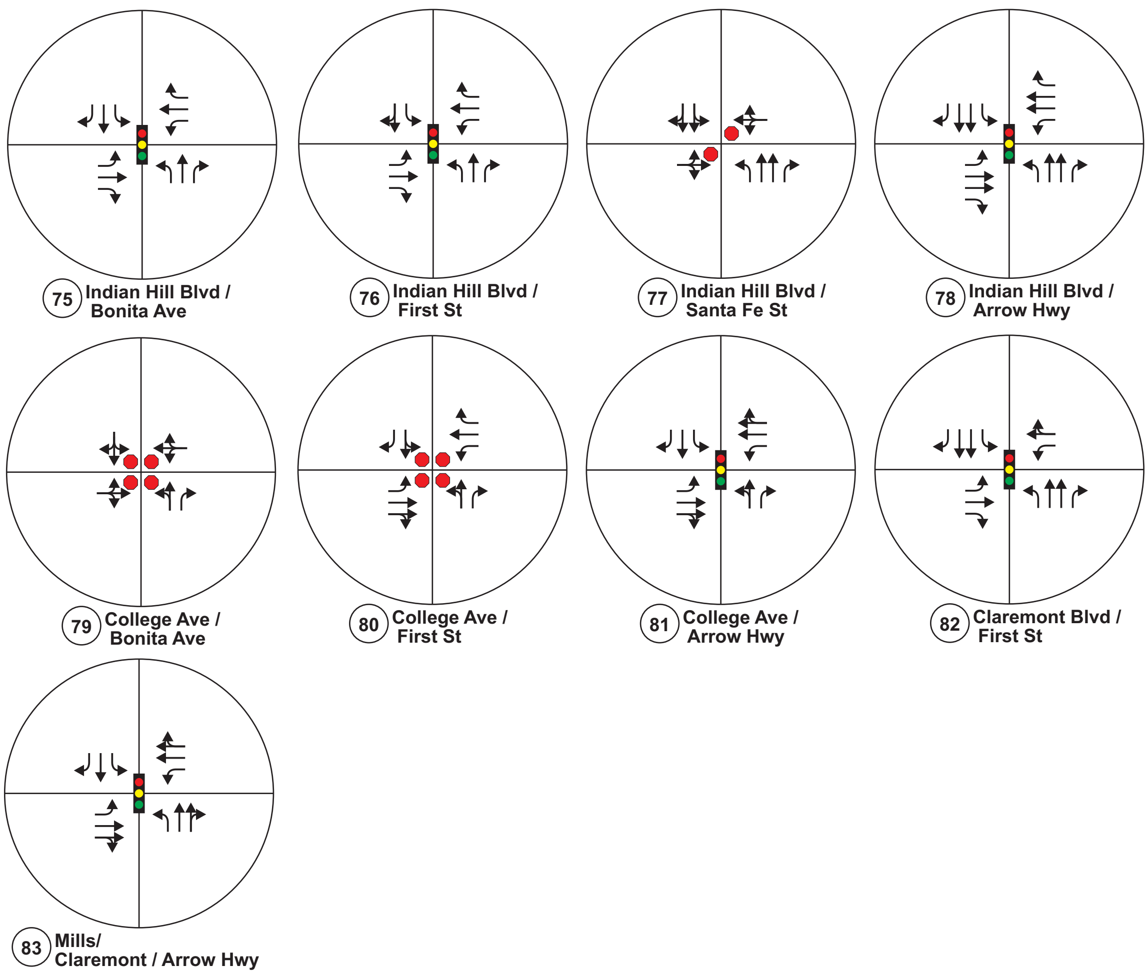
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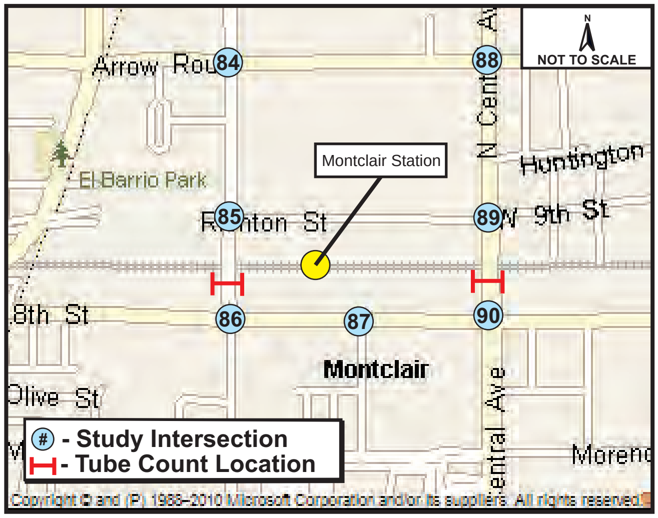
76 Indian Hill Blvd / First St
77 Indian Hill Blvd / Santa Fe St
78 Indian Hill Blvd / Arrow Hwy
79 College Ave / Bonita Ave
80 College Ave / First St
81 College Ave / Arrow Hwy
82 Claremont Blvd / First St
83 Mills/ Claremont / Arrow Hwy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Montclair Station
Huntington
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N 9th St
8th St
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Montclair
Olive St
Study Intersection
Tube Count Location
entral Ave
Moreno
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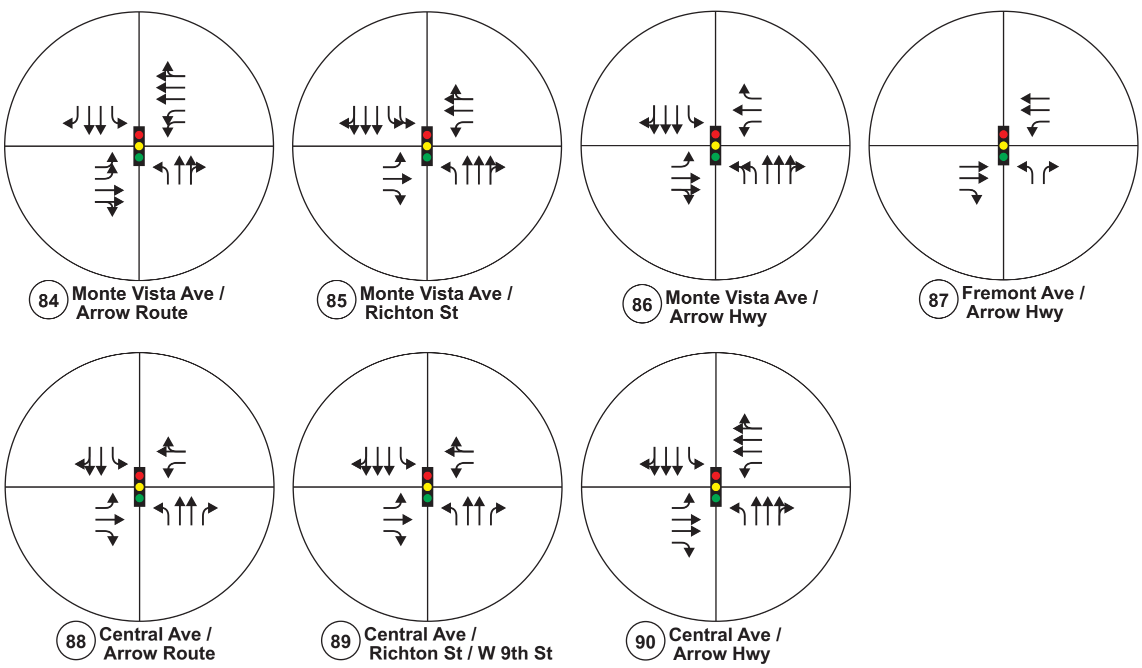
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85 Monte Vista Ave / Richton St
86 Monte Vista Ave / Arrow Hwy
87 Fremont Ave / Arrow Hwy
88 Central Ave / Arrow Route
89 Central Ave / Richton St / W 9th St
90 Central Ave / Arrow Hwy

3.1.1 Approach to Estimating Transportation Effects

Each of the 35 roadway segments was analyzed to determine daily traffic operating conditions. The performance of an arterial street network is typically measured in terms of level of service using the *Transportation Research Circular No. 212: Interim Materials on Highway Capacity* or volume-to-capacity ratio (V/C) methodology. LOS is a qualitative measure used to describe the condition of traffic flow, ranging from excellent (LOS A) to overloaded (LOS F). LOS D is typically recognized as the minimum acceptable LOS in urban areas. **Table 3-2** presents the LOS definitions for roadway segments

Table 3-2: Roadway Segment LOS Definitions

Level of Service	V/C Range	Definition
A	0.000 – 0.600	EXCELLENT. Free flow, light volumes
B	0.601 – 0.700	VERY GOOD. Free to stable flow, light to moderate volumes
C	0.701 – 0.800	GOOD. Stable flow, moderate volumes, freedom to maneuver noticeably restricted
D	0.801 – 0.900	FAIR. Approaches unstable flow, moderate to heavy volumes, limited freedom to maneuver
E	0.901 – 1.000	POOR. Extremely unstable flow, heavy volumes, maneuverability and psychological comfort extremely poor
F	>1.000	FAILURE. Forced or breakdown conditions, slow speeds, tremendous delays with continuously increasing queue lengths

Source: Transportation Research Board, *Transportation Research Circular No. 212: Interim Materials on Highway Capacity*, January 1980.

Each study intersection was analyzed to determine peak hour operations and LOS. LOS for signalized and unsignalized intersections is generally based on delay values using the Transportation Research Board 2000 *Highway Capacity Manual* methodology. These values are calculated using the average delay (in seconds) per approaching vehicle**. Table 3-3** and **Table 3-4** present the LOS definition for signalized and unsignalized (all way and two-way stop-controlled) intersections. The Synchro software version 7.0 was used to analyze peak hour intersection traffic operating conditions.

Table 3-3: Signalized Intersections – LOS Definitions		
Level of Service	**Average Vehicle Delay (Seconds)**	**Definition**
A	< 10.0	EXCELLENT. No vehicle waits longer than one red light and no approach phase are fully used.
B	> 10.0 and < 20.0	VERY GOOD. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.
C	> 20.0 and < 35.0	GOOD. Occasionally drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	> 35.0 and < 55.0	FAIR. Delays may be substantial during portions of the peak hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	> 55.0 and < 80.0	POOR. Represents the most vehicles intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	> 80	FAILURE. Backups from nearby locations or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Tremendous delays with continuously increasing queue lengths.
Source: Transportation Research Board, *Highway Capacity Manual* (2000), Special Report 209, Second Print July 2005.		

Table 3-4: Unsignalized Intersections – LOS Definitions	
Level of Service	**Average Vehicle Delay (Seconds)**
A	≤ 10.0
B	> 10.0 and ≤ 15.0
C	> 15.0 and ≤ 25.0
D	> 25.0 and ≤ 35.0
E	> 35.0 and ≤ 50.0
F	> 50.0
Source: Transportation Research Board, *Highway Capacity Manual* (2000), Special Report 209, Second Print July 2005.	

Traffic forecasts in the vicinity of the proposed grade crossing locations in each city were obtained from the 2003 and 2035 SCAG's RTP models to reflect the anticipated growth within the project area. Forecasts for the No Build Alternative would account for background growth in traffic due to additional regional and sub-regional land use development (cumulative projects) and population growth.

The CEQA Guidelines define "significant effect" as a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project. The determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data. Under CEQA, every agency in the state "is encouraged to develop and publish thresholds of significance" against which to compare the environmental impacts of projects. Such thresholds are to be published for public review and supported by substantial evidence before their adoption. A lead agency will normally consider the environmental impacts of a project to be significant if and only if they exceed established thresholds of significance. Under NEPA, significance is used to determine whether an EIS, or some lower level of documentation, will be required. If adequate data and analytical procedures are available, specific thresholds that indicate degradation of the resources of concern should be included in the NEPA analysis and defined by agency officials.

The impact methodology used to determine adverse or significant impacts at the study intersections, due to the proposed Gold Line Foothill Extension project, is to identify the change in delay between the TSM or Build conditions and the No Build. Since the project area includes several jurisdictions, an impact criterion that is uniform and can be applied across all the jurisdictions was selected. Consequently, the significant impact criteria used for this comparison was based on the Traffic Impact Analysis (TIA) Report Guidelines set forth by the County of Los Angeles Department of Public Works in 1997.

Based on the guidelines, an intersection is considered to be adversely or significantly impacted, in the TSM or Build condition, if the change in delay from the No Build condition is equal to or greater than the criteria set forth in **Table 3-5**. At each impacted location mitigation measures were identified. The impact criteria will be used under both NEPA and CEQA.

Table 3-5: Los Angeles County Intersection Impact Thresholds

Control Type	Final LOS with Project	V/C Increase from the No Build	Significant Increase in Delay (Seconds/Vehic)
Unsignalized Intersection	LOS C	≥ 0.04	≥ 4
	LOS D	≥ 0.02	≥ 2
	LOS E/F	≥ 0.01	≥ 1.5
Signalized Intersection	LOS C	≥ 0.04	≥ 6
	LOS D	≥ 0.02	≥ 4
	LOS E/F	≥ 0.01	≥ 2.5

Source: *Los Angeles County Traffic Impact Analysis Study Guidelines*, 1997.

Chapter 4 – Affected environment

This chapter of the report presents the existing conditions for each transportation component being evaluated. The transportation environment consists of transit, traffic circulation, parking and other modes such as pedestrians and bicycles.

4.1 PUBLIC TRANSIT

4.1.1 Study Area Transit Network

The study area has one of the most extensive networks of transit routes in the San Gabriel Valley. These routes generally follow a grid pattern and include many express and local routes. Four public transit agencies operate bus service within the study area: Foothill Transit, Omnitrans, Riverside Transit Authority (RTA), and Metrolink commuter rail service. Table 4-1 lists the current transit routes (including the end destinations of their services) within the study area.

Table 4-1: Public Transit Routes within the Study Area

Operator	Line(s)	Destination
Foothill Transit	187	Montclair – Claremont – Glendora – Pasadena
	197	Pomona – Claremont – Montclair
	281	Glendora – West Covina – Puente Hills Mall
	284	West Covina – Covina – San Dimas – Glendora
	291	La Verne – Pomona – South Pomona
	292	Claremont – Pomona
	480	Montclair – Pomona – West Covina
	488	Glendora – West Covina – El Monte
	492	Montclair – Arcadia – El Monte
	494	San Dimas – Glendora – El Monte
	498	Citrus College – Los Angeles (Express)
	499	San Dimas Park & Ride – Via Verde Park & Ride – Los Angeles (Express)
	690	Montclair – Pasadena
	699	Montclair - Fairplex Park & Ride - Cal State Los Angeles - USC Medical Center – LA (Express)
	851	Covina – Glendora
	855	Pomona TransCenter – Claremont
Omnitrans	65	Montclair – Chino Hills
	66	Fontana – Foothill – Montclair
	67	Montclair – Baseline – Fontana
	68	Chino – Montclair – Chaffey College
	80	Montclair - Ontario Convention Center - Rancho Cucamonga
RTA	204	Riverside – Montclair Transit Center
Metrolink	San Bernardino Line	Los Angeles – Claremont – San Bernardino

Source: 2010 Foothill Transit, Omnitrans, RTA and Metrolink timetables.

The predominant flow of transit passengers in the corridor is east-west, so most of the heavily used routes are those that run in an east-west direction. These include bus routes that operate on Foothill Boulevard, I-210, I-10, Bonita Avenue, and Arrow Highway. Many of these routes experience high ridership during peak periods, particularly Foothill Transit route 498, where headways (frequency of service) during the morning peak period average 5 to 10 minutes. **Table 4-2** shows the headways for all bus lines in the corridor and illustrates the high demand for service on many of the lines. In addition, the Gold Line Foothill Extension from Pasadena to Azusa is assumed to be operational and provides LRT service to riders from Union Station in downtown Los Angeles to Azusa.

Operator	Line	Days	AM Peak 6-9 AM	Midday 9 AM-3 PM	PM Peak 3-7 PM	Evening 7 PM-11 PM	Owl 11 PM-6 AM	Dir.	Hours of Service
Foothill Transit	187	Weekday Weekend	20 30	20 30	20 30	20 30	No Service No Service	EB/WB	4 AM-11 PM 5 AM-10 PM
	197	Weekday Weekend	30 60	30 60	30 60	60 60	No Service No Service	NB/SB	5:30 AM-8 PM 7 AM-7 PM
	281	Weekday Weekend	30 60	30 60	30 60	30 60	No Service No Service	NB/SB	5 AM-8:30 PM 6 AM-6 PM
	284	Weekday Weekend	60 80	90 40	45 80	45 No Service	No Service No Service	NB/SB	6 AM-8 PM 6:30 AM-5 PM
	291	Weekday Weekend	20 30	15-20 30	15 30	30 No Service	No Service No Service	NB/SB	4:30 AM-10 PM 6 AM-6 PM
	292	Weekday	30	No Service	30	No Service	No Service	NB/SB	6 AM-4 PM
	480	Weekday Weekend	30 30	30 60	30 30	30 30	60 No Service	EB/WB	5 AM-12 AM 5 AM-10 PM
	488	Weekday Weekend	30 60	60 60	30 60	60 60	No Service No Service	EB/WB	4 AM-9 PM 6:30 AM-7 PM
	498	Weekday	10-15	30	5-15	No Service	No Service	EB/WB	2 PM-7 PM 4 AM-8 AM
	492	Weekday Weekend	30 30	30 30	30 30	60 No Service	No Service No Service	EB/WB	5 AM-9 PM 6 AM-6 PM
	494	Weekday	30	No Service	30	No Service	No Service	EB/WB	4 PM-6 PM 5 AM-7 AM
	499	Weekday	12	No Service	15-30	No Service	No Service	EB/WB	2:45 PM-6:40 PM 5:30 AM-8 AM
	690	Weekday	10-20	No Service	30	No Service	No Service	EB/WB	3:30 PM-6:30 PM 5 AM-8 AM
	699	Weekday	10-20	40	10-15	No Service	No Service	EB/WB	2 PM-6:30 PM 4 AM-8 AM
	851	Weekday	30	No Service	60	No Service	No Service	NB/SB	6:30 AM-4:30 PM

Table 4-2: Existing Frequency of Transit Service (in minutes) (2010)

Table 4-2: Existing Frequency of Transit Service (in minutes) (2010)									
Operator	**Line**	**Days**	**AM Peak 6-9 AM**	**Midday 9 AM-3 PM**	**PM Peak 3-7 PM**	**Evening 7 PM-11 PM**	**Owl 11 PM-6 AM**	**Dir.**	**Hours of Service**
	855	Weekday	15-20	No Service	15-30	No Service	No Service	NB/SB	6:30 AM-3:30 PM
Omnitrans	65	Weekday Saturday Sunday	60 60 60	60 60 60	60 60 60	60 No Service No Service	No Service No Service No Service	NB/SB	4:30 AM-10 PM 6:30 AM-6:30 PM 6:30 AM-6:30 PM
	66	Weekday Saturday Sunday	15 30 30	15 30 30	15 30 30	30 No Service No Service	No Service No Service No Service	EB/WB	4 AM-10:30 PM 6 AM-9 PM 6 AM-6 PM
	67	Weekday	60	60	60	No Service	No Service	EB/WB	5:30 AM-7 PM
	68	Weekday Saturday	30 60	30 60	30 60	60 60	No Service No Service	NB/SB	5 AM-10:30 PM 6 AM-6 PM
	80	Weekday Saturday Sunday	60 60 60	60 60 60	60 60 60	60 No Service No Service	No Service No Service No Service	NB/SB	6 AM-8 PM 7 AM-7 PM 7 AM-7 PM
RTA	204	Weekday	40-50	No Service	50	No Service	No Service	NB/SB	5 AM-7 PM

Source: 2010 Foothill Transit, Omnitrans, and RTA timetables.
NB = northbound
SB = southbound
EB = Eastbound
WB = Westbound

4.1.2 Station-Area Transit Service

Glendora

Foothill Transit routes 284 and 851 service the area where the proposed Glendora Station would be sited along Glendora Boulevard.

San Dimas

The proposed San Dimas Station would be located between San Dimas and Walnut Avenues. Foothill Transit routes 492, 494, 499, and 690 service this area.

La Verne

The proposed La Verne Station would be located east of E Street, just north of Arrow Highway. The nearest bus routes are Foothill Transit routes 197 and 492. Route 197 runs along Arrow Highway and White Avenue, and comes within approximately 0.25 mile east of the station. Route 492 runs along Bonita Avenue, approximately 0.25 mile north of Arrow Highway.

Pomona

The proposed Pomona Station would be located west of Garey Avenue, east of the existing Metrolink station. The new station would be accessible via Foothill Transit routes 197 (on Arrow Highway), 291 (on Garey Avenue), and 492 (on Bonita Avenue), and Metrolink.

Claremont

The proposed Claremont Station would be located across from the historic Atchison, Topeka & Santa Fe Depot. Foothill Transit routes 187, 197, 292, 480, 492, 690, and 855, and Metrolink would service the new station.

Montclair

The proposed Montclair Station would be part of the existing Metrolink station at the Montclair Transcenter. Foothill Transit routes 187, 197, 480, 492, 690, 699, and Silver Streak service the TransCenter area. The station is also accessible via Omnitrans routes 65, 66, 67, 68, and 80; RTA 204, and Metrolink.

4.1.3 Conditions for Transit Operations

Greater Los Angeles is one of the most congested urban areas in the country. Consequently, existing bus transit service must operate in some of the most congested traffic conditions. Typical weekday rush hours within the study area extend from 6:00 to 9:00 AM and from 3:00 to 7:00 PM. With the exception of the Metrolink commuter service, mixed flow transit operations account for all transit service in the study area; therefore, traffic conditions such as long peak periods, congested operations, and vehicular queues also affect bus service. Although ridership on some of the bus routes is high, congestion on arterial streets and freeways affects bus travel times and reliability, thereby resulting in less than optimal service conditions. With high passenger loads, congested roads make implementation of reduced bus service headways (improved frequency of service) difficult to maintain and result in overcrowded buses.

The main transit agencies providing bus service in the study area are Foothill Transit, Omnitrans, and RTA. The three service providers share similar ridership performance trends where all three are projecting a decrease in total boardings. Foothill Transit had a system ridership of 14,970,000 passenger boardings for the Fiscal Year (FY) of 2009 They are projecting a FY 2010 ridership of 14,140,000, a decrease of 5.5%. Omnitrans had an overall system ridership of 15,452,794 in 2009. The projected 2010 ridership is 14,652,000, a decrease of 5.1%. They have a planned 2011 ridership of 14,254,000, an additional decrease of 2.7%. RTA has a FY 09/10 system wide ridership estimate of 7,918,081 and a FY10/11 projection of 7,475,818, a decrease of 5.5%.

Rail service in the area is provided by Metrolink. The average weekday ridership on the Metrolink system in September 2009 was 42,316. The riders for the same time period in September 2010 were 40,544, a decrease of 4%. Due to the economic downturn, all the major transit agencies serving the study area showed a decrease in ridership.

4.1.4 Planned Transit Program Improvements

Section 5.1 presents planned improvements to public transit for the different alternatives. In summary, the No Build Alternative would provide no significant improvement in transit services within the study area. As the population grows, the demand for additional transit service and service reliability will increase.

4.2 STREETS AND HIGHWAYS

4.2.1 Freeways and Arterials

The environment in which traffic was examined included, from west to east, the north-south major and secondary arterials between and including Barranca Avenue in Glendora and Central Avenue in Montclair. In addition, the east-west major and secondary arterials located within 1,000 feet of the existing rail right-of-way were evaluated, as follows:

- **I-210/SR 210 –** This is east-west freeway is known as the Foothill Freeway and connects Los Angeles with its northern suburbs following the foothills of the San Gabriel Mountains. The western freeway segment is I-210, extending from I-5 in Sylmar to SR 57 in Glendora, where it becomes SR 210. SR 210 and continues eastward through the project area. The proposed LRT extension would generally run parallel to this freeway; north of the I-210, and south of the SR 210.
- **SR 57 –** This is known as the Orange Freeway, a major north–south state highway in the greater Los Angeles area. It runs through Pomona and San Dimas and links I-10, SR 71, and I-210/SR 210, ending at I-210/SR 210 intersection in Glendora.
- **I-10 –** This is an east-west freeway to the south of both I-210/SR 210 and the project alignment. The segment between downtown Los Angeles and the Inland Empire is known as the San Bernardino Freeway. It serves study area cities: San Dimas, La Verne, Pomona, Claremont, and Montclair.
- **South Grand Avenue –**According to the Los Angeles County General Plan, this is a major north-south highway. It is a two-way street carrying about 12,000 vehicles per day.
- **South Glendora Avenue –** This is a major north-south highway according to the Los Angeles County General Plan. It is a two-way street carrying about 16,000 vehicles per day.

- **Arrow Highway –** This is a major east-west highway according to the Los Angeles County General Plan. It is a main two-way street carrying about 28,000 vehicles per day.
- **Historic Route 66 Highway (West Alosta Avenue) –** This is a major east-west highway according to the Los Angeles County General Plan. It is a two-way street carrying about 30,000 vehicles per day.
- **Lone Hill Avenue –** This is a major north-south highway according to the Los Angeles County General Plan. It is a two-way street carrying about 24,000 vehicles per day.
- **Foothill Boulevard –** According to the Los Angeles County General Plan, this is a secondary highway west of North Valley Center Avenue, and a major highway east of North Valley Center Avenue. It is a two-way east-west street that carries about 11,000 vehicles per day.
- **Bonita Avenue –** This is a secondary highway according to the Los Angeles County General Plan. It is a two-way east-west street carrying about 13,000 vehicles per day.
- **San Dimas Avenue –** This is a major north-south highway according to the Los Angeles County General Plan. It is a two-way street carrying about 10,000 vehicles per day.
- **San Dimas Canyon Road –** This is a major north-south highway according to the Los Angeles County General Plan. It is a two-way street carrying about 7,700 vehicles per day.
- **White Avenue –** This is a major highway north-south according to the Los Angeles County General Plan. It is a two-way street carrying about 16,000 vehicles per day.
- **North Garey Avenue –** This is a major north-south highway according to the Los Angeles County General Plan. It is a two-way street carrying about 21,000 vehicles per day.
- **North Towne Avenue –** This is a major north-south highway according to the Los Angeles County General Plan. It is a two-way street carrying about 25,000 vehicles per day.
- **Indian Hill Avenue –** This is a secondary highway north of Bonita Avenue and a major highway south of Bonita Avenue according to the Los Angeles County General Plan. It is a two-way, north south street and carries about 19,000 vehicles per day.
- **South Mills Avenue/Claremont Boulevard –** This is a major north-south highway according to the Los Angeles County General Plan. It is a two-way street carrying about 7,600 vehicles per day.
- **Monte Vista Avenue –** This is a major north-south highway according to the Los Angeles County General Plan. It is a two-way street carrying about 19,000 vehicles per day.

4.2.2 Programmed Roadway Improvements

No programmed major or secondary arterial roadway improvements are anticipated within the study area. The 2006 base year and the 2035 horizon year roadway networks coded in the travel demand forecasting model, which was used to develop future ridership, were compared for the number of traffic lanes and were found to be the same.

4.2.3 Daily Traffic Volumes

In May 2010, ADT counts were taken at 35 roadway segments within the study area. The 24-hour manual machine counts at the 35 roadway segments were collected on a representative weekday to determine existing daily traffic operations. Four of the segments are east-west roadways, and the remaining 31 are north-south roadways.

The existing conditions analysis was performed for all 35 roadway segments. The analysis showed that all roadway segments currently operate at LOS C or better. **Table 4-3** shows capacities, volumes, volume-to-capacity (V/C) ratios, and corresponding LOS for each segment analyzed.

Table 4-3: Existing Roadway Segment Average Daily Traffic Analysis (2010)

Roadway Segment	From	To	Capacity[1,2,3,4] (Vehicles/Day)	Volume (Vehicles/Day)	V/C	LOS
Glendora						
South Lone Hill Avenue	West Gladstone Street	Auto Centre Drive	32,000	24,167	0.76	C
South Loraine Avenue	Route 66	East Lemon Avenue	16,000	9,205	0.58	A
South Elwood Avenue	Route 66	East Lemon Avenue	12,000	2,361	0.20	A
South Glenwood Avenue	Route 66	East Lemon Avenue	12,000	2,437	0.20	A
South Pasadena Avenue	Route 66	East Lemon Avenue	12,000	2,307	0.19	A
South Glendora Avenue	Route 66	Foothill Boulevard	32,000	15,969	0.50	A
South Vermont Avenue	Route 66	West Foothill Boulevard	12,000	3,715	0.31	A
Grand Avenue	Route 66	West Leadora Avenue	32,000	12,383	0.39	A
Foothill Boulevard	Barranca Avenue	Glendora Avenue	16,000	10,569	0.66	B
North Barranca Avenue	West Foothill Boulevard	West Leadora Avenue	12,000	7,235	0.60	B
San Dimas						
San Dimas Canyon Road	Arrow Highway	Bonita Avenue	32,000	7,652	0.24	A
Walnut Avenue	East Arrow Highway	East Bonita Avenue	16,000	6,181	0.39	A
San Dimas Avenue	Arrow Highway	Bonita Avenue	32,000	10,122	0.32	A
Monte Vista Avenue	Commercial Street	Bonita Avenue	12,000	448	0.04	A
Cataract Avenue	Arrow Highway	First Street	12,000	2,530	0.21	A
Bonita Avenue	Eucla Avenue	San Dimas Avenue	32,000	13,038	0.41	A
Eucla Avenue	Bonita Avenue	Third Street	12,000	3,128	0.26	A
West Gladstone Street	Lone Hill Avenue	Amelia Avenue	32,000	12,999	0.41	A
La Verne						
White Avenue	Arrow Highway	Third Street	32,000	16,466	0.51	A
E Street	Arrow Highway	Third Street	16,000	6,064	0.38	A
D Street	Arrow Highway	Third Street	12,000	4,995	0.42	A
A Street	Arrow Highway	Third Street	12,000	1,174	0.10	A
Wheeler Avenue	Arrow Highway	Third Street	32,000	9,067	0.28	A

Table 4-3: Roadway Segment Average Daily Traffic Analysis (2010)

Roadway Segment	From	To	Capacity[1,2,3,4] (Vehicles/Day)	Volume (Vehicles/Day)	V/C	LOS
Pomona						
North Towne Avenue	Arrow Highway	Bonita Avenue	32,000	25,298	0.79	C
North Garey Avenue	Arrow Highway	Bonita Avenue	32,000	20,918	0.65	B
Fulton Road	Metrolink Driveway	—	16,000	1,345	0.08	A
Fulton Road	Arrow Highway	Bonita Avenue	16,000	1,635	0.10	A
Claremont						
South Mills Avenue/Claremont Boulevard	Arrow Highway	East First Street	32,000	7,577	0.24	A
Indian Hill Boulevard	Arrow Highway	Bonita Avenue	32,000	18,889	0.59	A
College Avenue	East Arrow Highway	West Bonita Avenue	12,000	5,068	0.42	A
College Avenue	Green Street	—	12,000	5,553	0.46	A
Cambridge Avenue	West Arrow Highway	Bonita Avenue	12,000	4,580	0.38	A
First Street	Indian Hill Boulevard	College Avenue	24,000	7,363	0.31	A
Montclair						
Monte Vista Avenue	Richton Street	Arrow Highway	32,000	18,837	0.59	A
Central Avenue	Richton Street	Arrow Highway	32,000	22,382	0.70	B

Source: Wiltec, 2010.
[1] Capacity of 32,000 assumes 800 vehicles per hour per lane multiplied by number of lanes, divided by a k-factor of 0.1.
[2] Capacity of 24,000 assumes 600 vehicles per hour per lane multiplied by number of lanes, divided by a k-factor of 0.1.
[3] Capacity of 16,000 assumes 800 vehicles per hour per lane multiplied by number of lanes, divided by a k-factor of 0.1.
[4] Capacity of 12,000 assumes 600 vehicles per hour per lane multiplied by number of lanes, divided by a k-factor of 0.1.

4.2.4 Study Intersections and Existing Levels of Service

Turning movement counts were collected at 90 intersections in the study area to assess existing peak hour traffic conditions. The chosen intersections are located both along the proposed LRT alignment and adjacent streets. The AM and PM peak hours were identified as the critical time periods for an assessment of existing conditions. All traffic count data were collected from field turning movement counts. Detailed vehicle turning movement data are included in **Appendix A** and are illustrated in **Figures 4-1 to 4-6**.

The intersection analysis showed that 6 of the 90 locations operate at LOS E or F. **Table 4-4** lists these 6 intersection locations. The remaining 84 intersections operate at LOS D or better during both AM and PM peak hours. **Table 4-5** presents the results of the existing AM and PM traffic operations and corresponding LOS at each of the study intersections. The detailed 2010 conditions LOS worksheets can be found in **Appendix B**. To report the LOS information required for both traffic operations and air quality evaluation for unsignalized intersections, two sets of LOS and delay numbers are shown. The first line shows the LOS and corresponding delay for the worst-case stop-controlled approach, which is the industry standard to determine traffic operating conditions. The second line shows the overall intersection LOS and corresponding delay, which is the information required to support the air quality analysis. All signalized intersections report only one set of values, which is the overall intersection LOS and corresponding delay.

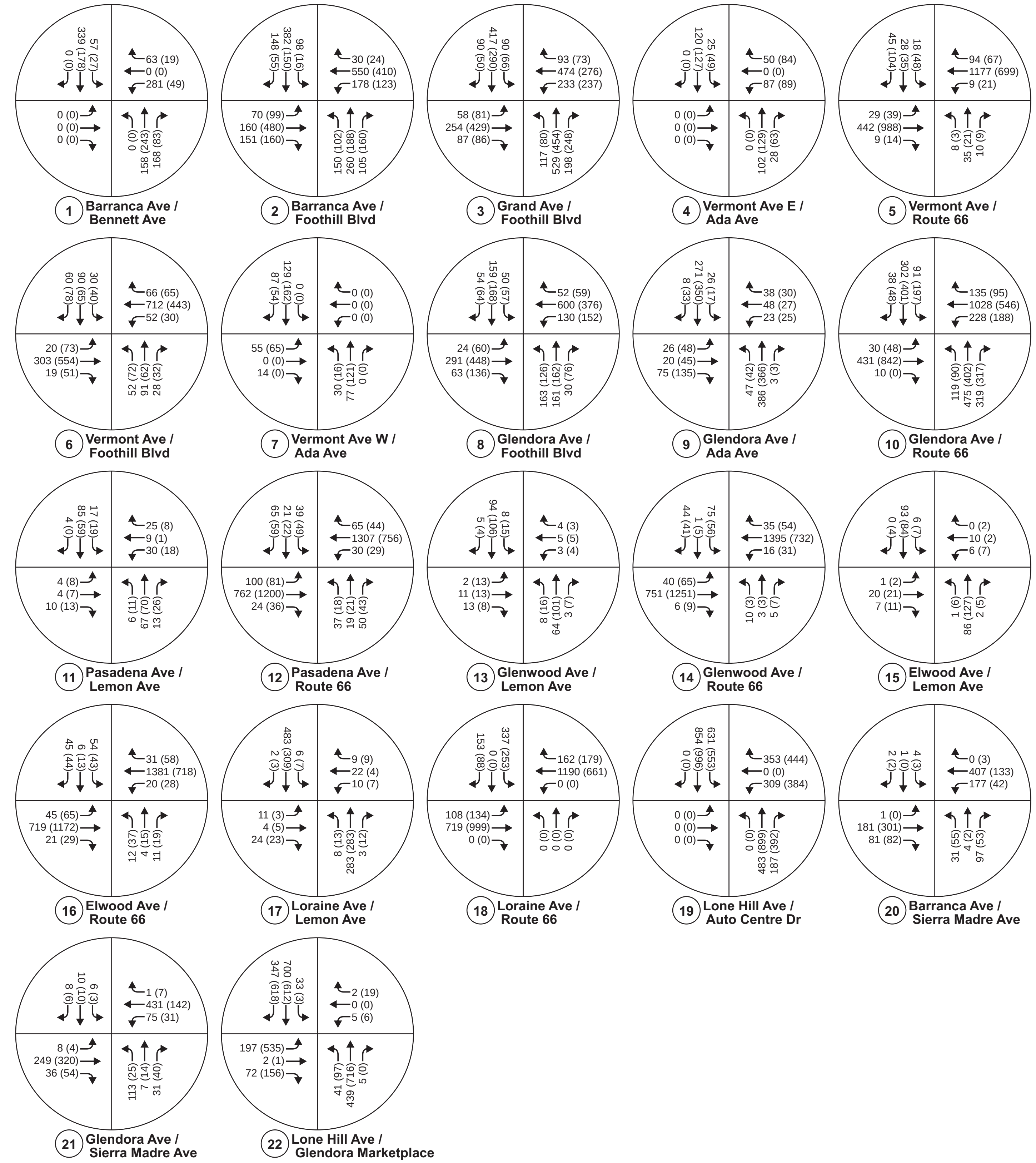
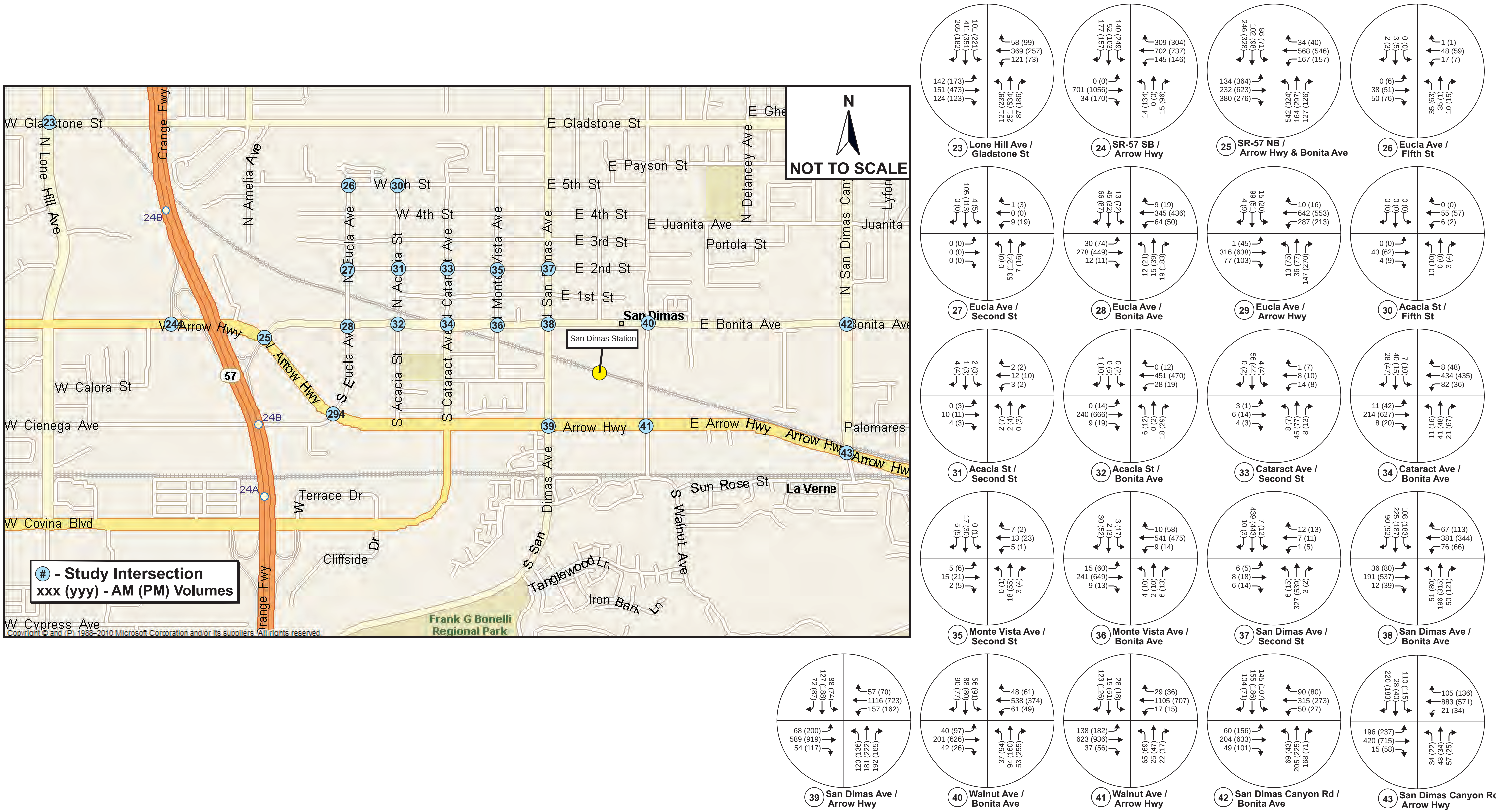


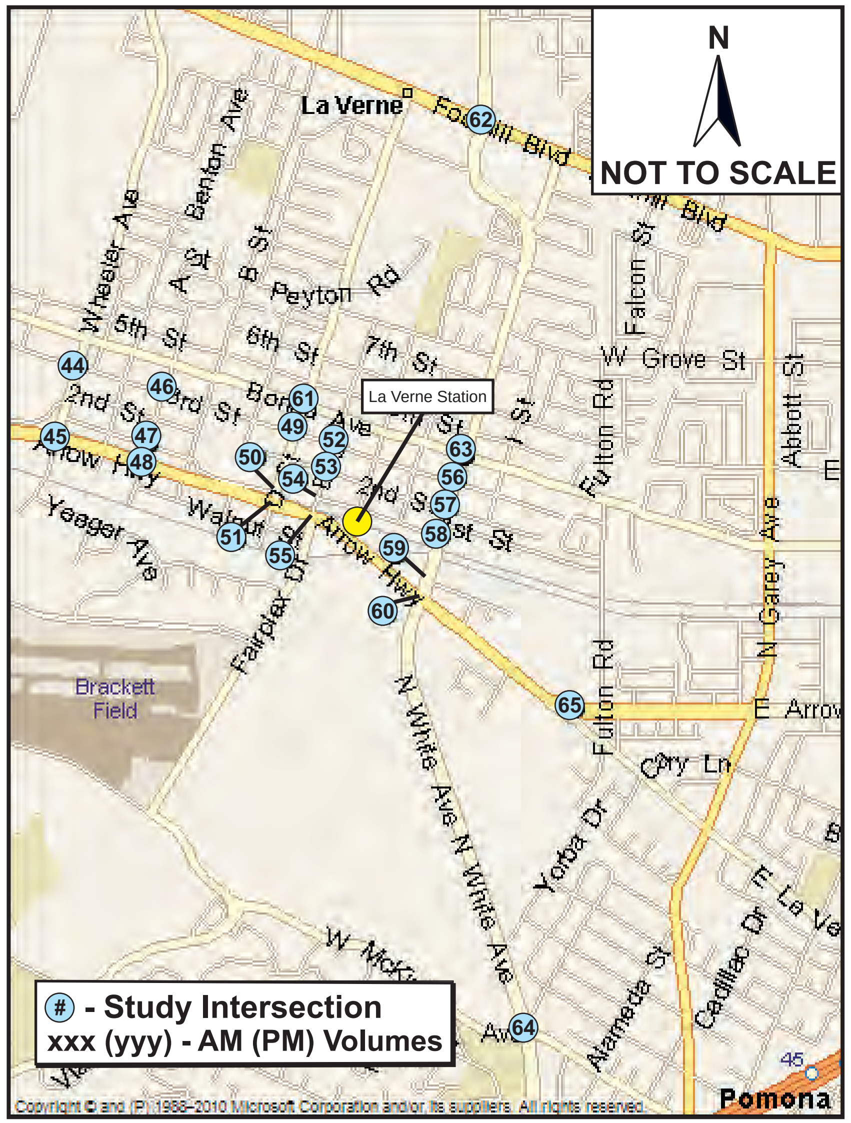
Figure 4-1: Existing (2010) AM/PM Peak Hour Traffic Volumes: Glendora

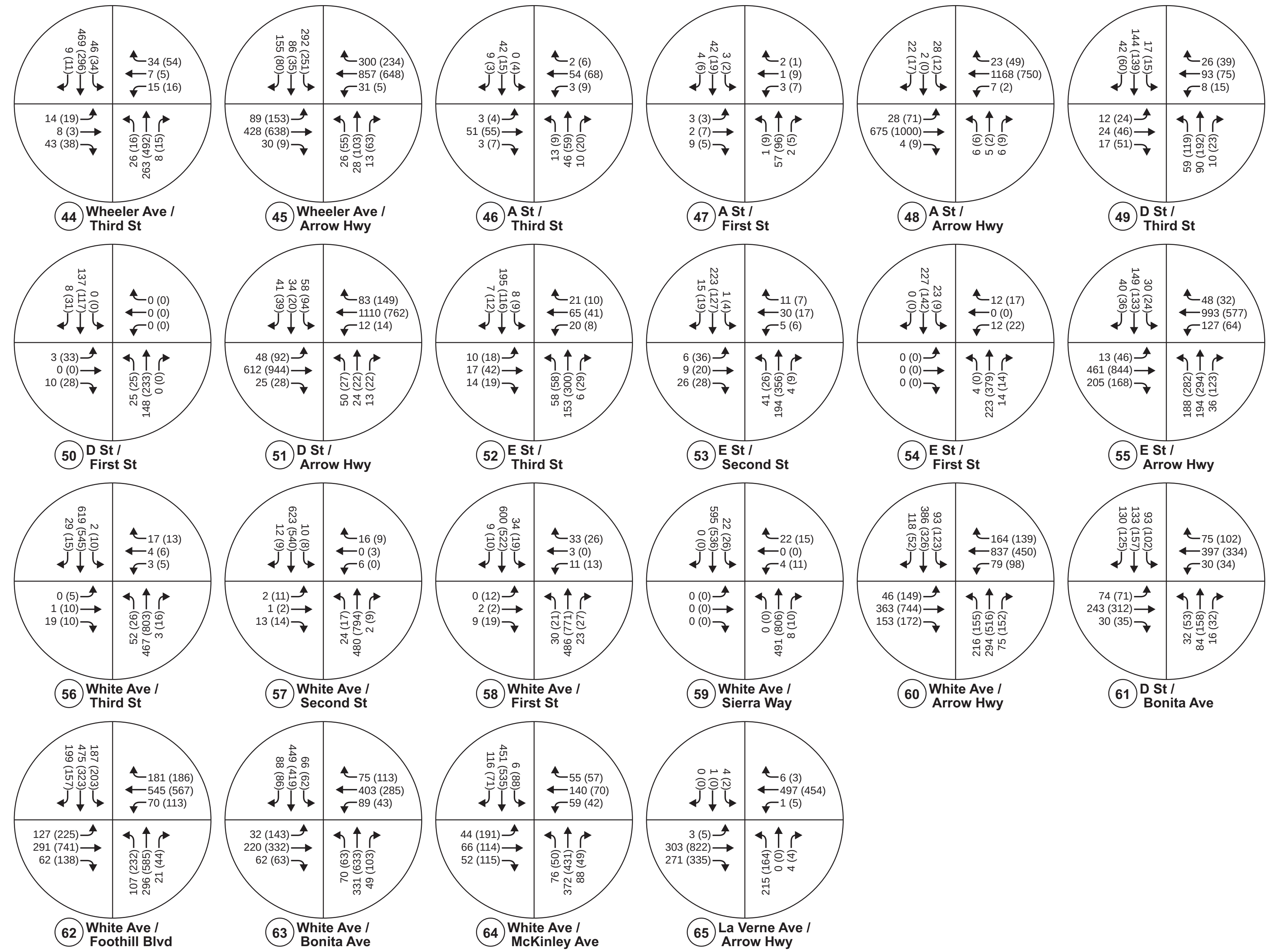


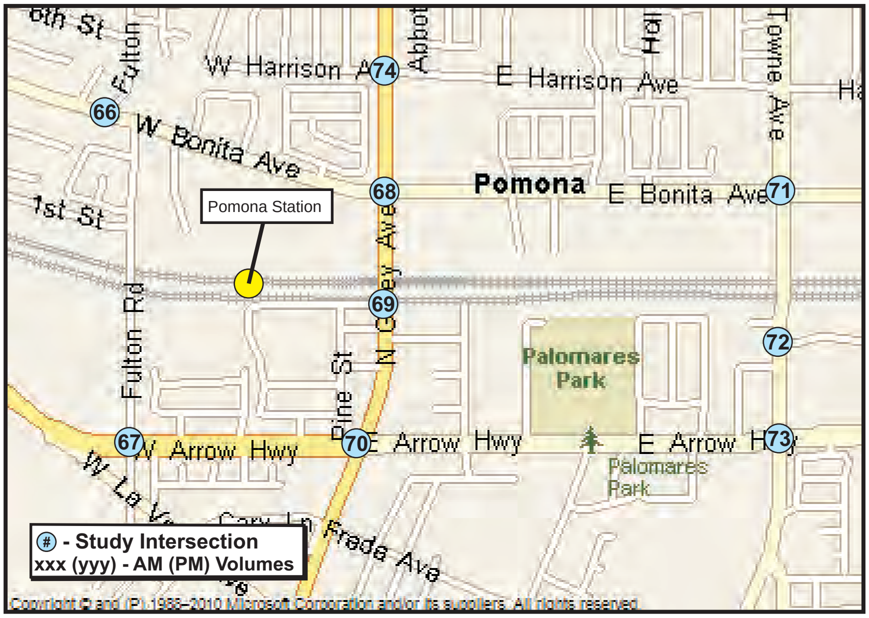
INTUEOR MAXIMIZING VALUE

Metro Gold Line Foothill Extension – Azusa To Montclair

Figure 4-2: Existing (2010) AM/PM Peak Hour Traffic Volumes: San Dimas


N
NOT TO SCALE
La Verne
Foothill Blvd
Wheeler Ave
A St
B St
Benton Ave
Peyton Rd
5th St
6th St
7th St
W Grove St
Falcon St
Fulton Rd
Abbott St
2nd St
3rd St
Bonita Ave
Arrow Hwy
Yeager Ave
Walnut St
Fairplex Dr
La Verne Station
N White Ave
N Garey Ave
E Arrow
Brackett Field
Yorba Dr
Alameda St
Cadillac Dr
E La Verne
Pomona
- Study Intersection
xxx (yyy) - AM (PM) Volumes
Copyright © and (P) 1988–2010 Microsoft Corporation and/or its suppliers. All rights reserved.


44 Wheeler Ave / Third St
45 Wheeler Ave / Arrow Hwy
46 A St / Third St
47 A St / First St
48 A St / Arrow Hwy
49 D St / Third St
50 D St / First St
51 D St / Arrow Hwy
52 E St / Third St
53 E St / Second St
54 E St / First St
55 E St / Arrow Hwy
56 White Ave / Third St
57 White Ave / Second St
58 White Ave / First St
59 White Ave / Sierra Way
60 White Ave / Arrow Hwy
61 D St / Bonita Ave
62 White Ave / Foothill Blvd
63 White Ave / Bonita Ave
64 White Ave / McKinley Ave
65 La Verne Ave / Arrow Hwy



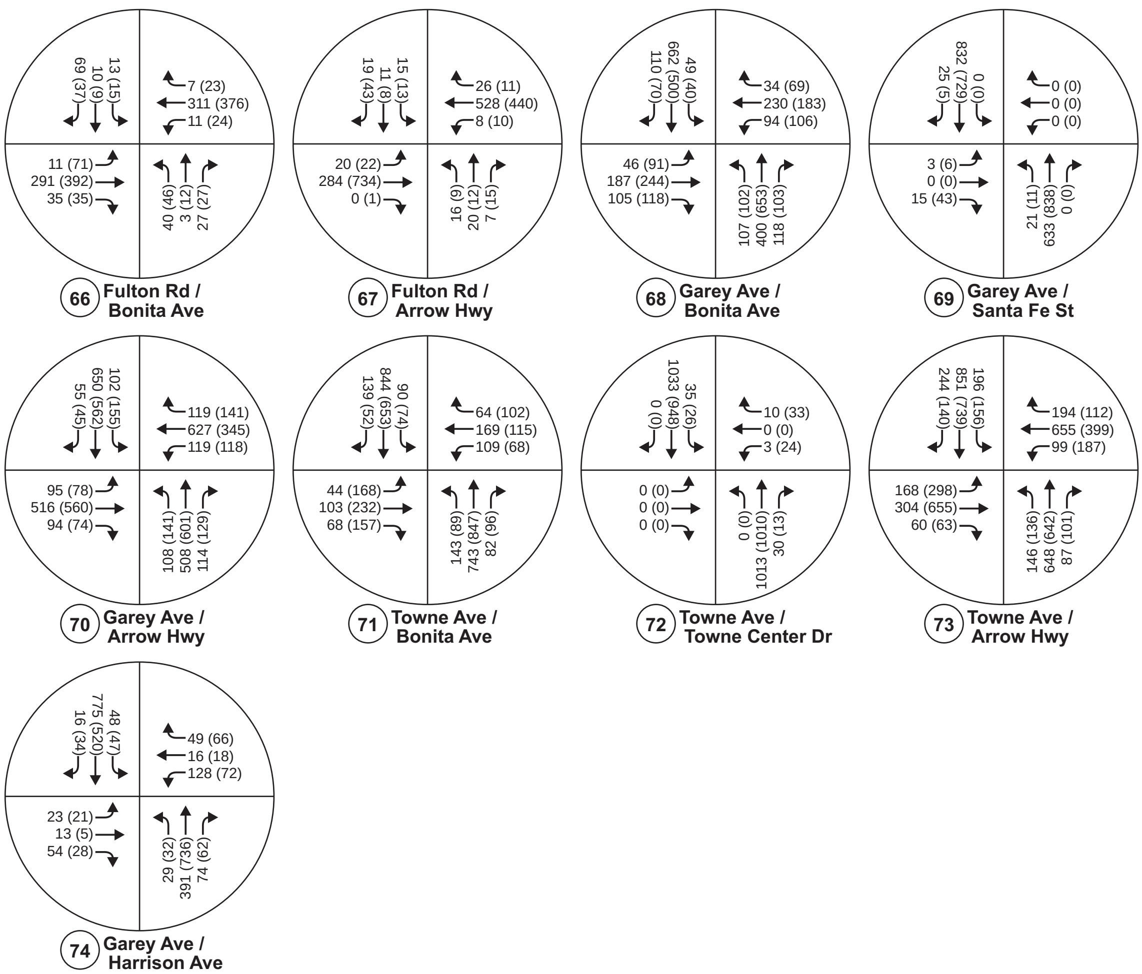
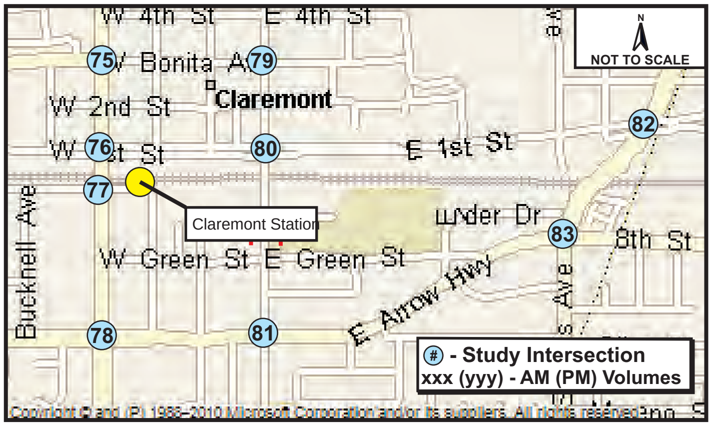


Figure 4-4: Existing (2010) AM/PM Peak Hour Traffic Volumes: Pomona



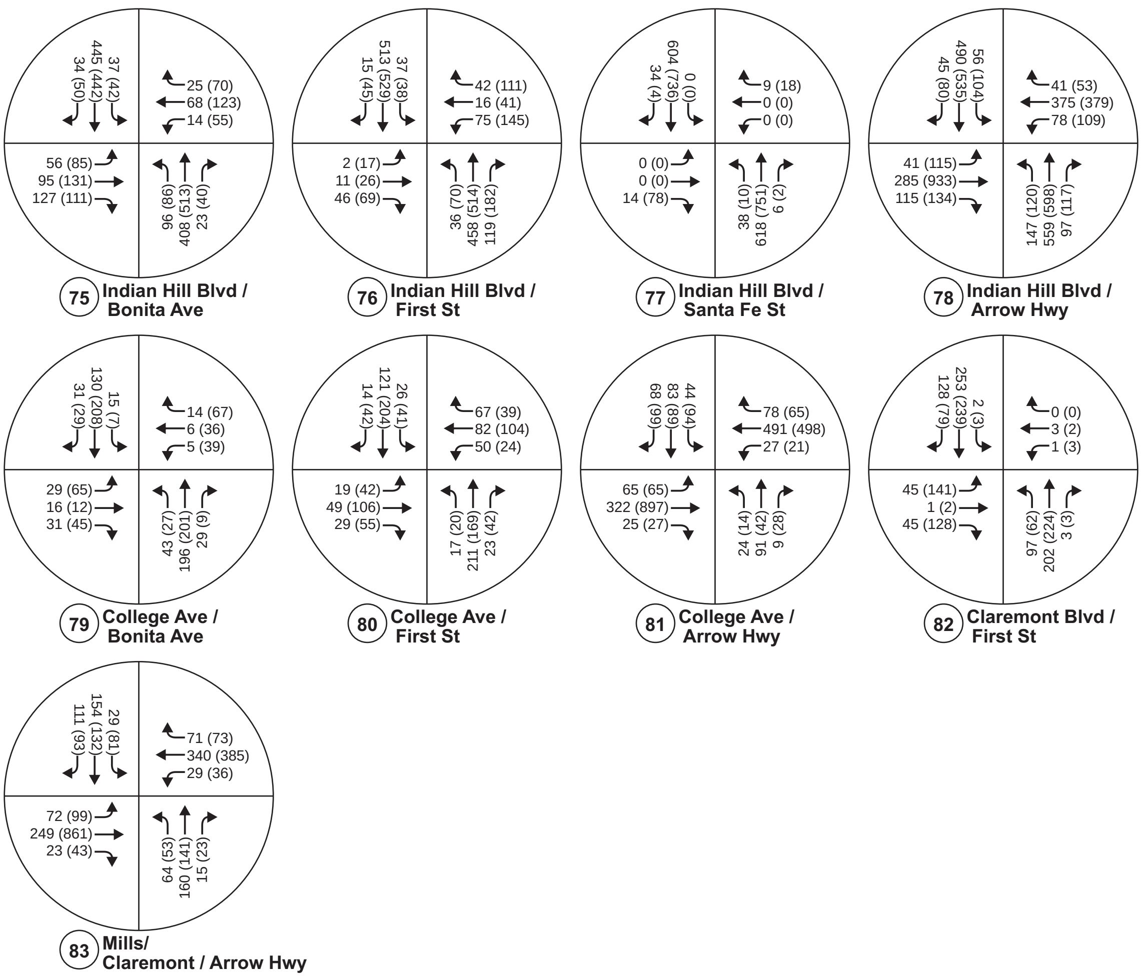
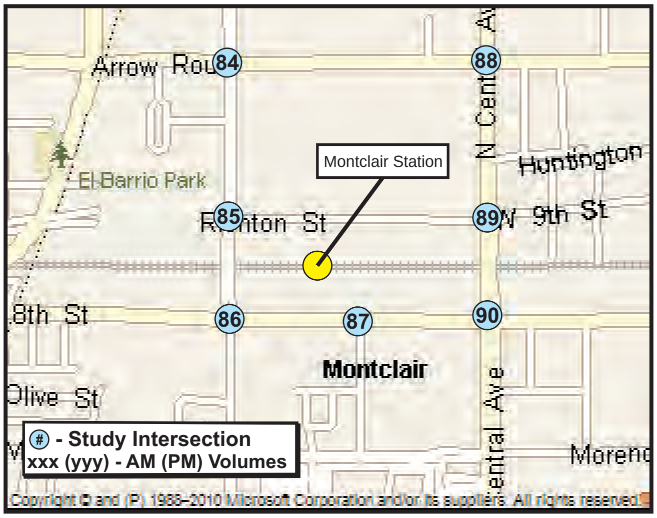


Figure 4-5: Existing (2010) AM/PM Peak Hour Traffic Volumes: Claremont



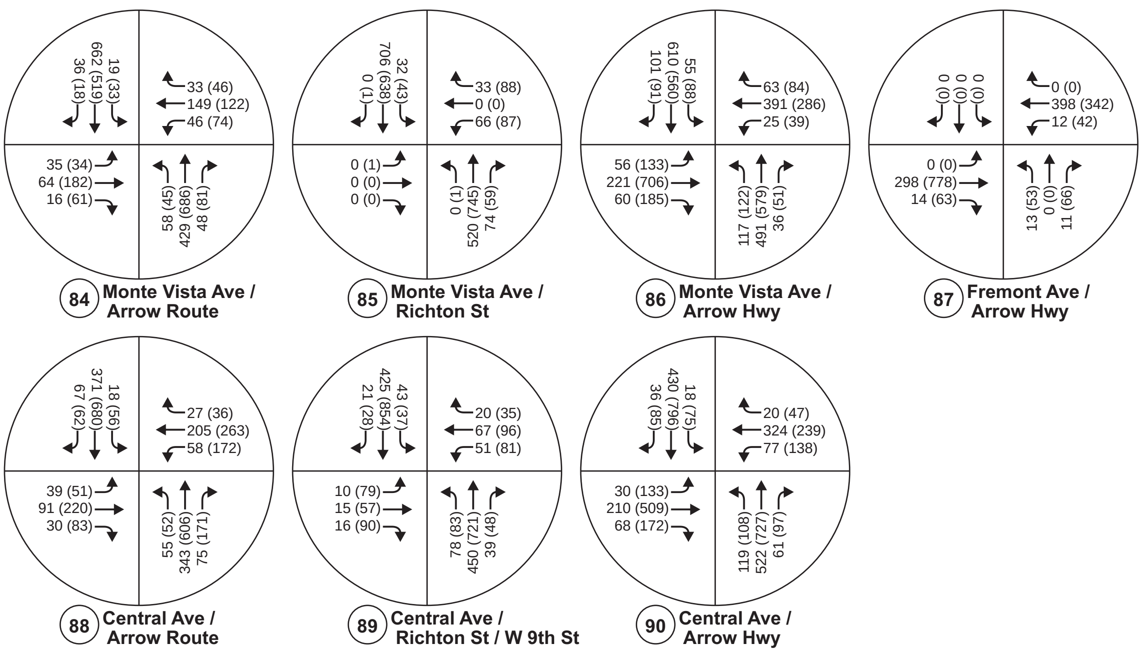


Figure 4-6: Existing (2010) AM/PM Peak Hour Traffic Volumes: Montclair

Table 4-4: Intersections Currently Operating at LOS E or F (2010)

Intersection	Jurisdiction	Control Type
Glenwood Avenue/Route 66	Glendora	2-Way Stop
Monte Vista Avenue/Bonita Avenue	San Dimas	2-Way Stop
A Street/Arrow Highway	La Verne	2-Way Stop
White Avenue/Third Street	La Verne	2-Way Stop
La Verne Avenue/Arrow Highway	La Verne	2-Way Stop
Fulton Road/Bonita Avenue	Pomona	2-Way Stop

Table 4-5: Existing Intersection LOS Analysis (2010)

#	Intersection	Jurisdiction	AM		PM	
			LOS	Delay[2]	LOS	Delay[2]
1	Barranca Avenue/Bennett Avenue	Glendora	C	16.5	B	11.6
			A[1]	5.8[1]	A[1]	1.7[1]
2	Barranca Avenue/Foothill Boulevard	Glendora	A	9.7	A	7.5
3	Grand Avenue/Foothill Boulevard	Glendora	C	27.3	C	23.9
4	Vermont Avenue East/Ada Avenue	Glendora	B	11.0	B	12.3
			A[1]	4.2[1]	A[1]	4.7[1]
5	Vermont Avenue/Route 66	Glendora	A	6.6	A	7.8
6	Vermont Avenue/Foothill Boulevard	Glendora	A	6.8	A	6.2
7	Vermont Avenue West/Ada Avenue	Glendora	B	10.6	B	11.3
			A[1]	2.5[1]	A[1]	2.1[1]
8	Glendora Avenue/Foothill Boulevard	Glendora	C	20.1	C	22.3
9	Glendora Avenue/Ada Avenue	Glendora	B	10.6	B	12.1
10	Glendora Avenue/Route 66	Glendora	B	17.9	C	21.2
11	Pasadena Avenue/Lemon Avenue	Glendora	A	7.7	A	7.6
12	Pasadena Avenue/Route 66	Glendora	A	9.4	A	8.7
13	Glenwood Avenue/Lemon Avenue	Glendora	A	9.8	B	10.7
			A[1]	2.3[1]	A[1]	2.5[1]
14	Glenwood Avenue/Route 66	Glendora	F	487.7	F	304.7
			D[1]	25.3[1]	B[1]	14.8[1]
15	Elwood Avenue/Lemon Avenue	Glendora	B	10.4	B	10.5
			A[1]	2.2[1]	A[1]	2.1[1]
16	Elwood Avenue/Route 66	Glendora	B	16.7	B	14.3
17	Loraine Avenue/Lemon Avenue	Glendora	C	16.7	B	12.4
			A[1]	1.6[1]	A[1]	1.1[1]
18	Loraine Avenue/Route 66	Glendora	B	13.9	B	10.5
19	Lone Hill Avenue/Auto Centre Drive	Glendora	B	13.7	B	16.7
20	Barranca Avenue/Sierra Madre Avenue	Glendora	C	15.7	B	13.7
			A[1]	3.6[1]	A[1]	2.8[1]
21	Glendora Avenue/Sierra Madre Avenue	Glendora	C	23.8	B	12.0
22	Lone Hill Avenue/Glendora Marketplace	Glendora	B	15.1	B	19.5

Table 4-5: Existing Intersection LOS Analysis (2010)						
			AM		PM	
#	Intersection	Jurisdiction	LOS	Delay[2]	LOS	Delay[2]
23	Lone Hill Avenue/Gladstone Street	San Dimas	B	16.9	C	21.7
24	SR-57 (southbound)/Arrow Highway	San Dimas	A	5.3	A	9.5
25	SR-57 (northbound)/Arrow Highway & Bonita Avenue	San Dimas	B	17.6	B	19.9
26	Eucla Avenue/Fifth Street	San Dimas	A	7.2	A	7.2
27	Eucla Avenue/Second Street	San Dimas	A	9.4	B	10.0
			A[1]	0.7[1]	A[1]	0.9[1]
28	Eucla Avenue/Bonita Avenue	San Dimas	A	4.7	A	6.0
29	Eucla Avenue/Arrow Highway	San Dimas	A	7.4	A	9.8
30	Acacia Street/Fifth Street	San Dimas	A	9.1	A	9.1
			A[1]	1.4[1]	A[1]	1.0[1]
31	Acacia Street/Second Street	San Dimas	A	9.0	A	9.1
			A[1]	7.3[1]	A[1]	6.4[1]
32	Acacia Street/Bonita Avenue	San Dimas	B	10.4	C	18.2
			A[1]	0.6[1]	A[1]	1.1[1]
33	Cataract Avenue/Second Street	San Dimas	A	9.7	A	9.8
			A[1]	8.3[1]	A[1]	7.9[1]
34	Cataract Avenue/Bonita Avenue	San Dimas	B	10.3	C	15.0
35	Monte Vista Avenue/Second Street	San Dimas	A	9.2	A	9.7
			A[1]	4.8[1]	A[1]	3.7[1]
36	Monte Vista Avenue/Bonita Avenue	San Dimas	C	15.4	E	39.7
			A[1]	1.0[1]	A[1]	2.9[1]
37	San Dimas Avenue/Second Street	San Dimas	C	16.8	C	22.3
			A[1]	0.9[1]	A[1]	1.5[1]
38	San Dimas Avenue/Bonita Avenue	San Dimas	B	10.2	B	13.0
39	San Dimas Avenue/Arrow Highway	San Dimas	C	23.0	C	29.4
40	Walnut Avenue/Bonita Avenue	San Dimas	A	5.9	B	10.7
41	Walnut Avenue/Arrow Highway	San Dimas	B	10.8	B	10.4
42	San Dimas Canyon Road/Bonita Avenue	San Dimas	A	6.3	A	7.3
43	San Dimas Canyon Road/Arrow Highway	San Dimas	B	11.4	B	10.1
44	Wheeler Avenue/Third Street	La Verne	B	14.4	B	13.8
			A[1]	2.6[1]	A[1]	2.4[1]
45	Wheeler Avenue/Arrow Highway	La Verne	B	13.3	B	11.6
46	A Street/Third Street	La Verne	B	10.1	B	10.3
			A[1]	5.3[1]	A[1]	4.7[1]
47	A Street/First Street	La Verne	A	9.2	A	9.8
			A[1]	1.6[1]	A[1]	2.3[1]
48	A Street/Arrow Highway	La Verne	F	77.2	E	40.0
			A[1]	2.6[1]	A[1]	1.1[1]
49	D Street/Third Street	La Verne	A	9.1	B	11.5

Table 4-5: Existing Intersection LOS Analysis (2010)

#	Intersection	Jurisdiction	AM		PM	
			LOS	Delay[2]	LOS	Delay[2]
50	D Street/First Street	La Verne	A	9.5	B	10.9
			A[1]	1.0[1]	A[1]	1.9[1]
51	D Street/Arrow Highway	La Verne	A	4.7	A	4.9
52	E Street/Third Street	La Verne	A	9.2	B	11.0
53	E Street/Second Street	La Verne	B	13.2	B	13.5
			A[1]	2.6[1]	A[1]	2.8[1]
54	E Street/First Street	La Verne	B	10.9	B	11.7
			A[1]	0.9[1]	A[1]	0.9[1]
55	E Street/Arrow Highway	La Verne	B	18.6	C	23.5
56	White Avenue/Third Street	La Verne	C	19.6	E	41.8
			A[1]	1.4[1]	A[1]	1.9[1]
57	White Avenue/Second Street	La Verne	C	18.5	D	32.5
			A[1]	1.1[1]	A[1]	1.2[1]
58	White Avenue/First Street	La Verne	C	20.0	D	29.7
			A[1]	1.6[1]	A[1]	1.8[1]
59	White Avenue/Sierra Way	La Verne	B	10.7	C	15.3
			A[1]	0.4[1]	A[1]	0.5[1]
60	White Avenue/Arrow Highway	La Verne	C	21.5	C	24.7
61	D Street/Bonita Avenue	La Verne	A	7.6	A	8.0
62	White Avenue/Foothill Boulevard	La Verne	C	23.8	C	34.2
63	White Avenue/Bonita Avenue	La Verne	B	12.2	B	13.9
64	White Avenue/McKinley Avenue	La Verne	B	10.5	B	12.0
65	La Verne Avenue/Arrow Highway	La Verne	D	28.6	F	196.9
			A[1]	6.2[1]	C[1]	22.8[1]
66	Fulton Road/Bonita Avenue	Pomona	C	17.2	E	30.8
			A[1]	3.0[1]	A[1]	4.2[1]
67	Fulton Road/Arrow Highway	Pomona	C	17.9	C	24.2
			A[1]	1.8[1]	A[1]	1.6[1]
68	Garey Avenue/Bonita Avenue	Pomona	B	13.2	B	13.3
69	Garey Avenue/Santa Fe Street	Pomona	B	11.8	B	11.5
			A[1]	0.3[1]	A[1]	0.4[1]
70	Garey Avenue/Arrow Highway	Pomona	C	21.5	C	25.8
71	Towne Avenue/Bonita Avenue	Pomona	A	7.3	A	9.5
72	Towne Avenue/Towne Center Drive	Pomona	C	18.4	D	27.9
			A[1]	0.3[1]	A[1]	0.9[1]
73	Towne Avenue/Arrow Highway	Pomona	C	34.9	D	37.0
74	Garey Avenue/Harrison Avenue	Pomona	A	6.7	A	4.7
75	Indian Hill Boulevard/Bonita Avenue	Claremont	A	7.3	A	8.5
76	Indian Hill Boulevard/First Street	Claremont	A	9.3	B	12.4
77	Indian Hill Boulevard/Santa Fe Street	Claremont	B	10.7	B	12.0
			A[1]	0.4[1]	A[1]	0.8[1]

Table 4-5: Existing Intersection LOS Analysis (2010)						
			AM		PM	
#	Intersection	Jurisdiction	LOS	Delay[2]	LOS	Delay[2]
78	Indian Hill Boulevard/Arrow Highway	Claremont	B	18.8	C	27.4
79	College Avenue/Bonita Avenue	Claremont	A	9.1	B	10.8
80	College Avenue/First Street	Claremont	A	9.6	B	10.7
81	College Avenue/Arrow Highway	Claremont	A	5.2	A	6.5
82	Claremont Boulevard/First Street	Claremont	A	3.4	A	5.9
83	Mills/Claremont/Arrow Highway	Claremont	B	14.6	B	16.3
84	Monte Vista Avenue/Arrow Route	Montclair	B	11.9	B	12.8
85	Monte Vista Avenue/Richton Street	Montclair	A	3.2	A	6.4
86	Monte Vista Avenue/Arrow Highway	Montclair	B	16.8	C	21.3
87	Fremont Avenue/Arrow Highway	Montclair	A	1.8	A	4.0
88	Central Avenue/Arrow Route	Montclair	B	10.9	B	17.4
89	Central Avenue/Richton Street/West 9th Street	Montclair	A	7.6	A	9.1
90	Central Avenue/Arrow Highway	Montclair	B	14.3	C	21.6

[1] Overall intersection LOS and delay at unsignalized intersections is reported to support the air quality analysis
[2] Average vehicle delay in seconds

4.3 PARKING

Parking at the six new stations would be designed to accommodate patrons using the LRT service. The parking demand and the number of parking stalls would be partially guided by the boarding projections from the transportation modeling process for 2035. It is estimated that more than 5,150 total parking spaces would be required. It is anticipated that existing on-street parking spaces near the stations will not be displaced by the construction of the proposed project alignment. Parking information for each new station follows.

Glendora

The Glendora Station would be sited on a parcel between Glendora Avenue on the east and northeast, East Ada Street on the north, and Vermont Avenue on the west. At this station, parking would be in a two-level parking structure directly south of the station and within the Metro right-of-way. Approximately 400 parking spaces would be required by 2035. Vehicular access and egress would be via Glendora Avenue on the east end and Vermont Avenue on the west end. Pedestrian connections between the platform and parking structure would be via sidewalks on Vermont Avenue and Glendale Avenue.

San Dimas

The proposed San Dimas Station would be between San Dimas and Walnut Avenues, north of Arrow Highway. It would have a center platform and a two-level above-grade parking structure south of the right-of-way. Approximately 400 parking spaces would be needed by 2035. Parking would be in a multi-level structure just south of the station in a mid-block site bounded by the Grove Street Station mixed-use development on the north and Arrow Highway on the south. Vehicular access and egress would be via

Walnut Avenue. Travel between floors would be via sloped floor parking bays. Pedestrians would walk to and from the platform and parking structure via an elevated walkway at the east end of the station that then connects to the east end of the station platform within the Metro right-of-way.

La Verne

The La Verne Station would be located east of E Street, just north of Arrow Highway and would require 600 parking spaces by 2035. A rectangular four-level sloped-floor parking garage would be provided in the irregular-shaped property just south and east of the platform on the north side of Arrow Highway; the rest of the parcel would be available for commercial development. Vehicular access and egress would be via Arrow Highway. Due to the proximity of the station driveway to E Street, only right turns would be permitted into and out of the site. Pedestrian access would be relatively convenient and require crossing only the eastbound LRT track, either at-grade at E street or at a gate-controlled pedestrian crossing at the east end of the station platform.

Pomona

The Pomona Station would have a center platform located west of Garey Avenue near the existing Metrolink station. A new parking structure would be located on industrial land north of the right-of-way. Approximately 1,050 spaces would be needed by 2035; existing Metrolink parking is approximately 350 spaces. The new spaces would be provided in a shared Gold Line/Metrolink garage just north of the existing Gold Line station platform. This site is currently part of a larger industrial property with an unoccupied building on it. Vehicular access would be via a driveway from Garey Avenue on the north side of the structure. Pedestrian access to the Gold Line and Metrolink platforms would be via a pedestrian bridge over the BNSF freight track and Gold Line tracks.

Claremont

Claremont has a thriving multi-modal transit center focused on its historic restored Atchison, Topeka & Santa Fe Depot, located north of the tracks to the east of Indian Hill Boulevard. The proposed Claremont Station would be a center-platform configuration located across from the historic station. The combined Gold Line and Metrolink parking demand at Claremont Station would be approximately 1,100 in 2035. Today, approximately 400 parking spaces are in the Metrolink lot on 1st Street, east of College Avenue. To accommodate the future needs, a three-level parking structure is proposed at the parking lot site. Vehicular access and egress would be via a pair of driveways connected to 1st Street; the driveways would not interfere with the bus transfer bays on 1st Street. Travel to and from the garage would be via 1st Street, crossing College Avenue at grade, then continuing along the College Avenue sidewalk to the walkway between the eastbound and westbound LRT tracks to the platform.

Montclair

The Montclair Station would be just north of the existing Metrolink station platforms with convenient pedestrian access to Metrolink trains via the existing pedestrian tunnel. The existing Montclair TransCenter, including a major bus transfer facility and adjacent park-and-ride, would also serve the LRT station. Parking needs at the Montclair Station would be 1,600 spaces by 2035. There are currently more than 1,600 surface parking spaces at the Montclair TransCenter where the LRT station is proposed. These spaces are used by Metrolink passengers and bus riders who use the park-and-ride. While the existing lots would be ample to serve future needs even with the Build Alternative added, the entire area surrounding the station including the parking lots are scheduled for redevelopment as part of the North Montclair Downtown Specific Plan. For the purposes of the environmental analysis, the existing parking site was studied. A parking lot could be located south of the Build Alternative and Metrolink tracks. However, it would be constructed only if the surface lots were displaced by future development.

4.4 PEDESTRIAN AND BICYCLE FACILITIES

According to the County of Los Angeles Bicycle Master Plan, three of the six proposed station locations would be near within the vicinity of existing bike lanes. Glendora Avenue has a Class III bike route near the location of the proposed Glendora Station. Near the proposed San Dimas Station, Arrow Highway has a Class III bike route, while San Dimas Avenue has a Class III bike route north of Arrow Highway, and a Class II bike lane south of Arrow Highway. College Avenue near the proposed Claremont station has a Class II bike lane.

4.5 AT-GRADE RAILROAD CROSSINGS

There are 30 locations in the corridor where the existing railroad crosses highways (not including the existing freeway under passes at I-210 and SR 57), two of which, historic Highway 66 in Glendora and Monte Vista Avenue in Montclair, are grade-separated. While the proposed LRT alignment would maintain these existing grade separations by building separate bridges, the crossing at Monte Vista Avenue was studied as an at-grade crossing for purposes of analysis in the EIS/EIR.[2] Thus, 29 crossings were evaluated using the Metropolitan Transportation Authority's (Metro) *Policy for Grade Crossing for Light Rail Transit* (December 4, 2003). This evaluation shows how highway traffic would be affected by proposed train headway operations. It also would be used to determine whether an at-grade crossing is feasible or a grade separation should be studied in more detail. **Table 4-6** provides the list of analyzed crossings. The results of the analysis are provided in Section 5.5.

[2] To allow the railroad to provide continued service to customers on the northerly side of the corridor, the LRT must cross the railroad at two locations. Lone Hill Avenue in Glendora and Towne Avenue in Pomona were chosen as the two locations where an LRT grade separation of an existing highway could be accomplished, even though the Metro policy described above does not mandate grade separations at these two locations.

Table 4-6: List of Analyzed Crossing Locations	
City	**Crossing Intersections**
Glendora	• Barranca Avenue • Grand Avenue/Foothill Boulevard • Vermont Avenue/Ada Avenue • Glendora Avenue • Pasadena Avenue • Glenwood Avenue • Elwood Avenue • Loraine Avenue • Lone Hill Avenue/Auto Center Drive
San Dimas	• Gladstone Street • Eucla Street • Cataract Avenue/Bonita Avenue • Monte Vista Avenue • San Dimas Avenue • Walnut Avenue • San Dimas Canyon Road
La Verne	• Wheeler Avenue • A Street • D Street • E Street • White Avenue
Pomona	• Fulton Road • Garey Avenue • Towne Avenue
Claremont	• Cambridge Avenue • Indian Hill Boulevard • College Avenue • Claremont Boulevard/South Mill Road
Montclair	• Monte Vista Avenue

Chapter 5 – Impacts

This chapter of the report presents the operational and construction effects/impacts of the proposed project for each one of the scenarios under consideration. The forecasts used to perform the operational analysis account for background growth in traffic due to cumulative projects, consisting of additional regional and sub-regional land use development, and population and employment growth.

5.1 PUBLIC TRANSIT

5.1.1 No Build Alternative

As the population grows, the demand for adequate and reliable transit service also will increase. Public transit service performance will likely decrease because of the projected increase in traffic congestion. This is likely to make travel via transit a less attractive option for San Gabriel Valley patrons. For those patrons who have no other travel options, travel times will increase and transit usage will be less convenient.

The No Build Alternative would provide no significant improvement in transit services in the study area. Short term planned changes to local fixed route bus services are presented below.

- Foothill Transit does not have any current specific plans to implement major changes to the transit services provided.

- Omnitrans has developed a Financially Constrained Service Plan to be implemented over the Fiscal Years of 2010 through 2014. This plan takes into account the limited available funding and the farebox recovery target of 25%, which is a factor that restricts the addition of service. The first stage of the plan is to be implemented in September 2010, affecting the service for Fiscal Year 2011. The proposed measures are:

    - Route 65: Reduce weekday evening service from 30 minutes to 60 minute frequency; restructure Los Seranos loop.
    - Route 66: Reduce mid-weekday service from 15 minute to 30 minute frequency.
    - Route 67: Eliminate weekend service or contract using smaller vehicles.
    - Route 68: Eliminate weekend service or contract using smaller vehicles.

With the recent economic downturn, transit operators in the area have shown a systemwide ridership decrease. Other than the short term planned changes identified above, future bus routes and frequency will be determined by their respective transit operators based on the demand and operating costs at that time. No other significant transit additions are projected in this scenario.

5.1.2 TSM Alternative

The TSM Alternative would emphasize transportation system upgrades, such as intersection improvements, signal improvements and synchronization, minor road widening, traffic engineering actions to manage flow, bus route restructuring, shortened bus headways, expanded use of articulated buses, reserved bus lanes, expanded park-and-ride facilities, express and limited-stop service, and timed-transfer operations.

In addition, this alternative proposes a rapid bus route instead of a light rail as a link between the Azusa-Citrus Station to the Montclair Transcenter Station. Buses will be powered by diesel, hybrid/electric, CNG, or fuel cell, and the designed capacity would be 60-65 passengers per vehicle. Operational strategies include transit signal priority (TSP) and signal synchronization. As a result, this alternative would beneficial and help improve the east-west connection between the cities within the study area without any negative impacts.

5.1.3 Build Alternative

The Build Alternative is a 12.6-mile extension from Azusa to Montclair. It operates on two light rail tracks next to a freight track along the existing Metro-owned right-of-way, which is also currently used by Metrolink.

Regional Transit Access and Connectivity

The Build Alternative would increase transit service. It would introduce a premium service that would serve the region and provide improved service reliability as well decrease travel times for transit patrons. Forecast data indicate that transit ridership would increase with the introduction of the improved service.

The Build Alternative would provide passengers with greater access to regional transit opportunities and would provide improved regional transit connectivity. For passengers who board the Gold Line at the six new proposed stations the Gold Line Light Rail system would provide continuous service from Montclair to Long Beach Transfers could be made at Union Station to a variety of different transit alternatives.. Transfers could be made to the Metro Red Line at Union Station with its subway service to Wilshire Center and North Hollywood. The Exposition Line and the Gold Line Eastside Extension to the Beverly/Atlantic Station could also be accessed via the Downtown Regional Connector, which would be constructed and operational, and the Green Line to Norwalk and Redondo Beach would be accessible via the Long Beach Blue Line. Dozens of local and express bus lines converge at Union Station, and several transit providers service Union Station, including Santa Monica’s Big Blue Bus, LADOT, Foothill Transit, Torrance Transit, Santa Clarita Transit, and the Antelope Valley Transportation Authority. Metrolink commuter rail service is also available for regional travel to Ventura, San Bernardino, Riverside, Orange, and San Diego counties as well as to northern Los Angeles County. Amtrak rail service can also be accessed at Union Station for long-distance travel to other cities in California and the nation.

To enhance transit connectivity with the Build Alternative and provide access to the stations, the frequencies of bus service routes in the study area would be improved. Per the Foothill Extension Bus Interface Plan, **Table 5-1** presents the proposed changes to the hourly number of buses to enhance bus service in the Build Alternative. Consequently, the Build Alternative would benefit bus transit impacts on regional access and connectivity.

Table 5-1: Build Alternative – Proposed Changes to Bus Service (Buses Per Hour)

Bus Line	Glendora Station						San Dimas Station						La Verne Station						Pomona Station						Claremont Station						Montclair Station					
	AM Peak			PM Peak			AM Peak			PM Peak			AM Peak			PM Peak			AM Peak			PM Peak			AM Peak			PM Peak			AM Peak			PM Peak		
	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover
Foothill Transit																																				
188[1]	3	3		3	3																				3	3		3	3		3		1	3		1
197																									2	2		2	2		2		1	2		1
492							1		1	1		1	4			4									2	2		2	2		2		1	2		1
291																			3	3		3	3													
292																																				
480																									2	2		2	2		2		1	2		1
851	1	1		1	1																															
690																									2	2		2	2		2		1	2		1
699																															4		1		4	1
284		1	1		1	1																														
Omnitrans																																				
65																															1		1	1		1
66																															4		1	4		1
67																															1		1	1		1
68																															2	2		2	2	
80																															1		1	1		1
RTA																																				
204																															1		1	1		1

Table 5-1: Build Alternative – Proposed Changes to Bus Service (Buses Per Hour)

Bus Line	Glendora Station						San Dimas Station						La Verne Station						Pomona Station						Claremont Station						Montclair Station					
	AM Peak			PM Peak			AM Peak			PM Peak			AM Peak			PM Peak			AM Peak			PM Peak			AM Peak			PM Peak			AM Peak			PM Peak		
	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover	Northbound/Eastbound	Southbound/Westbound	Layover
Total	4	5	1	4	5		1		1	1		1		4			4		3	3		3	3			3			3		25	2	11	21	6	11

[1] New proposed bus route

Source: Foothill Extension Bus Interface Plan, Parsons Brinckerhoff, 2011

Bus Route Interface and Service Modifications

To maintain connectivity with other transit operators and bus services in the study area, it is important that the proposed stations are well-served by existing and proposed bus routes. The proposed transit operating plan for the Build Alternative provides a connection to existing bus lines at each station and proposes that certain bus lines be considered for rerouting in order to provide improved access to the light rail system. Rerouting considerations would follow the typical bus route changes process for Foothill Transit and Omnitrans, including a public review period for the proposed changes, a comment process, and input from members of the Bus Riders Union.

According to FTA regulations and guidelines for entities that receive federal transit funding, a public hearing must be offered for a change in fare structure or for service changes that affect more than 25 percent of the revenue or route-miles for a given transit line. CEQA requires that impacts be measured against criteria for significance and that all significant impacts be addressed or mitigated. The proposed bus route modification constitutes a less than significant impact and would require no mitigation. **Table 5-2** shows the proposed bus interface and service modification.

Table 5-2: Build Alternative – Proposed Bus Interface and Service Modification

City	Improvements
Glendora	Foothill Transit Route 187 would be divided in three. The segment east of Azusa Citrus would be designated as Route 188, and would be re-routed from Alosta Avenue between Vermont Avenue and Glendora Avenue. It is recommended that it run on Vermont Avenue, Ada Street and Glendora Avenue.
	Move terminus and layover point for Foothill Transit Route 284 to Glendora Avenue and Ada Street.
	Consider Obtaining a pedestrian way easement through the redevelopment parcel to the north and that the existing bus stop at Ada Avenue be relocated near the pedestrainway. Additionally, a turnout for the southbound bus stop could be provided along the south side of Glendora Avenue.
	The narrow parcel south of the tracks from Vermont Avenue to Glendora Avenue is proposed to be used for either a parking lot with a capacity of about 200 spaces or a 2-3 story parking structure with approximately 350 to 400 spaces.
San Dimas	New layover location for Foothill Transit Route 494 and 499 in the vicinity of San Dimas station. Bus stops at the park-and-ride lot for routes 494 and 499 would be moved or added for closer proximity to the LRT station.
La Verne	Insert loop around the station between White Avenue and Arrow Highway and create a new stop close to the station. In the westbound direction, buses should continue ahead on Arrow Highway, turn right on E or F street, right on 1st Street and then enter White Avenue. Loop in reverse order for the eastbound direction. A bus turnout should be evaluated on Arrow Highway at the station to accommodate a bus stop for Foothill Transit Route 197.
	Additional bus service could be provided by a possible city shuttle bus on E street between the Fairplex and the city's Old Towne center to the north including a stop by the station entrance.
Pomona	Include a bus stop in the vicinity of the Pomona Station with possible turnout for Foothill Transit Route 291 on Garey Avenue north of the rail tracks. Because it is a joint Gold Line and Metrolink Station complex, an off-street transit center is also something that should be considered for Pomona Station.
	It is proposed that route 492 be diverted to serve the Pomona station.
	Parcels adjacent to the station could be developed to provide park-and-ride and/or related improvements.
Claremont	Divide Foothill Transit Route 187 into three segments. The segment east of Azusa-Citrus would be designated as Route 188.
	A park-and-ride garage for LRT and Metrolink riders is proposed over the existing Metrolink parking lot east of College Avenue next to the bus transfer/layover facility.
Montclair	Foothill Routes 494 and 690 are candidates to be discontinued, as they run parallel to the Gold Line Extension when Phase 2B – Azusa to Montclair is completed.
	Introduction of the LRT station together with the specific plan for future development will require moving the existing bus transit center away from its current location eastward but still on the north side of the rail tracks.

Bus Stop Impacts

Under the Build Alternative, bus stops would remain in their current general locations, although some may be relocated to better interface with the new LRT stations. Bus stops would be located close to the street corner where there is access to the station entrance. Some stations may provide bus loading and unloading areas near the proposed parking facilities.

Metrolink Operation Impacts

The Build Alternative would overlap with a short segment of the Metrolink San Bernardino Line in Pomona, Claremont, and Montclair. The Build Alternative would run along the same right-of-way as the Metrolink, but LRT trains would operate on separate tracks and use different platforms than the Metrolink commuter trains. The freight track would merge with the Metrolink track, resulting in two LRT tracks and two Metrolink/freight tracks.

LRT Patronage Forecasts

Table 5-3 shows the projected daily ridership at each LRT station based on the results of the transportation travel demand model for the Build Alternative. The highest number of passengers boarding the system would be at the Montclair Station, with the next highest being at the Pomona Station. The model also shows that the stations with the highest patronage would be the ones with the greatest number of connecting transit services. The highest concentration of boardings would occur during the peak periods as people use the system to and from their places of employment. Total daily ridership for the Build Alternative is projected to be 17,766 passengers by the year 2035.

Table 5-3: Build Alternative –Daily LRT Ridership

Station	Total Daily
Glendora	1,860
San Dimas	1,778
La Verne	1,836
Pomona	3,014
Claremont	2,840
Montclair	6,440
Total	**17,766**

Source: Parsons Brinckerhoff, 2011

5.1.4 Construction Phase

During construction of the project, it may be necessary for traffic lanes to be temporarily closed. Generally, lane closures would take place at night in order to minimize traffic disruptions. Construction activities that entail the relocation of utilities and the construction of trackways and stations would require the temporary closure of lanes at roadways with at-grade crossings. Three types of grade crossing configurations were identified; mid-block locations, locations adjacent to an intersection and locations where the tracks diagonally cross the intersection. With temporary lane closures occurring during the night, it is anticipated that construction impacts will be minimal at the midblock and adjacent intersection locations. Since these lane closures are expected to take place during the night hours and outside the AM and PM peak commuting periods, there will be no impacts to both transit and traffic. Intersection operating conditions would remain at acceptable service levels because of the low traffic volumes that travel during the night. In addition, during the lane closures detour routes would be identified and clearly signed. However, at the two locations where the tracks diagonally cross the intersection, full closure of the intersection during the night hours is expected. At these select locations, impacts during construction would be considered adverse/significant and would require the development of mitigation measures.

It is anticipated that temporary lane closures would take place during the night hours when traffic volumes are substantially lower than the AM and PM peak periods. Some bus routes may require rerouting and stops may be temporarily relocated. In addition, detour routes may be implemented and clearly signed to temporarily divert traffic flow away from the closure area. Within the proposed alignment, the tracks diagonally cross the intersection at a total of two locations, one in Glendora and one in San Dimas. The Glendora intersection is at Grand Avenue/Foothill Boulevard. The San Dimas intersection is at Cataract Avenue/ Bonita Avenue. During construction, these two intersections would be closed at night and transit and traffic would be re-routed to bypass the closure. Since traffic volumes are low during the night hours, it is anticipated that this adverse/significant impact can be mitigated by diverting traffic and clearly signing the detour route. Due to the diversion of traffic, bus stops would also be temporarily relocated onto the proposed detour route.

Although these construction impacts may be temporary, they would be significant during the construction phase and would require temporary mitigation measures for the duration of the construction period.

5.2 STREETS AND HIGHWAYS

5.2.1 No Build Alternative

Intersection Traffic Conditions

For traffic operations, year 2035 traffic forecasts were developed so that potential changes with the proposed LRT system can be evaluated and compared to the No Build Alternative. The following paragraphs present anticipated changes to intersection operations, the development of growth factors and the resulting traffic operations for the No Build Alternative.

The Southern California Association of Governments' (SCAG) Regional Transportation Plan (RTP) model estimates future travel demand in Los Angeles County. Traffic forecasts obtained from the 2003 and 2035 RTP models were reviewed in the vicinity of the proposed grade crossings during the PM peak period. A traffic screenline was developed, consistent with the alignment of the project, and was used to assess the roadway segment traffic volumes arriving and departing the proposed grade crossings during the four-hour PM peak period (traffic congestion in the PM peak period is typically worse than the AM peak period). Factors were subsequently developed that represent the increases in traffic volumes as a result of development in and around the project corridor. Due to varying development patterns/projections unique to each corridor city, growth factors were developed for each local jurisdiction.

Each at-grade crossing is categorized by two types of configurations, either the typical mid-block crossings where trains block two approaches or a diagonal crossing where a train will pass through an intersection diagonally, affecting all four approaches. Each grade crossing location along the project alignment is analyzed by direction (north/south or east/west). Estimation of the traffic growth in the city of Montclair and the city of Upland involved review of traffic volumes at and around the key intersections in the vicinity of the project alignment. Each intersection was analyzed through a combination of approach volumes for the purpose of this analysis.

Traffic may be more congested in one direction than the other depending on the time of day. It may also fluctuate due to the seasonal changes, and may redistribute among closely-spaced crossings depending on the area and the local traffic conditions. The approach taken combines the traffic volumes along a screenlien at and in close proximity to multiple crossings in each jurisdiction, and the difference in total traffic volumes between 2003 and 2035 is then calculated. This results in an overall growth factor for each jurisdiction.

A comparison of these traffic forecasts indicates that the traffic growth in the vicinity of the project corridor is estimated to range from 0.6% to 0.9% annually. The linear interpolation method assumed that that total growth was divided by the 32-year timeframe (from year 2003 to year 2035) to calculate average yearly growth factors. This amounts to a total growth in traffic between 2010 and 2035 of between 14.3% and 21.9%.

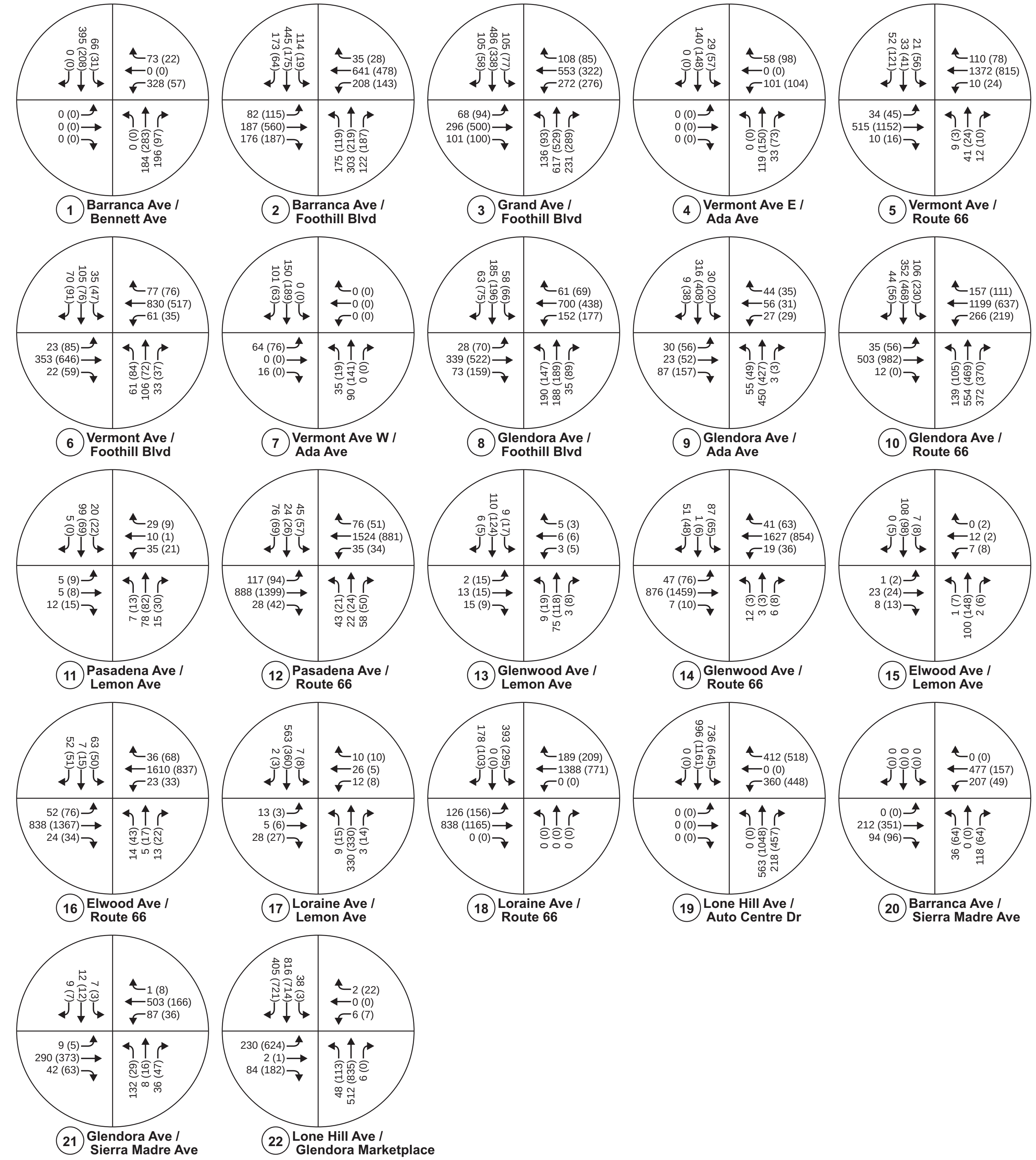
Another alternative method would be to interpolate the corridor traffic growth by a compound annual growth rate for each corridor city. Each compound annual growth rate was calculated by taking the Nth root of the total percentage growth rate, where N is the number of years in the period being considered (i.e., 32 years). The estimated compound growth rates range from 0.5% to 0.8% annually. Total traffic growth percentages between year 2010 and 2035 were estimated to range between approximately 14.0% and 21.3%.

Both the linear method and the compound method yield similar amount of traffic growth from year 2010 and year 2035. There is no available data indicating the growth profile in the corridor cities and the traffic growth could be a combination of varying curved rates and flat rates. It was decided that the linear average rate method, as summarized in **Table 5-4**, provides a reasonable average of the growth patterns in the corridor cities; and therefore should be used in the grade crossing and traffic analysis for the project.

Table 5-4: No Build Alternative – Growth Factors (2035)

City	Annual Growth	Accumulated Growth (2010 to 2035)
Glendora	0.7%	16.6%
San Dimas	0.9%	21.9%
La Verne	0.6%	14.3%
Pomona	0.7%	17.5%
Claremont	0.7%	17.0%
Montclair	0.7%	18.0%
Upland	0.9%	21.7%
Sources: Fehr & Peers, 2010		

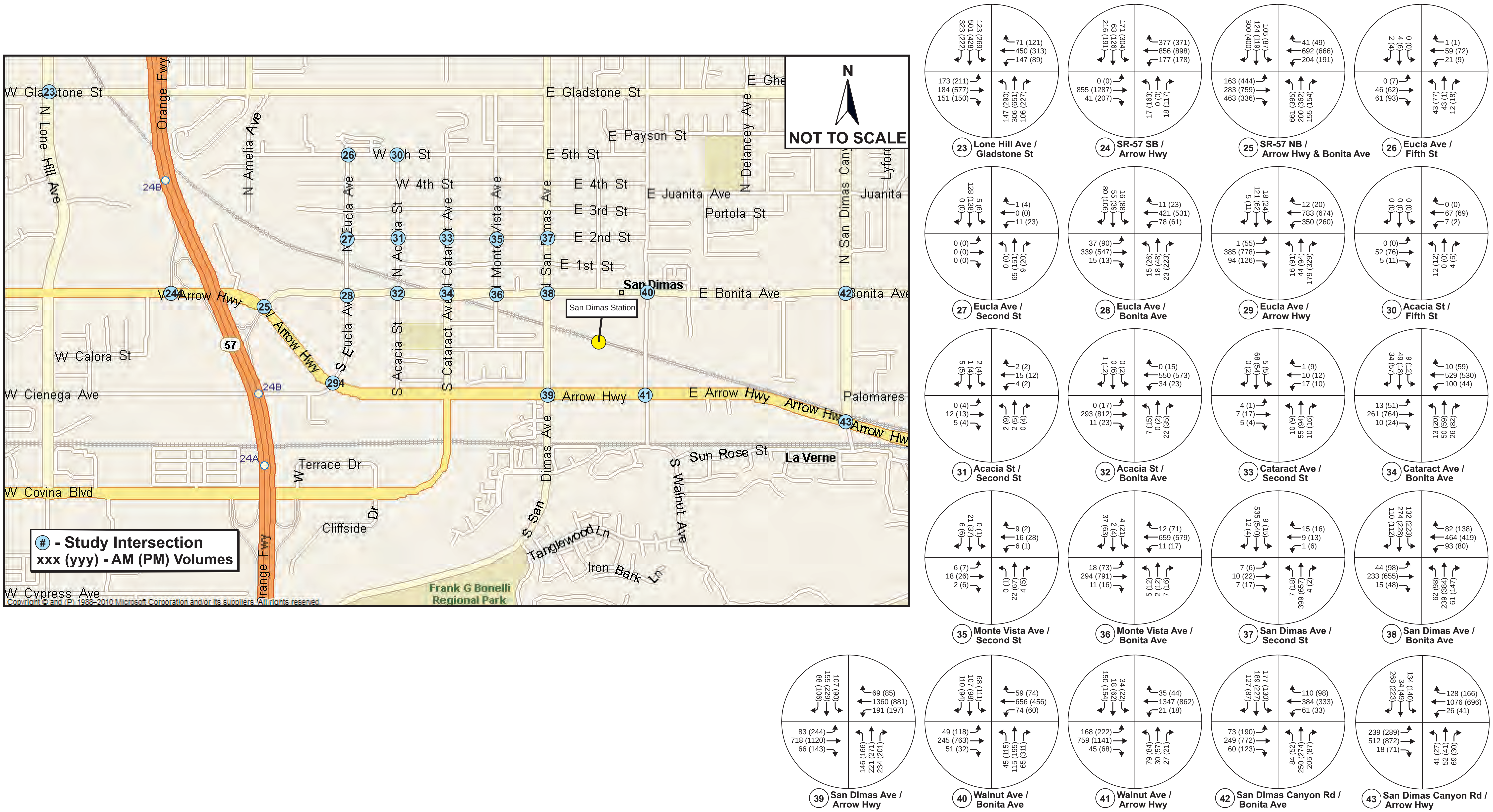
The growth factors were applied to each of the 90 study intersections according to their jurisdiction. **Figures 5-1 to 5-5** show the No Build peak hour traffic volumes during the AM/PM peak hours.



INTUEOR MAXIMIZING VALUE

Metro Gold Line Foothill Extension – Azusa To Montclair

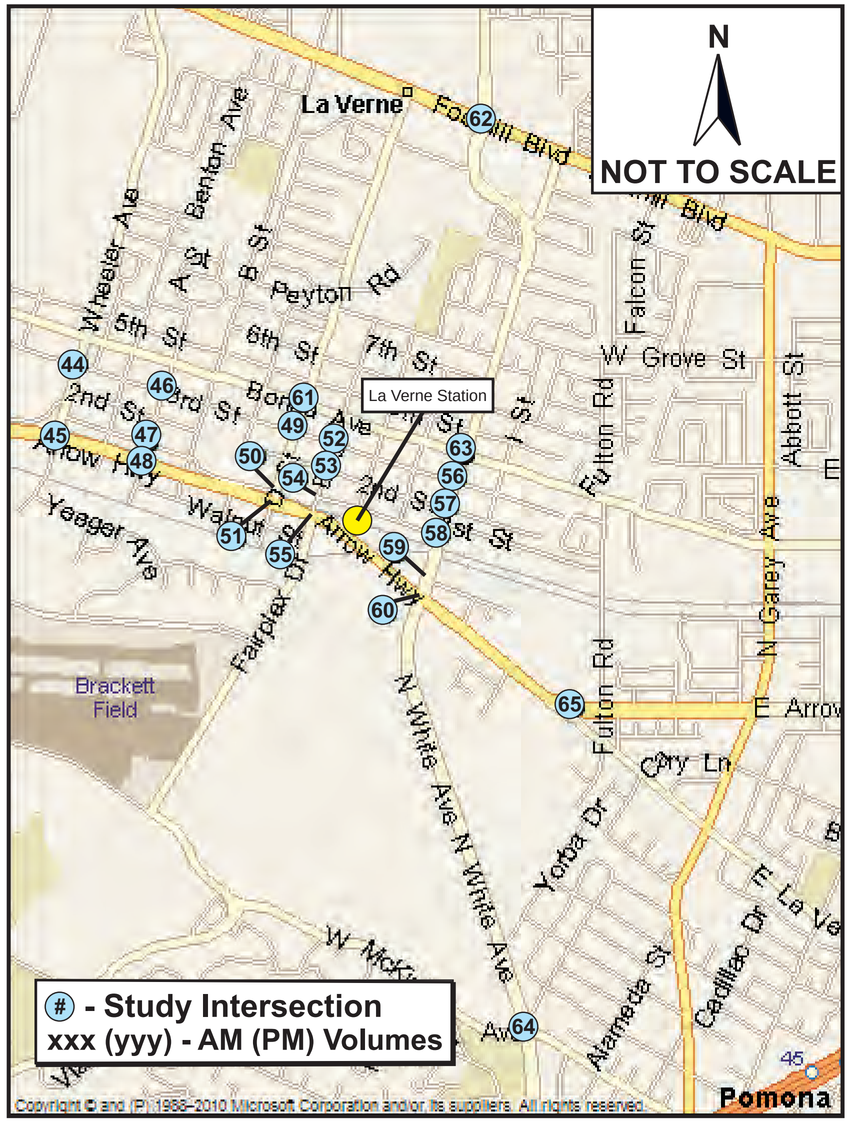
Figure 5-1: No Build (2035) AM/PM Peak Hour Traffic Volumes: Glendora

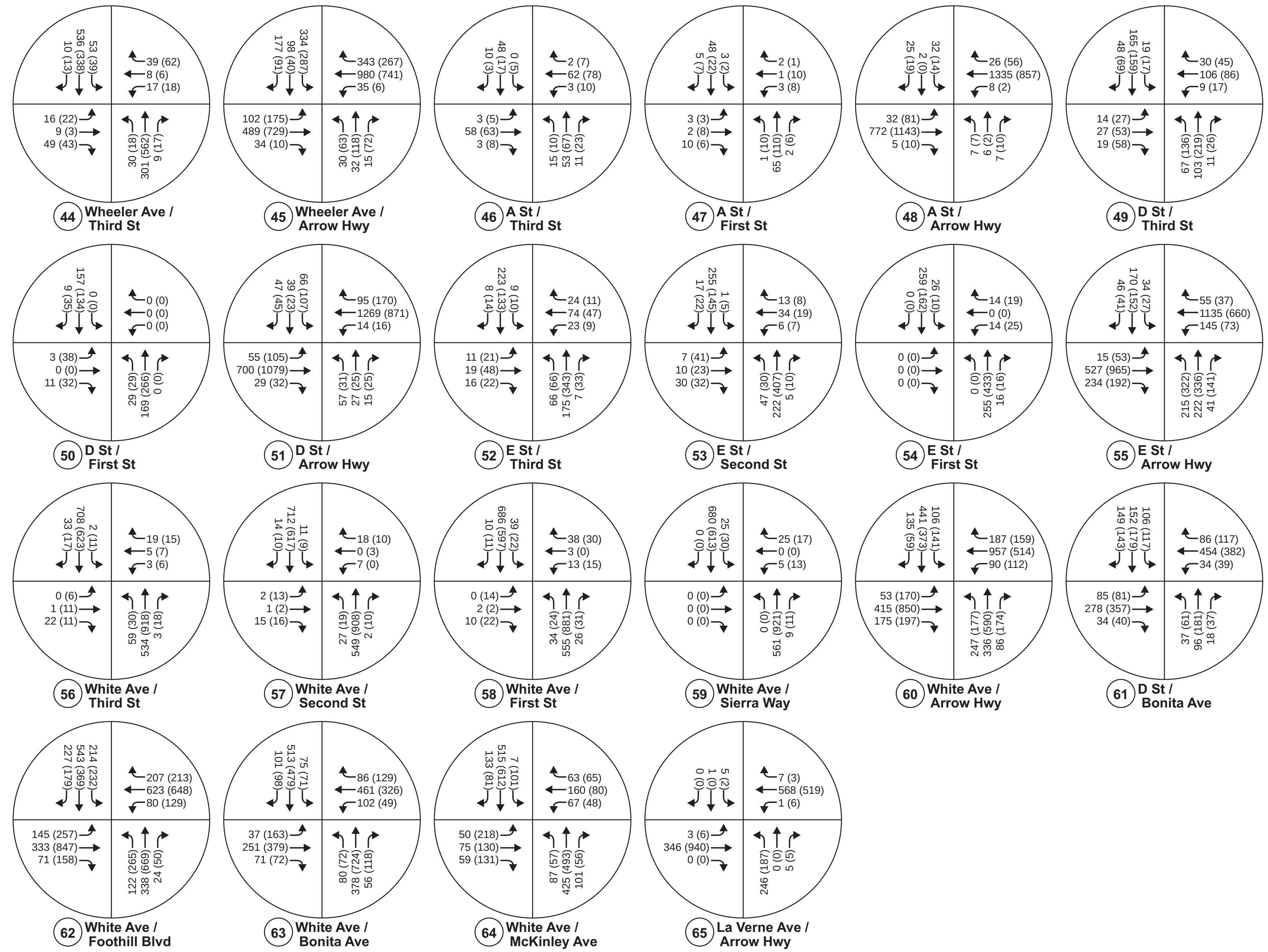


INTUEOR MAXIMIZING VALUE

Metro Gold Line Foothill Extension – Azusa To Montclair

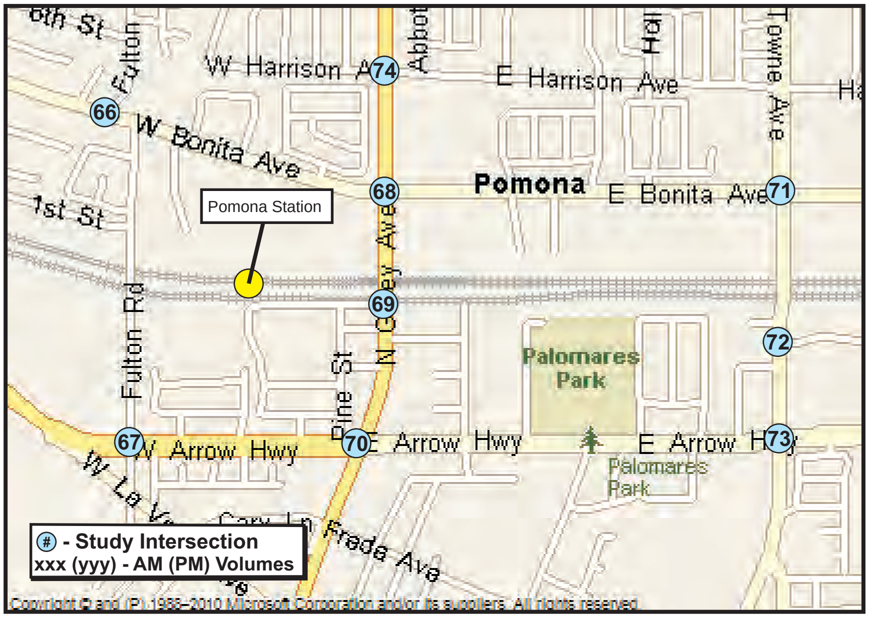
Figure 5-2: No Build (2035) AM/PM Peak Hour Traffic Volumes: San Dimas





Metro Gold Line Foothill Extension – Azusa To Montclair

Figure 5-3: No Build (2035) AM/PM Peak Hour Traffic Volumes: La Verne



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Abbot
Towne Ave
Pine St
Palomares Park
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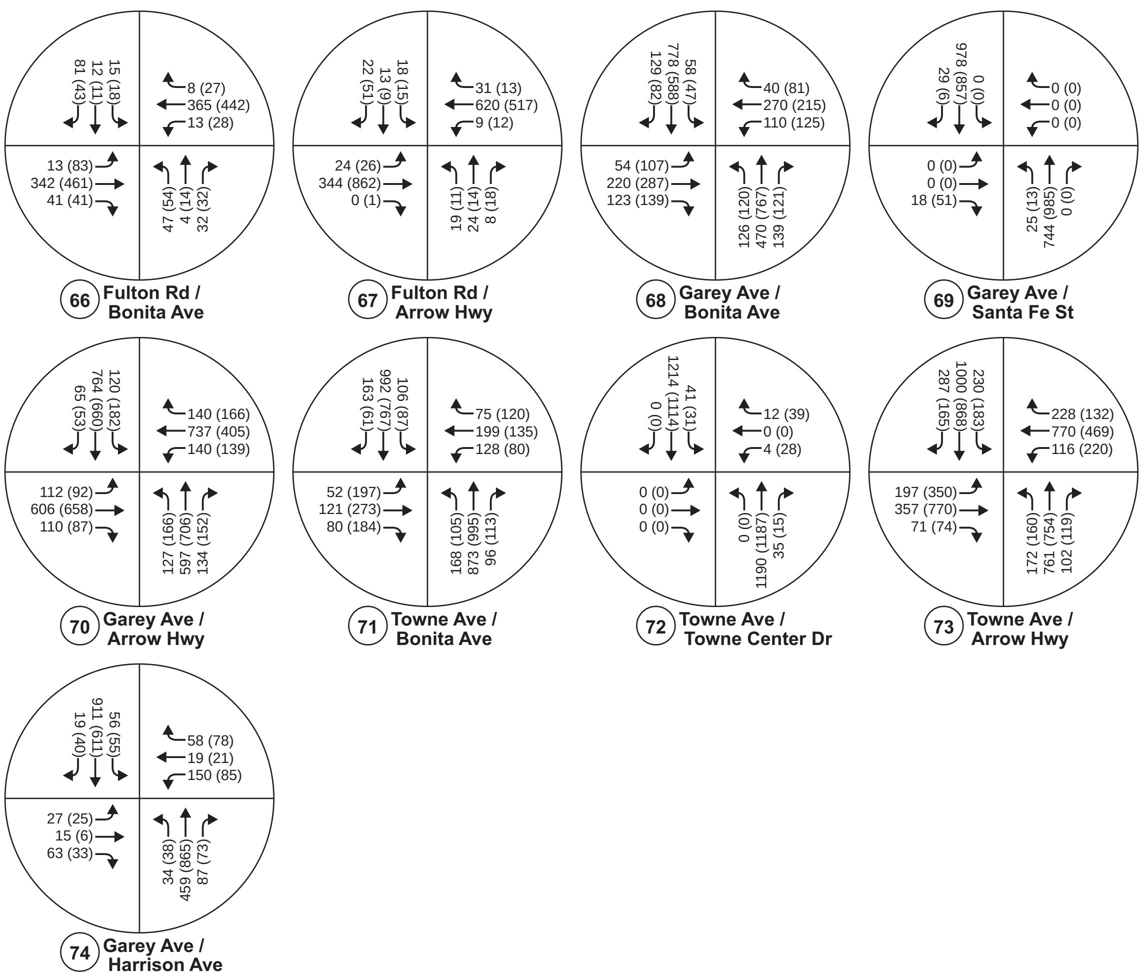

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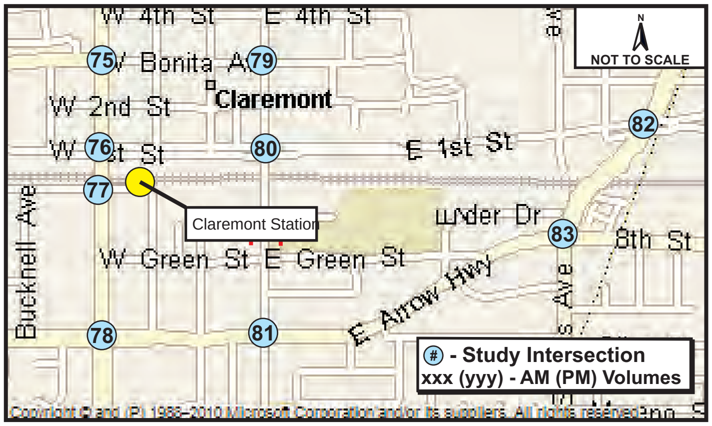

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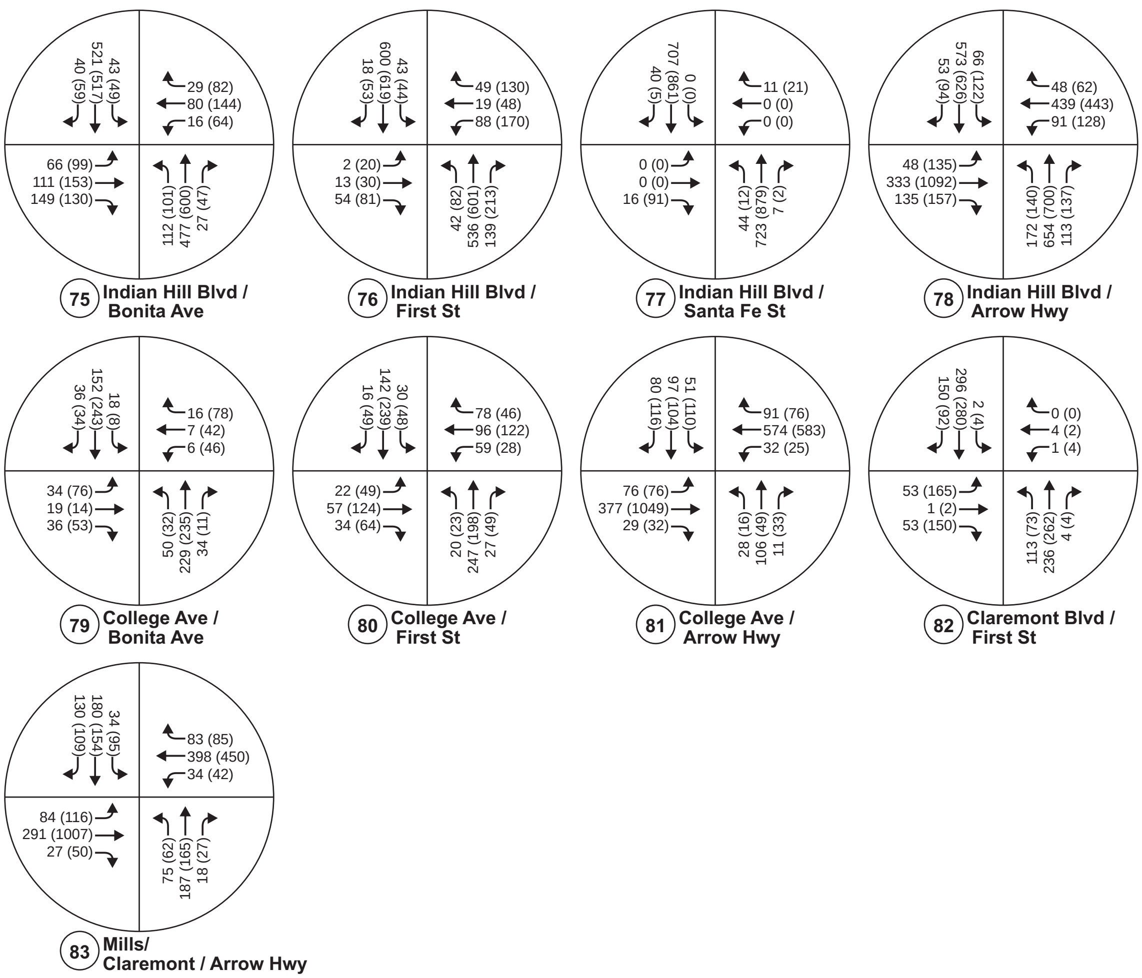

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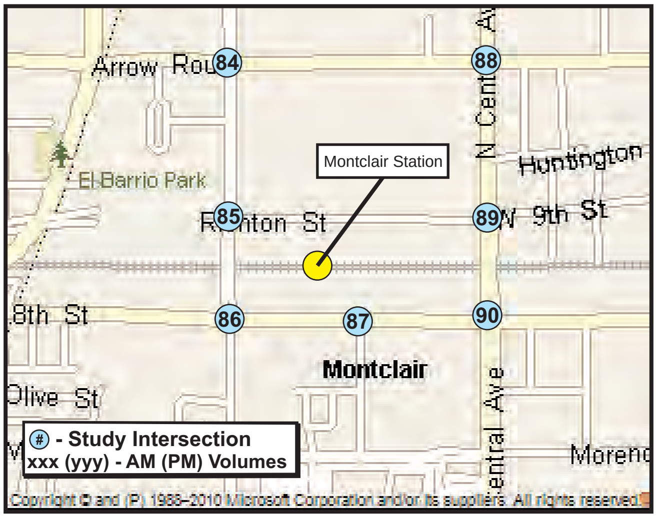
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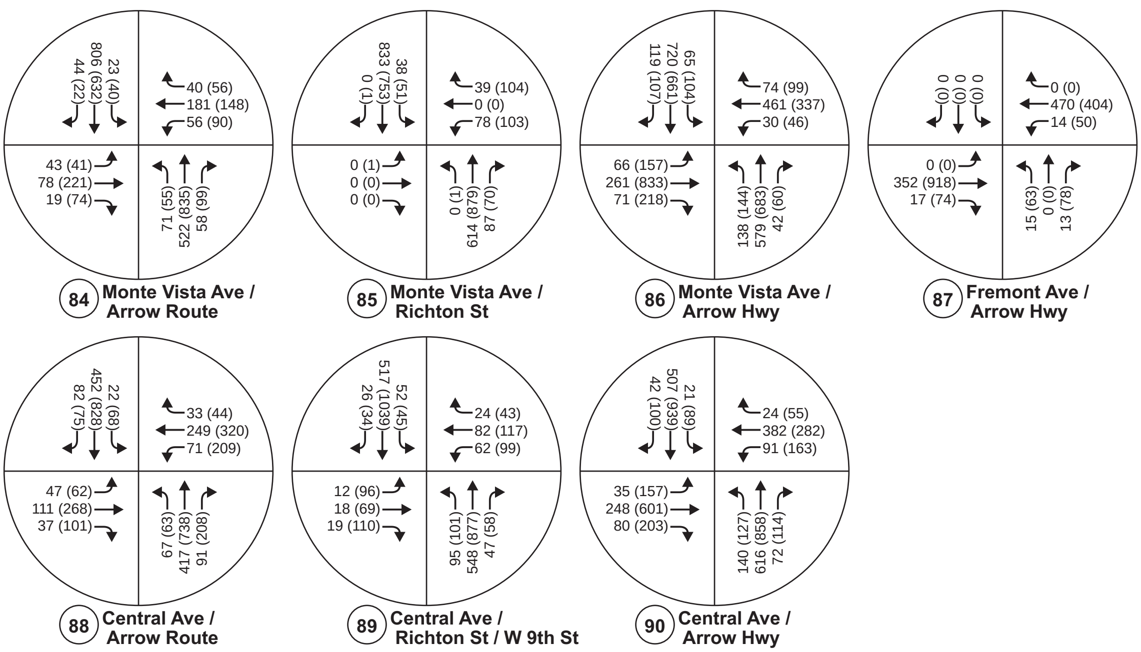
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24 (55)
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140 (127)
616 (858)
72 (114)
90 Central Ave / Arrow Hwy

The future No Build Alternative was analyzed, and the resulting traffic operating conditions and corresponding LOS are provided in **Table 5-5** and also included in **Appendix C**. As noted earlier, this analysis includes all highway and transit projects and operations within the region that SCAG and Metro expect to be in place by the year 2035. These transportation projects are accounted for in the travel demand forecasting model that was used to develop the growth factors.

Table 5-5: No Build Alternative – Intersection Level of Service (2035)[3]

#	Intersection	Jurisdiction	AM		PM	
			LOS	Delay[2]	LOS	Delay[2]
1	Barranca Avenue/Bennett Avenue	Glendora	C	21.1	B	12.4
			A[1]	7.3[1]	A[1]	1.8[1]
2	Barranca Avenue/Foothill Boulevard	Glendora	B	12.1	A	8.4
3	Grand Avenue/Foothill Boulevard	Glendora	C	29.5	C	34.3
4	Vermont Avenue E/Ada Avenue	Glendora	B	11.8	B	13.7
			A[1]	4.4[1]	A[1]	5.2[1]
5	Vermont Avenue/Route 66	Glendora	A	7.5	A	8.4
6	Vermont Avenue/Foothill Boulevard	Glendora	A	7.7	A	7.0
7	Vermont Avenue West/Ada Avenue	Glendora	B	11.1	B	12.0
			A[1]	2.6[1]	A[1]	2.2[1]
8	Glendora Avenue/Foothill Boulevard	Glendora	C	25.0	C	30.2
9	Glendora Avenue/Ada Avenue	Glendora	B	12.2	B	14.9
10	Glendora Avenue/Route 66	Glendora	C	24.4	C	29.5
11	Pasadena Avenue/Lemon Avenue	Glendora	A	7.9	A	7.8
12	Pasadena Avenue/Route 66	Glendora	B	11.8	B	10.7
13	Glenwood Avenue/Lemon Avenue	Glendora	A	9.9	B	11.2
			A[1]	2.3[1]	A[1]	2.6[1]
14	Glenwood Avenue/Route 66	Glendora	F	OFL	F	1097.3
			F[1]	502.5[1]	F[1]	51.6[1]
15	Elwood Avenue/Lemon Avenue	Glendora	B	10.7	B	10.9
			A[1]	2.2[1]	A[1]	2.1[1]
16	Elwood Avenue/Route 66	Glendora	B	15.4	B	16.2
17	Loraine Avenue/Lemon Avenue	Glendora	C	20.0	B	13.7
			A[1]	1.8[1]	A[1]	1.2[1]
18	Loraine Avenue/Route 66	Glendora	B	19.3	B	11.8
19	Lone Hill Avenue/Auto Centre Drive	Glendora	B	15.6	C	24.1
20	Barranca Avenue/Sierra Madre Avenue	Glendora	C	20.5	C	15.8
			A[1]	4.3[1]	A[1]	3.1[1]
21	Glendora Avenue/Sierra Madre Avenue	Glendora	E	47.0	B	14.5
22	Lone Hill Avenue/Glendora Marketplace	Glendora	B	15.4	C	23.1
23	Lone Hill Avenue/Gladstone Street	San Dimas	B	18.8	C	25.5
24	SR-57 (southbound)/Arrow Highway	San Dimas	A	7.5	C	20.2
25	SR-57 (northbound)/Arrow Highway & Bonita Avenue	San Dimas	C	26.2	C	29.2
26	Eucla Avenue/Fifth Street	San Dimas	A	7.4	A	7.4

Table 5-5: No Build Alternative – Intersection Level of Service (2035)[3]

#	Intersection	Jurisdiction	AM		PM	
			LOS	Delay[2]	LOS	Delay[2]
27	Eucla Avenue/Second Street	San Dimas	A	9.7	B	10.5
			A[1]	0.7[1]	A[1]	1.0[1]
28	Eucla Avenue/Bonita Avenue	San Dimas	A	4.7	A	8.1
29	Eucla Avenue/Arrow Highway	San Dimas	A	8.4	B	11.8
30	Acacia Street/Fifth Street	San Dimas	A	9.2	A	9.3
			A[1]	1.4[1]	A[1]	1.0[1]
31	Acacia Street/Second Street	San Dimas	A	9.1	A	9.2
			A[1]	7.4[1]	A[1]	6.4[1]
32	Acacia Street/Bonita Avenue	San Dimas	B	11.1	C	24.4
			A[1]	0.7[1]	A[1]	1.4[1]
33	Cataract Avenue/Second Street	San Dimas	A	9.9	B	10.0
			A[1]	8.4[1]	A[1]	8.0[1]
34	Cataract Avenue/Bonita Avenue	San Dimas	B	12.5	C	25.0
35	Monte Vista Avenue/Second Street	San Dimas	A	9.3	A	9.9
			A[1]	4.8[1]	A[1]	3.7[1]
36	Monte Vista Avenue/Bonita Avenue	San Dimas	C	20.2	F	119.5
			A[1]	1.2[1]	A[1]	9.2[1]
37	San Dimas Avenue/Second Street	San Dimas	C	21.2	E	36.2
			A[1]	1.0[1]	A[1]	2.3[1]
38	San Dimas Avenue/Bonita Avenue	San Dimas	B	12.2	B	19.6
39	San Dimas Avenue/Arrow Highway	San Dimas	C	28.9	D	48.9
40	Walnut Avenue/Bonita Avenue	San Dimas	A	6.7	B	13.9
41	Walnut Avenue/Arrow Highway	San Dimas	B	12.0	B	11.8
42	San Dimas Canyon Road/Bonita Avenue	San Dimas	A	7.3	A	9.0
43	San Dimas Canyon Road/Arrow Highway	San Dimas	B	13.8	B	12.1
44	Wheeler Avenue/Third Street	La Verne	C	16.5	C	15.6
			A[1]	2.9[1]	A[1]	2.6[1]
45	Wheeler Avenue/Arrow Highway	La Verne	B	14.8	B	12.9
46	A Street/Third Street	La Verne	B	10.3	B	10.6
			A[1]	5.4[1]	A[1]	4.9[1]
47	A Street/First Street	La Verne	A	9.3	A	10.0
			A[1]	1.5[1]	A[1]	2.3[1]
48	A Street/Arrow Highway	La Verne	F	198.6	F	62.6
			A[1]	6.1[1]	A[1]	1.6[1]
49	D Street/Third Street	La Verne	A	9.6	B	13.5
50	D Street/First Street	La Verne	A	9.7	B	11.5
			A[1]	1.0[1]	A[1]	2.0[1]
51	D Street/Arrow Highway	La Verne	A	5.9	A	6.2
52	E Street/Third Street	La Verne	A	9.9	B	12.9
53	E Street/Second Street	La Verne	B	14.3	B	14.8

Table 5-5: No Build Alternative – Intersection Level of Service (2035)[3]

#	Intersection	Jurisdiction	AM		PM	
			LOS	Delay[2]	LOS	Delay[2]
			A[1]	2.8[1]	A[1]	3.1[1]
54	E Street/First Street	La Verne	B	11.4	B	12.6
			A[1]	0.9[1]	A[1]	1.0[1]
55	E Street/Arrow Highway	La Verne	C	22.5	C	27.6
56	White Avenue/Third Street	La Verne	D	26.5	F	78.9
			A[1]	1.8[1]	A[1]	3.2[1]
57	White Avenue/Second Street	La Verne	C	24.8	F	56.4
			A[1]	1.3[1]	A[1]	1.8[1]
58	White Avenue/First Street	La Verne	D	28.4	E	49.5
			A[1]	2.1[1]	A[1]	2.8[1]
59	White Avenue/Sierra Way	La Verne	B	11.2	C	18.0
			A[1]	0.4[1]	A[1]	0.5[1]
60	White Avenue/Arrow Highway	La Verne	C	26.3	C	30.6
61	D Street/Bonita Avenue	La Verne	A	8.1	B	10.2
62	White Avenue/Foothill Boulevard	La Verne	C	29.6	D	39.9
63	White Avenue/Bonita Avenue	La Verne	B	14.0	B	17.3
64	White Avenue/McKinley Avenue	La Verne	B	11.0	B	14.1
65	La Verne Avenue/Arrow Highway	La Verne	F	50.6	F	471.1
			B[1]	10.9[1]	F[1]	54.3[1]
66	Fulton Road/Bonita Avenue	Pomona	C	22.1	F	58.1
			A[1]	3.6[1]	A[1]	6.8[1]
67	Fulton Road/Arrow Highway	Pomona	C	22.4	D	33.9
			A[1]	2.2[1]	A[1]	2.1[1]
68	Garey Avenue/Bonita Avenue	Pomona	B	16.0	B	15.8
69	Garey Avenue/Santa Fe Street	Pomona	B	10.8	B	12.4
			A[1]	0.3[1]	A[1]	0.4[1]
70	Garey Avenue/Arrow Highway	Pomona	C	28.3	C	30.9
71	Towne Avenue/Bonita Avenue	Pomona	A	9.9	B	11.2
72	Towne Avenue/Towne Center Drive	Pomona	D	27.1	F	50.9
			A[1]	0.4[1]	A[1]	1.6[1]
73	Towne Avenue/Arrow Highway	Pomona	D	44.5	D	45.1
74	Garey Avenue/Harrison Avenue	Pomona	A	7.5	A	6.0
75	Indian Hill Boulevard/Bonita Avenue	Claremont	A	8.1	A	9.1
76	Indian Hill Boulevard/First Street	Claremont	B	10.9	B	15.5
77	Indian Hill Boulevard/Santa Fe Street	Claremont	B	11.2	B	13.2
			A[1]	0.5[1]	A[1]	0.8[1]
78	Indian Hill Boulevard/Arrow Highway	Claremont	C	21.2	D	37.3
79	College Avenue/Bonita Avenue	Claremont	A	9.9	B	12.5
80	College Avenue/First Street	Claremont	B	10.8	B	12.6
81	College Avenue/Arrow Highway	Claremont	A	6.3	A	7.3
82	Claremont Boulevard/First Street	Claremont	A	3.3	A	5.9

Table 5-5: No Build Alternative – Intersection Level of Service (2035)[3]						
#	Intersection	Jurisdiction	AM		PM	
			LOS	Delay[2]	LOS	Delay[2]
83	Mills/Claremont/Arrow Highway	Claremont	B	14.9	B	19.8
84	Monte Vista Avenue/Arrow Route	Montclair	B	13.1	B	14.6
85	Monte Vista Avenue/Richton Street	Montclair	A	3.3	A	6.3
86	Monte Vista Avenue/Arrow Highway	Montclair	B	18.7	C	31.0
87	Fremont Avenue/Arrow Highway	Montclair	A	1.8	A	4.1
88	Central Avenue/Arrow Route	Montclair	B	12.1	C	20.5
89	Central Avenue/Richton Street/W 9th Street	Montclair	A	8.4	B	10.4
90	Central Avenue/Arrow Highway	Montclair	B	15.9	C	29.6

[1] Overall intersection LOS and delay at unsignalized intersections is reported to support the air quality analysis
[2] Average vehicle delay in seconds
[3] Shading shows intersections that, in 2035, would operate at LOS E or F under the No Build Alternative

Under the No Build Alternative, four intersections would operate at LOS E or F in the AM peak hour, and ten intersections would operate at LOS E or F in the PM peak hour (shaded cells). The others would continue to operate at LOS D or better. All the highlighted intersections would be unsignalized two-way stop-controlled intersections. Vehicles approaching these intersections from the minor streets would not find adequate gaps to perform their maneuvers in a timely manner. Two LOS and delay numbers are shown at the unsignalized intersection locations to report the LOS information required for both traffic operations and air quality evaluation. The top line shows the LOS and corresponding delay for the worst-case stop-controlled approach, which is required to determine traffic operating conditions. The bottom line shows the intersection LOS and corresponding delay, information that is required to support the air quality analysis.

Roadway Segment Traffic Operations

The same growth factors were also applied to each of the 35 study roadway segments. **Table 5-6** presents the results of the analysis. All roadway segments would operate at LOS D or better, except North Towne Avenue between Arrow Highway and Bonita Avenue, which would operate at LOS E.

Table 5-6: No Build Alternative – Roadway Segment Average Daily Traffic Analysis (2035)

Roadway Segment	From	To	Capacity[1,2,3,4] (Vehicles/Day)	Volume (Vehicles/Day)	V/C	LOS
Glendora						
South Lone Hill Avenue	West Gladstone Street	Auto Centre Drive	32,000	28,179	0.88	D
South Loraine Avenue	Route 66	East Lemon Avenue	16,000	10,733	0.67	B
South Elwood Avenue	Route 66	East Lemon Avenue	12,000	2,753	0.23	A
South Glenwood Avenue	Route 66	East Lemon Avenue	12,000	2,842	0.24	A
South Pasadena Avenue	Route 66	East Lemon Avenue	12,000	2,690	0.22	A
South Glendora Avenue	Route 66	Foothill Boulevard	32,000	18,620	0.58	A
South Vermont Avenue	Route 66	West Foothill Boulevard	12,000	4,332	0.36	A
Grand Avenue	Route 66	West Leadora Avenue	32,000	14,439	0.45	A
Foothill Boulevard	Barranca Avenue	Glendora Avenue	16,000	12,323	0.77	C
North Barranca Avenue	West Foothill Boulevard	West Leadora Avenue	12,000	8,436	0.70	C
San Dimas						
San Dimas Canyon Rd	Arrow Highway	Bonita Avenue	32,000	9,328	0.29	A
Walnut Avenue	East Arrow Highway	East Bonita Avenue	16,000	7,535	0.47	A
San Dimas Avenue	Arrow Highway	Bonita Avenue	32,000	12,339	0.39	A
Monte Vista Avenue	Commercial Street	Bonita Avenue	12,000	546	0.05	A
Cataract Avenue	Arrow Highway	First Street	12,000	3,084	0.26	A
Bonita Avenue	Eucla Avenue	San Dimas Avenue	32,000	15,893	0.50	A
Eucla Avenue	Bonita Avenue	Third Street	12,000	3,813	0.32	A
West Gladstone Street	Lone Hill Avenue	Amelia Avenue	32,000	15,846	0.50	A
La Verne						
White Avenue	Arrow Highway	Third Street	32,000	18,821	0.59	A
E Street	Arrow Highway	Third Street	16,000	6,931	0.43	A
D Street	Arrow Highway	Third Street	12,000	5,709	0.48	A
A Street	Arrow Highway	Third Street	12,000	1,342	0.11	A
Wheeler Avenue	Arrow Highway	Third Street	32,000	10,364	0.32	A

Table 5-6: No Build Alternative – Roadway Segment Average Daily Traffic Analysis (2035)

Roadway Segment	From	To	Capacity[1,2,3,4] (Vehicles/Day)	Volume (Vehicles/Day)	V/C	LOS
Pomona						
North Towne Avenue	Arrow Highway	Bonita Avenue	32,000	29,725	0.93	E
North Garey Avenue	Arrow Highway	Bonita Avenue	32,000	24,579	0.77	C
Fulton Road	Metrolink Driveway	—	16,000	1,580	0.10	A
Fulton Road	Arrow Highway	Bonita Avenue	16,000	1,921	0.12	A
Claremont						
South Mills Avenue/Claremont Boulevard	Arrow Highway	East First Street	32,000	8,865	0.28	A
Indian Hill Boulevard	Arrow Highway	Bonita Avenue	32,000	22,100	0.69	B
College Avenue	East Arrow Highway	West Bonita Avenue	12,000	5,930	0.49	A
College Avenue	Green Street	—	12,000	6,497	0.54	A
Cambridge Avenue	West Arrow Highway	Bonita Avenue	12,000	5,359	0.45	A
First Street	Indian Hill Boulevard	College Avenue	24,000	8,615	0.36	A
Montclair						
Monte Vista Avenue	Richton Street	Arrow Highway	32,000	22,228	0.69	B
Central Avenue	Richton Street	Arrow Highway	32,000	27,239	0.85	D

[1] Capacity of 32,000 assumes 800 vehicles per hour per lane multiplied by number of lanes, divided by a k-factor of 0.1.
[2] Capacity of 24,000 assumes 600 vehicles per hour per lane multiplied by number of lanes, divided by a k-factor of 0.1.
[3] Capacity of 16,000 assumes 800 vehicles per hour per lane multiplied by number of lanes, divided by a k-factor of 0.1.
[4] Capacity of 12,000 assumes 600 vehicles per hour per lane multiplied by number of lanes, divided by a k-factor of 0.1.

5.2.2 TSM Alternative

Intersection Traffic Conditions

The TSM Alternative would add a new rapid bus line from the existing Azusa/Citrus Station (western terminus of the Gold Line Foothill Extension—Pasadena to Azusa) to the existing Metrolink Station in Montclair. These buses would operate at 10-minute headways in each direction during the weekday AM and PM peak hours, and every 20 minutes in each direction during the weekday off-peak hours.

Adjustments to traffic flow patterns caused by the rapid bus line were determined by using projections from the transportation model developed for this study. The year 2035 No Build Alternative and the TSM Alternative peak period model data were compared to determine the effects of the proposed alternative on traffic flow and circulation patterns. The peak period link data from the No Build and TSM travel demand model outputs were used in this analysis. **Table 5-7** presents the percentage change comparison between 2035 TSM Alternative traffic forecasts and the 2035 No Build traffic forecasts. The table shows the percentage change in traffic volume caused by change in circulation patterns.

Table 5-7: TSM Alternative – Average AM and PM Percentage Change in Traffic Volumes (2035)

Glendora	-0.241%
San Dimas	-0.389%
La Verne	-0.212%
Pomona	-0.380%
Claremont	-0.483%
Montclair	-0.258%

The overall shifts in traffic were applied to the 2035 No Build PM peak hour turning movement volumes to develop the future AM and PM peak hour projections for the TSM Alternative at each of the 90 study intersections. In addition, the number of buses operating during the peak hour was added to peak hour turning movements of the affected intersections to yield a set of 2035 forecasts. Intersection lane configurations are assumed to be the same as with the No Build Alternative. **Figures 5-7 to 5-12** show the TSM peak hour traffic volumes during the AM/PM peak hours.Intersection lane configurations for this alternative are assumed to be the same as the No Build Alternative.

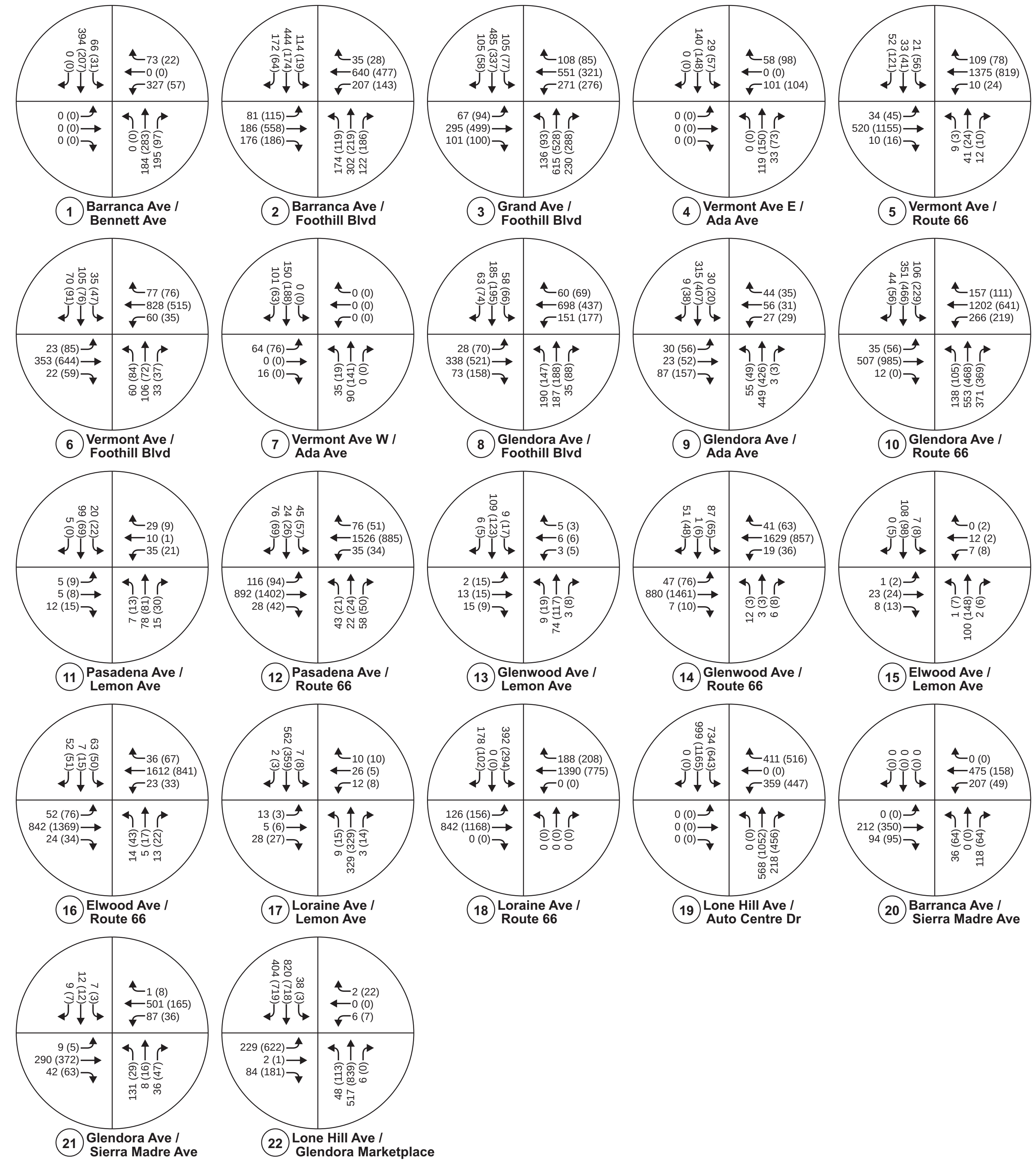
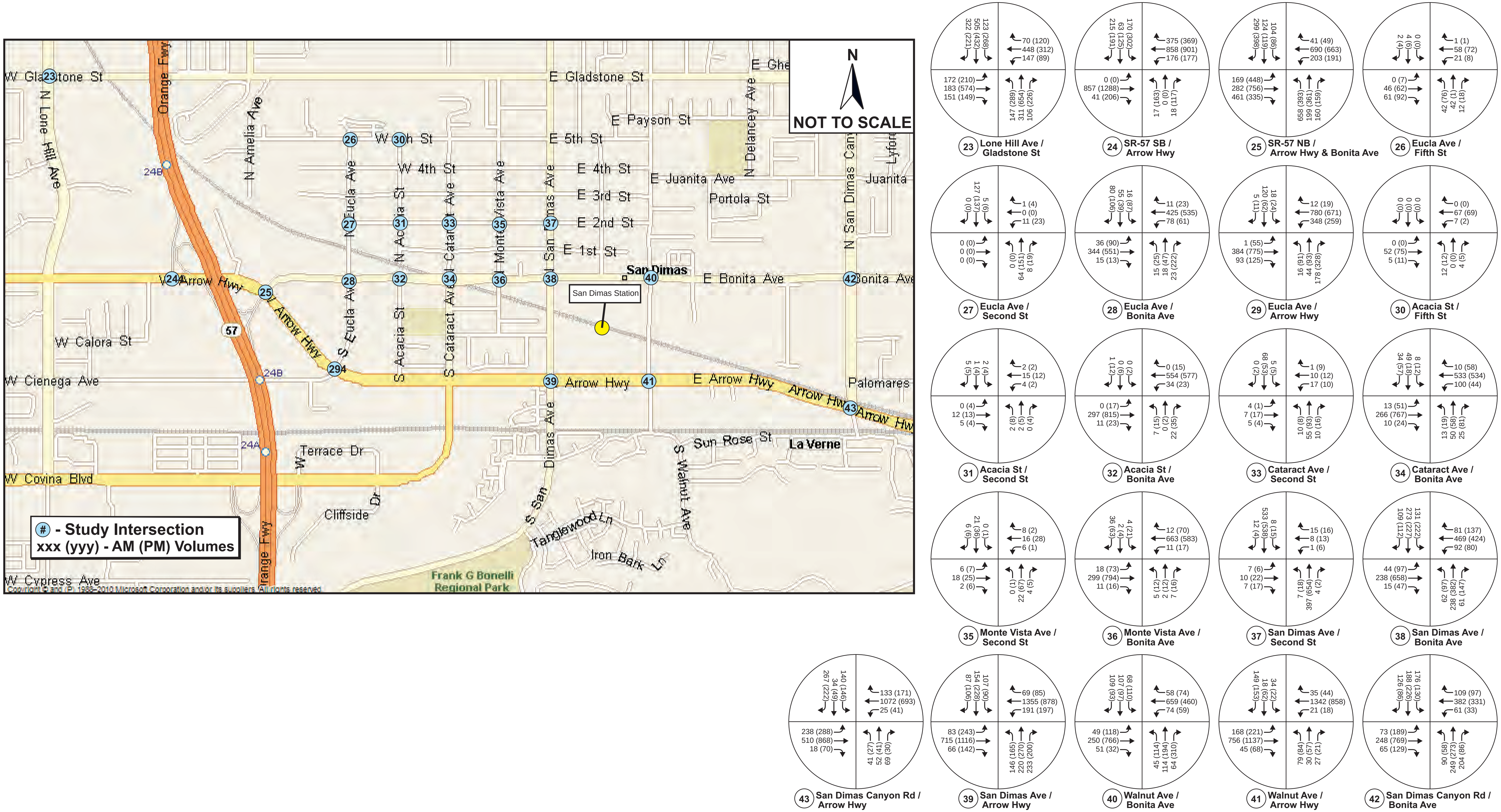


Figure 5-7: TSM (2035) AM/PM Peak Hour Traffic Volumes: Glendora



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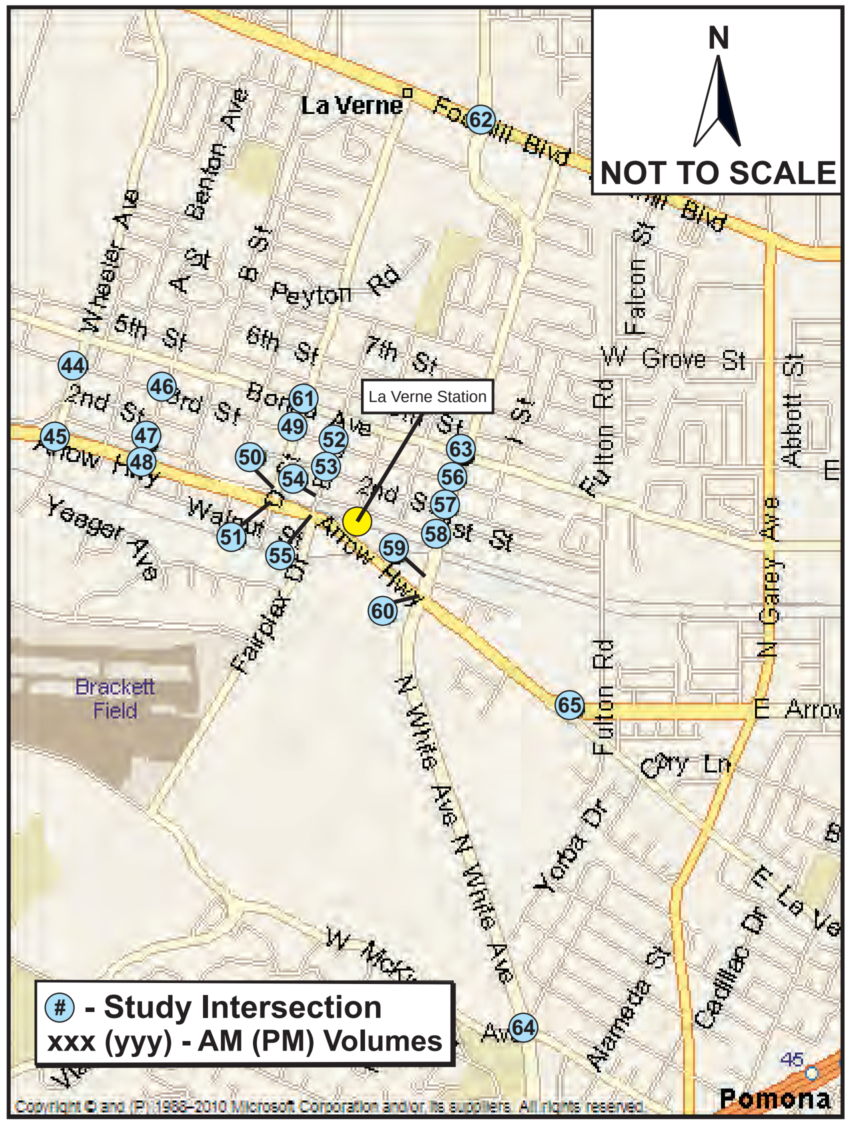
Metro Gold Line Foothill Extension – Azusa To Montclair

Figure 5-8: TSM (2035) AM/PM Peak Hour Traffic Volumes: San Dimas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Fairplex Dr
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W Grove St
Falcon St
Fulton Rd
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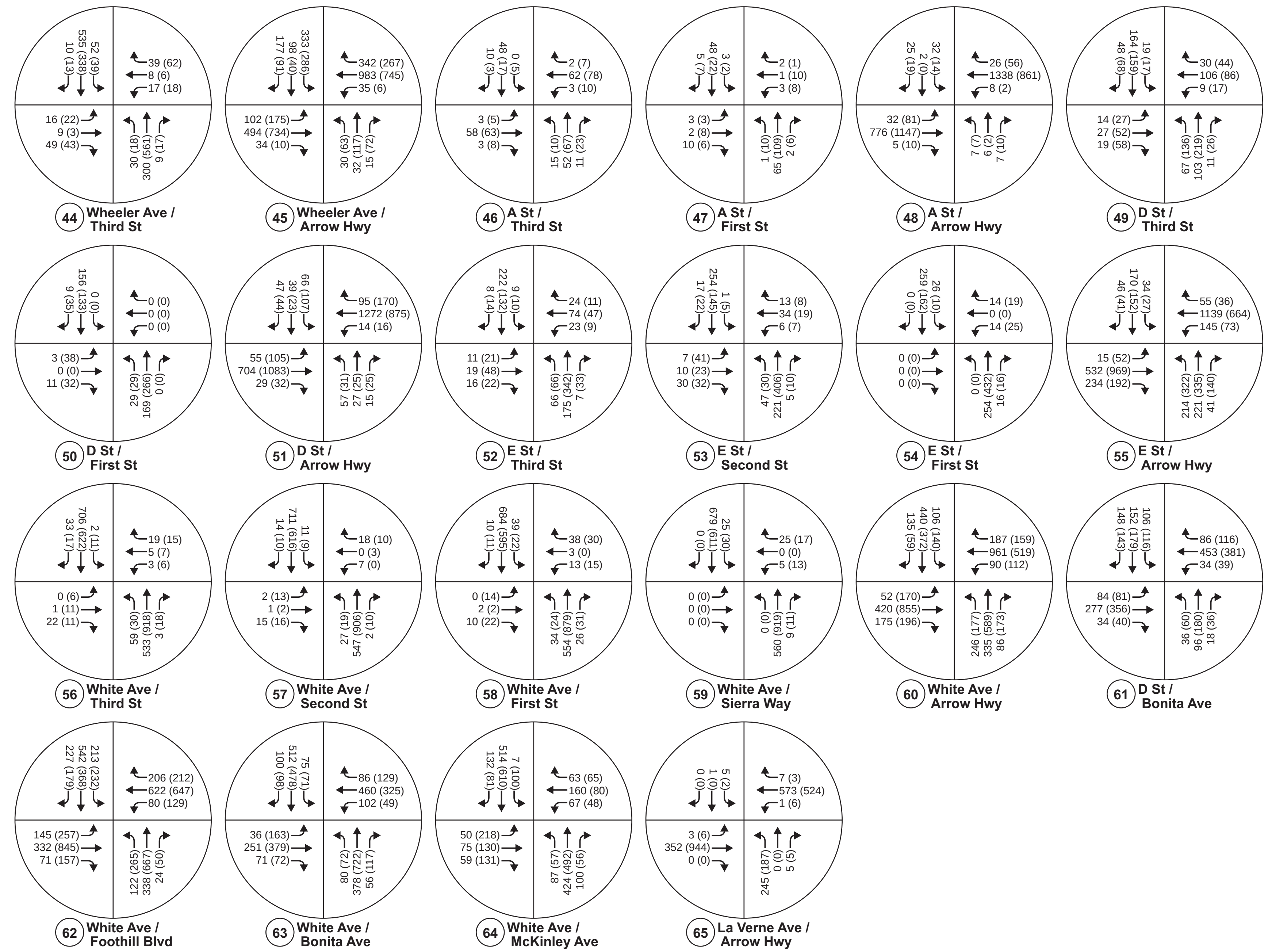
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52 E St / Third St
53 E St / Second St
54 E St / First St
55 E St / Arrow Hwy
56 White Ave / Third St
57 White Ave / Second St
58 White Ave / First St
59 White Ave / Sierra Way
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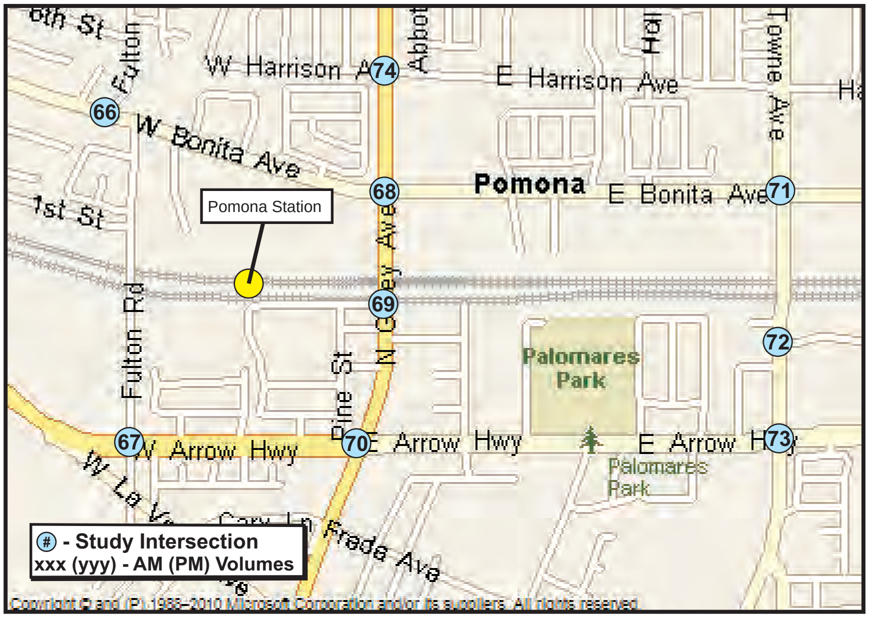
65 La Verne Ave / Arrow Hwy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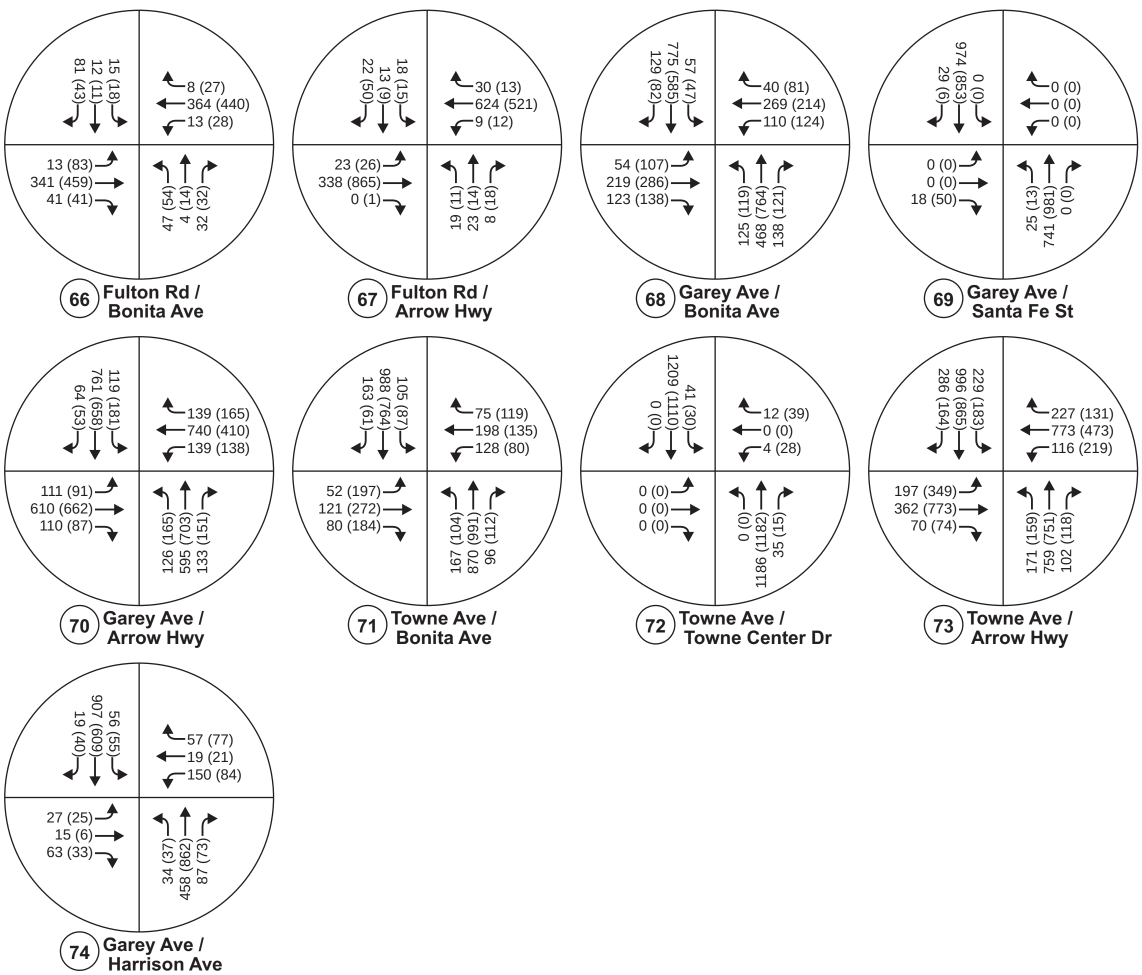
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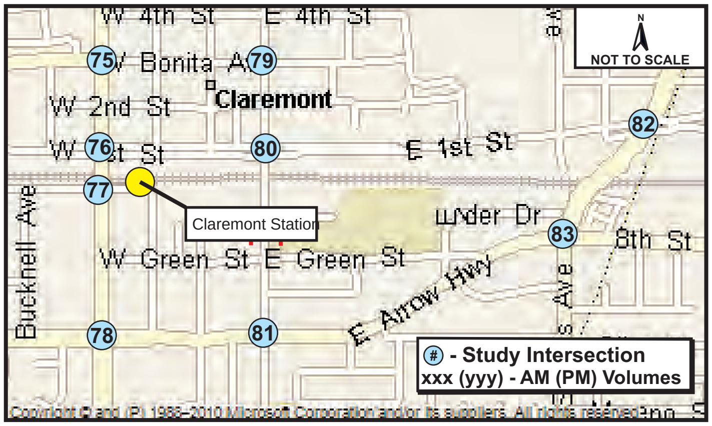

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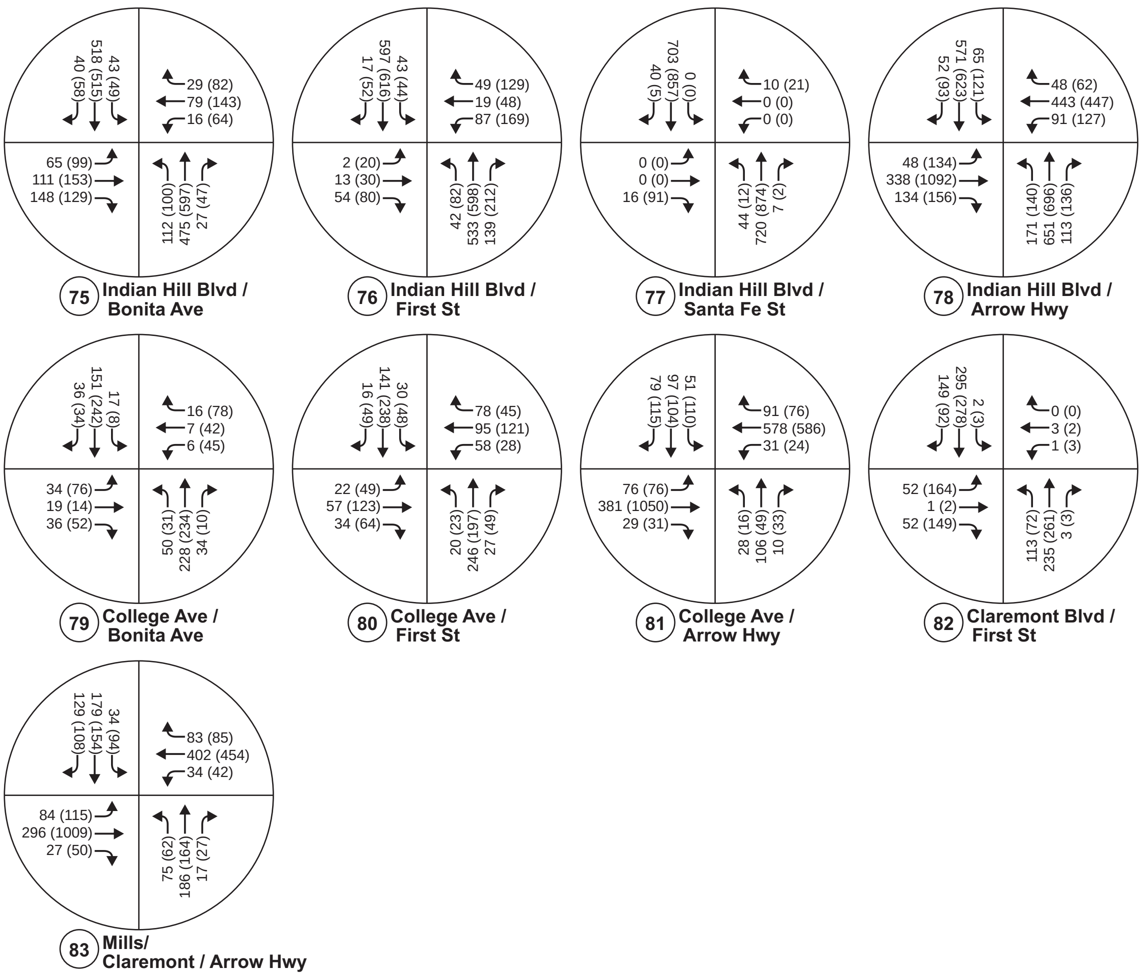

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27 (47)
75 Indian Hill Blvd / Bonita Ave
43 (44)
597 (616)
17 (52)
49 (129)
19 (48)
87 (169)
2 (20)
13 (30)
54 (80)
42 (82)
533 (598)
139 (212)
76 Indian Hill Blvd / First St
0 (0)
703 (857)
40 (5)
10 (21)
0 (0)
0 (0)
0 (0)
0 (0)
16 (91)
44 (12)
720 (874)
7 (2)
77 Indian Hill Blvd / Santa Fe St
65 (121)
571 (623)
52 (93)
48 (62)
443 (447)
91 (127)
48 (134)
338 (1092)
134 (156)
171 (140)
651 (696)
113 (136)
78 Indian Hill Blvd / Arrow Hwy
17 (8)
151 (242)
36 (34)
16 (78)
7 (42)
6 (45)
34 (76)
19 (14)
36 (52)
50 (31)
228 (234)
34 (10)
79 College Ave / Bonita Ave
30 (48)
141 (238)
16 (49)
78 (45)
95 (121)
58 (28)
22 (49)
57 (123)
34 (64)
20 (23)
246 (197)
27 (49)
80 College Ave / First St
51 (110)
97 (104)
79 (115)
91 (76)
578 (586)
31 (24)
76 (76)
381 (1050)
29 (31)
28 (16)
106 (49)
10 (33)
81 College Ave / Arrow Hwy
2 (3)
295 (278)
149 (92)
0 (0)
3 (2)
1 (3)
52 (164)
1 (2)
52 (149)
113 (72)
235 (261)
3 (3)
82 Claremont Blvd / First St
34 (94)
179 (154)
129 (108)
83 (85)
402 (454)
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186 (164)
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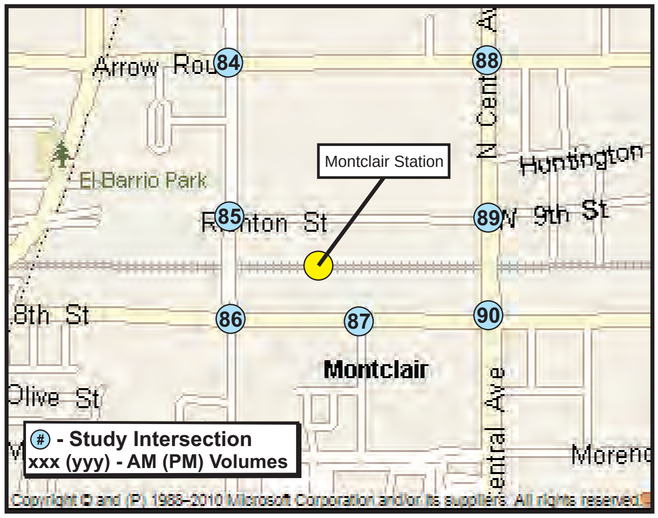
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Richton St
Montclair Station
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85
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- Study Intersection
xxx (yyy) - AM (PM) Volumes
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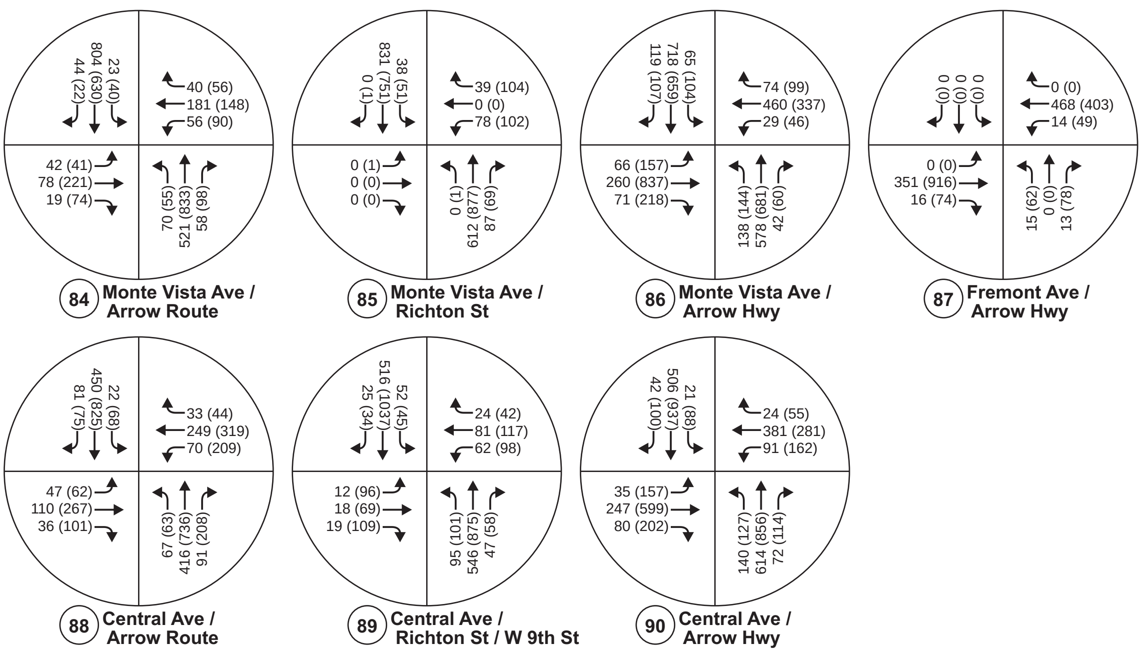
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40 (56)
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42 (41)
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521 (833)
58 (98)
84 Monte Vista Ave / Arrow Route
38 (51)
831 (751)
0 (1)
39 (104)
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78 (102)
0 (1)
0 (0)
0 (0)
0 (1)
612 (877)
87 (69)
85 Monte Vista Ave / Richton St
65 (104)
718 (659)
119 (107)
74 (99)
460 (337)
29 (46)
66 (157)
260 (837)
71 (218)
138 (144)
578 (681)
42 (60)
86 Monte Vista Ave / Arrow Hwy
0 (0)
0 (0)
0 (0)
0 (0)
468 (403)
14 (49)
0 (0)
351 (916)
16 (74)
15 (62)
0 (0)
13 (78)
87 Fremont Ave / Arrow Hwy
22 (68)
450 (825)
81 (75)
33 (44)
249 (319)
70 (209)
47 (62)
110 (267)
36 (101)
67 (63)
416 (736)
91 (208)
88 Central Ave / Arrow Route
52 (45)
516 (1037)
25 (34)
24 (42)
81 (117)
62 (98)
12 (96)
18 (69)
19 (109)
95 (101)
546 (875)
47 (58)
89 Central Ave / Richton St / W 9th St
21 (88)
506 (937)
42 (100)
24 (55)
381 (281)
91 (162)
35 (157)
247 (599)
80 (202)
140 (127)
614 (856)
72 (114)
90 Central Ave / Arrow Hwy

Future traffic operations were evaluated by incorporating the volumes, roadway geometrics, type of control and signal phasing, using the Synchro software. The results of the traffic analysis for the TSM Alternative and corresponding AM and PM peak hour LOS presented in **Table 5-8** and are also included in **Appendix D**, are similar to the No Build Alternative. A review of the results indicates that, under the TSM Alternative, 86 intersections would continue to operate at LOS D or better in the AM peak hour and 80 intersections would continue to operate at LOS D or better in the PM peak hour.

Table 5-8: TSM Alternative – Intersection Level of Service (2035)[3]

#	Intersection	Jurisdiction	AM		PM	
			LOS	Delay[2]	LOS	Delay[2]
1	Barranca Avenue/Bennett Avenue	Glendora	C	21.0	B	12.4
			A[1]	7.3[1]	A[1]	1.8[1]
2	Barranca Avenue/Foothill Boulevard	Glendora	B	12.0	A	8.4
3	Grand Avenue/Foothill Boulevard	Glendora	C	29.5	C	34.3
4	Vermont Avenue East/Ada Avenue	Glendora	B	11.8	B	13.7
			A[1]	4.4[1]	A[1]	5.2[1]
5	Vermont Avenue/Route 66	Glendora	A	7.5	A	8.4
6	Vermont Avenue/Foothill Boulevard	Glendora	A	7.7	A	7.0
7	Vermont Avenue West/Ada Avenue	Glendora	B	11.1	B	12.0
			A[1]	2.6[1]	A[1]	2.2[1]
8	Glendora Avenue/Foothill Boulevard	Glendora	C	24.9	C	30.0
9	Glendora Avenue/Ada Avenue	Glendora	B	12.2	B	14.9
10	Glendora Avenue/Route 66	Glendora	C	24.6	C	29.5
11	Pasadena Avenue/Lemon Avenue	Glendora	A	7.9	A	7.8
12	Pasadena Avenue/Route 66	Glendora	B	11.8	B	10.7
13	Glenwood Avenue/Lemon Avenue	Glendora	A	9.9	B	11.2
			A[1]	2.3[1]	A[1]	2.6[1]
14	Glenwood Avenue/Route 66	Glendora	F	OFL	F	OFL
			F[1]	501.5[1]	F[1]	453.4[1]
15	Elwood Avenue/Lemon Avenue	Glendora	B	10.7	B	10.9
			A[1]	2.2[1]	A[1]	2.1[1]
16	Elwood Avenue/Route 66	Glendora	B	15.4	B	16.3
17	Loraine Avenue/Lemon Avenue	Glendora	C	20.0	B	13.7
			A[1]	1.8[1]	A[1]	1.2[1]
18	Loraine Avenue/Route 66	Glendora	B	19.3	B	11.8
19	Lone Hill Avenue/Auto Centre Drive	Glendora	B	15.6	C	24.1
20	Barranca Avenue/Sierra Madre Avenue	Glendora	C	20.4	C	15.8
			A[1]	4.3[1]	A[1]	3.1[1]
21	Glendora Avenue/Sierra Madre Avenue	Glendora	E	46.3	B	14.5
22	Lone Hill Avenue/Glendora Marketplace	Glendora	B	15.4	C	23.2
23	Lone Hill Avenue/Gladstone Street	San Dimas	B	18.8	C	25.4
24	SR-57 (southbound)/Arrow Highway	San Dimas	A	7.5	B	20.0

Table 5-8: TSM Alternative – Intersection Level of Service (2035)[3]						
			AM		PM	
#	**Intersection**	**Jurisdiction**	LOS	Delay[2]	LOS	Delay[2]
25	SR-57 (northbound)/Arrow Highway & Bonita Avenue	San Dimas	C	26.3	C	29.3
26	Eucla Avenue/Fifth Street	San Dimas	A	7.4	A	7.4
27	Eucla Avenue/Second Street	San Dimas	A	9.7	B	10.4
			A[1]	0.7[1]	A[1]	1.0[1]
28	Eucla Avenue/Bonita Avenue	San Dimas	A	4.7	A	8.1
29	Eucla Avenue/Arrow Highway	San Dimas	A	8.4	B	11.8
30	Acacia Street/Fifth Street	San Dimas	A	9.2	A	9.3
			A[1]	1.4[1]	A[1]	1.0[1]
31	Acacia Street/Second Street	San Dimas	A	9.1	A	9.2
			A[1]	7.4[1]	A[1]	6.4[1]
32	Acacia Street/Bonita Avenue	San Dimas	B	11.1	C	24.6
			A[1]	0.7[1]	A[1]	1.4[1]
33	Cataract Avenue/Second Street	San Dimas	A	9.9	B	10.0
			A[1]	8.4[1]	A[1]	8.0[1]
34	Cataract Avenue/Bonita Avenue	San Dimas	B	12.5	D	25.1
35	Monte Vista Avenue/Second Street	San Dimas	A	9.3	A	9.8
			A[1]	4.7[1]	A[1]	3.7[1]
36	Monte Vista Avenue/Bonita Avenue	San Dimas	C	20.5	F	123.7
			A[1]	1.2[1]	A[1]	9.5[1]
37	San Dimas Avenue/Second Street	San Dimas	C	21.0	E	35.8
			A[1]	1.0[1]	A[1]	2.3[1]
38	San Dimas Avenue/Bonita Avenue	San Dimas	B	12.2	B	19.6
39	San Dimas Avenue/Arrow Highway	San Dimas	C	28.8	D	48.4
40	Walnut Avenue/Bonita Avenue	San Dimas	A	6.6	B	13.8
41	Walnut Avenue/Arrow Highway	San Dimas	B	12.0	B	11.8
42	San Dimas Canyon Road/Bonita Avenue	San Dimas	A	7.3	A	9.0
43	San Dimas Canyon Road/Arrow Highway	San Dimas	B	13.9	B	12.2
44	Wheeler Avenue/Third Street	La Verne	C	16.5	C	15.5
			A[1]	2.9[1]	A[1]	2.6[1]
45	Wheeler Avenue/Arrow Highway	La Verne	B	14.8	B	12.9
46	A Street/Third Street	La Verne	B	10.3	B	10.6
			A[1]	5.4[1]	A[1]	4.9[1]
47	A Street/First Street	La Verne	A	9.3	A	10.0
			A[1]	1.5[1]	A[1]	2.3[1]
48	A Street/Arrow Highway	La Verne	F	202.1	F	63.4
			A[1]	6.2[1]	A[1]	1.6[1]
49	D Street/Third Street	La Verne	A	9.6	B	13.5
50	D Street/First Street	La Verne	A	9.7	B	11.5

#	Intersection	Jurisdiction	AM LOS	AM Delay[2]	PM LOS	PM Delay[2]
			A[1]	1.0[1]	A[1]	2.0[1]
51	D Street/Arrow Highway	La Verne	A	5.9	A	6.2
52	E Street/Third Street	La Verne	A	9.9	B	12.9
53	E Street/Second Street	La Verne	B	14.2	B	14.8
			A[1]	2.8[1]	A[1]	3.1[1]
54	E Street/First Street	La Verne	B	11.4	B	12.6
			A[1]	0.9[1]	A[1]	1.0[1]
55	E Street/Arrow Highway	La Verne	C	22.5	C	27.7
56	White Avenue/Third Street	La Verne	D	26.3	F	78.6
			A[1]	1.7[1]	A[1]	3.2[1]
57	White Avenue/Second Street	La Verne	C	24.7	F	55.9
			A[1]	1.3[1]	A[1]	1.8[1]
58	White Avenue/First Street	La Verne	D	28.2	E	48.9
			A[1]	2.1[1]	A[1]	2.8[1]
59	White Avenue/Sierra Way	La Verne	B	11.2	C	17.9
			A[1]	0.4[1]	A[1]	0.5[1]
60	White Avenue/Arrow Highway	La Verne	C	26.2	C	30.6
61	D Street/Bonita Avenue	La Verne	A	8.1	B	10.1
62	White Avenue/Foothill Boulevard	La Verne	C	29.5	D	39.8
63	White Avenue/Bonita Avenue	La Verne	B	13.9	B	17.2
64	White Avenue/McKinley Avenue	La Verne	B	11.0	B	14.1
65	La Verne Avenue/Arrow Highway	La Verne	F	52.5	F	481.6
			B[1]	11.1[1]	F[1]	55.2[1]
66	Fulton Road/Bonita Avenue	Pomona	C	22.0	F	57.3
			A[1]	3.6[1]	A[1]	6.8[1]
67	Fulton Road/Arrow Highway	Pomona	C	22.0	D	34.2
			A[1]	2.2[1]	A[1]	2.1[1]
68	Garey Avenue/Bonita Avenue	Pomona	B	16.0	B	15.7
69	Garey Avenue/Santa Fe Street	Pomona	B	10.8	B	12.4
			A[1]	0.3[1]	A[1]	0.4[1]
70	Garey Avenue/Arrow Highway	Pomona	C	28.1	C	30.7
71	Towne Avenue/Bonita Avenue	Pomona	A	9.9	B	11.1
72	Towne Avenue/Towne Center Drive	Pomona	D	26.8	E	49.6
			A[1]	0.4[1]	A[1]	1.5[1]
73	Towne Avenue/Arrow Highway	Pomona	D	44.5	D	44.8
74	Garey Avenue/Harrison Avenue	Pomona	A	7.5	A	5.9
75	Indian Hill Boulevard/Bonita Avenue	Claremont	A	8.1	A	9.1
76	Indian Hill Boulevard/First Street	Claremont	B	10.9	B	15.4
77	Indian Hill Boulevard/Santa Fe Street	Claremont	B	11.2	B	13.1
			A[1]	0.5[1]	A[1]	0.8[1]
78	Indian Hill Boulevard/Arrow Highway	Claremont	C	21.1	D	37.2

Table 5-8: TSM Alternative – Intersection Level of Service (2035)[3]

Table 5-8: TSM Alternative – Intersection Level of Service (2035)[3]						
#	Intersection	Jurisdiction	AM		PM	
			LOS	Delay[2]	LOS	Delay[2]
79	College Avenue/Bonita Avenue	Claremont	A	9.8	B	12.4
80	College Avenue/First Street	Claremont	B	10.7	B	12.5
81	College Avenue/Arrow Highway	Claremont	A	6.4	A	7.3
82	Claremont Boulevard/First Street	Claremont	A	3.3	A	5.9
83	Mills/Claremont/Arrow Highway	Claremont	B	14.9	B	19.8
84	Monte Vista Avenue/Arrow Route	Montclair	B	13.1	B	14.6
85	Monte Vista Avenue/Richton Street	Montclair	A	3.3	A	6.3
86	Monte Vista Avenue/Arrow Highway	Montclair	B	18.6	C	31.0
87	Fremont Avenue/Arrow Highway	Montclair	A	1.8	A	4.1
88	Central Avenue/Arrow Route	Montclair	B	12.1	C	20.5
89	Central Avenue/Richton Street/W 9th Street	Montclair	A	8.5	B	10.4
90	Central Avenue/Arrow Highway	Montclair	B	15.9	C	29.6

[1] Overall intersection LOS and delay at unsignalized intersections is reported to support the air quality analysis
[2] Average vehicle delay in seconds
[3] Shading shows intersections that, in 2035, would operate at LOS E or F under the TSM Alternative

Summary of Impacts

Using the threshold criteria presented in **Table 3-5**, intersection operating conditions under the TSM Alternative were compared with the No Build Alternative to identify adversely (NEPA) or significantly (CEQA) affected locations. **Table 5-9** and **Table 5-10** summarize intersection impacts. The intersections that are projected to be adversely affected are shaded.

As seen in **Table 5-9** and **Table 5-10**, four intersections are anticipated to be adversely/significantly impacted prior to any mitigation measures. They are:

- Glenwood Avenue at Route 66
- Monte Vista Avenue at Bonita Avenue
- A Street at Arrow Highway
- La Verne Avenue at Arrow Highway

The TSM alternative will not result in any significant impact to the other 86 intersections, though several locations are projected to operate at LOS F. Generally, LOS F is associated with back-ups and increased queue lengths and should be addressed by improving intersection operations prior to reaching this level of congestion. Since it is difficult to validate impacts at these extreme levels of congestion, it is recommended that the affected jurisdictions implement improvements at these congested intersections prior to the construction of this project.

Table 5-9: AM Peak Hour – Intersection Impacts Comparison (TSM and No Build Alternatives)[2]

#	Intersection	Jurisdiction	2035 No Build		2035 TSM		Change in Delay	Significant Impact
			Delay[1]	LOS	Delay[1]	LOS		
1	Barranca Avenue/Bennett Avenue	Glendora	B	21.1	C	21.0	-0.1	NO
2	Barranca Avenue/Foothill Boulevard	Glendora	B	12.1	B	12.0	-0.1	NO
3	Grand Avenue/Foothill Boulevard	Glendora	C	29.5	C	29.5	0.0	NO
4	Vermont Avenue East/Ada Avenue	Glendora	B	11.8	B	11.8	0.0	NO
5	Vermont Avenue/Route 66	Glendora	A	7.5	A	7.5	0.0	NO
6	Vermont Avenue/Foothill Boulevard	Glendora	A	7.7	A	7.7	0.0	NO
7	Vermont Avenue W/Ada Avenue	Glendora	B	11.1	B	11.1	0.0	NO
8	Glendora Avenue/Foothill Boulevard	Glendora	C	25.0	C	24.9	-0.1	NO
9	Glendora Avenue/Ada Avenue	Glendora	B	12.2	B	12.2	0.0	NO
10	Glendora Avenue/Route 66	Glendora	C	24.4	C	24.6	0.2	NO
11	Pasadena Avenue/Lemon Avenue	Glendora	A	7.9	A	7.9	0.0	NO
12	Pasadena Avenue/Route 66	Glendora	B	11.8	B	11.8	0.0	NO
13	Glenwood Avenue/Lemon Avenue	Glendora	A	9.9	A	9.9	0.0	NO
14	Glenwood Avenue/Route 66	Glendora	F	OFL	F	OFL	N/A	YES
15	Elwood Avenue/Lemon Avenue	Glendora	B	10.7	B	10.7	0.0	NO
16	Elwood Avenue/Route 66	Glendora	B	15.4	B	15.4	0.0	NO
17	Loraine Avenue/Lemon Avenue	Glendora	C	20.0	C	20.0	0.0	NO
18	Loraine Avenue/Route 66	Glendora	B	19.3	B	19.3	0.0	NO
19	Lone Hill Avenue/Auto Centre Drive	Glendora	B	15.6	B	15.6	0.0	NO
20	Barranca Avenue/Sierra Madre Avenue	Glendora	C	20.5	C	20.4	-0.1	NO
21	Glendora Avenue/Sierra Madre Avenue	Glendora	E	47.0	E	46.3	-0.7	NO
22	Lone Hill Avenue/Glendora Marketplace	Glendora	B	15.4	B	15.4	0.0	NO
23	Lone Hill Avenue/Gladstone Street	San Dimas	B	18.8	B	18.8	0.0	NO
24	SR-57 (southbound)/Arrow Highway	San Dimas	A	7.5	A	7.5	0.0	NO
25	SR-57 (northbound)/Arrow Highway & Bonita Avenue	San Dimas	C	26.2	C	26.3	0.1	NO
26	Eucla Avenue/Fifth Street	San Dimas	A	7.4	A	7.4	0.0	NO

Table 5-9: AM Peak Hour – Intersection Impacts Comparison (TSM and No Build Alternatives)[2]								
#	Intersection	Jurisdiction	2035 No Build		2035 TSM		Change in Delay	Significant Impact
			Delay[1]	LOS	Delay[1]	LOS		
27	Eucla Avenue/Second Street	San Dimas	A	9.7	A	9.7	0.0	NO
28	Eucla Avenue/Bonita Avenue	San Dimas	A	4.7	A	4.7	0.0	NO
29	Eucla Avenue/Arrow Highway	San Dimas	A	8.4	A	8.4	0.0	NO
30	Acacia Street/Fifth Street	San Dimas	A	9.2	A	9.2	0.0	NO
31	Acacia Street/Second Street	San Dimas	A	9.1	A	9.1	0.0	NO
32	Acacia Street/Bonita Avenue	San Dimas	B	11.1	B	11.1	0.0	NO
33	Cataract Avenue/Second Street	San Dimas	A	9.9	A	9.9	0.0	NO
34	Cataract Avenue/Bonita Avenue	San Dimas	B	12.5	B	12.5	0.0	NO
35	Monte Vista Avenue/Second Street	San Dimas	A	9.3	A	9.3	0.0	NO
36	Monte Vista Avenue/Bonita Avenue	San Dimas	C	20.2	C	20.5	0.3	NO
37	San Dimas Avenue/Second Street	San Dimas	C	21.2	C	21.0	-0.2	NO
38	San Dimas Avenue/Bonita Avenue	San Dimas	B	12.2	B	12.2	0.0	NO
39	San Dimas Avenue/Arrow Highway	San Dimas	C	28.9	C	28.8	-0.1	NO
40	Walnut Avenue/Bonita Avenue	San Dimas	A	6.7	A	6.6	-0.1	NO
41	Walnut Avenue/Arrow Highway	San Dimas	B	12.0	B	12.0	0.0	NO
42	San Dimas Canyon Road/Bonita Avenue	San Dimas	A	7.3	A	7.3	0.0	NO
43	San Dimas Canyon Road/Arrow Highway	San Dimas	B	13.8	B	13.9	0.1	NO
44	Wheeler Avenue/Third Street	La Verne	C	16.5	C	16.5	0.0	NO
45	Wheeler Avenue/Arrow Highway	La Verne	B	14.8	B	14.8	0.0	NO
46	A Street/Third Street	La Verne	B	10.3	B	10.3	0.0	NO
47	A Street/First Street	La Verne	A	9.3	A	9.3	0.0	NO
48	A Street/Arrow Highway	La Verne	F	198.6	F	202.1	3.5	YES
49	D Street/Third Street	La Verne	A	9.6	A	9.6	0.0	NO
50	D Street/First Street	La Verne	A	9.7	A	9.7	0.0	NO
51	D Street/Arrow Highway	La Verne	A	5.9	A	5.9	0.0	NO
52	E Street/Third Street	La Verne	A	9.9	A	9.9	0.0	NO

#	Intersection	Jurisdiction	2035 No Build		2035 TSM		Change in Delay	Significant Impact
			Delay[1]	LOS	Delay[1]	LOS		
	Table 5-9: AM Peak Hour – Intersection Impacts Comparison (TSM and No Build Alternatives)[2]							
53	E Street/Second Street	La Verne	B	14.3	B	14.2	-0.1	NO
54	E Street/First Street	La Verne	B	11.4	B	11.4	0.0	NO
55	E Street/Arrow Highway	La Verne	C	22.5	C	22.5	0.0	NO
56	White Avenue/Third Street	La Verne	D	26.5	D	26.3	-0.2	NO
57	White Avenue/Second Street	La Verne	C	24.8	C	24.7	-0.1	NO
58	White Avenue/First Street	La Verne	D	28.4	D	28.2	-0.2	NO
59	White Avenue/Sierra Way	La Verne	B	11.2	B	11.2	0.0	NO
60	White Avenue/Arrow Highway	La Verne	C	26.3	C	26.2	-0.1	NO
61	D Street/Bonita Avenue	La Verne	A	8.1	A	8.1	0.0	NO
62	White Avenue/Foothill Boulevard	La Verne	C	29.6	C	29.5	-0.1	NO
63	White Avenue/Bonita Avenue	La Verne	B	14.0	B	13.9	-0.1	NO
64	White Avenue/McKinley Avenue	La Verne	B	11.0	B	11.0	0.0	NO
65	La Verne Avenue/Arrow Highway	La Verne	F	50.6	F	52.5	1.9	NO
66	Fulton Road/Bonita Avenue	Pomona	C	22.1	C	22.0	-0.1	NO
67	Fulton Road/Arrow Highway	Pomona	C	22.4	C	22.0	-0.4	NO
68	Garey Avenue/Bonita Avenue	Pomona	B	16.0	B	16.0	0.0	NO
69	Garey Avenue/Santa Fe Street	Pomona	B	10.8	B	10.8	0.0	NO
70	Garey Avenue/Arrow Highway	Pomona	C	28.3	C	28.1	-0.2	NO
71	Towne Avenue/Bonita Avenue	Pomona	A	9.9	A	9.9	0.0	NO
72	Towne Avenue/Towne Center Drive	Pomona	D	27.1	D	26.8	-0.3	NO
73	Towne Avenue/Arrow Highway	Pomona	D	44.5	D	44.5	0.0	NO
74	Garey Avenue/Harrison Avenue	Pomona	A	7.5	A	7.5	0.0	NO
75	Indian Hill Boulevard/Bonita Avenue	Claremont	A	8.1	A	8.1	0.0	NO
76	Indian Hill Boulevard/First Street	Claremont	B	10.9	B	10.9	0.0	NO
77	Indian Hill Boulevard/Santa Fe Street	Claremont	B	11.2	B	11.2	0.0	NO
78	Indian Hill Boulevard/Arrow Highway	Claremont	C	21.2	C	21.1	-0.1	NO

Table 5-9: AM Peak Hour – Intersection Impacts Comparison (TSM and No Build Alternatives)[2]								
#	**Intersection**	**Jurisdiction**	**2035 No Build**		**2035 TSM**		**Change in Delay**	**Significant Impact**
			Delay[1]	**LOS**	**Delay[1]**	**LOS**		
79	College Avenue/Bonita Avenue	Claremont	A	9.9	A	9.8	-0.1	NO
80	College Avenue/First Street	Claremont	B	10.8	B	10.7	-0.1	NO
81	College Avenue/Arrow Highway	Claremont	A	6.3	A	6.4	0.1	NO
82	Claremont Boulevard/First Street	Claremont	A	3.3	A	3.3	0.0	NO
83	Mills/Claremont/Arrow Highway	Claremont	B	14.9	B	14.9	0.0	NO
84	Monte Vista Avenue/Arrow Route	Montclair	B	13.1	B	13.1	0.0	NO
85	Monte Vista Avenue/Richton Street	Montclair	A	3.3	A	3.3	0.0	NO
86	Monte Vista Avenue/Arrow Highway	Montclair	B	18.7	B	18.6	-0.1	NO
87	Fremont Avenue/Arrow Highway	Montclair	A	1.8	A	1.8	0.0	NO
88	Central Avenue/Arrow Route	Montclair	B	12.1	B	12.1	0.0	NO
89	Central Avenue/Richton Street/W 9th Street	Montclair	A	8.4	A	8.5	0.1	NO
90	Central Avenue/Arrow Highway	Montclair	B	15.9	B	15.9	0.0	NO

[1] Average vehicle delay in seconds
[2] Shading shows intersections that would be significantly impacted as a result of the TSM Alternative

Table 5-10: PM Peak Hour – Intersection Impacts Comparison (TSM and No Build Alternatives)[2]

#	Intersection	Jurisdiction	2035 No Build		2035 TSM		Change in Delay	Significant Impact
			Delay[1]	LOS	Delay[1]	LOS		
1	Barranca Avenue/Bennett Avenue	Glendora	B	12.4	B	12.4	0.0	NO
2	Barranca Avenue/Foothill Blvd	Glendora	A	8.4	A	8.4	0.0	NO
3	Grand Avenue/Foothill Blvd	Glendora	C	34.3	C	34.3	0.0	NO
4	Vermont Avenue E/Ada Avenue	Glendora	B	13.7	B	13.7	0.0	NO
5	Vermont Avenue/Route 66	Glendora	A	8.4	A	8.4	0.0	NO
6	Vermont Avenue/Foothill Blvd	Glendora	A	7.0	A	7.0	0.0	NO
7	Vermont Avenue W/Ada Avenue	Glendora	B	12.0	B	12.0	0.0	NO
8	Glendora Avenue/Foothill Blvd	Glendora	C	30.2	C	30.0	-0.2	NO
9	Glendora Avenue/Ada Avenue	Glendora	B	14.9	B	14.9	0.0	NO
10	Glendora Avenue/Route 66	Glendora	C	29.5	C	29.5	0.0	NO
11	Pasadena Avenue/Lemon Avenue	Glendora	A	7.8	A	7.8	0.0	NO
12	Pasadena Avenue/Route 66	Glendora	B	10.7	B	10.7	0.0	NO
13	Glenwood Avenue/Lemon Avenue	Glendora	B	11.2	B	11.2	0.0	NO
14	Glenwood Avenue/Route 66	Glendora	F	1097.3	F	OFL	N/A	YES
15	Elwood Avenue/Lemon Avenue	Glendora	B	10.9	B	10.9	0.0	NO
16	Elwood Avenue/Route 66	Glendora	B	16.2	B	16.3	0.1	NO
17	Loraine Avenue/Lemon Avenue	Glendora	B	13.7	B	13.7	0.0	NO
18	Loraine Avenue/Route 66	Glendora	B	11.8	B	11.8	0.0	NO
19	Lone Hill Avenue/Auto Centre Drive	Glendora	C	24.1	C	24.1	0.0	NO
20	Barranca Avenue/Sierra Madre Avenue	Glendora	C	15.8	C	15.8	0.0	NO
21	Glendora Avenue/Sierra Madre Avenue	Glendora	B	14.5	B	14.5	0.0	NO
22	Lone Hill Avenue/Glendora Marketplace	Glendora	C	23.1	C	23.2	0.1	NO
23	Lone Hill Avenue/Gladstone Street	San Dimas	C	25.5	C	25.4	-0.1	NO
24	SR-57 (southbound)/Arrow Highway	San Dimas	C	20.2	B	20.0	-0.2	NO
25	SR-57 (northbound)/Arrow Highway & Bonita Avenue	San Dimas	C	29.2	C	29.3	0.1	NO
26	Eucla Avenue/Fifth Street	San Dimas	A	7.4	A	7.4	0.0	NO

Table 5-10: PM Peak Hour – Intersection Impacts Comparison (TSM and No Build Alternatives)[2]								
			2035 No Build		2035 TSM			
#	Intersection	Jurisdictio n	Delay[1]	LOS	Delay[1]	LOS	Change in Delay	Significant Impact
27	Eucla Avenue/Second Street	San Dimas	B	10.5	B	10.4	-0.1	NO
28	Eucla Avenue/Bonita Avenue	San Dimas	A	8.1	A	8.1	0.0	NO
29	Eucla Avenue/Arrow Highway	San Dimas	B	11.8	B	11.8	0.0	NO
30	Acacia Street/Fifth Street	San Dimas	A	9.3	A	9.3	0.0	NO
31	Acacia Street/Second Street	San Dimas	A	9.2	A	9.2	0.0	NO
32	Acacia Street/Bonita Avenue	San Dimas	C	24.4	C	24.6	0.2	NO
33	Cataract Avenue/Second Street	San Dimas	B	10.0	B	10.0	0.0	NO
34	Cataract Avenue/Bonita Avenue	San Dimas	C	25.0	D	25.1	0.1	NO
35	Monte Vista Avenue/Second Street	San Dimas	A	9.9	A	9.8	-0.1	NO
36	Monte Vista Avenue/Bonita Avenue	San Dimas	F	119.5	F	123.7	4.2	YES
37	San Dimas Avenue/Second Street	San Dimas	E	36.2	E	35.8	-0.4	NO
38	San Dimas Avenue/Bonita Avenue	San Dimas	B	19.6	B	19.6	0.0	NO
39	San Dimas Avenue/Arrow Highway	San Dimas	D	48.9	D	48.4	-0.5	NO
40	Walnut Avenue/Bonita Avenue	San Dimas	B	13.9	B	13.8	-0.1	NO
41	Walnut Avenue/Arrow Highway	San Dimas	B	11.8	B	11.8	0.0	NO
42	San Dimas Canyon Rd/Bonita Avenue	San Dimas	A	9.0	A	9.0	0.0	NO
43	San Dimas Canyon Rd/Arrow Highway	San Dimas	B	12.1	B	12.2	0.1	NO
44	Wheeler Avenue/Third Street	La Verne	C	15.6	C	15.5	-0.1	NO
45	Wheeler Avenue/Arrow Highway	La Verne	B	12.9	B	12.9	0.0	NO
46	A Street/Third Street	La Verne	B	10.6	B	10.6	0.0	NO
47	A Street/First Street	La Verne	A	10.0	A	10.0	0.0	NO
48	A Street/Arrow Highway	La Verne	F	62.6	F	63.4	0.8	NO
49	D Street/Third Street	La Verne	B	13.5	B	13.5	0.0	NO
50	D Street/First Street	La Verne	B	11.5	B	11.5	0.0	NO
51	D Street/Arrow Highway	La Verne	A	6.2	A	6.2	0.0	NO
52	E Street/Third Street	La Verne	B	12.9	B	12.9	0.0	NO

Table 5-10: PM Peak Hour – Intersection Impacts Comparison (TSM and No Build Alternatives)[2]								
#	**Intersection**	**Jurisdiction**	**2035 No Build**		**2035 TSM**		**Change in Delay**	**Significant Impact**
			Delay[1]	**LOS**	**Delay[1]**	**LOS**		
53	E Street/Second Street	La Verne	B	14.8	B	14.8	0.0	NO
54	E Street/First Street	La Verne	B	12.6	B	12.6	0.0	NO
55	E Street/Arrow Highway	La Verne	C	27.6	C	27.7	0.1	NO
56	White Avenue/Third Street	La Verne	F	78.9	F	78.6	-0.3	NO
57	White Avenue/Second Street	La Verne	F	56.4	F	55.9	-0.5	NO
58	White Avenue/First Street	La Verne	E	49.5	E	48.9	-0.6	NO
59	White Avenue/Sierra Way	La Verne	C	18.0	C	17.9	-0.1	NO
60	White Avenue/Arrow Highway	La Verne	C	30.6	C	30.6	0.0	NO
61	D Street/Bonita Avenue	La Verne	B	10.2	B	10.1	-0.1	NO
62	White Avenue/Foothill Blvd	La Verne	D	39.9	D	39.8	-0.1	NO
63	White Avenue/Bonita Avenue	La Verne	B	17.3	B	17.2	-0.1	NO
64	White Avenue/McKinley Avenue	La Verne	B	14.1	B	14.1	0.0	NO
65	La Verne Avenue/Arrow Highway	La Verne	F	471.1	F	481.6	10.5	YES
66	Fulton Rd/Bonita Avenue	Pomona	F	58.1	F	57.3	-0.8	NO
67	Fulton Rd/Arrow Highway	Pomona	D	33.9	D	34.2	0.3	NO
68	Garey Avenue/Bonita Avenue	Pomona	B	15.8	B	15.7	-0.1	NO
69	Garey Avenue/Santa Fe Street	Pomona	B	12.4	B	12.4	0.0	NO
70	Garey Avenue/Arrow Highway	Pomona	C	30.9	C	30.7	-0.2	NO
71	Towne Avenue/Bonita Avenue	Pomona	B	11.2	B	11.1	-0.1	NO
72	Towne Avenue/Towne Center Drive	Pomona	F	50.9	E	49.6	-1.3	NO
73	Towne Avenue/Arrow Highway	Pomona	D	45.1	D	44.8	-0.3	NO
74	Garey Avenue/Harrison Avenue	Pomona	A	6.0	A	5.9	-0.1	NO
75	Indian Hill Blvd/Bonita Avenue	Claremont	A	9.1	A	9.1	0.0	NO
76	Indian Hill Blvd/First Street	Claremont	B	15.5	B	15.4	-0.1	NO
77	Indian Hill Blvd/Santa Fe Street	Claremont	B	13.2	B	13.1	-0.1	NO
78	Indian Hill Blvd/Arrow Highway	Claremont	D	37.3	D	37.2	-0.1	NO

#	Intersection	Jurisdiction	2035 No Build		2035 TSM		Change in Delay	Significant Impact
			Delay[1]	LOS	Delay[1]	LOS		
79	College Avenue/Bonita Avenue	Claremont	B	12.5	B	12.4	-0.1	NO
80	College Avenue/First Street	Claremont	B	12.6	B	12.5	-0.1	NO
81	College Avenue/Arrow Highway	Claremont	A	7.3	A	7.3	0.0	NO
82	Claremont Blvd/First Street	Claremont	A	5.9	A	5.9	0.0	NO
83	Mills/Claremont/Arrow Highway	Claremont	B	19.8	B	19.8	0.0	NO
84	Monte Vista Avenue/Arrow Route	Montclair	B	14.6	B	14.6	0.0	NO
85	Monte Vista Avenue/Richton Street	Montclair	A	6.3	A	6.3	0.0	NO
86	Monte Vista Avenue/Arrow Highway	Montclair	C	31.0	C	31.0	0.0	NO
87	Fremont Avenue/Arrow Highway	Montclair	A	4.1	A	4.1	0.0	NO
88	Central Avenue/Arrow Route	Montclair	C	20.5	C	20.5	0.0	NO
89	Central Avenue/Richton Street/W 9th Street	Montclair	B	10.4	B	10.4	0.0	NO
90	Central Avenue/Arrow Highway	Montclair	C	29.6	C	29.6	0.0	NO

Table 5-10: PM Peak Hour – Intersection Impacts Comparison (TSM and No Build Alternatives)[2]

[1] Average vehicle delay in seconds
[2] Shading shows intersections that would be significantly impacted as a result of the TSM Alternative

Roadway Segment Traffic Operations

The same percentage changes from the No Build Alternative were also applied to each of the 35 study roadway segments in the TSM Alternative (**Table 5-11**). Similar to the No Build Alternative, all roadway segments would operate at LOS D or better, except North Towne Avenue between Arrow Highway and Bonita Avenue, which would operate at LOS E.

Table 5-11: TSM Alternative – Roadway Segment Average Daily Traffic Analysis (2035)						
Roadway Segment	**From**	**To**	**Capacity[1,2,3,4] (Vehicles/Day)**	**Volume (Vehicles/Day)**	**V/C**	**LOS**
Glendora						
South Lone Hill Avenue	West Gladstone Street	Auto Centre Drive	32,000	28,111	0.88	D
South Loraine Avenue	Route 66	East Lemon Avenue	16,000	10,707	0.67	B
South Elwood Avenue	Route 66	East Lemon Avenue	12,000	2,746	0.23	A
South Glenwood Avenue	Route 66	East Lemon Avenue	12,000	2,835	0.24	A
South Pasadena Avenue	Route 66	East Lemon Avenue	12,000	2,683	0.22	A
South Glendora Avenue	Route 66	Foothill Boulevard	32,000	18,575	0.58	A
South Vermont Avenue	Route 66	West Foothill Boulevard	12,000	4,321	0.36	A
Grand Avenue	Route 66	West Leadora Avenue	32,000	14,404	0.45	A
Foothill Boulevard	Barranca Avenue	Glendora Avenue	16,000	12,294	0.77	C
North Barranca Avenue	West Foothill Boulevard	West Leadora Avenue	12,000	8,416	0.70	C
San Dimas						
San Dimas Canyon Road	Arrow Highway	Bonita Avenue	32,000	9,292	0.29	A
Walnut Avenue	East Arrow Highway	East Bonita Avenue	16,000	7,505	0.47	A
San Dimas Avenue	Arrow Highway	Bonita Avenue	32,000	12,291	0.38	A
Monte Vista Avenue	Commercial Street	Bonita Avenue	12,000	544	0.05	A
Cataract Avenue	Arrow Highway	First Street	12,000	3,072	0.26	A
Bonita Avenue	Eucla Avenue	San Dimas Avenue	32,000	15,832	0.49	A
Eucla Avenue	Bonita Avenue	Third Street	12,000	3,798	0.32	A
West Gladstone Street	Lone Hill Avenue	Amelia Avenue	32,000	15,784	0.49	A
La Verne						
White Avenue	Arrow Highway	Third Street	32,000	18,781	0.59	A
E Street	Arrow Highway	Third Street	16,000	6,916	0.43	A
D Street	Arrow Highway	Third Street	12,000	5,697	0.47	A
A Street	Arrow Highway	Third Street	12,000	1,339	0.11	A

Table 5-11: TSM Alternative – Roadway Segment Average Daily Traffic Analysis (2035)

Roadway Segment	From	To	Capacity[1,2,3,4] (Vehicles/Day)	Volume (Vehicles/Day)	V/C	LOS
Wheeler Avenue	Arrow Highway	Third Street	32,000	10,342	0.32	A
Pomona						
North Towne Avenue	Arrow Highway	Bonita Avenue	32,000	29,612	0.93	E
North Garey Avenue	Arrow Highway	Bonita Avenue	32,000	24,485	0.77	C
Fulton Road	Metrolink Driveway	—	16,000	1,574	0.10	A
Fulton Road	Arrow Highway	Bonita Avenue	16,000	1,914	0.12	A
Claremont						
South Mills Avenue/Claremont Blvd	Arrow Highway	East First Street	32,000	8,822	0.28	A
Indian Hill Boulevard	Arrow Highway	Bonita Avenue	32,000	21,993	0.69	B
College Avenue	East Arrow Highway	West Bonita Avenue	12,000	5,901	0.49	A
College Avenue	Green Street	—	12,000	6,466	0.54	A
Cambridge Avenue	West Arrow Highway	Bonita Avenue	12,000	5,333	0.44	A
First Street	Indian Hill Boulevard	College Avenue	24,000	8,573	0.36	A
Montclair						
Monte Vista Avenue	Richton Street	Arrow Highway	32,000	22,170	0.69	B
Central Avenue	Richton Street	Arrow Highway	32,000	27,169	0.85	D

[1] Capacity of 32,000 assumes 800 vehicles per hour per lane multiplied by number of lanes, divided by a k-factor of 0.1.
[2] Capacity of 24,000 assumes 600 vehicles per hour per lane multiplied by number of lanes, divided by a k-factor of 0.1.
[3] Capacity of 16,000 assumes 800 vehicles per hour per lane multiplied by number of lanes, divided by a k-factor of 0.1.
[4] Capacity of 12,000 assumes 600 vehicles per hour per lane multiplied by number of lanes, divided by a k-factor of 0.1.

5.2.3 Build Alternative

As noted earlier, the Azusa to Montclair Build LRT Alternative would extend the Gold Line Foothill Extension LRT Phase 2A from the Azusa/Citrus Station to the Montclair Station. This alternative would run through the cities of Glendora, San Dimas, La Verne, Pomona, Claremont and Montclair.

Shifts in Traffic Patterns

Similar to the TSM Alternative, adjustments to traffic flow patterns as a result of the Build Alternative were determined by using projections from the transportation model developed for this study. The 2035 No Build Alternative and the Build Alternative model data were compared to determine the effects of the Build Alternative on traffic flow and circulation patterns. The peak period link data from each model output were used in this analysis. The results for 2035 are shown in **Table 5-12**, which shows a decrease in traffic volumes for all six cities.

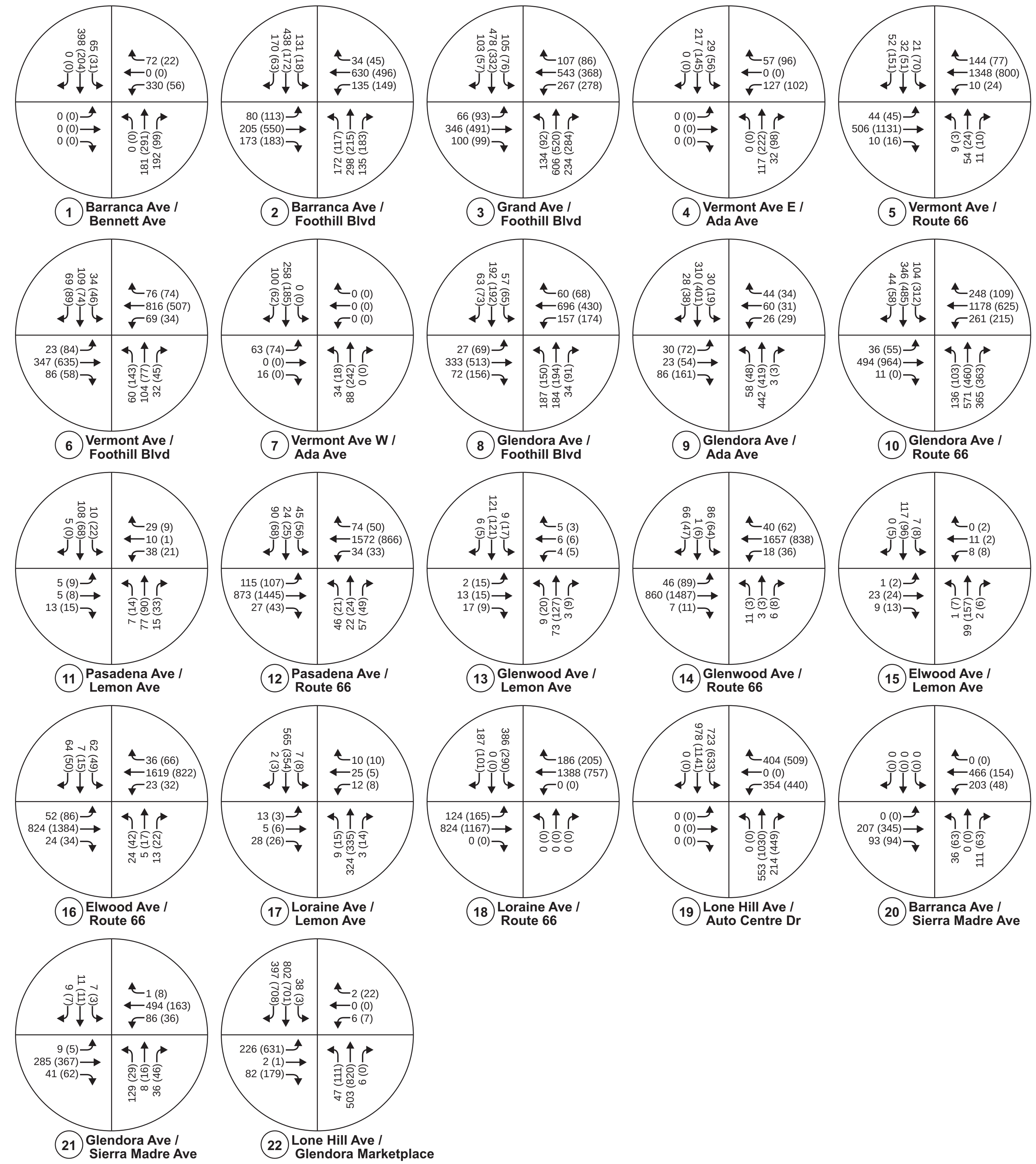
Table 5-12: Build Alternative – Average AM and PM Percentage Change in Traffic Volumes (2035)

Glendora	-1.763%
San Dimas	-2.120%
La Verne	-0.579%
Pomona	-1.380%
Claremont	-1.514%
Montclair	-0.616%

The overall decrease in traffic volumes were applied to the 2035 No Build PM peak hour turning movement volumes to develop the future AM and PM peak hour turning movement traffic projections for the Build Alternative at each of the 90 study intersections.

However, since intersections surrounding the stations would experience increased vehicular activity because of station operations, the turning movement volumes were adjusted to reflect this condition. Trips generated to and from the parking area at each station were determined and distributed along the roadway network to reflect station access conditions. The station access analysis assumed a parking occupancy of approximately 95 percent during both the AM and PM peak hours. Also, it was assumed that 70 percent of patrons arrive within the AM peak hour and that 65 percent leaves within the PM peak hour. In addition, it was assumed that 10 percent of vehicles accessing the station were kiss-and-ride patrons. A total of 5,150 parking spaces distributed among the six stations would be provided. **Table 5-13** shows the number of parking spaces for each station. **Figures 5-13 to 5-18** show the Build peak hour traffic volumes during the AM/PM peak hours.

Table 5-13: Build Alternative – Parking Space Provisions		
City	**Parking Location(s)**	**Stalls**
Glendora	South of tracks, east of South Vermont Avenue and west of Glendora Avenue	400
San Dimas	Parking structure on north side of Arrow Highway between San Dimas and Walnut Avenues and south of right-of-way.	400
La Verne	Parking garage in the irregular shaped property just to the south and east of the platform, north of Arrow Highway	600
Pomona	Parking structure at site west of Garey Avenue, south of Bonita Avenue and north of right-of-way.	1,050
Claremont	Structure built on the existing Metrolink surface parking lot east of College Avenue and north of right-of-way.	1,100
Montclair	Use existing parking at transit center, no structure.	1,600
	Total	**5,150**



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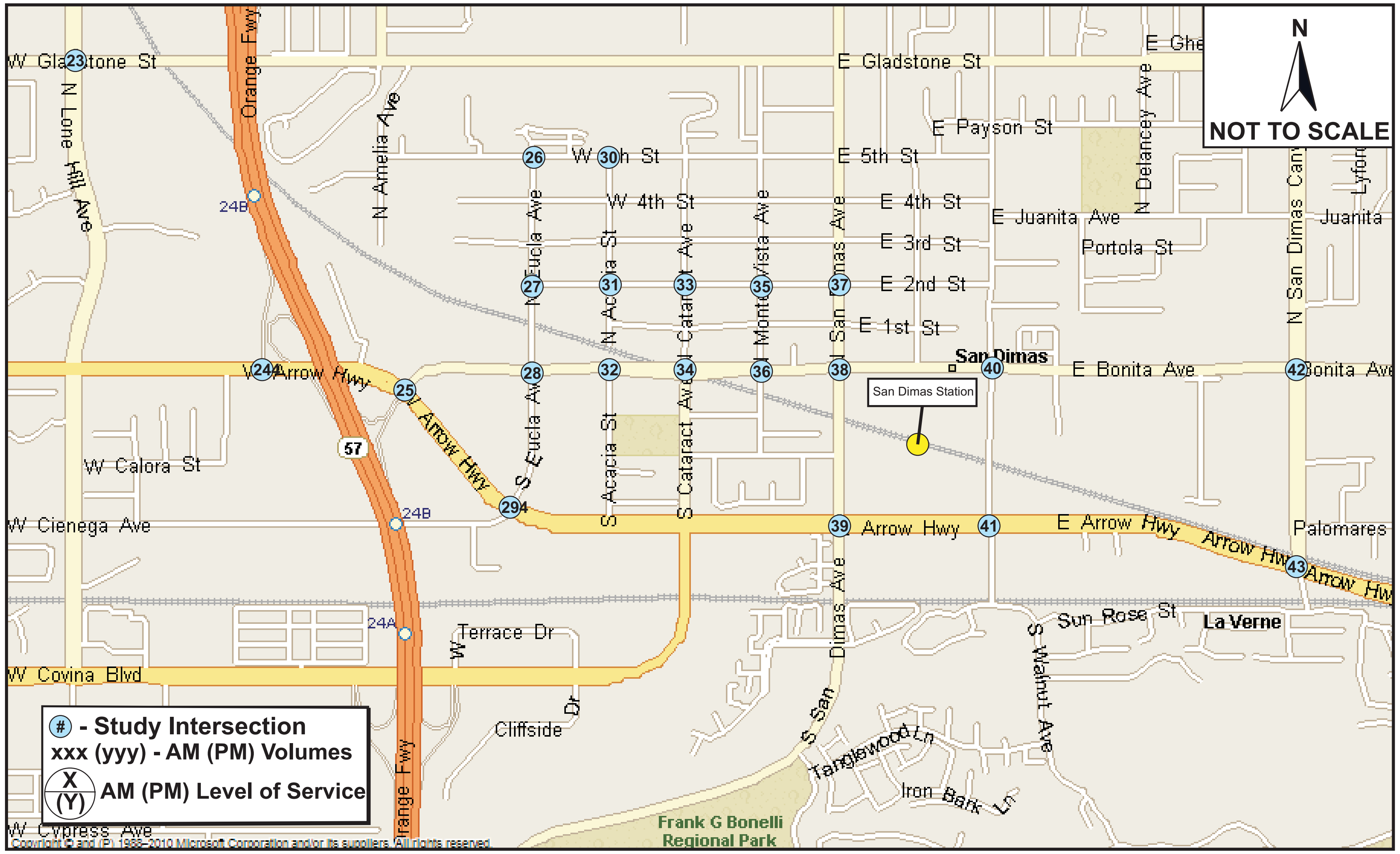
Metro Gold Line Foothill Extension – Azusa To Montclair

Figure 5-13: Build (2035) AM/PM Peak Hour Traffic Volumes: Glendora



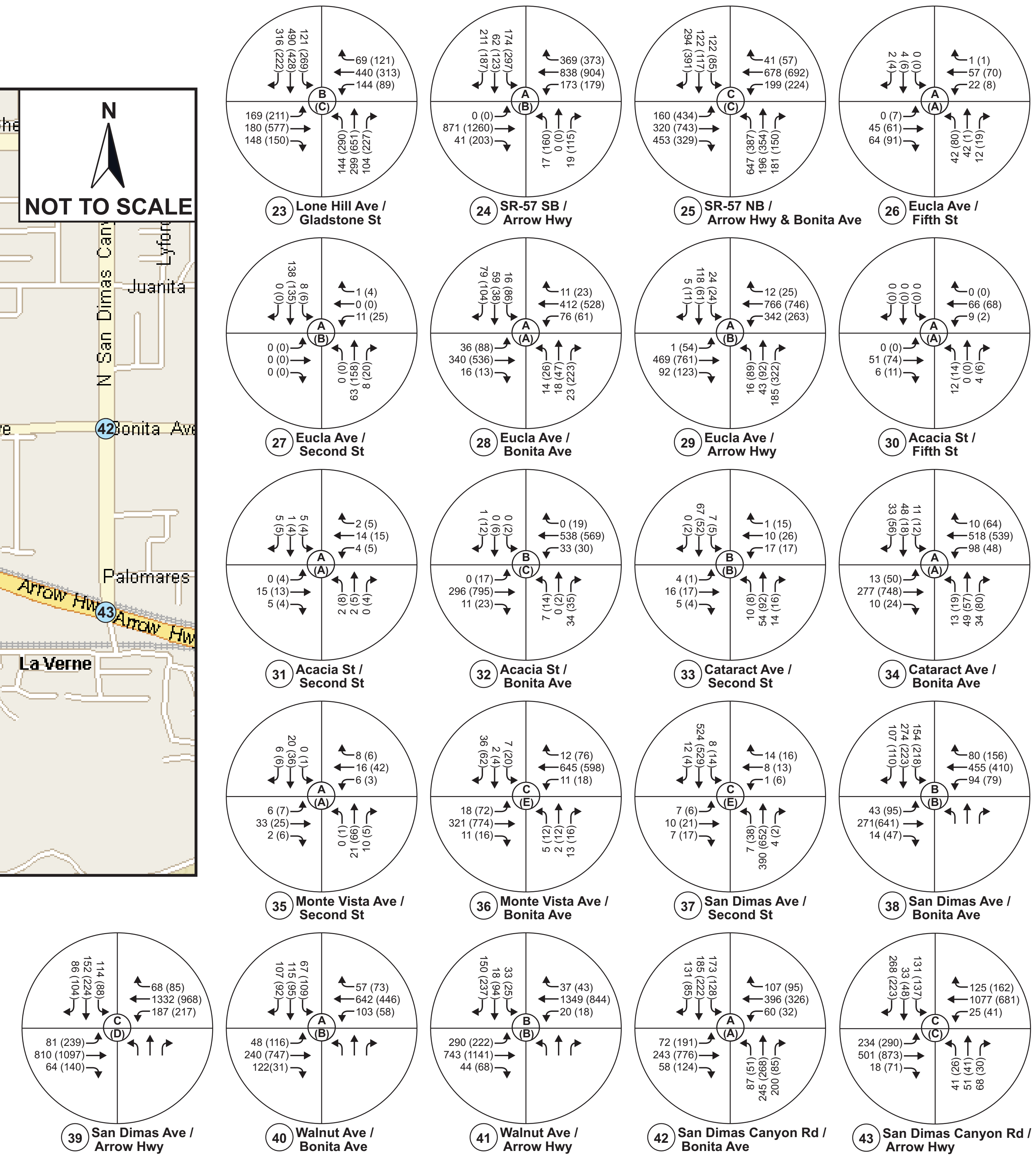
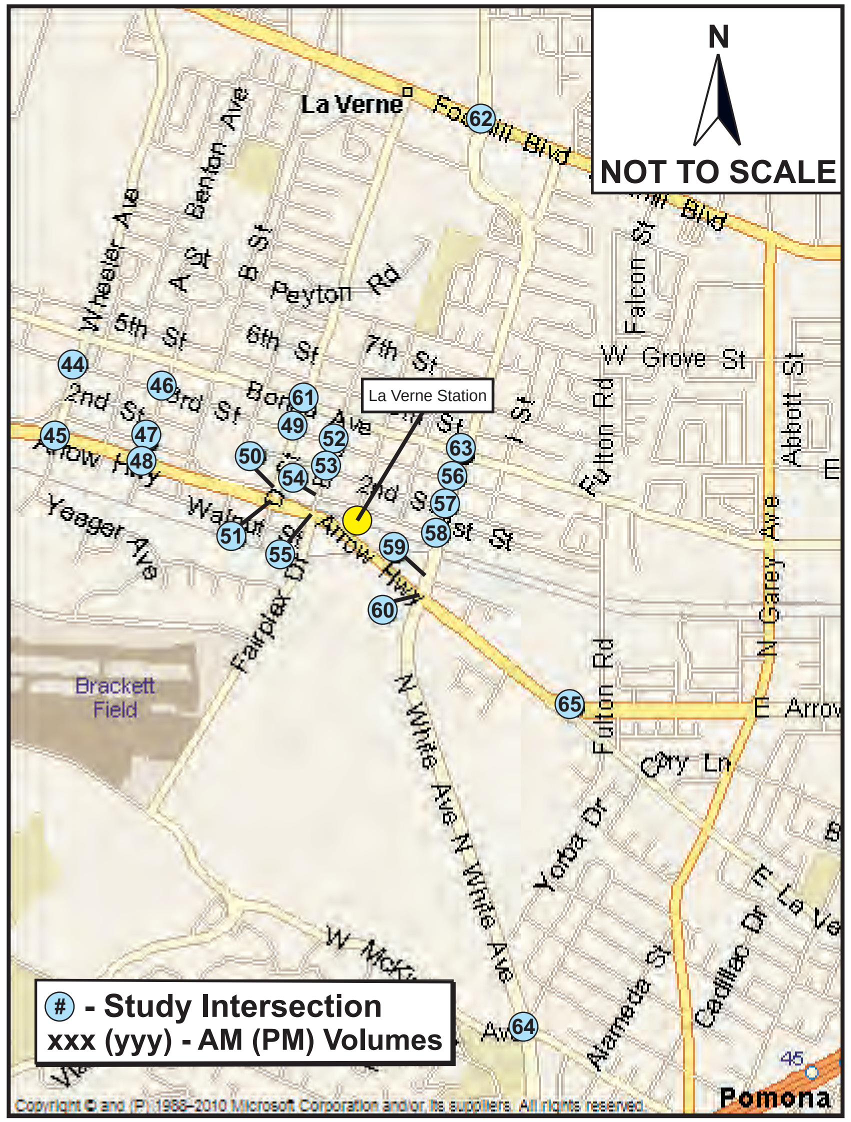
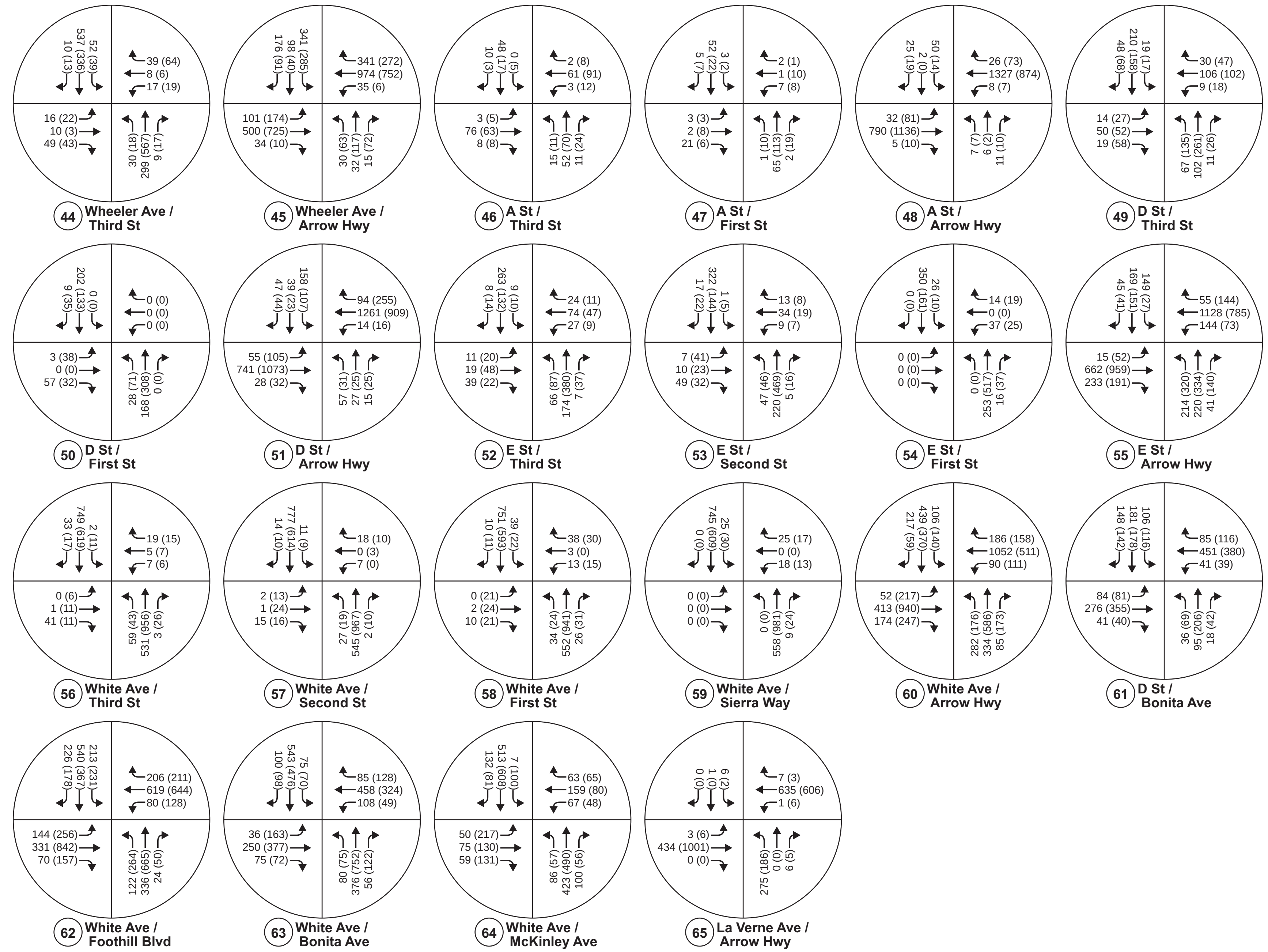


Figure 5-14: Build (2035) AM/PM Peak Hour Traffic Volumes: San Dimas





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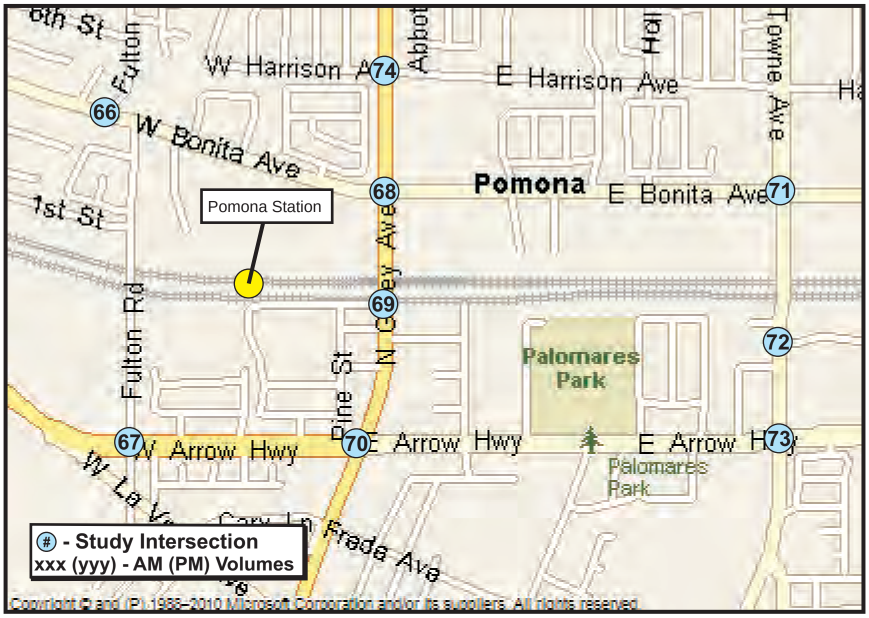
Metro Gold Line Foothill Extension – Azusa To Montclair

Figure 5-15: Build (2035) AM/PM Peak Hour Traffic Volumes: La Verne


W Harrison Ave
E Harrison Ave
W Bonita Ave
E Bonita Ave
Pomona
Pomona Station
1st St
Fulton Rd
N Garey Ave
Pine St
Towne Ave
Abbot
Palomares Park
W Arrow Hwy
E Arrow Hwy
W La Verne
Freda Ave
- Study Intersection
xxx (yyy) - AM (PM) Volumes
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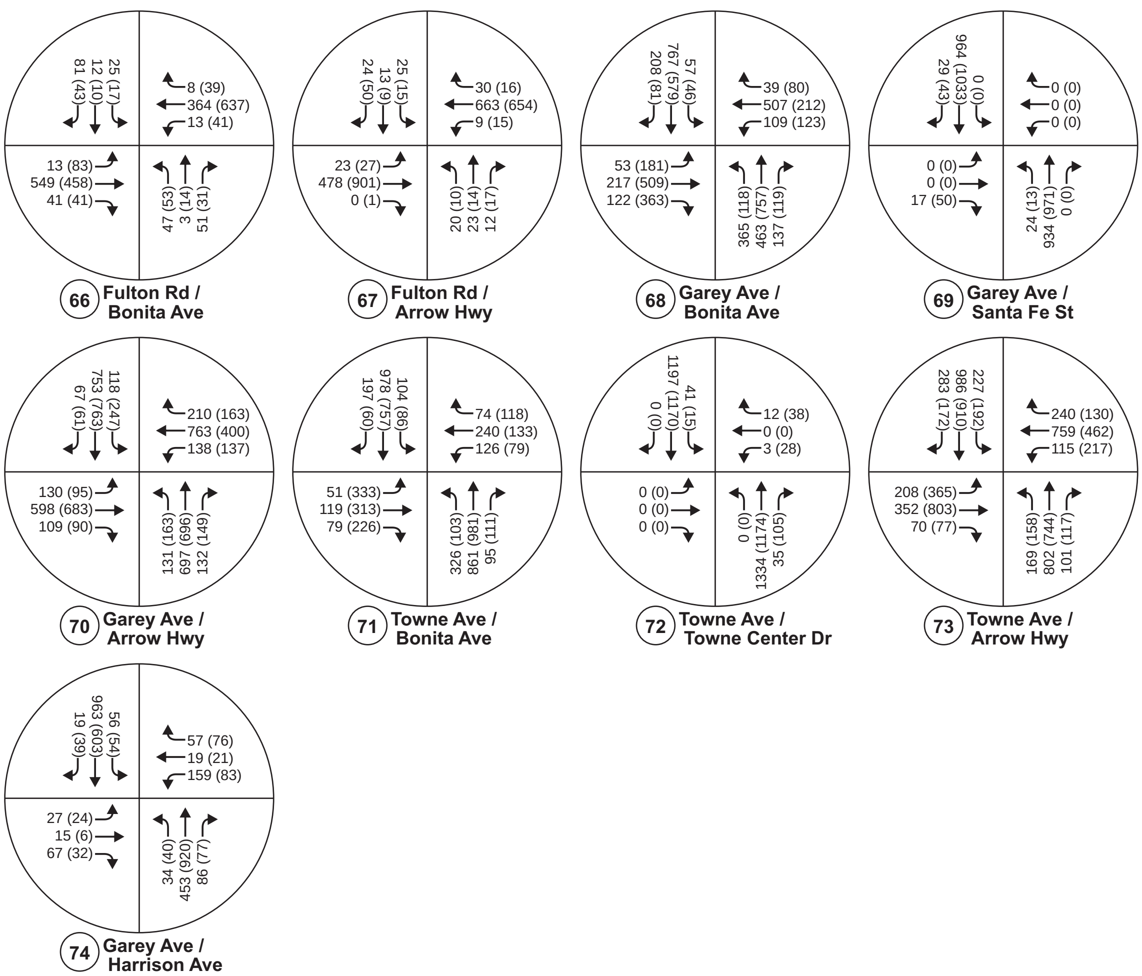
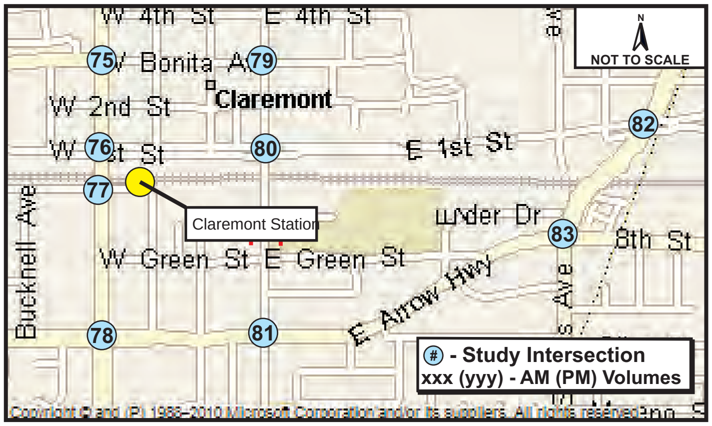

66 Fulton Rd / Bonita Ave
25 (17)
12 (10)
81 (43)
8 (39)
364 (637)
13 (41)
13 (83)
549 (458)
41 (41)
47 (53)
3 (14)
51 (31)
67 Fulton Rd / Arrow Hwy
25 (15)
13 (9)
24 (50)
30 (16)
663 (654)
9 (15)
23 (27)
478 (901)
0 (1)
20 (10)
23 (14)
12 (17)
68 Garey Ave / Bonita Ave
57 (46)
767 (579)
208 (81)
39 (80)
507 (212)
109 (123)
53 (181)
217 (509)
122 (363)
365 (118)
463 (757)
137 (119)
69 Garey Ave / Santa Fe St
0 (0)
964 (1033)
29 (43)
0 (0)
0 (0)
0 (0)
0 (0)
0 (0)
17 (50)
24 (13)
934 (971)
0 (0)
70 Garey Ave / Arrow Hwy
118 (247)
753 (763)
67 (61)
210 (163)
763 (400)
138 (137)
130 (95)
598 (683)
109 (90)
131 (163)
697 (696)
132 (149)
71 Towne Ave / Bonita Ave
104 (86)
978 (757)
197 (60)
74 (118)
240 (133)
126 (79)
51 (333)
119 (313)
79 (226)
326 (103)
861 (981)
95 (111)
72 Towne Ave / Towne Center Dr
41 (15)
1197 (1170)
0 (0)
12 (38)
0 (0)
3 (28)
0 (0)
0 (0)
0 (0)
0 (0)
1334 (1174)
35 (105)
73 Towne Ave / Arrow Hwy
227 (192)
986 (910)
283 (172)
240 (130)
759 (462)
115 (217)
208 (365)
352 (803)
70 (77)
169 (158)
802 (744)
101 (117)
74 Garey Ave / Harrison Ave
56 (54)
963 (603)
19 (39)
57 (76)
19 (21)
159 (83)
27 (24)
15 (6)
67 (32)
34 (40)
453 (920)
86 (77)


W 4th St
E 4th St
NOT TO SCALE
75
W Bonita A
79
Claremont
W 2nd St
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76
80
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82
77
Claremont Station
Bucknell Ave
under Dr
83
8th St
W Green St
E Green St
E Arrow Hwy
78
81
- Study Intersection
xxx (yyy) - AM (PM) Volumes
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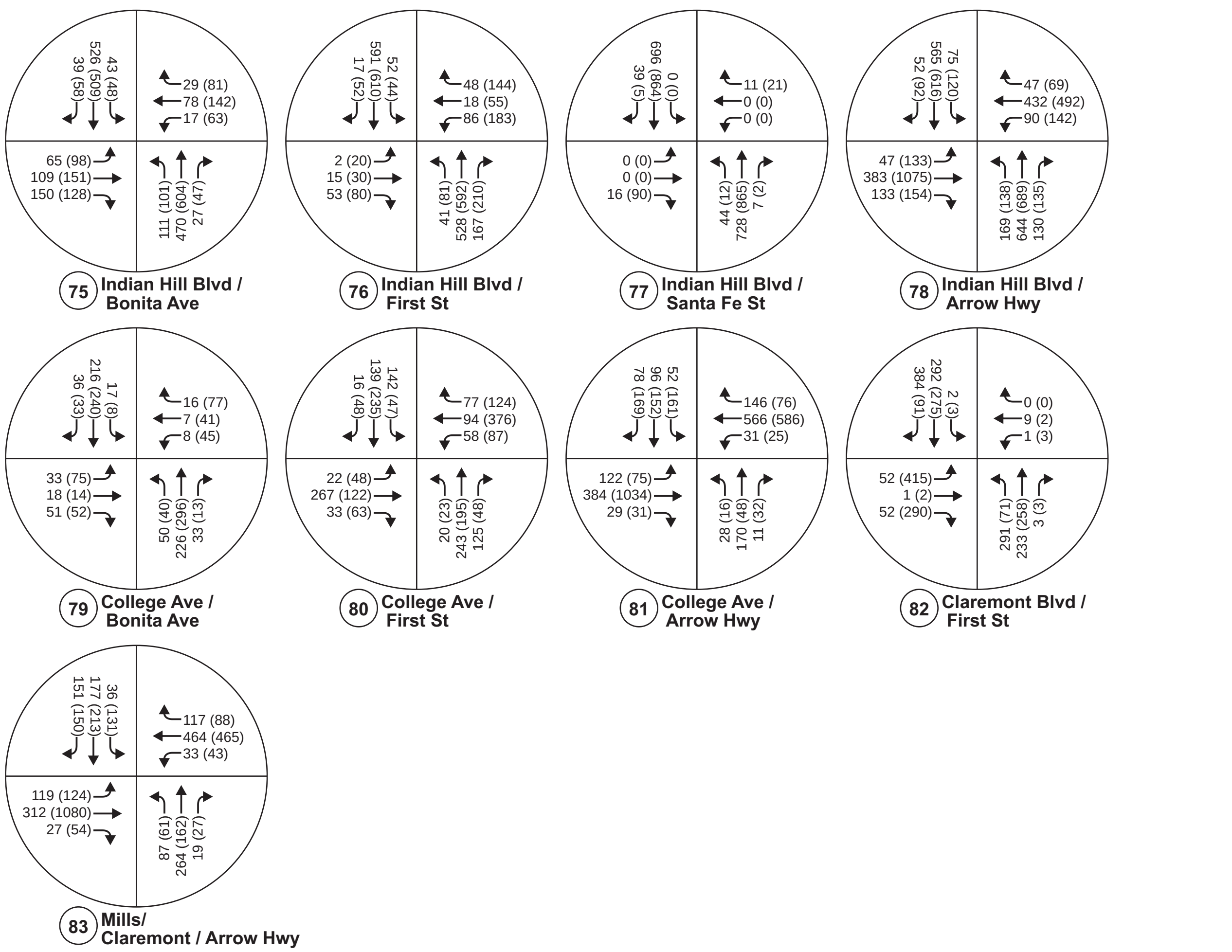
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52 (44)
591 (610)
17 (52)
48 (144)
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86 (183)
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15 (30)
53 (80)
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528 (592)
167 (210)
76 Indian Hill Blvd / First St
0 (0)
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39 (5)
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16 (90)
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728 (865)
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77 Indian Hill Blvd / Santa Fe St
75 (120)
565 (616)
52 (92)
47 (69)
432 (492)
90 (142)
47 (133)
383 (1075)
133 (154)
169 (138)
644 (689)
130 (135)
78 Indian Hill Blvd / Arrow Hwy
17 (8)
216 (240)
36 (33)
16 (77)
7 (41)
8 (45)
33 (75)
18 (14)
51 (52)
50 (40)
226 (296)
33 (13)
79 College Ave / Bonita Ave
142 (47)
139 (235)
16 (48)
77 (124)
94 (376)
58 (87)
22 (48)
267 (122)
33 (63)
20 (23)
243 (195)
125 (48)
80 College Ave / First St
52 (161)
96 (152)
78 (169)
146 (76)
566 (586)
31 (25)
122 (75)
384 (1034)
29 (31)
28 (16)
170 (48)
11 (32)
81 College Ave / Arrow Hwy
2 (3)
292 (275)
384 (91)
0 (0)
9 (2)
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52 (415)
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52 (290)
291 (71)
233 (258)
3 (3)
82 Claremont Blvd / First St
36 (131)
177 (213)
151 (150)
117 (88)
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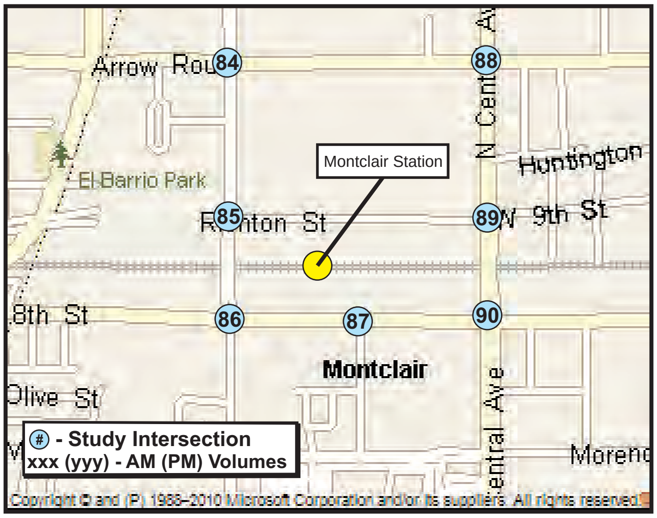
119 (124)
312 (1080)
27 (54)
87 (61)
264 (162)
19 (27)
83 Mills/ Claremont / Arrow Hwy



Arrow Route
El Barrio Park
Montclair Station
Huntington
Richton St
W 9th St
8th St
Montclair
Olive St
N Central Ave
Central Ave
Moreno
84
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- Study Intersection
xxx (yyy) - AM (PM) Volumes
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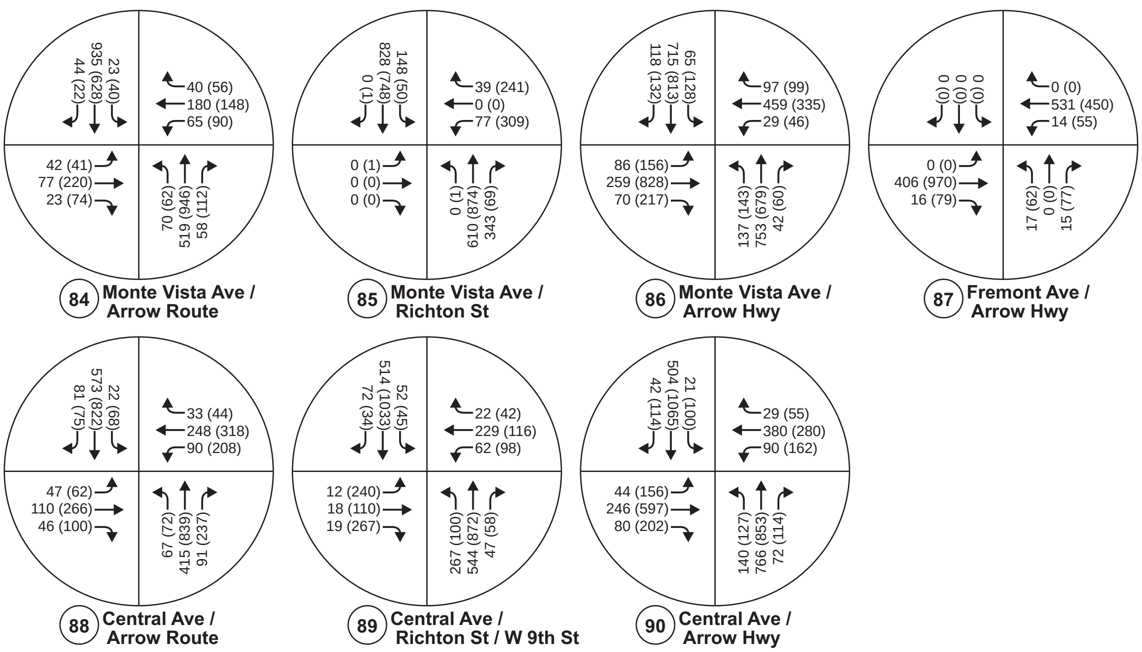

23 (40)
935 (628)
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180 (148)
65 (90)
42 (41)
77 (220)
23 (74)
70 (62)
519 (946)
58 (112)
84 Monte Vista Ave / Arrow Route
148 (50)
828 (748)
0 (1)
39 (241)
0 (0)
77 (309)
0 (1)
0 (0)
0 (0)
0 (1)
610 (874)
343 (69)
85 Monte Vista Ave / Richton St
65 (128)
715 (813)
118 (132)
97 (99)
459 (335)
29 (46)
86 (156)
259 (828)
70 (217)
137 (143)
753 (679)
42 (60)
86 Monte Vista Ave / Arrow Hwy
0 (0)
0 (0)
0 (0)
0 (0)
531 (450)
14 (55)
0 (0)
406 (970)
16 (79)
17 (62)
0 (0)
15 (77)
87 Fremont Ave / Arrow Hwy
22 (68)
573 (822)
81 (75)
33 (44)
248 (318)
90 (208)
47 (62)
110 (266)
46 (100)
67 (72)
415 (839)
91 (237)
88 Central Ave / Arrow Route
52 (45)
514 (1033)
72 (34)
22 (42)
229 (116)
62 (98)
12 (240)
18 (110)
19 (267)
267 (100)
544 (872)
47 (58)
89 Central Ave / Richton St / W 9th St
21 (100)
504 (1065)
42 (114)
29 (55)
380 (280)
90 (162)
44 (156)
246 (597)
80 (202)
140 (127)
766 (853)
72 (114)
90 Central Ave / Arrow Hwy

In addition, two intersections—Foothill Boulevard/Grand Avenue, and Cataract Avenue/Bonita Avenue—are configured such that the LRT tracks would cross the intersection diagonally. At these locations, new traffic signals would be provided or existing signals would be modified. As a result, Cataract Avenue/Bonita Avenue would become signalized. For both intersections, an exclusive signal phase for the LRT would be provided, whereby all other traffic movements would be stopped. Based on the following assumptions, a hold phase of 80 seconds was added to the cycle to represent the worst-case train operating condition.

- Operation of two-car trains at 10-minute headway per direction (train length is assumed to be approximately 180 feet).
- A maximum operating speed of 55 miles per hour.
- An average diagonal cross-street width of about 150 feet.
- Additional five Metrolink commuter trains (four in the eastbound direction and one in the westbound direction) per hour in the shared project corridor in the Cities of La Verne, Pomona, Claremont and Montclair.

Summary of Improvements as Part of the Project

The following traffic improvements would be part of this project and are included in the analysis of the 2035 Build Alternative. These improvements are required for safe operation of the LRT system at-grade crossing locations.

San Dimas

- **Cataract Avenue/Bonita Avenue –** Signalize this intersection as part of the project.
- **San Dimas Canyon Road/Arrow Highway –** Provide a right-turn pocket for the westbound approach from Arrow Highway. Convert the eastbound and westbound movement phase on Arrow Highway from permissive/protected to protected only.

La Verne

- **Wheeler Avenue/Arrow Highway –** Provide a right-turn pocket for the westbound approach from Arrow Highway. Convert the eastbound and westbound movement phase on Arrow Highway from permissive/protected to protected only.
- **A Street/Arrow Highway –** Signalize this intersection as part of the project. Provide a right-turn pocket for the westbound approach from Arrow Highway.
- **D Street/Arrow Highway –** Provide a right-turn pocket for the westbound approach from Arrow Highway. Convert the eastbound and westbound movement phase on Arrow Highway from permissive/protected to protected only.
- **E Street/Arrow Highway –** Provide a right-turn pocket for the westbound approach from Arrow Highway.

Intersection Traffic Conditions

Future traffic operations were evaluated by incorporating the volumes, roadway geometrics, type of control, and signal phasing using the Synchro software (**Table 5-14**). Detailed worksheets are attached as **Appendix E**. As indicated in the table, four intersections in the AM peak hour and 11 intersections in the PM peak hour are anticipated to operate at LOS E or F; the remaining intersections would operate at LOS D or better.

Table 5-14: Build Alternative – Intersection Level of Service (2035)[3]

#	Intersection	Jurisdiction	AM		PM	
			LOS	Delay[2]	LOS	Delay[2]
1	Barranca Avenue/Bennett Avenue	Glendora	C	20.9	B	12.4
			A[1]	7.3[1]	A[1]	1.8[1]
2	Barranca Avenue/Foothill Boulevard	Glendora	B	11.1	A	8.4
3	Grand Avenue/Foothill Boulevard	Glendora	C	29.9	C	28.5
4	Vermont Avenue East/Ada Avenue	Glendora	B	13.3	C	15.3
			A[1]	4.7[1]	A[1]	4.9[1]
5	Vermont Avenue/Route 66	Glendora	A	7.5	A	9.1
6	Vermont Avenue/Foothill Boulevard	Glendora	A	7.5	A	7.7
7	Vermont Avenue West/Ada Avenue	Glendora	B	12.3	B	13.2
			A[1]	2.3[1]	A[1]	2.0[1]
8	Glendora Avenue/Foothill Boulevard	Glendora	C	28.1	C	28.1
9	Glendora Avenue/Ada Avenue	Glendora	B	12.3	C	15.3
10	Glendora Avenue/Route 66	Glendora	C	22.8	C	32.4
11	Pasadena Avenue/Lemon Avenue	Glendora	A	7.9	A	7.8
12	Pasadena Avenue/Route 66	Glendora	B	12.4	B	11.2
13	Glenwood Avenue/Lemon Avenue	Glendora	B	10.1	B	11.3
			A[1]	2.3[1]	A[1]	2.6[1]
14	Glenwood Avenue/Route 66	Glendora	F	OFL	F	OFL
			F[1]	548.2[1]	F[1]	443.2[1]
15	Elwood Avenue/Lemon Avenue	Glendora	B	10.8	B	11.0
			A[1]	2.2[1]	A[1]	2.0[1]
16	Elwood Avenue/Route 66	Glendora	B	15.5	B	18.1
17	Loraine Avenue/Lemon Avenue	Glendora	C	19.8	B	13.7
			A[1]	1.8[1]	A[1]	1.2[1]
18	Loraine Avenue/Route 66	Glendora	B	19.1	B	11.6
19	Lone Hill Avenue/Auto Centre Drive	Glendora	B	15.4	C	22.7
20	Barranca Avenue/Sierra Madre Avenue	Glendora	C	19.8	C	15.5
			A[1]	4.2[1]	A[1]	3.1[1]
21	Glendora Avenue/Sierra Madre Avenue	Glendora	E	43.3	B	14.2
22	Lone Hill Avenue/Glendora Marketplace	Glendora	B	15.2	C	23.1
23	Lone Hill Avenue/Gladstone Street	San Dimas	B	18.6	C	25.5
24	SR-57 (southbound)/Arrow Highway	San Dimas	A	7.4	B	19.4
25	SR-57 (northbound)/Arrow Highway & Bonita Avenue	San Dimas	C	27.5	C	29.1

Table 5-14: Build Alternative – Intersection Level of Service (2035)[3]

#	Intersection	Jurisdiction	AM		PM	
			LOS	Delay[2]	LOS	Delay[2]
26	Eucla Avenue/Fifth Street	San Dimas	A	7.4	A	7.4
27	Eucla Avenue/Second Street	San Dimas	A	9.8	B	10.5
			A[1]	0.8[1]	A[1]	1.0[1]
28	Eucla Avenue/Bonita Avenue	San Dimas	A	4.8	A	8.0
29	Eucla Avenue/Arrow Highway	San Dimas	A	8.8	B	11.7
30	Acacia Street/Fifth Street	San Dimas	A	9.2	A	9.3
			A[1]	1.5[1]	A[1]	1.1[1]
31	Acacia Street/Second Street	San Dimas	A	9.1	A	9.1
			A[1]	7.5[1]	A[1]	6.7[1]
32	Acacia Street/Bonita Avenue	San Dimas	B	10.6	C	24.4
			A[1]	0.8[1]	A[1]	1.4[1]
33	Cataract Avenue/Second Street	San Dimas	B	10.0	B	10.3
			A[1]	8.1[1]	A[1]	7.5[1]
34	Cataract Avenue/Bonita Avenue	San Dimas	A	6.1	A	5.2
35	Monte Vista Avenue/Second Street	San Dimas	A	9.5	A	9.9
			A[1]	5.2[1]	A[1]	4.4[1]
36	Monte Vista Avenue/Bonita Avenue	San Dimas	C	17.7	E	47.9
			A[1]	1.3[1]	A[1]	3.5[1]
37	San Dimas Avenue/Second Street	San Dimas	C	20.5	E	38.2
			A[1]	1.0[1]	A[1]	2.6[1]
38	San Dimas Avenue/Bonita Avenue	San Dimas	B	12.2	B	18.5
39	San Dimas Avenue/Arrow Highway	San Dimas	C	29.8	D	48.3
40	Walnut Avenue/Bonita Avenue	San Dimas	A	6.6	B	14.6
41	Walnut Avenue/Arrow Highway	San Dimas	B	16.7	B	13.2
42	San Dimas Canyon Road/Bonita Avenue	San Dimas	A	7.3	A	9.0
43	San Dimas Canyon Road/Arrow Highway	San Dimas	C	27.6	C	28.1
44	Wheeler Avenue/Third Street	La Verne	C	16.7	C	15.7
			A[1]	2.9[1]	A[1]	2.7[1]
45	Wheeler Avenue/Arrow Highway	La Verne	D	50.6	D	37.8
46	A Street/Third Street	La Verne	B	10.4	B	10.8
			A[1]	5.0[1]	A[1]	4.8[1]
47	A Street/First Street	La Verne	A	9.5	B	10.0
			A[1]	2.2[1]	A[1]	2.1[1]
48	A Street/Arrow Highway	La Verne	A	9.8	D	39.9
49	D Street/Third Street	La Verne	B	10.2	C	15.4
50	D Street/First Street	La Verne	A	9.9	B	12.7
			A[1]	1.8[1]	A[1]	2.6[1]
51	D Street/Arrow Highway	La Verne	C	22.2	C	30.4
52	E Street/Third Street	La Verne	B	10.6	C	16.0
53	E Street/Second Street	La Verne	C	15.6	C	16.9
			A[1]	2.9[1]	A[1]	3.3[1]

#	Intersection	Jurisdiction	AM LOS	AM Delay[2]	PM LOS	PM Delay[2]
Table 5-14: Build Alternative – Intersection Level of Service (2035)[3]						
54	E Street/First Street	La Verne	B	13.6	B	13.7
			A[1]	1.3[1]	A[1]	0.9[1]
55	E Street/Arrow Highway	La Verne	C	27.3	C	33.3
56	White Avenue/Third Street	La Verne	E	39.8	F	95.9
			A[1]	2.3[1]	A[1]	3.9[1]
57	White Avenue/Second Street	La Verne	D	28.0	F	121.4
			A[1]	1.4[1]	A[1]	4.6[1]
58	White Avenue/First Street	La Verne	D	33.1	F	142.2
			A[1]	2.2[1]	A[1]	7.7[1]
59	White Avenue/Sierra Way	La Verne	B	14.8	C	19.6
			A[1]	0.6[1]	A[1]	0.5[1]
60	White Avenue/Arrow Highway	La Verne	C	31.9	C	31.7
61	D Street/Bonita Avenue	La Verne	A	8.2	B	10.8
62	White Avenue/Foothill Boulevard	La Verne	C	29.4	D	39.6
63	White Avenue/Bonita Avenue	La Verne	B	14.3	B	17.9
64	White Avenue/McKinley Avenue	La Verne	B	10.8	B	14.1
65	La Verne Avenue/Arrow Highway	La Verne	F	141.3	F	652.8
			D[1]	29.2[1]	F[1]	68.8[1]
66	Fulton Road/Bonita Avenue	Pomona	D	29.4	F	137.4
			A[1]	4.4[1]	B[1]	11.7[1]
67	Fulton Road/Arrow Highway	Pomona	D	27.4	E	44.5
			A[1]	2.6[1]	A[1]	2.4[1]
68	Garey Avenue/Bonita Avenue	Pomona	C	32.6	B	18.5
69	Garey Avenue/Santa Fe Street	Pomona	A	9.4	B	13.2
			A[1]	0.2[1]	A[1]	0.4[1]
70	Garey Avenue/Arrow Highway	Pomona	C	29.9	C	34.5
71	Towne Avenue/Bonita Avenue	Pomona	B	18.5	B	15.6
72	Towne Avenue/Towne Center Drive	Pomona	D	28.7	E	49.0
			A[1]	0.4[1]	A[1]	1.3[1]
73	Towne Avenue/Arrow Highway	Pomona	D	45.8	D	46.7
74	Garey Avenue/Harrison Avenue	Pomona	A	7.9	A	5.9
75	Indian Hill Boulevard/Bonita Avenue	Claremont	A	8.1	A	9.1
76	Indian Hill Boulevard/First Street	Claremont	B	11.1	B	18.7
77	Indian Hill Boulevard/Santa Fe Street	Claremont	B	11.2	B	13.2
			A[1]	0.5[1]	A[1]	0.8[1]
78	Indian Hill Boulevard/Arrow Highway	Claremont	C	21.1	D	37.3
79	College Avenue/Bonita Avenue	Claremont	B	10.4	B	14.2
80	College Avenue/First Street	Claremont	C	15.2	E	35.6
81	College Avenue/Arrow Highway	Claremont	A	7.4	A	9.5
82	Claremont Boulevard/First Street	Claremont	A	4.0	B	10.2
83	Mills/Claremont/Arrow Highway	Claremont	B	18.2	C	25.2

Table 5-14: Build Alternative – Intersection Level of Service (2035)[3]						
			AM		PM	
#	Intersection	Jurisdiction	LOS	Delay[2]	LOS	Delay[2]
84	Monte Vista Avenue/Arrow Route	Montclair	B	13.3	B	14.7
85	Monte Vista Avenue/Richton Street	Montclair	A	5.4	A	10.0
86	Monte Vista Avenue/Arrow Highway	Montclair	B	19.1	C	32.9
87	Fremont Avenue/Arrow Highway	Montclair	A	1.7	A	4.1
88	Central Avenue/Arrow Route	Montclair	B	13.0	C	21.8
89	Central Avenue/Richton Street/West 9th Street	Montclair	B	13.1	B	15.2
90	Central Avenue/Arrow Highway	Montclair	B	15.8	C	31.3

[1] Overall intersection LOS and delay at unsignalized intersections is reported to support the air quality analysis
[2] Average vehicle delay in seconds
[3] Shading shows intersections that, in 2035, would operate at LOS E or F under the Build Alternative

Summary of Impacts

Using the thresholds presented earlier in **Table 3-5**, the intersection operating conditions under the Build Alternative were compared with the No Build Alternative to identify adversely (NEPA) and significantly affected (CEQA) locations. **Table 5-15** and **Table 5-16** show that 10 intersections in the AM peak hour are anticipated to be adversely (NEPA) and significantly affected (CEQA), 12 intersections in the PM peak hour would be adversely (NEPA) and significantly affected (CEQA), and some intersections would improve.

Table 5-15: AM Peak Hour Intersection Impacts Comparison (Build and No Build Alternatives)[2]								
#	Intersection	Jurisdiction	2035 No Build Delay[1]	2035 No Build LOS	2035 Build Delay[1]	2035 Build LOS	Change in Delay	Significant Impact
1	Barranca Avenue/Bennett Avenue	Glendora	B	21.1	C	20.9	-0.2	NO
2	Barranca Avenue/Foothill Boulevard	Glendora	B	12.1	B	11.1	-1.0	NO
3	Grand Avenue/Foothill Boulevard	Glendora	C	29.5	C	29.9	0.4	NO
4	Vermont Avenue East/Ada Avenue	Glendora	B	11.8	B	13.3	1.5	NO
5	Vermont Avenue/Route 66	Glendora	A	7.5	A	7.5	0.0	NO
6	Vermont Avenue/Foothill Boulevard	Glendora	A	7.7	A	7.5	-0.2	NO
7	Vermont Avenue W/Ada Avenue	Glendora	B	11.1	B	12.3	1.2	NO
8	Glendora Avenue/Foothill Boulevard	Glendora	C	25.0	C	28.1	3.1	NO
9	Glendora Avenue/Ada Avenue	Glendora	B	12.2	B	12.3	0.1	NO
10	Glendora Avenue/Route 66	Glendora	C	24.4	C	22.8	-1.6	NO
11	Pasadena Avenue/Lemon Avenue	Glendora	A	7.9	A	7.9	0.0	NO
12	Pasadena Avenue/Route 66	Glendora	B	11.8	B	12.4	0.6	NO
13	Glenwood Avenue/Lemon Avenue	Glendora	A	9.9	B	10.1	0.2	NO
14	Glenwood Avenue/Route 66	Glendora	F	OFL	F	OFL	N/A	YES
15	Elwood Avenue/Lemon Avenue	Glendora	B	10.7	B	10.8	0.1	NO
16	Elwood Avenue/Route 66	Glendora	B	15.4	B	15.5	0.1	NO
17	Loraine Avenue/Lemon Avenue	Glendora	C	20.0	C	19.8	-0.2	NO
18	Loraine Avenue/Route 66	Glendora	B	19.3	B	19.1	-0.2	NO
19	Lone Hill Avenue/Auto Centre Drive	Glendora	B	15.6	B	15.4	-0.2	NO
20	Barranca Avenue/Sierra Madre Avenue	Glendora	C	20.5	C	19.8	-0.7	NO
21	Glendora Avenue/Sierra Madre Avenue	Glendora	E	47.0	E	43.3	-3.7	NO
22	Lone Hill Avenue/Glendora Marketplace	Glendora	B	15.4	B	15.2	-0.2	NO
23	Lone Hill Avenue/Gladstone Street	San Dimas	B	18.8	B	18.6	-0.2	NO
24	SR-57 (southbound)/Arrow Highway	San Dimas	A	7.5	A	7.4	-0.1	NO
25	SR-57 (northbound)/Arrow Highway & Bonita Avenue	San Dimas	C	26.2	C	27.5	1.3	NO
26	Eucla Avenue/Fifth Street	San Dimas	A	7.4	A	7.4	0.0	NO

Table 5-15: AM Peak Hour Intersection Impacts Comparison (Build and No Build Alternatives)[2]								
#	**Intersection**	**Jurisdiction**	**2035 No Build**		**2035 Build**		**Change in Delay**	**Significant Impact**
			Delay[1]	**LOS**	**Delay[1]**	**LOS**		
27	Eucla Avenue/Second Street	San Dimas	A	9.7	A	9.8	0.1	NO
28	Eucla Avenue/Bonita Avenue	San Dimas	A	4.7	A	4.8	0.1	NO
29	Eucla Avenue/Arrow Highway	San Dimas	A	8.4	A	8.8	0.4	NO
30	Acacia Street/Fifth Street	San Dimas	A	9.2	A	9.2	0.0	NO
31	Acacia Street/Second Street	San Dimas	A	9.1	A	9.1	0.0	NO
32	Acacia Street/Bonita Avenue	San Dimas	B	11.1	B	10.6	-0.5	NO
33	Cataract Avenue/Second Street	San Dimas	A	9.9	B	10.0	0.1	NO
34	Cataract Avenue/Bonita Avenue	San Dimas	B	12.5	A	6.1	-6.4	NO
35	Monte Vista Avenue/Second Street	San Dimas	A	9.3	A	9.5	0.2	NO
36	Monte Vista Avenue/Bonita Avenue	San Dimas	C	20.2	C	17.7	-2.5	NO
37	San Dimas Avenue/Second Street	San Dimas	C	21.2	C	20.5	-0.7	NO
38	San Dimas Avenue/Bonita Avenue	San Dimas	B	12.2	B	12.2	0.0	NO
39	San Dimas Avenue/Arrow Highway	San Dimas	C	28.9	C	29.8	0.9	NO
40	Walnut Avenue/Bonita Avenue	San Dimas	A	6.7	A	6.6	-0.1	NO
41	Walnut Avenue/Arrow Highway	San Dimas	B	12.0	B	16.7	4.7	NO
42	San Dimas Canyon Road/Bonita Avenue	San Dimas	A	7.3	A	7.3	0.0	NO
43	San Dimas Canyon Road/Arrow Highway	San Dimas	B	13.8	C	27.6	13.8	YES
44	Wheeler Avenue/Third Street	La Verne	C	16.5	C	16.7	0.2	NO
45	Wheeler Avenue/Arrow Highway	La Verne	B	14.8	D	50.6	35.8	YES
46	A Street/Third Street	La Verne	B	10.3	B	10.4	0.1	NO
47	A Street/First Street	La Verne	A	9.3	A	9.5	0.2	NO
48	A Street/Arrow Highway	La Verne	F	198.6	A	9.8	-188.8	NO
49	D Street/Third Street	La Verne	A	9.6	B	10.2	0.6	NO
50	D Street/First Street	La Verne	A	9.7	A	9.9	0.2	NO
51	D Street/Arrow Highway	La Verne	A	5.9	C	22.2	16.3	YES
52	E Street/Third Street	La Verne	A	9.9	B	10.6	0.7	NO

Table 5-15: AM Peak Hour Intersection Impacts Comparison (Build and No Build Alternatives)[2]

#	Intersection	Jurisdiction	2035 No Build		2035 Build		Change in Delay	Significant Impact
			Delay[1]	LOS	Delay[1]	LOS		
53	E Street/Second Street	La Verne	B	14.3	C	15.6	1.3	NO
54	E Street/First Street	La Verne	B	11.4	B	13.6	2.2	NO
55	E Street/Arrow Highway	La Verne	C	22.5	C	27.3	4.8	NO
56	White Avenue/Third Street	La Verne	D	26.5	E	39.8	13.3	YES
57	White Avenue/Second Street	La Verne	C	24.8	D	28.0	3.2	NO
58	White Avenue/First Street	La Verne	D	28.4	D	33.1	4.7	YES
59	White Avenue/Sierra Way	La Verne	B	11.2	B	14.8	3.6	NO
60	White Avenue/Arrow Highway	La Verne	C	26.3	C	31.9	5.6	NO
61	D Street/Bonita Avenue	La Verne	A	8.1	A	8.2	0.1	NO
62	White Avenue/Foothill Boulevard	La Verne	C	29.6	C	29.4	-0.2	NO
63	White Avenue/Bonita Avenue	La Verne	B	14.0	B	14.3	0.3	NO
64	White Avenue/McKinley Avenue	La Verne	B	11.0	B	10.8	-0.2	NO
65	La Verne Avenue/Arrow Highway	La Verne	F	50.6	F	141.3	90.7	YES
66	Fulton Road/Bonita Avenue	Pomona	C	22.1	D	29.4	7.3	YES
67	Fulton Road/Arrow Highway	Pomona	C	22.4	D	27.4	5.0	YES
68	Garey Avenue/Bonita Avenue	Pomona	B	16.0	C	32.6	16.6	YES
69	Garey Avenue/Santa Fe Street	Pomona	B	10.8	A	9.4	-1.4	NO
70	Garey Avenue/Arrow Highway	Pomona	C	28.3	C	29.9	1.6	NO
71	Towne Avenue/Bonita Avenue	Pomona	A	9.9	B	18.5	8.6	NO
72	Towne Avenue/Towne Center Drive	Pomona	D	27.1	D	28.7	1.6	NO
73	Towne Avenue/Arrow Highway	Pomona	D	44.5	D	45.8	1.3	NO
74	Garey Avenue/Harrison Avenue	Pomona	A	7.5	A	7.9	0.4	NO
75	Indian Hill Boulevard/Bonita Avenue	Claremont	A	8.1	A	8.1	0.0	NO
76	Indian Hill Boulevard/First Street	Claremont	B	10.9	B	11.1	0.2	NO
77	Indian Hill Boulevard/Santa Fe Street	Claremont	B	11.2	B	11.2	0.0	NO
78	Indian Hill Boulevard/Arrow Highway	Claremont	C	21.2	C	21.1	-0.1	NO
79	College Avenue/Bonita Avenue	Claremont	A	9.9	B	10.4	0.5	NO

Table 5-15: AM Peak Hour Intersection Impacts Comparison (Build and No Build Alternatives)[2]

#	Intersection	Jurisdiction	2035 No Build		2035 Build		Change in Delay	Significant Impact
			Delay[1]	LOS	Delay[1]	LOS		
80	College Avenue/First Street	Claremont	B	10.8	C	15.2	4.4	NO
81	College Avenue/Arrow Highway	Claremont	A	6.3	A	7.4	1.1	NO
82	Claremont Boulevard/First Street	Claremont	A	3.3	A	4.0	0.7	NO
83	Mills/Claremont/Arrow Highway	Claremont	B	14.9	B	18.2	3.3	NO
84	Monte Vista Avenue/Arrow Route	Montclair	B	13.1	B	13.3	0.2	NO
85	Monte Vista Avenue/Richton Street	Montclair	A	3.3	A	5.4	2.1	NO
86	Monte Vista Avenue/Arrow Highway	Montclair	B	18.7	B	19.1	0.4	NO
87	Fremont Avenue/Arrow Highway	Montclair	A	1.8	A	1.7	-0.1	NO
88	Central Avenue/Arrow Route	Montclair	B	12.1	B	13.0	0.9	NO
89	Central Avenue/Richton Street/West 9th Street	Montclair	A	8.4	B	13.1	4.7	NO
90	Central Avenue/Arrow Highway	Montclair	B	15.9	B	15.8	-0.1	NO

[1] Average vehicle delay in seconds
[2] Shading shows intersections that would be significantly impacted as a result of the Build Alternative

Table 5-16: PM Peak Hour Intersection Impacts Comparison (Build and No Build Alternatives)[2]								
#	Intersection	Jurisdiction	2035 No Build LOS	2035 No Build Delay[1]	2035 Build LOS	2035 Build Delay[1]	Change in Delay	Significant Impact
1	Barranca Avenue/Bennett Avenue	Glendora	B	12.4	B	12.4	0.0	NO
2	Barranca Avenue/Foothill Boulevard	Glendora	A	8.4	A	8.4	0.0	NO
3	Grand Avenue/Foothill Boulevard	Glendora	C	34.3	C	28.5	-5.8	NO
4	Vermont Avenue East/Ada Avenue	Glendora	B	13.7	C	15.3	1.6	NO
5	Vermont Avenue/Route 66	Glendora	A	8.4	A	9.1	0.7	NO
6	Vermont Avenue/Foothill Boulevard	Glendora	A	7.0	A	7.7	0.7	NO
7	Vermont Avenue West/Ada Avenue	Glendora	B	12.0	B	13.2	1.2	NO
8	Glendora Avenue/Foothill Boulevard	Glendora	C	30.2	C	28.1	-2.1	NO
9	Glendora Avenue/Ada Avenue	Glendora	B	14.9	C	15.3	0.4	NO
10	Glendora Avenue/Route 66	Glendora	C	29.5	C	32.4	2.9	NO
11	Pasadena Avenue/Lemon Avenue	Glendora	A	7.8	A	7.9	0.1	NO
12	Pasadena Avenue/Route 66	Glendora	B	10.7	B	11.2	0.5	NO
13	Glenwood Avenue/Lemon Avenue	Glendora	B	11.2	B	11.3	0.1	NO
14	Glenwood Avenue/Route 66	Glendora	F	1097.3	F	OFL	N/A	YES
15	Elwood Avenue/Lemon Avenue	Glendora	B	10.9	B	11.0	0.1	NO
16	Elwood Avenue/Route 66	Glendora	B	16.2	B	18.1	1.9	NO
17	Loraine Avenue/Lemon Avenue	Glendora	B	13.7	B	13.7	0.0	NO
18	Loraine Avenue/Route 66	Glendora	B	11.8	B	11.6	-0.2	NO
19	Lone Hill Avenue/Auto Centre Drive	Glendora	C	24.1	C	22.7	-1.4	NO
20	Barranca Avenue/Sierra Madre Avenue	Glendora	C	15.8	C	15.5	-0.3	NO
21	Glendora Avenue/Sierra Madre Avenue	Glendora	B	14.5	B	14.2	-0.3	NO
22	Lone Hill Avenue/Glendora Marketplace	Glendora	C	23.1	C	23.1	0.0	NO
23	Lone Hill Avenue/Gladstone Street	San Dimas	C	25.5	C	25.5	0.0	NO
24	SR-57 (southbound)/Arrow Highway	San Dimas	C	20.2	B	19.4	-0.8	NO
25	SR-57 (northbound)/Arrow Highway & Bonita Avenue	San Dimas	C	29.2	C	29.1	-0.1	NO
26	Eucla Avenue/Fifth Street	San Dimas	A	7.4	A	7.4	0.0	NO

Table 5-16: PM Peak Hour Intersection Impacts Comparison (Build and No Build Alternatives)[2]								
			2035 No Build		**2035 Build**			
#	**Intersection**	**Jurisdiction**	**LOS**	**Delay[1]**	**LOS**	**Delay[1]**	**Change in Delay**	**Significant Impact**
27	Eucla Avenue/Second Street	San Dimas	B	10.5	B	10.5	0.0	NO
28	Eucla Avenue/Bonita Avenue	San Dimas	A	8.1	A	8.0	-0.1	NO
29	Eucla Avenue/Arrow Highway	San Dimas	B	11.8	B	11.7	-0.1	NO
30	Acacia Street/Fifth Street	San Dimas	A	9.3	A	9.3	0.0	NO
31	Acacia Street/Second Street	San Dimas	A	9.2	A	9.1	-0.1	NO
32	Acacia Street/Bonita Avenue	San Dimas	C	24.4	C	24.4	0.0	NO
33	Cataract Avenue/Second Street	San Dimas	B	10.0	B	10.3	0.3	NO
34	Cataract Avenue/Bonita Avenue	San Dimas	C	25.0	A	5.2	-19.8	NO
35	Monte Vista Avenue/Second Street	San Dimas	A	9.9	A	9.9	0.0	NO
36	Monte Vista Avenue/Bonita Avenue	San Dimas	F	119.5	E	47.9	-71.6	NO
37	San Dimas Avenue/Second Street	San Dimas	E	36.2	E	38.2	2.0	YES
38	San Dimas Avenue/Bonita Avenue	San Dimas	B	19.6	B	18.5	-1.1	NO
39	San Dimas Avenue/Arrow Highway	San Dimas	D	48.9	D	48.3	-0.6	NO
40	Walnut Avenue/Bonita Avenue	San Dimas	B	13.9	B	14.6	0.7	NO
41	Walnut Avenue/Arrow Highway	San Dimas	B	11.8	B	13.2	1.4	NO
42	San Dimas Canyon Road/Bonita Avenue	San Dimas	A	9.0	A	9.0	0.0	NO
43	San Dimas Canyon Road/Arrow Highway	San Dimas	B	12.1	C	28.1	16.0	YES
44	Wheeler Avenue/Third Street	La Verne	C	15.6	C	15.7	0.1	NO
45	Wheeler Avenue/Arrow Highway	La Verne	B	12.9	D	37.8	24.9	YES
46	A Street/Third Street	La Verne	B	10.6	B	10.8	0.2	NO
47	A Street/First Street	La Verne	A	10.0	B	10.0	0.0	NO
48	A Street/Arrow Highway	La Verne	F	62.6	D	39.9	-22.7	NO
49	D Street/Third Street	La Verne	B	13.5	C	15.4	1.9	NO
50	D Street/First Street	La Verne	B	11.5	B	12.7	1.2	NO
51	D Street/Arrow Highway	La Verne	A	6.2	C	30.4	24.2	YES
52	E Street/Third Street	La Verne	B	12.9	C	16.0	3.1	NO

Table 5-16: PM Peak Hour Intersection Impacts Comparison (Build and No Build Alternatives)[2]

#	Intersection	Jurisdiction	2035 No Build		2035 Build		Change in Delay	Significant Impact
			LOS	Delay[1]	LOS	Delay[1]		
53	E Street/Second Street	La Verne	B	14.8	C	16.9	2.1	NO
54	E Street/First Street	La Verne	B	12.6	B	13.7	1.1	NO
55	E Street/Arrow Highway	La Verne	C	27.6	C	33.3	5.7	NO
56	White Avenue/Third Street	La Verne	F	78.9	F	95.9	17.0	YES
57	White Avenue/Second Street	La Verne	F	56.4	F	121.4	65.0	YES
58	White Avenue/First Street	La Verne	E	49.5	F	142.2	92.7	YES
59	White Avenue/Sierra Way	La Verne	C	18.0	C	19.6	1.6	NO
60	White Avenue/Arrow Highway	La Verne	C	30.6	C	31.7	1.1	NO
61	D Street/Bonita Avenue	La Verne	B	10.2	B	10.8	0.6	NO
62	White Avenue/Foothill Boulevard	La Verne	D	39.9	D	39.6	-0.3	NO
63	White Avenue/Bonita Avenue	La Verne	B	17.3	B	17.9	0.6	NO
64	White Avenue/McKinley Avenue	La Verne	B	14.1	B	14.1	0.0	NO
65	La Verne Avenue/Arrow Highway	La Verne	F	471.1	F	652.8	181.7	YES
66	Fulton Road/Bonita Avenue	Pomona	F	58.1	F	137.4	79.3	YES
67	Fulton Road/Arrow Highway	Pomona	D	33.9	E	44.5	10.6	YES
68	Garey Avenue/Bonita Avenue	Pomona	B	15.8	B	18.5	2.7	NO
69	Garey Avenue/Santa Fe Street	Pomona	B	12.4	B	13.2	0.8	NO
70	Garey Avenue/Arrow Highway	Pomona	C	30.9	C	34.5	3.6	NO
71	Towne Avenue/Bonita Avenue	Pomona	B	11.2	B	15.6	4.4	NO
72	Towne Avenue/Towne Center Drive	Pomona	F	50.9	E	49.0	-1.9	NO
73	Towne Avenue/Arrow Highway	Pomona	D	45.1	D	46.7	1.6	NO
74	Garey Avenue/Harrison Avenue	Pomona	A	6.0	A	5.9	-0.1	NO
75	Indian Hill Boulevard/Bonita Avenue	Claremont	A	9.1	A	9.1	0.0	NO
76	Indian Hill Boulevard/First Street	Claremont	B	15.5	B	18.7	3.2	NO
77	Indian Hill Boulevard/Santa Fe Street	Claremont	B	13.2	B	13.2	0.0	NO
78	Indian Hill Boulevard/Arrow Highway	Claremont	D	37.3	D	37.3	0.0	NO
79	College Avenue/Bonita Avenue	Claremont	B	12.5	B	14.2	1.7	NO

Table 5-16: PM Peak Hour Intersection Impacts Comparison (Build and No Build Alternatives)[2]

#	Intersection	Jurisdiction	2035 No Build		2035 Build		Change in Delay	Significant Impact
			LOS	Delay[1]	LOS	Delay[1]		
80	College Avenue/First Street	Claremont	B	12.6	E	35.6	23.0	YES
81	College Avenue/Arrow Highway	Claremont	A	7.3	A	9.5	2.2	NO
82	Claremont Boulevard/First Street	Claremont	A	5.9	B	10.2	4.3	NO
83	Mills/Claremont/Arrow Highway	Claremont	B	19.8	C	25.2	5.4	NO
84	Monte Vista Avenue/Arrow Route	Montclair	B	14.6	B	14.7	0.1	NO
85	Monte Vista Avenue/Richton Street	Montclair	A	6.3	A	10.0	3.7	NO
86	Monte Vista Avenue/Arrow Highway	Montclair	C	31.0	C	32.9	1.9	NO
87	Fremont Avenue/Arrow Highway	Montclair	A	4.1	A	4.1	0.0	NO
88	Central Avenue/Arrow Route	Montclair	C	20.5	C	21.8	1.3	NO
89	Central Avenue/Richton Street/W 9th Street	Montclair	B	10.4	B	15.2	4.8	NO
90	Central Avenue/Arrow Highway	Montclair	C	29.6	C	31.3	1.7	NO

[1] Average vehicle delay in seconds
[2] Shading shows intersections that would be significantly impacted as a result of the Build Alternative

Roadway Segment Traffic Operations

The same percentage changes from the No Build Alternative were also applied to each of the 35 study roadway segments in the Build Alternative. The results are presented in **Table 5-17**. Similar to the No Build Alternative, all roadway segments would operate at LOS D or better, except North Towne Avenue between Arrow Highway and Bonita Avenue, which would operate at LOS E.

Table 5-17: Build Alternative – Roadway Segment Average Daily Traffic Analysis (2035)						
Roadway Segment	**From**	**To**	**Capacity[1,2,3,4] (Vehicles/Day)**	**Volume (Vehicles/Day)**	**V/C**	**LOS**
Glendora						
South Lone Hill Avenue	West Gladstone Street	Auto Centre Drive	32,000	27,682	0.87	D
South Loraine Avenue	Route 66	E Lemon Avenue	16,000	10,544	0.66	B
South Elwood Avenue	Route 66	E Lemon Avenue	12,000	2,704	0.23	A
South Glenwood Avenue	Route 66	E Lemon Avenue	12,000	2,791	0.23	A
South Pasadena Avenue	Route 66	E Lemon Avenue	12,000	2,643	0.22	A
South Glendora Avenue	Route 66	Foothill Boulevard	32,000	18,292	0.57	A
South Vermont Avenue	Route 66	West Foothill Boulevard	12,000	4,255	0.35	A
Grand Avenue	Route 66	West Leadora Avenue	32,000	14,184	0.44	A
Foothill Boulevard	Barranca Avenue	Glendora Avenue	16,000	12,106	0.76	C
North Barranca Avenue	West Foothill Boulevard	West Leadora Avenue	12,000	8,287	0.69	B
San Dimas						
San Dimas Canyon Road	Arrow Highway	Bonita Avenue	32,000	9,130	0.29	A
Walnut Avenue	East Arrow Highway	East Bonita Avenue	16,000	7,375	0.46	A
San Dimas Avenue	Arrow Highway	Bonita Avenue	32,000	12,077	0.38	A
Monte Vista Avenue	Commercial Street	Bonita Avenue	12,000	535	0.04	A
Cataract Avenue	Arrow Highway	First Street	12,000	3,019	0.25	A
Bonita Avenue	Eucla Avenue	San Dimas Avenue	32,000	15,556	0.49	A
Eucla Avenue	Bonita Avenue	Third Street	12,000	3,732	0.31	A
West Gladstone Street	Lone Hill Avenue	Amelia Avenue	32,000	15,510	0.48	A
La Verne						
White Avenue	Arrow Highway	Third Street	32,000	18,712	0.58	A
E Street	Arrow Highway	Third Street	16,000	6,891	0.43	A
D Street	Arrow Highway	Third Street	12,000	5,676	0.47	A
A Street	Arrow Highway	Third Street	12,000	1,334	0.11	A

Roadway Segment	From	To	Capacity[1,2,3,4] (Vehicles/Day)	Volume (Vehicles/Day)	V/C	LOS
Wheeler Avenue	Arrow Highway	Third Street	32,000	10,304	0.32	A
Pomona						
North Towne Avenue	Arrow Highway	Bonita Avenue	32,000	29,313	0.92	E
North Garey Avenue	Arrow Highway	Bonita Avenue	32,000	24,238	0.76	C
Fulton Road	Metrolink Driveway	—	16,000	1,558	0.10	A
Fulton Road	Arrow Highway	Bonita Avenue	16,000	1,894	0.12	A
Claremont						
South Mills Avenue/Claremont Boulevard	Arrow Highway	E First S	32,000	8,731	0.27	A
Indian Hill Boulevard	Arrow Highway	Bonita Avenue	32,000	21,765	0.68	B
College Avenue	E Arrow Highway	West Bonita Avenue	12,000	5,840	0.49	A
College Avenue	Green Street	—	12,000	6,399	0.53	A
Cambridge Avenue	West Arrow Highway	Bonita Avenue	12,000	5,277	0.44	A
First Street	Indian Hill Boulevard	College Avenue	24,000	8,484	0.35	A
Montclair						
Monte Vista Avenue	Richton Street	Arrow Highway	32,000	22,091	0.69	B
Central Avenue	Richton Street	Arrow Highway	32,000	27,071	0.85	D

Table 5-17: Build Alternative – Roadway Segment Average Daily Traffic Analysis (2035)

[1] Capacity of 32,000 assumes 800 vehicles per hour per lane multiplied by number of lanes, divided by a k-factor of 0.1.
[2] Capacity of 24,000 assumes 600 vehicles per hour per lane multiplied by number of lanes, divided by a k-factor of 0.1.
[3] Capacity of 16,000 assumes 800 vehicles per hour per lane multiplied by number of lanes, divided by a k-factor of 0.1.
[4] Capacity of 12,000 assumes 600 vehicles per hour per lane multiplied by number of lanes, divided by a k-factor of 0.1.

Additional Traffic Issues at Specific Locations

In addition to the study intersections and roadways, several jurisdictions provided a list of additional specific areas of concern for further evaluation. An effort was conducted to evaluate impacts, due to the Build Alternative, at these specific locations and to recommend a set of solutions to address the impacts.

The City of Glendora advised of a traffic impact near the proposed parking structure for the LRT station. The proposed parking station is located along Glendora Avenue north of Route 66. There currently exists a driveway accessing the Albertsons shopping plaza, between Route 66 and the proposed parking structure access. The City is concerned that the additional traffic being generated by the future LRT parking structure would compromise the gaps available for vehicles exiting and entering the Albertsons driveway to maneuver safely in and out of the site. A traffic count was conducted at the Albertsons driveway and existing and future operating conditions were analyzed to determine if any significant impacts would occur as a result of the project generated traffic. The analysis showed that no queuing issues would affect vehicles entering or exiting the shopping plaza. In addition, the effects of the signal at the intersection of Glendora Avenue and Route 66 would create adequate gaps for vehicles to complete their turn movements.

The Cities of San Dimas and La Verne are concerned with the access to the station parking from Arrow Highway. A level of service evaluation was performed for both locations and it was determined that both ingress/egress intersections would be signalized and turning pockets would be provided on Arrow Highway for all turning movements entering the parking structure.

The Cities of San Dimas, Pomona, and Claremont each identified a grade crossing location that had been previously analyzed using the MTA Grade Crossing Policy for Light Rail Transit. The results of the analysis concluded that all three locations would require improvements to maintain safe operations with an at-grade configuration.

Further detailed analyses will be performed during the conceptual engineering and design phases of the project. **Table 5-18** provides a summary of the traffic impacts and recommendations at these locations.

Table 5-18: Impacts at Specific Locations

Location	Jurisdiction	Traffic Impact	Proposed Improvements
Access to proposed parking structure off Glendora Avenue.	Glendora	No Impact	• None
Access to proposed parking structure off Walnut Avenue.	San Dimas	No Impact	• Provide a left-turn pocket for the northbound approach from Walnut Avenue
Bonita Avenue /Cataract Avenue grade crossing	San Dimas	No Impact, with incorporation of the proposed Improvements	• Reconfigure the intersection as a traffic island or re-align Bonita Avenue and reduce the median width to reduce the size of the intersection. • Install traffic signals. • Provide four quadrant gates • Provide pedestrian gates • Implement education programs, as

Table 5-18: Impacts at Specific Locations			
Location	**Jurisdiction**	**Traffic Impact**	**Proposed Improvements**
			appropriate, for the local schools • Provide pre-emption of the traffic control • Adjust device placements and warning signs to provide positive control.
Access to proposed parking structure off Arrow Highway	La Verne	No Impact with incorporation of the proposed recommendations	• Signalize the proposed access • Provide a Left-turn pocket for the westbound approach from Arrow Highway • Provide a right-turn pocket for the eastbound approach from Arrow Highway
Garey Avenue grade crossing	Pomona	No Impact, with incorporation of the proposed Improvements	• Provide four quadrant gates • Address gate timing issues with dual sets of tracks (eliminate the bouncing gates phenomena) • Provide pedestrian gates • Evaluate whether medians could be extended • Improve street lighting at the crossing
Indian Hill grade crossing	Claremont	No Impact, with incorporation of the proposed Improvements	• Shift the Metrolink station platform to the east of College Avenue to minimize the gate down time • Provide four quadrant gates • Provide pedestrian gates • Provide pre-emption of the traffic signal at First Street • Provide do not block intersection signs at First Street • Consider use of narrow median along Indian Hill Boulevard north of the crossing • Develop design to prohibit eastbound left turns from west leg of Santa Fe Avenue • Provide right-of-way fencing in vicinity of crossing

5.2.4 Construction Phase

It may be necessary for traffic lanes to be temporarily closed. Generally, lane closures would take place at night in order to minimize traffic disruptions. Construction activities that entail the relocation of utilities and the construction of trackways and stations would require the temporary closure of lanes at roadways with at-grade crossings. Three types of grade crossing configurations were identified; midblock locations, locations adjacent to an intersection and locations where the tracks diagonally cross the intersection. With temporary lane closures occurring during the night, it is anticipated that construction impacts will be minimal at the mid-block and adjacent intersection locations. Since these lane closures are expected to take place during the night hours and outside the AM and PM peak commuting periods, there will be no impacts to both transit and traffic. Intersection operating conditions would remain at acceptable service levels because of the low traffic volumes that travel during the night. In addition, during the lane closures detour routes would be identified and clearly signed. However, at the two locations where the tracks diagonally cross the intersection, full closure of the intersection during the night hours is expected. At these select locations, impacts during construction, due to temporary interference with normal traffic flow, would be considered adverse/significant and would require the implementation of mitigation measures.

As with transit, it is anticipated that temporary lane closures would take place during the night hours when traffic volumes are substantially lower than the AM and PM peak periods. Some bus routes may require re-routing and stops may be temporarily relocated. In addition, detour routes may be implemented and clearly signed to temporarily divert traffic flow away from the closure area. Within the proposed alignement, the tracks diagonally cross the intersection at a total of two locations, one in Glendora and one in San Dimas. The Glendora intersection is at Grand Avenue/Foothill Boulevard. The San Dimas intersection is at Cataract Avenue/Bonita Avenue. During construction, these two intersections would be closed at night and transit and traffic would be re-routed to bypass the closure. Since traffic volumes are low during the night hours, it is anticipated that this adverse/significant impact can be mitigated by diverting traffic and clearly signing the detour route.

5.3 PARKING

On-street parking is available near the proposed stations at Glendora and La Verne. The existing Metrolink stations at Pomona and Claremont also provide on-street parking near the stations. No on-street parking is provided near the Montclair Transcenter; however, sufficient off-street parking is available for current and future operations.

There are two locations where the Build Alternative would minimally displace on-street parking near the proposed stations. One is “D” Street in La Verne where the space occupied by one diagonal stall on the east side of the street just north of the tracks would be needed for a pedestrian safety area. The other is Santa Fe Avenue in Claremont where the space occupied by three parallel parking stalls on the north side of the street (one west of Indian Hill Boulevard and two east of Indian Hill Boulevard) are needed for pedestrian safety areas. Aside from these two locations, current on-street parking configurations and the existing number of on-street parking spaces would remain the same.

It may be necessary to prohibit on-street parking when traffic lanes are temporarily closed due to construction activities. These activities include the relocation of utilities and the construction of trackways and stations. The temporary closure of lanes would be required at roadways with at-grade crossings.

Generally, lane closures would take place at night in order to minimize disruptions. With temporary lane closures occurring during the night, it is anticipated that construction impacts will be minimal at the mid-block and adjacent intersection locations. Since these lane closures are expected to take place during the night hours and outside of the AM and PM peak commuting periods, there will be no impacts to on-street parking spaces. Existing on-street parking spaces and loading stalls within the traffic control zone of influence that would be affected by construction activities would be temporarily removed as directed by the agency with jurisdiction. Track construction at the two locations where they diagonally cross the intersection, will require full closure of the intersection during the night hours. On-street parking spaces and loading stalls within the traffic control zone would be temporarily removed. To minimize the loss of crucial commercial parking during the off-peak day time hours, contractors would be required to have all employees park off-street at Authority-approved locations. Although these construction impacts may be temporary, they would be significant during the off-peak period and would require temporary mitigation measures for the duration of the construction period. During the night hours, parking impacts due to construction are considered insignificant due to the low demand for parking during the night hours.

5.4 PEDESTRIAN AND BICYCLE FACILITIES

The three stations that would be adjacent to existing bike lanes (Glendora, San Dimas, and Claremont) would require further evaluation during the next phases of the project to determine if station operations would conflict with existing or future bike lanes. A review of the General Plan for each city has identified the following changes that are planned for their respective city.

- Glendora – Construct Class I (off-road facility) along Foothill Boulevard to provide access to Citrus Community College, Azusa Pacific University, and the proposed Gold Line Station.
- San Dimas – Incorporate bike amenities such as long-term bicycle storage and a Bike Station into the San Dimas Gold Line Station. Provide safe cyclist connections.
- Claremont – Construct Citrus Regional Bikeway utilizing Bonita Avenue and First Street as Primary route to Claremont Boulevard. Connect bikeway to Upland/Montclair trail at county line.
- Montclair – Develop a complete bicycle trail system throughout the city, including a regional Class I Bicycle Trail along Metro railroad tracks, connecting Claremont, Pomona, La Verne, and San Dimas.

Station environments would be analyzed for pedestrian usage and safety. The Glendora Station site is currently an empty lot, so there is no existing pedestrian activity. The other proposed stations sit on developed land that would need to be wholly or partially acquired. Pedestrian circulation would be improved at these locations to ensure safe and efficient paths to traverse the proposed station and the parking facilities.

When construction of tracks or station area encroaches into a sidewalk, walkway, or crosswalk area, special consideration would be given to pedestrian safety. Pedestrian access to adjoining properties and bicycle traffic movements would be maintained during construction; however, portions of sidewalks may be temporarily closed. Temporary nighttime closures of sidewalks and crosswalks may be necessary. In addition, temporary lane closures could inhibit the flow of bicycle traffic during construction.

5.5 AT-GRADE RAILROAD CROSSINGS

Metro grade crossing policy provides a framework for assessing traffic safety and operations related to at-grade crossings and identifying the need for safety treatments or grade separation. The policy includes a systematic review process and identifies corresponding “milestones” before determining the feasibility of a grade-crossing. The review process includes the following:

- **Initial Screening (Milestone 1) –** The first step is a planning-level assessment to categorize the grade crossings based on the roadway volumes conflicting with the LRT operations and the train frequencies. Each grade crossing is assigned to one of three groups: “At-Grade Should Be Feasible,” “Possible At-Grade Operation,” and “Grade Separation Usually Required.” When a crossing is identified as “At-Grade Should Be Feasible,” detailed engineering-level operational and safety analyses can still be triggered for (1) gated crossing with traffic pre-emption and (2) locations with salient geometry or safety issues.
- **Detailed Analysis (Milestone 2) –** The second step is to provide a further safety and operations analysis to evaluate the potential impacts of LRT train operations (such as pre-emption or signal priority) on traffic delay and cross-street progression. Review of existing and future site conditions, geometry, intersection volume-to-capacity ratio, traffic control, rail operation design and options is required. Preliminary disposition from this process is either “At-Grade Operation Should Be Feasible” or “Grade Separation Usually Required.” This analysis may also identify potential operational impacts or safety concerns caused by LRT train operations and possible mitigation measures for safety enhancements.
- **Verification (Milestone 3) –** This is the final step before determining the adequacy of an at-grade crossing design and recommending whether a grade separation should be required. This analysis would be required only if an agreement regarding the proposed final design solutions could not be obtained from Metro and local constituencies (including other involved agencies and the community, as appropriate) due to concerns relating to safety, cost, operations, policy, and/or community desires). This task may involve refinement and validation of projected traffic volumes and rail operations using simulation modeling.

Milestone 1 is usually undertaken during the preliminary planning for a project. Milestones 2 and 3 are typically undertaken during preliminary engineering and environmental clearance. The final decision should be secured in conjunction with final engineering of a project.

The final decision on a crossing configuration for an intersection is based on the preceding technical analysis, engineering studies, and consensus-building. The California Public Utilities Commission must approve each grade-crossing application, and other third-party agreements and requirements must also be met.

Of the 29 at-grade crossing scenarios studied, the Milestone 1 screening indicated that no grade separations would be required, based on proposed train headways and the conflicting traffic volumes per hour per line. The Monte Vista Avenue crossing in Montclair is grade separated and would remain grade separated (even though the analysis indicated that the traffic volumes crossing the rail track would not trigger the grade separation). In addition, the Lone Hill Avenue/Auto Center Drive and the Towne Avenue crossings are proposed to be grade-separated although the analysis indicated that traffic volumes would not trigger a grade separation at either location. **Table 5-19** presents the grade crossing locations where Milestone 1 and Milestone 2 analysis was conducted.

Table 5-19: Grade Crossing Locations Studied in Milestone 1 and 2 Analyses

City	Grade Crossing Locations (Milestone 1 Report)	Possible At-Grade Operation Crossing (Milestone 2 Report)
Glendora	• Barranca Avenue • Grand Avenue/Foothill Boulevard • Vermont Avenue/Ada Avenue • Glendora Avenue • Pasadena Avenue • Glenwood Avenue • Elwood Avenue • Loraine Avenue • Lone Hill Avenue/Auto Centre Drive	• Grand Avenue/Foothill Boulevard
San Dimas	• Gladstone Street • Eucla Street • Cataract Avenue/Bonita Avenue • Monte Vista Avenue • San Dimas Avenue • Walnut Avenue • San Dimas Canyon Road	• Gladstone Street • Cataract Avenue/Bonita Avenue • San Dimas Avenue
La Verne	• Wheeler Avenue • A Street • D Street • E Street • White Avenue • Fulton Road**	None
Pomona	• Garey Avenue • Towne Avenue	None
Claremont	• Cambridge Avenue • Indian Hill Boulevard • College Avenue • Claremont Boulevard/Mills Avenue	None
Montclair	• Monte Vista Avenue	None

Source: Fehr and Peers, 2011
**also located in Pomona

Detailed Analysis Reports (Milestone 2 Analysis) were completed for each crossing identified in the "Possible At-Grade Operation" region, as well as those that were in the borderline region between the "At Grade Should be Feasible" category and the "Possible At-Grade Operation" category. Using several checks on rail operations, traffic operations, and safety, feasible mitigations and crossing treatments for these four crossings were identified. **Table 5-20** outlines the treatments that would allow these crossings to be operable at grade. The full text of the treatments is available **Appendix F**. The treatments as identified in the grade crossing analysis will be correlated with the proposed mitigations from the traffic analysis to create a comprehensive plan for each crossing and adjacent intersection.

Table 5-20: Results of Milestone 2 Grade Crossing Analysis

City	Grade Crossing	Recommended Treatment for At-Grade Operation
Glendora	Grand Avenue/ Foothill Boulevard	• Provide four quadrant gates • Provide pedestrian gates • Education programs to be implemented as appropriate for the local schools • Revise pedestrian channelization to improve control of movements • Provide pre-emption of the traffic control • Consider use of narrow median along Foothill Boulevard • Incorporate provision to ban right-turn-on-red • Provide potential anti-queuing controls. Include installation of “DO NOT BLOCK INTERSECTION” sign and “KEEP CLEAR” pavement marking at the Grand Avenue / Foothill Boulevard intersection and the side controlled Grand Avenue / Carroll Avenue intersection.
San Dimas	Gladstone Street	• Provide four quadrant gates • Provide pedestrian gates • Implement education programs, as appropriate, for the local schools • Provide potential anti-queuing controls. Include installation of “DO NOT BLOCK INTERSECTION” sign and “KEEP CLEAR” pavement at the adjacent signalized intersection of Lone Hill Avenue /Gladstone Street
San Dimas	Cataract Avenue/ Bonita Avenue	• Reconfigure the intersection as a traffic island or re-align Bonita Avenue and reduce the median width to reduce the size of the intersection. Install traffic signals. • Provide four quadrant gates • Provide pedestrian gates • Implement education programs, as appropriate, for the local schools • Provide pre-emption of the traffic control • Adjust device placements and warning signs to provide positive control.
San Dimas	San Dimas Avenue	• Provide four quadrant gates • Provide pedestrian gates • Provide potential anti-queuing controls. Include installation of “DO NOT BLOCK INTERSECTION” sign and “KEEP CLEAR” pavement nearby intersections, including: San Dimas Avenue/Bonita Avenue and San Dimas Avenue/West Railway.

Source: Fehr and Peers, 2011

Chapter 6 – Mitigation Measures

For the most part, public transit and on-street parking would be the same as the No Build Alternative. Pedestrian and bicycle facilities would be enhanced when compared to the No Build Alternative due to the proposed LRT project and its associated stations. For traffic circulation, a number of improvements are proposed as a result of this evaluation. The improvements include those implemented as part of the project as outlined above in the Build Alternative as well as the proposed mitigation measures, identified below, to address significant impacts. Further details about the proposed mitigation measures and residual impacts, if any, are provided below.

6.1 MITIGATION MEASURES

Pedestrian and bicycle facilities would be enhanced as a result of the project and associated stations. Improvements would be implemented for traffic circulation. Some would be an integral part of the Build Alternative, and some would be considered mitigation measures, to address significant impacts.

A number of intersections will be signalized as part of the mitigation measures for both The TSM and Build Alternatives. It is recommended that traffic signal system-wide operational improvements be made on intersections in progression. The following arterials will be set up for traffic signal system-wide coordination and synchronization.

- Route 66 – Glendora
- Bonita Avenue – San Dimas
- Arrow Highway – San Dimas and La Verne
- White Avenue – La Verne

6.1.1 Short-Term Construction Mitigation Measures

TR- 1 - During final design, site- and street-specific Worksite Traffic Control Plans shall be developed in cooperation with the appropriate departments of transportation in each Azusa-Montclair corridor City and with Los Angeles County to accommodate required pedestrian and traffic movements. To the extent practical, traffic lanes will be maintained in both directions, particularly during periods of peak traffic operations. Access to homes and businesses shall be maintained throughout the construction period. To the extent feasible, lane closures shall occur during the night hours.

TR-2 - Designated haul routes for trucks shall be identified during final design in cooperation with the corridor Cities and implemented throughout the construction process. These routes shall be situated to minimize noise, vibration, and other possible impacts. Following completion of the project, if slight physical damage to surface of the haul route roads is found, the road shall be treated as necessary.

TR-3 - The Traffic Management Control Plan shall be developed and implemented. The Plan shall be developed in close coordination with local jurisdictions, the local emergency response agencies (including fire and police departments and ambulance services), school districts, and other agencies as appropriate. The Plan shall include, but not be limited to:

- Providing public information through media alerts, flyers, and Authority website to alert and inform the community about construction activities and schedules, including planned street and access closures.
- Providing traveler information (traffic advisor radio, changeable message signs (CMS)), including detour routes
- Creating a hotline for the community with a direct connection to staff to answer questions, provide information, and resolve issues. In addition, field offices shall be opened at specific locations identified as best serving the community and neighborhoods.
- Developing specific street closures and phasing plans, and other measures.
- Posting advance notices indicating when access closed or limited on city streets
- Posting signs indicating access routes and alternate access points, as well as announcing that affected businesses are open.
- Placing newspaper notices to indicate street and access closures
- Before any significant bus rerouting changes are made, fliers shall be provided on buses at least two weeks in advance notifying riders of route modifications. In addition, hoods shall be placed over bus-stop signs notifying riders of what modifications have been made to the bus route.

6.1.2 Long-Term Mitigation Measures

For the intersections where significant traffic impacts were identified the following modifications were considered:

- Modifications to intersection geometrics within the existing pavement width, if feasible.
- Changes to signal operations to improve efficiency.
- Signalization of selected two- and four-way stop-controlled intersections.

Within the Study Area, 13 intersections were found to be significantly affected. The following mitigation measures are considered feasible and can be accommodated within the existing right-of-way. These measures shall be implemented prior to the inauguration of Project's operations.

TR-1 In Glendora, the Construction Authority shall cooperatively work with the City, and contribute funding as necessary, to ensure the signalization at the intersection of Glenwood Avenue and West Route 66.

TR-2 In San Dimas, the Construction Authority shall cooperatively work with the City, and contribute funding as necessary, to ensure the signalization at the intersection of San Dimas Avenue and Second Street.

TR-3 In La Verne, the Construction Authority shall cooperatively work with the City, and contribute funding as necessary, to ensure the signalization of the intersections of White Avenue and First Street, White Avenue and Second Street, and La Verne Avenue and Arrow Highway.

TR-4 In Pomona, the Construction Authority shall cooperatively work with the City, and contribute funding as necessary, to ensure the signalization of the intersection of Fulton Road and Bonita Avenue.

TR-6 In Pomona, the Construction Authority shall cooperatively work with the City, and contribute funding as necessary, to modify the Garey Avenue and Bonita Avenue intersection within existing right-of-way. The proposed modification is a restriping of the northbound approach to provide two exclusive left-turn lanes, one through lane, and one shared right-turn/through lane. The "receiving leg" would also be restriped to provide two through lanes.

TR-7 In Claremont, the Construction Authority shall cooperatively work with the City, and contribute funding as necessary, ensure the signalization of the intersection of College Avenue and First Street.

6.2 LEVEL OF IMPACT AFTER MITIGATION

Results of the intersection operating conditions after implementation of the Build Alternative mitigation measures are provided in **Table 6-2**. Detailed worksheets are attached as **Appendix H**. As shown, 10 of the 13 affected intersections will be mitigated to a level that is *less than significant*. For the three remaining affected intersections, no improvements can be accommodated within the existing right-of-way. However, even without mitigation the San Dimas Canyon Road/Arrow Highway and D Street/Arrow Highway would continue to operate at LOS C, while the intersection of Wheeler Avenue/Arrow Highway would operate at LOS D, which are acceptable level of service in urban areas. Nonetheless, impact at these three intersections is considered to be significant unavoidable according to the impact criteria.

Table 6-1: Build Alternative – Mitigated Intersection Level of Service

#	Intersection	Jurisdiction	AM		PM		Residual Impact
			LOS	Delay[1]	LOS	Delay[1]	
14	Glenwood Avenue/Route 66	Glendora	B	10.9	A	7.1	No
37	San Dimas Avenue/Second Street	San Dimas	A	2.3	A	3.9	No
43	San Dimas Canyon Road/Arrow Highway	San Dimas	C	27.6	C	28.1	Yes
45	Wheeler Avenue/Arrow Highway	La Verne	D	50.6	D	37.8	Yes
51	D Street/Arrow Highway	La Verne	C	22.2	C	30.4	Yes
56	White Avenue/Third Street	La Verne	D	28.4	F	77.6	No
57	White Avenue/Second Street	La Verne	A	3.4	A	7	No
58	White Avenue/First Street	La Verne	A	5.4	A	7.3	No
65	La Verne Avenue/Arrow Highway	La Verne	B	15.3	A	8.3	No
66	Fulton Road/Bonita Avenue	Pomona	A	18.1	A	9	No
67	Fulton Road/Arrow Highway	Pomona	C	24.5	D	32	No
68	Garey Avenue/Bonita Avenue	Pomona	C	21.9	B	19.1	No
80	College Avenue/First Street	Claremont	A	7.9	A	9.7	No

[1] Average vehicle delay in seconds per vehicle

Chapter 7 – Conclusions

The overall conclusions of the traffic study are presented in this section. In summary, there two impact categories; those found to be significant after mitigation and those found to be insignificant after mitigation.

7.1 PUBLIC TRANSIT

No unavoidable significant adverse impacts have been identified. Any impacts resulting from the displacement of bus stops or shifts in bus routes due to street design changes would be mitigated to a level that is less than significant by the adjustment of schedules and the notification of bus patrons so that they are aware of any route and time changes. Proposed developments, either under construction or planned, along the proposed alignment and station areas would benefit from increased transit service. In addition, the transit trips generated by these new development projects would contribute to the operational success of the overall regional LRT system. These would be considered beneficial impacts because they would increase system wide ridership thus benefiting the overall transit system.

7.2 STREETS AND HIGHWAYS

7.2.1 No Build Alternatine

Impacts due to overall growth in the Regional Connector project area are reflected in the No Build traffic forecasts and associated AM and PM peak hour level of service estimates.

7.2.2 TSM Alternative

A total of four intersection locations were impacted. After implementation of the proposed mitigation measures all four locations would be mitigated to a level of insignificance. There would be no residual impacts for this alternative.

7.2.3 Build Alternative

A total of thirteen intersection locations were impacted. After implementation of the proposed mitigation measures ten locations would be mitigated to a level of insignificance. In addition, there would be residual impacts at three intersections for this alternative.

7.3 PARKING

It is anticipated that construction of the future LRT alignment and stations would not impact or displace any existing on-street parking stalls. Current on-street parking configurations and the existing number of on-street parking spaces would remain the same.

7.4 OTHER MODES

The proposed station sites in the cities of Glendora, San Dimas, and Claremont would be adjacent to existing bike lanes and will need further evaluation during the next phases of the project to determine if construction of the LRT stations would conflict with the existing and any future bike lanes. Also, current station environments would need to be analyzed for pedestrian usage and safety.

Metro Gold Line Foothill Extension – Microsimulation Traffic Analysis of Bonita/Cataract Intersection

TECHNICAL MEMORANDUM

Metro Gold Line Foothill Extension – Microsimulation Traffic Analysis of Bonita/Cataract Intersection

PREPARED FOR:	Denis Cournoyer/Metro Gold Line Foothill Extension Construction Authority
PREPARED BY:	Loren Bloomberg/CH2M Kavita Boddu/CH2M
DATE:	September 8, 2017
PROJECT NUMBER:	680051.T8.01

The purpose of this memorandum is to summarize the results of a comprehensive traffic simulation analysis, to assess traffic operations for the LRT and freight crossings at the Bonita Avenue/Cataract Avenue intersection. VISSIM microsimulation analysis was performed to analyze the operations of the intersection, under a variety of scenarios, including with and without grade separation of the LRT, including with and without grade separation of the LRT.

Bonita Avenue/Cataract Avenue Intersection – Proposed Geometric Concept

The proposed concept for the Bonita Avenue and Cataract Avenue intersection is that the intersection would remain as an at-grade crossing, but would be converted from all-way stop control to signalized control.

East of Acacia Street, Bonita Avenue would curve south and use a portion of the vacant parcel southwest of the Bonita Avenue/Cataract Avenue intersection to allow for a less skewed crossing of the existing freight track and of the proposed LRT tracks. Bonita Avenue would maintain two through lanes in both the eastbound and westbound directions at the intersection. Eastbound Bonita Avenue would drop one lane east of Cataract Avenue and eliminate parking on the south side of Bonita from the grade crossing to Monte Vista Avenue similar to the existing lane drop condition but to allow the merge point to be further east. Both right turning movements from Bonita Avenue to Cataract Avenue would be accommodated by new slip lanes. Cataract Avenue would maintain one northbound and one southbound lane, but would add left turn bays on both approaches. The northbound and southbound left turn bays would allow for protected left signal phasing to avoid vehicles waiting on the railroad tracks.

Microsimulation Analysis

A microsimulation analysis was performed for the Bonita Avenue/Cataract Avenue intersection to determine whether satisfactory traffic operations could be maintained with at-grade train operations. A VISSIM microsimulation model was updated to be able to conduct a comprehensive sensitivity analysis. The original analysis is detailed in the “Task Z: Bonita/Cataract Operational Analysis and Vissim Microsimulation” memorandum (AECOM, December 27, 2016)

VISSIM is a stochastic (random) model, so the results vary with each run. Traffic volumes are an input (in vehicles/hour), but the specific vehicles vary with each cycle. To smooth out changes due to random variation, 30 simulation runs, with different random number seeds, were conducted as the source of the results in the report. Since there is much variation in traffic patterns and volumes in real life, the VISSIM simulation is an excellent representation of the random effects and the overall operations. Also, VISSIM is one of the few tools that can capture the complex operations of train preemption.

The microsimulation model limits, included intersections, and simulated traffic control are shown in **Figure** 1. The analysis was focused on the future year 2035 weekday PM peak hour traffic operations.

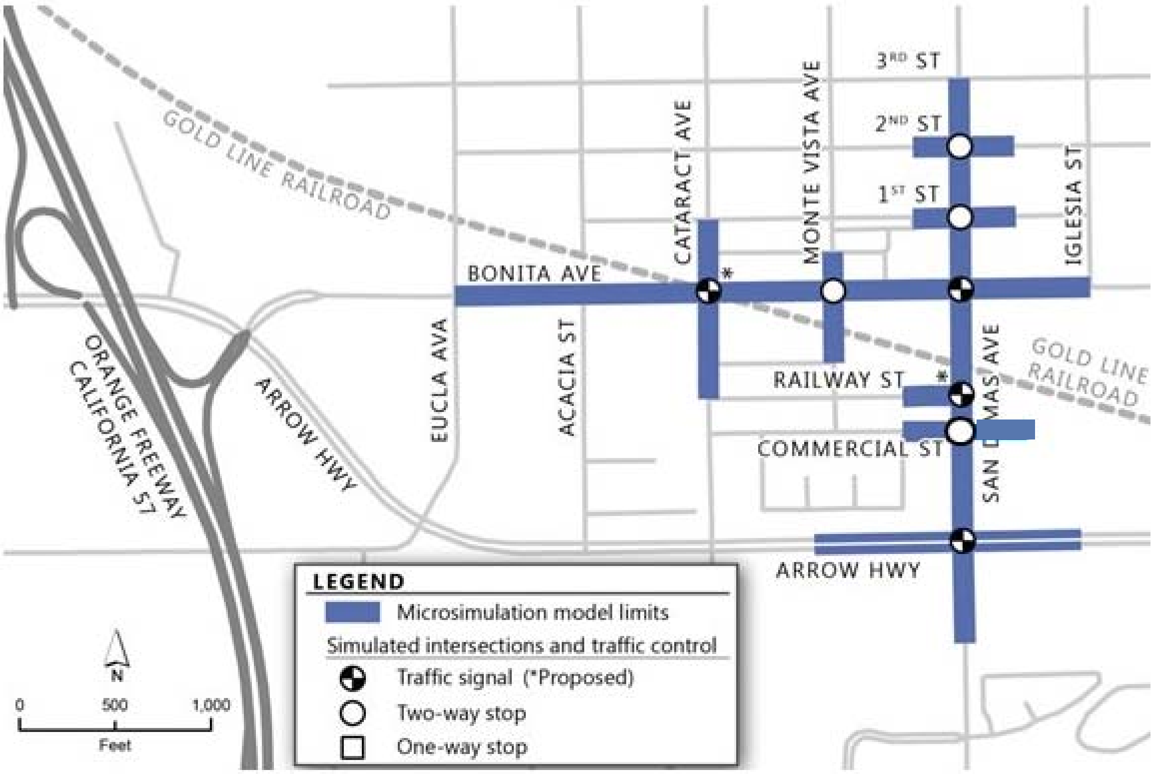


Figure 1: Microsimulation Model Limits

The modeling approach included a revised set of base model assumptions, and then some parameters were varied to allow for a sensitivity analysis. Assumptions in the base model included:

- 2035 weekday PM peak hour vehicular traffic (based on 2016 traffic counts extrapolated to 2035). The forecasts were developed using an annual 0.9% growth factor and then reducing by 2.12% per the 2012 FEIR. The net effect is a growth rate from existing to 2035 of approximately 15% total.
- LRT headways of 5 minutes.
- Up to 2.5 minutes of random train delay (up to half of the train headway). This variation in arrival times reflects the fact that trains do not arrive exactly on schedule.
- At the crossings, train operations were modeled by stopping traffic in all directions with an all-red signal phase. All-red times were set at 80 seconds (about 55 seconds of warning/vehicle clearance time, and about 25 seconds of train clearance time.
- Advanced preemption occurs before the all-red period, when the train signals that it is in the vicinity. During advanced pre-emption, one phase is held in green for a defined period (26 seconds at the Bonita Avenue/Cataract Avenue intersection) to clear vehicles and allow pedestrians to cross the street.
- The LRT train stops for 20 seconds at the station east of San Dimas.

- One freight train crossing during the middle of the peak hour, traveling at 40 mph.

Three train schedule scenarios were evaluated, because the model results showed that the schedule affects performance. The offsets of the train schedules (at five-minute headways) were varied from 0 to 150 seconds (0/75/150 seconds) in the three scenarios.

The scenarios with a 75-second offset were the most likely to have both eastbound and westbound trains crossings at the same time, which minimizes delay. However, the random delay (schedule variations) also affected the results. Apart from the variations in the schedule offset, the rest of the parameters were kept constant between the three scenarios.

Microsimulation Results

Table 1 summarizes the overall intersection average delay per vehicle and Level of Service (LOS) for the future year 2035 PM peak hour. Delay is the average over the peak hour, including periods with and without rail crossings. **Table 1** shows the results of 30 simulation runs. The data include the average, minimum and maximum of all the three scenarios combined, and the results for each scenario. There is a fair degree of variation in delay between scenarios in the peak hour, but all will be LOS E or worse.

Table 1 : Bonita Avenue/Cataract Avenue - Signalized Intersection LOS

	Average	Minimum	Maximum	Scenario 1	Scenario 2	Scenario 3
Delay (seconds/vehicle)	90	59	149	96/F	94/F	81/E
Intersection LOS	F	E	F	F	F	E

The average queues were generally within the available storage for all the runs. In the worst-case scenario, the maximum queue exceeded the available storage by 80 feet on eastbound Bonita Avenue.

Table 2 shows the delay and LOS for the signalized intersections along San Dimas Avenue. All the intersections operate at LOS D or better in all three scenarios.

Table 2: San Dimas Avenue - Signalized Intersection LOS

Intersection Name	Delay (seconds/vehicle)/LOS		
	Scenario 1	Scenario 2	Scenario 3
San Dimas Avenue/Bonita Avenue	30/C	32/C	33/C
San Dimas Avenue/Railway Street/Park and Ride	34/C	46/D	45/D
San Dimas Avenue/Arrow Highway	29/C	29/C	29/C

For the intersection of San Dimas Avenue and Railway Street, the average queues were within the available storage. For the worst-case scenario, the maximum queue exceeded by 25 feet in the northbound direction and by 85 feet in the southbound direction. The queue in the southbound direction for this intersection is measured between the tracks and San Dimas Avenue/Bonita Avenue intersection.

In addition to these three scenarios, the 2035 PM network was analyzed assuming a grade separation for LRT, while maintaining the at-grade operation for freight. With this scenario, the intersection will operate well, because the only gate closures will be for the very occasional freight train. The projected operations for the intersection with LRT grade separation will be LOS B (16 seconds of delay).

Summary

The simulation of the Bonita Avenue/Cataract Avenue intersection with an at-grade railroad crossing for the LRT and freight predicts operations at LOS F under the future year 2035 PM traffic volumes. The average delay (90 seconds per vehicle) exceeds the acceptable limits for operations. Grade separating the LRT tracks would improve the intersection to LOS B (16 seconds of delay per vehicle).

Metro Gold Line Foothill Extension – Glendora Avenue Grade Crossing Queuing Analysis

TECHNICAL MEMORANDUM

Metro Gold Line Foothill Extension – Glendora Avenue Grade Crossing Queuing Analysis

PREPARED FOR:	Denis Cournoyer, Metro Gold Line Foothill Extension Construction Authority
PREPARED BY:	Loren Bloomberg and Suhasini Kilim, CH2M
DATE:	November 2, 2017
PROJECT NUMBER:	680051.T7.01

The purpose of this technical memorandum is to summarize the results of the traffic analysis at the proposed Glendora Avenue grade crossing. The focus of the analysis was on the queuing and available storage.

Introduction

As part of the project improvements for the construction of the Metro Foothill Gold Line Extension (Phase 2B) at the Glendora Avenue grade crossing in Glendora, CA, improvements are planned at the Route 66/Glendora Avenue intersection to ensure that it can accommodate the growing demand and changes in operations with the implementation of Light Rail Transit (LRT). Figure 1 is a map of the Glendora Avenue grade crossing and the three study intersections. A detailed engineering drawing is provided as an attachment.

The grade crossing is located about 500 feet north of Route 66 and 280 feet south of Walnut Avenue. Currently, Glendora Avenue is a four-lane roadway with 35 mph posted speed limit. The analysis includes evaluation of existing and future (2035) no-build and build scenarios at the signalized intersection at Route 66/Glendora Avenue, along with the unsignalized intersections of Glendora Avenue/Avalon Apartments (south of the tracks), and Glendora Avenue/Walnut Avenue (north of the tracks). The build scenario includes the future Gold Line LRT service; no-build does not.

Traffic Volumes

Table 1 is a summary of traffic volumes for the analysis scenarios. Morning (6 to 9 AM) and evening (4 to 7 PM) peak period traffic counts were collected on Tuesday, June 13, 2017 to determine the peak hour volumes at three study intersections along Glendora Avenue. Based on the traffic counts (provided as attachments), the AM peak hour was identified as 8 to 9 AM and the PM peak hour was identified as 4:45 to 5:45 PM.

The Albertson's shopping center driveway intersection was considered for analysis based on the traffic counts. Estimates based on the data from Table 1 suggests an average of 25 vehicles/hour (in 2035) making left turns from NB Glendora Avenue into the shopping center, and 28 vehicles/hour exiting the shopping center driveway. Given these relatively low volumes, no additional analysis was necessary.

Future volumes for the three intersections were estimated using the traffic forecasting methodology as described in the *Final Environmental Impact Report (FEIR) for the Metro Gold Line Foothill Extension – Azusa to Montclair Project (February 2013)*. As identified in Table 2-12 of the FEIR, a 0.7% annual growth rate was applied to grow the intersection volumes from the existing (2017) to no-build (2035) scenario. To calculate the build scenario volumes, a reduction factor of -1.763% (for the City of Glendora as per FEIR Table 2-24) was applied. The FEIR also factored some additional trips at intersections around the stations, since intersections surrounding the stations would experience increased vehicular activity because of station operations, the turning movement volumes were adjusted to reflect this condition.

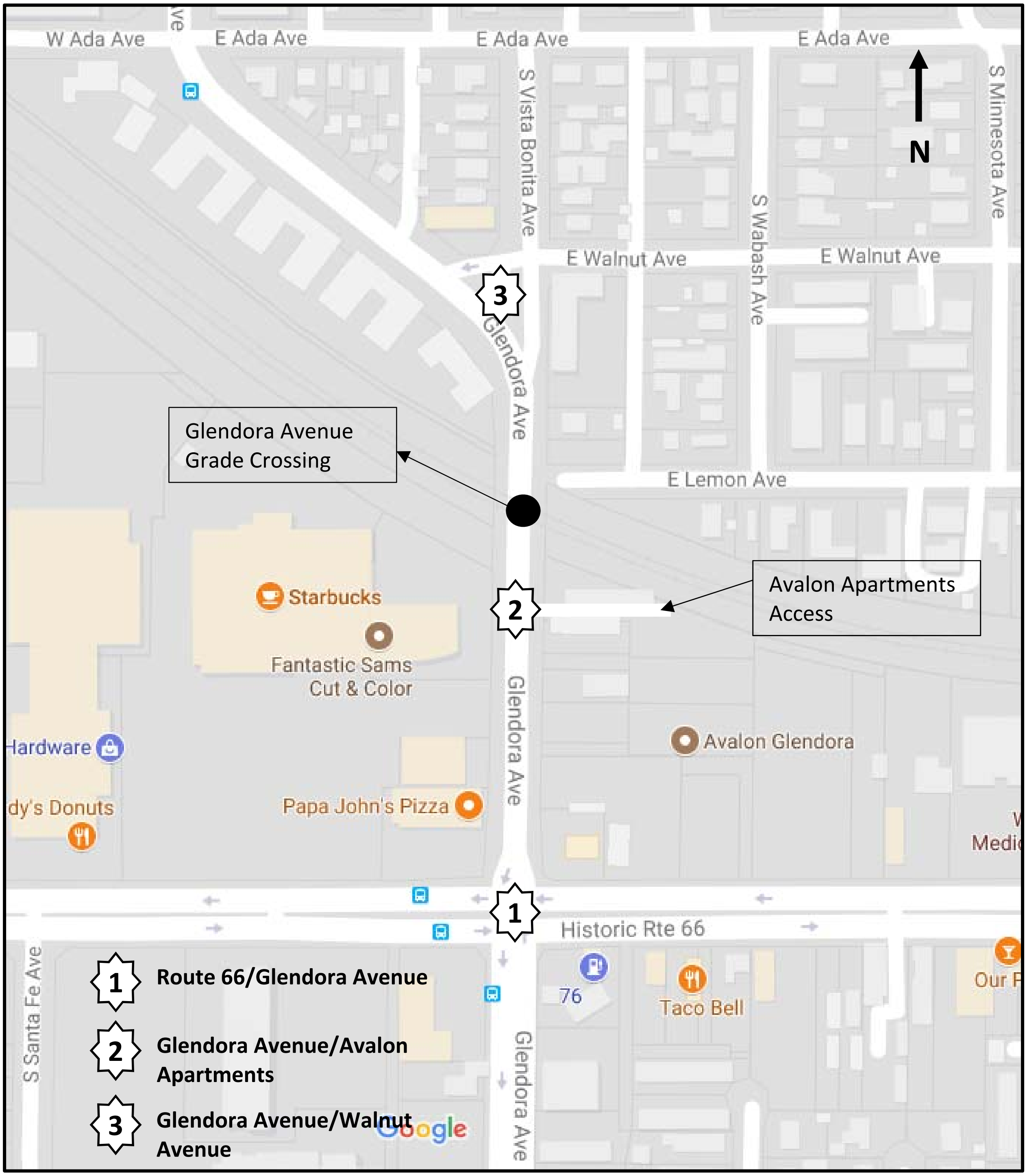


Figure 1: Study Area

Source: Google Maps

Table 1: Summary of AM and PM Peak Hour Volumes (Existing, No-Build, and Build)

Route 66/Glendora Avenue														
Peak Hour	Analysis Scenario	Glendora Avenue			Route 66			Glendora Avenue			Route 66			TOTAL
		SBL	SBT	SBR	WBL	WBT	WBR	NBL	NBT	NBR	EBL	EBT	EBR	
AM	2017 Existing	93	264	37	194	679	135	86	321	189	31	283	37	2349
	2035 No-Build	105	299	42	220	770	153	98	364	214	35	321	42	2663
	2035 Build	103	294	41	216	756	207	96	376	210	34	315	41	2689
PM	2017 Existing	183	389	55	217	529	104	123	437	337	72	806	69	3321
	2035 No-Build	207	441	62	246	600	118	139	495	382	82	914	78	3764
	2035 Build	260	455	61	242	589	116	137	486	375	81	898	77	3777

Glendora Avenue/Avalon Apartments Entrance														
Peak Hour	Analysis Scenario	Glendora Avenue			Avalon Apartments			Glendora Avenue						TOTAL
		SBL	SBT	SBR	WBL	WBT	WBR	NBL	NBT	NBR				
AM	2017 Existing	0	367	0	19	0	8	0	399	9				802
	2035 No-Build	0	416	0	22	0	9	0	452	10				909
	2035 Build	0	409	0	22	0	12	0	466	10				919
PM	2017 Existing	1	518	0	6	0	0	0	533	17				1075
	2035 No-Build	1	587	0	7	0	0	0	604	19				1218
	2035 Build	1	606	0	7	0	0	0	593	19				1226

Glendora Avenue/Walnut Avenue/Vista Bonita Avenue														
Peak Hour	Analysis Scenario	Vista Bonita Avenue			Walnut Avenue			Glendora Avenue			Glendora Avenue			TOTAL
		SBL	SBT	SBR	WBL	WBT	WBR	NBL	NBT	NBR	EBL	EBT	EBR	
AM	2017 Existing	4	81	2	22	7	3	282	114	12	2	1	267	797
	2035 No-Build	5	92	2	25	8	3	320	129	14	2	1	303	904
	2035 Build	5	90	2	35	8	3	314	127	14	2	1	313	914
PM	2017 Existing	1	58	0	20	4	3	416	186	36	0	1	469	1194
	2035 No-Build	1	66	0	23	5	3	472	211	41	0	1	532	1355
	2035 Build	1	65	0	23	5	3	487	207	51	0	1	523	1366

Level of Service and Queuing Analysis

The Synchro® (version 9.1, Build 908) traffic analysis software was used to analyze the study intersections along Glendora Avenue under the existing, no-build, and build scenarios during AM and PM peak hours. Queuing was evaluated at the intersections downstream of the tracks, to evaluate the potential for queues spilling back to the tracks. For the build scenario, an exclusive eastbound/westbound signal phase for the proposed Gold Line LRT was provided at the Glendora Avenue grade crossing. A gate down time of 55 seconds was used to represent train operations.

Table 2 is a summary of the Level of Service (LOS) evaluations for the study intersections. Details on the queuing analysis are provided below.

Table 2: LOS Analysis

Analysis Scenario	Glendora Avenue/Route 66	Glendora Avenue/Walnut Avenue
Existing	LOS D AM	LOS A AM
	LOS D PM	LOS A PM
2035 No-Build	LOS D AM	LOS A AM
	LOS E PM	LOS A PM
2035 Build	LOS D AM	LOS A AM
	LOS E PM	LOS A PM

Southbound Approach at Route 66/Glendora Avenue

Table 3 is a summary of the queuing analysis for the southbound approach at Route 66/Glendora Avenue. The "Queues Report" function in Synchro was used to determine the 50th and 95th percentile queues. These queues were compared to the available storage (for both through lanes and left turns) to determine if the queues exceed the available storage. The Highway Capacity Manual (HCM) 2010 volume/capacity (v/c) ratio was also reported to determine if the reported queues are significantly underestimated when the ratios are greater than 1.0.

The results in Table 3 indicate that the existing southbound through lanes would be able to accommodate the queues in both no-build and build scenarios. The queues are not expected to extend across the train tracks 500 feet to the north. However, the 50th and 95th percentile queues for the southbound left-turn lane are anticipated to exceed the existing storage length. These queues are not long enough to extend across the train tracks but could affect through traffic. Also, two-way left turn lane on Glendora Avenue provides additional storage for the southbound left-turn pocket, which will effectively extend the pocket to 400 feet (back to proposed median island).

The queues during the build scenario are somewhat longer than the no-build scenario. However, most of the queuing is due to existing and future traffic at the intersection. No improvements are needed as a result of Gold Line operations.

Table 3: Queuing Analysis at Route 66/Glendora Avenue - Southbound

Peak Hour	Movement	Lane Group	Storage (ft.)	HCM 2010 Volume/Capacity	50th Percentile Lane Group Queue (ft.)	95th Percentile Lane Group Queue (ft.)
2017 Existing - Southbound Glendora Avenue						
AM	Left	L	160	0.97	86	**#164**
	Thru/Right	TR	500*	0.26	78	121
PM	Left	L	160	1.47**	**~186**	**#300**
	Thru/Right	TR	500*	0.41	153	200
2035 No-Build - Southbound Glendora Avenue						
AM	Left	L	160	1.11**	~117	**#188**
	Thru/Right	TR	500*	0.3	97	138
PM	Left	L	160	1.27**	**~246**	**#362**
	Thru/Right	TR	500*	0.5	183	234
2035 Build - Southbound Glendora Avenue						
AM	Left	L	160	1.09**	~113	**#184**
	Thru/Right	TR	500*	0.29	95	135
PM	Left	L	160	1.02**	**~321**	**#448**
	Thru/Right	TR	500*	0.5	241	297

** distance to the grade crossing*
*** volume exceeds capacity*
~/# Volume exceeds capacity, queues may be longer
Queues that exceed storage are reported in **bold red**

Northbound Approach at Glendora Avenue/Walnut Avenue

The Glendora Avenue/Walnut Avenue intersection is unsignalized. The northbound and southbound through approaches are uninterrupted. Since queues for an uninterrupted approach at an unsignalized intersection cannot be reported in Synchro, SimTraffic was used to visually observe the queues. Table 4 is a summary of the results of SimTraffic analysis for the northbound approach. These results were based on averaging the outputs from 20 simulation runs for each peak hour. The results show that the 95th percentile queues are negligible. The queues won't extend across the train tracks, to the south.

The Synchro and SimTraffic worksheets are included in the attachments.

Table 4: Queuing Analysis at Glendora Avenue/Walnut Avenue - Northbound

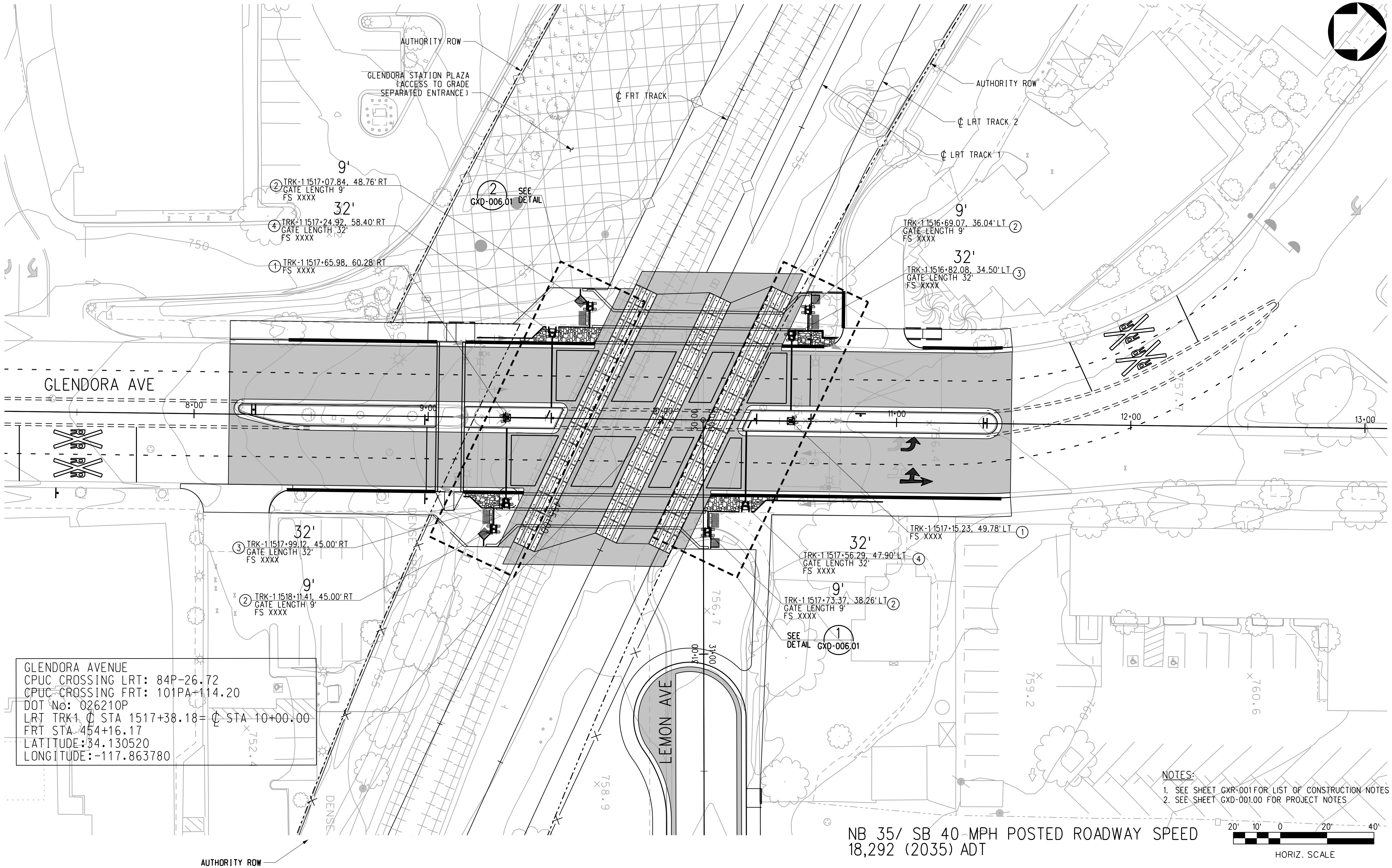
Analysis Scenario	Peak Hour	95th Percentile Lane Group Queue (ft.)
Existing	AM	<25
	PM	<25
2035 No-Build	AM	<25
	PM	<25
2035 Build	AM	<25
	PM	<25

Conclusions

The results of the queuing analysis at Glendora Avenue grade crossing indicate that the projected 2035 no-build and build traffic will not result in queues that extend across the train tracks. The evaluation was conducted on the two approaches downstream of the tracks: southbound at the Route 66/Glendora Avenue intersection, and northbound at the Glendora Avenue/Walnut Avenue intersection. No changes to storage lengths are needed as a result of Gold Line operations.

List of Attachments

- Engineering Drawing
- Traffic Counts
- Synchro Output Worksheets
- SimTraffic Output Worksheets



GLENDORA AVENUE
CPUC CROSSING LRT: 84P-26.72
CPUC CROSSING FRT: 101PA-114.20
DOT No: 026210P
LRT TRK1 ℄ STA 1517+38.18= ℄ STA 10+00.00
FRT STA 454+16.17
LATITUDE:34.130520
LONGITUDE:-117.863780

NOTES:
1. SEE SHEET GXR-001 FOR LIST OF CONSTRUCTION NOTES
2. SEE SHEET GXD-001.00 FOR PROJECT NOTES

NB 35/ SB 40 MPH POSTED ROADWAY SPEED
18,292 (2035) ADT

REV.	DATE	DESCRIPTION	DES.	ENG.
		REVISIONS		
		DRAFT NOT FOR CONSTRUCTION		

HILL
Hill International
406 E. HUNTINGTON, SUITE 202
MONROVIA, CA 91016 - 3633

METRO GOLD LINE FOOTHILL EXTENSION CONSTRUCTION AUTHORITY
GOLD LINE FOOTHILL EXTENSION PHASE 2B
GLENDORA TO MONTCLAIR
JUNE 15, 2017

GOLD LINE FOOTHILL EXTENSION
ADVANCED CONCEPTUAL ENGINEERING
PHASE 2B ALIGNMENT
GRADE CROSSING
GLENDORA AVENUE PLAN

DRAWING NO GXD-006.00
REV A
SHEET NO

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10/4/2017 8:01:17 PM
USER=jhuong

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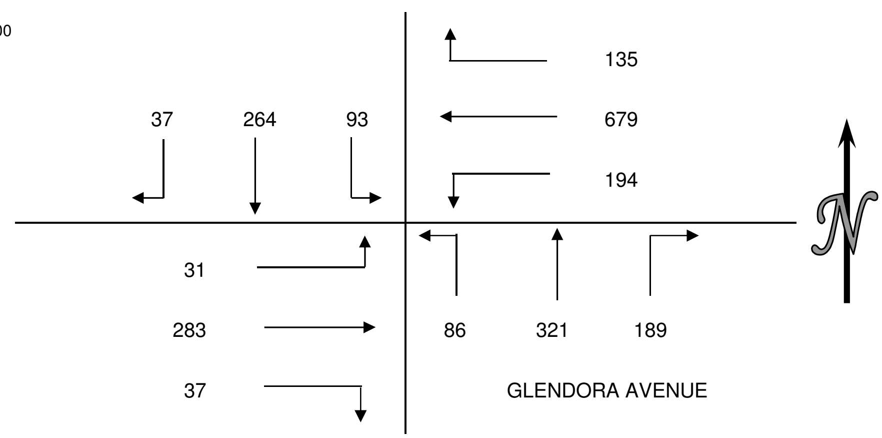
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT: CH2M HILL, INC.
PROJECT: FOOTHILL GOLDLINE TRAFFIC OUNTS
DATE: TUESDAY JUNE 13, 2017
PERIOD: 6:00 AM TO 9:00 AM
INTERSECTION: N/S GLENDORA AVENUE
E/W ROUTE 66
CITY: GLENDORA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-615	6	30	6	26	274	27	15	21	8	2	24	1	440
615-630	3	28	4	26	259	23	12	21	6	3	26	0	411
630-645	7	47	4	29	282	23	7	26	10	4	20	4	463
645-700	9	35	9	70	243	34	25	27	18	2	39	4	515
700-715	5	40	8	39	223	31	28	57	19	3	31	7	491
715-730	9	41	14	27	213	35	50	39	21	3	44	7	503
730-745	9	53	12	27	245	45	34	67	21	6	49	4	572
745-800	6	55	24	20	217	51	53	77	22	9	54	11	599
800-815	8	60	20	34	194	47	49	65	16	8	66	5	572
815-830	5	72	16	30	179	61	50	69	22	10	65	6	585
830-845	16	61	26	31	165	39	47	75	19	8	76	8	571
845-900	8	71	31	40	141	47	43	112	29	11	76	12	621
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-700	25	140	23	151	1058	107	59	95	42	11	109	9	1829
615-715	24	150	25	164	1007	111	72	131	53	12	116	15	1880
630-730	30	163	35	165	961	123	110	149	68	12	134	22	1972
645-745	32	169	43	163	924	145	137	190	79	14	163	22	2081
700-800	29	189	58	113	898	162	165	240	83	21	178	29	2165
715-815	32	209	70	108	869	178	186	248	80	26	213	27	2246
730-830	28	240	72	111	835	204	186	278	81	33	234	26	2328
745-845	35	248	86	115	755	198	199	286	79	35	261	30	2327
800-900	37	264	93	135	679	194	189	321	86	37	283	31	2349

AM PEAK HOUR: 800-900



ROUTE 66

PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
600-615	0	0	1	0	1
615-630	1	0	0	0	1
630-645	1	1	1	2	5
645-700	1	1	0	0	2
700-715	0	1	0	0	1
715-730	3	2	0	0	5

BICYCLE COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
600-615	1	1	0	0	2
615-630	0	0	0	0	0
630-645	1	0	0	0	1
645-700	0	0	0	0	0
700-715	0	0	0	0	0
715-730	0	0	0	0	0

730-745	1	0	0	0	1
745-800	0	3	0	0	3
800-815	0	3	2	0	5
815-830	1	0	0	5	6
830-845	0	1	1	2	4
845-900	0	0	1	3	4
HOUR TOTALS PERIOD	NORTH LEG	EAST LEG	SOUTH LEG	WEST LEG	TOTAL
600-700	3	2	2	2	9
615-715	3	3	1	2	9
630-730	5	5	1	2	13
645-745	5	4	0	0	9
700-800	4	6	0	0	10

730-745	0	0	0	0	0
745-800	1	1	0	1	3
800-815	0	1	0	0	1
815-830	0	0	0	1	1
830-845	0	1	1	1	3
845-900	1	0	0	0	1
HOUR TOTALS PERIOD	NORTH LEG	EAST LEG	SOUTH LEG	WEST LEG	TOTAL
600-700	2	1	0	0	3
615-715	1	0	0	0	1
630-730	1	0	0	0	1
645-745	0	0	0	0	0
700-800	1	1	0	1	3

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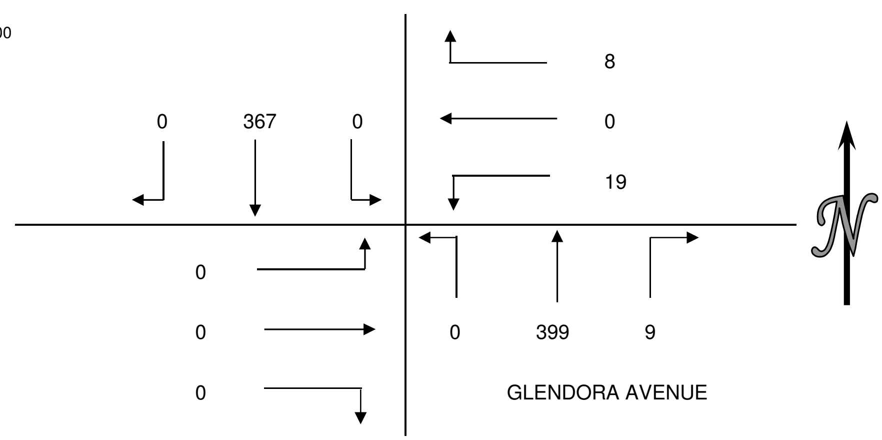
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M HILL, INC.
PROJECT:		FOOTHILL GOLDLINE TRAFFIC OUNTS
DATE:		TUESDAY JUNE 13, 2017
PERIOD:		6:00 AM TO 9:00 AM
INTERSECTION:	N/S	GLENDORA AVENUE
	E/W	AVALON APARTMENTS
CITY:		GLENDORA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-615	0	32	0	1	0	3	0	28	0	0	0	0	64
615-630	0	33	0	2	0	2	0	33	0	0	0	0	70
630-645	0	28	0	1	0	1	0	41	0	0	0	0	71
645-700	0	38	0	2	0	3	0	57	0	0	0	0	100
700-715	0	55	0	2	0	2	1	66	0	0	0	0	126
715-730	0	57	0	1	0	4	2	75	0	0	0	0	139
730-745	0	60	0	1	0	2	3	77	0	0	0	0	143
745-800	0	80	0	0	0	4	2	103	0	0	0	0	189
800-815	0	90	0	3	0	5	2	81	0	0	0	0	181
815-830	0	93	0	1	0	2	2	90	0	0	0	0	188
830-845	0	88	0	1	0	6	5	106	0	0	0	0	206
845-900	0	96	0	3	0	6	0	122	0	0	0	0	227
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-700	0	131	0	6	0	9	0	159	0	0	0	0	305
615-715	0	154	0	7	0	8	1	197	0	0	0	0	367
630-730	0	178	0	6	0	10	3	239	0	0	0	0	436
645-745	0	210	0	6	0	11	6	275	0	0	0	0	508
700-800	0	252	0	4	0	12	8	321	0	0	0	0	597
715-815	0	287	0	5	0	15	9	336	0	0	0	0	652
730-830	0	323	0	5	0	13	9	351	0	0	0	0	701
745-845	0	351	0	5	0	17	11	380	0	0	0	0	764
800-900	0	367	0	8	0	19	9	399	0	0	0	0	802

AM PEAK HOUR: 800-900



AVALON APARTMENTS

PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
600-615	0	0	1	0	1
615-630	0	1	0	0	1
630-645	0	0	0	0	0
645-700	0	2	0	0	2
700-715	0	2	1	0	3
715-730	0	0	1	0	1

BICYCLE COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
600-615	0	0	0	0	0
615-630	0	1	0	0	1
630-645	0	0	0	0	0
645-700	0	0	0	0	0
700-715	0	0	0	0	0
715-730	0	0	0	0	0

730-745	0	2	2	0	4
745-800	0	3	0	0	3
800-815	0	4	0	0	4
815-830	0	1	0	0	1
830-845	0	1	0	0	1
845-900	0	0	0	0	0
HOUR TOTALS PERIOD	NORTH LEG	EAST LEG	SOUTH LEG	WEST LEG	TOTAL
600-700	0	3	1	0	4
615-715	0	5	1	0	6
630-730	0	4	2	0	6
645-745	0	6	4	0	10
700-800	0	7	4	0	11

730-745	0	1	0	0	1
745-800	0	0	0	0	0
800-815	0	1	0	0	1
815-830	0	0	0	0	0
830-845	0	2	0	0	2
845-900	0	0	0	0	0
HOUR TOTALS PERIOD	NORTH LEG	EAST LEG	SOUTH LEG	WEST LEG	TOTAL
600-700	0	1	0	0	1
615-715	0	1	0	0	1
630-730	0	0	0	0	0
645-745	0	1	0	0	1
700-800	0	1	0	0	1

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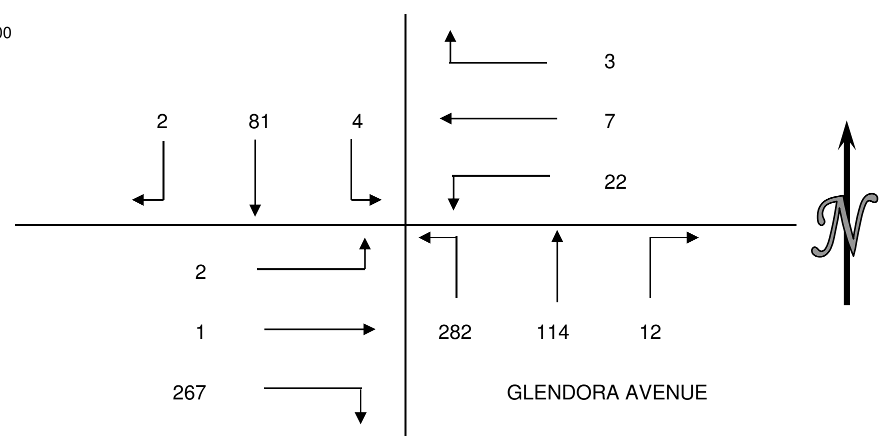
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M HILL, INC.
PROJECT:		FOOTHILL GOLDLINE TRAFFIC OUNTS
DATE:		TUESDAY JUNE 13, 2017
PERIOD:		6:00 AM TO 9:00 AM
INTERSECTION:	N/S	GLENDORA AVENUE
	E/W	WALNUT AVENUE
CITY:		GLENDORA AVENUE

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-615	0	3	0	1	0	3	4	3	18	14	0	0	46
615-630	0	14	0	0	0	3	2	7	20	17	0	0	63
630-645	0	13	0	0	1	3	0	11	34	21	1	0	84
645-700	0	16	0	0	2	2	2	15	48	19	0	0	104
700-715	0	10	0	0	0	4	1	22	38	25	1	0	101
715-730	0	10	1	0	1	2	2	23	41	35	0	0	115
730-745	0	23	1	0	3	2	7	20	70	51	0	0	177
745-800	2	13	2	0	1	4	8	26	65	74	1	0	196
800-815	0	23	3	2	3	6	4	28	51	66	1	0	187
815-830	2	21	1	0	2	2	1	21	73	64	0	1	188
830-845	0	23	0	1	1	5	3	29	67	66	0	0	195
845-900	0	14	0	0	1	9	4	36	91	71	0	1	227
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-700	0	46	0	1	3	11	8	36	120	71	1	0	297
615-715	0	53	0	0	3	12	5	55	140	82	2	0	352
630-730	0	49	1	0	4	11	5	71	161	100	2	0	404
645-745	0	59	2	0	6	10	12	80	197	130	1	0	497
700-800	2	56	4	0	5	12	18	91	214	185	2	0	589
715-815	2	69	7	2	8	14	21	97	227	226	2	0	675
730-830	4	80	7	2	9	14	20	95	259	255	2	1	748
745-845	4	80	6	3	7	17	16	104	256	270	2	1	766
800-900	2	81	4	3	7	22	12	114	282	267	1	2	797

AM PEAK HOUR: 800-900



WALNUT AVENUE

PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
600-615	0	0	0	0	0
615-630	0	0	0	0	0
630-645	0	0	0	0	0
645-700	0	1	0	0	1
700-715	0	1	0	0	1
715-730	0	1	1	0	2

BICYCLE COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
600-615	0	0	0	0	0
615-630	0	0	0	0	0
630-645	0	0	0	0	0
645-700	0	0	0	0	0
700-715	0	0	0	0	0
715-730	0	1	0	0	1

730-745	0	1	1	0	2
745-800	0	2	0	0	2
800-815	0	0	0	0	0
815-830	1	3	0	0	4
830-845	0	2	0	0	2
845-900	0	3	0	0	3
HOUR TOTALS PERIOD	NORTH LEG	EAST LEG	SOUTH LEG	WEST LEG	TOTAL
600-700	0	1	0	0	1
615-715	0	2	0	0	2
630-730	0	3	1	0	4
645-745	0	4	2	0	6
700-800	0	5	2	0	7

730-745	0	0	0	1	1
745-800	0	0	0	0	0
800-815	0	0	0	0	0
815-830	0	2	0	0	2
830-845	0	0	0	0	0
845-900	0	0	0	0	0
HOUR TOTALS PERIOD	NORTH LEG	EAST LEG	SOUTH LEG	WEST LEG	TOTAL
600-700	0	0	0	0	0
615-715	0	0	0	0	0
630-730	0	1	0	0	1
645-745	0	1	0	1	2
700-800	0	1	0	1	2

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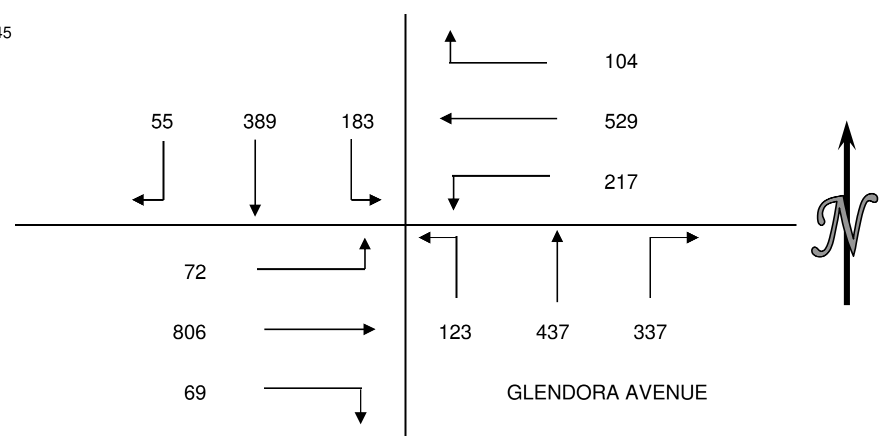
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M HILL, INC.
PROJECT:		FOOTHILL GOLDLINE TRAFFIC OUNTS
DATE:		TUESDAY JUNE 13, 2017
PERIOD:		4:00 PM TO 7:00 PM
INTERSECTION:	N/S	GLENDORA AVENUE
	E/W	ROUTE 66
CITY:		GLENDORA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	8	78	46	24	103	39	79	135	21	17	162	23	735
415-430	15	83	40	24	112	43	72	100	25	13	181	13	721
430-445	11	72	36	22	123	49	73	108	32	28	163	17	734
445-500	15	98	56	36	116	58	80	104	26	14	192	18	813
500-515	16	113	35	25	128	49	90	104	28	19	204	17	828
515-530	14	87	45	24	154	57	79	111	34	13	216	25	859
530-545	10	91	47	19	131	53	88	118	35	23	194	12	821
545-600	10	78	41	27	109	55	101	105	30	20	202	20	798
600-615	9	85	35	27	136	47	82	118	26	25	176	13	779
615-630	10	76	29	24	106	52	48	104	16	19	173	12	669
630-645	5	67	23	23	92	44	65	101	18	18	184	11	651
645-700	7	61	26	18	87	32	59	87	16	13	133	13	552
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	49	331	178	106	454	189	304	447	104	72	698	71	3003
415-515	57	366	167	107	479	199	315	416	111	74	740	65	3096
430-530	56	370	172	107	521	213	322	427	120	74	775	77	3234
445-545	55	389	183	104	529	217	337	437	123	69	806	72	3321
500-600	50	369	168	95	522	214	358	438	127	75	816	74	3306
515-615	43	341	168	97	530	212	350	452	125	81	788	70	3257
530-630	39	330	152	97	482	207	319	445	107	87	745	57	3067
545-645	34	306	128	101	443	198	296	428	90	82	735	56	2897
600-700	31	289	113	92	421	175	254	410	76	75	666	49	2651

AM PEAK HOUR: 445-545



ROUTE 66

PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-415	1	5	1	2	9
415-430	1	10	2	1	14
430-445	0	4	2	0	6
445-500	3	0	2	3	8
500-515	2	4	1	3	10
515-530	2	9	4	0	15

BICYCLE COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-415	0	0	0	1	1
415-430	0	2	0	0	2
430-445	0	0	0	0	0
445-500	2	0	0	0	2
500-515	1	1	1	0	3
515-530	0	0	1	1	2

530-545	1	2	0	3	6
545-600	1	0	3	1	5
600-615	1	4	1	2	8
615-630	0	2	0	1	3
630-645	2	1	3	2	8
645-700	1	0	2	2	5
HOUR TOTALS PERIOD	NORTH LEG	EAST LEG	SOUTH LEG	WEST LEG	TOTAL
400-500	5	19	7	6	37
415-515	6	18	7	7	38
430-530	7	17	9	6	39
445-545	8	15	7	9	39
500-600	6	15	8	7	36

530-545	1	0	1	1	3
545-600	0	0	0	0	0
600-615	1	0	1	0	2
615-630	1	0	0	1	2
630-645	0	1	2	0	3
645-700	1	0	0	1	2
HOUR TOTALS PERIOD	NORTH LEG	EAST LEG	SOUTH LEG	WEST LEG	TOTAL
400-500	2	2	0	1	5
415-515	3	3	1	0	7
430-530	3	1	2	1	7
445-545	4	1	3	2	10
500-600	2	1	3	2	8

WILTEC

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INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M HILL, INC.
PROJECT:		FOOTHILL GOLDLINE TRAFFIC OUNTS
DATE:		TUESDAY JUNE 13, 2017
PERIOD:		4:00 PM TO 7:00 PM
INTERSECTION:	N/S	GLENDORA AVENUE
	E/W	AVALON APARTMENTS
CITY:		GLENDORA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	0	131	0	0	0	2	3	129	0	0	0	0	265
415-430	0	151	1	1	0	0	3	149	0	0	0	0	305
430-445	0	127	0	1	0	1	2	137	0	0	0	0	268
445-500	0	136	0	0	0	2	4	142	0	0	0	0	284
500-515	0	125	1	0	0	0	2	125	0	0	0	0	253
515-530	0	118	0	0	0	1	5	132	0	0	0	0	256
530-545	0	139	0	0	0	3	6	134	0	0	0	0	282
545-600	0	122	1	2	0	0	3	154	0	0	0	0	282
600-615	0	119	1	2	0	1	5	143	0	0	0	0	271
615-630	0	107	1	3	0	5	9	128	0	0	0	0	253
630-645	0	97	0	1	0	1	4	112	0	0	0	0	215
645-700	0	95	0	1	0	2	5	104	0	0	0	0	207
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	0	545	1	2	0	5	12	557	0	0	0	0	1122
415-515	0	539	2	2	0	3	11	553	0	0	0	0	1110
430-530	0	506	1	1	0	4	13	536	0	0	0	0	1061
445-545	0	518	1	0	0	6	17	533	0	0	0	0	1075
500-600	0	504	2	2	0	4	16	545	0	0	0	0	1073
515-615	0	498	2	4	0	5	19	563	0	0	0	0	1091
530-630	0	487	3	7	0	9	23	559	0	0	0	0	1088
545-645	0	445	3	8	0	7	21	537	0	0	0	0	1021
600-700	0	418	2	7	0	9	23	487	0	0	0	0	946

AM PEAK HOUR: 400-500

AVALON APARTMENTS

PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-415	0	1	1	0	2
415-430	0	0	0	0	0
430-445	0	4	0	0	4
445-500	0	0	0	0	0
500-515	0	0	2	0	2
515-530	1	0	2	0	3

BICYCLE COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-415	0	0	0	0	0
415-430	0	4	0	0	4
430-445	0	0	0	0	0
445-500	0	0	0	0	0
500-515	0	1	0	0	1
515-530	0	0	0	0	0

530-545	1	1	0	0	2
545-600	0	2	0	0	2
600-615	2	1	0	0	3
615-630	1	1	0	0	2
630-645	0	1	0	0	1
645-700	0	1	0	0	1
HOUR TOTALS PERIOD	NORTH LEG	EAST LEG	SOUTH LEG	WEST LEG	TOTAL
400-500	0	5	1	0	6
415-515	0	4	2	0	6
430-530	1	4	4	0	9
445-545	2	1	4	0	7
500-600	2	3	4	0	9

530-545	0	0	0	0	0
545-600	0	0	0	0	0
600-615	0	0	0	0	0
615-630	0	0	0	0	0
630-645	0	0	0	0	0
645-700	0	0	0	0	0
HOUR TOTALS PERIOD	NORTH LEG	EAST LEG	SOUTH LEG	WEST LEG	TOTAL
400-500	0	4	0	0	4
415-515	0	5	0	0	5
430-530	0	1	0	0	1
445-545	0	1	0	0	1
500-600	0	1	0	0	1

WILTEC

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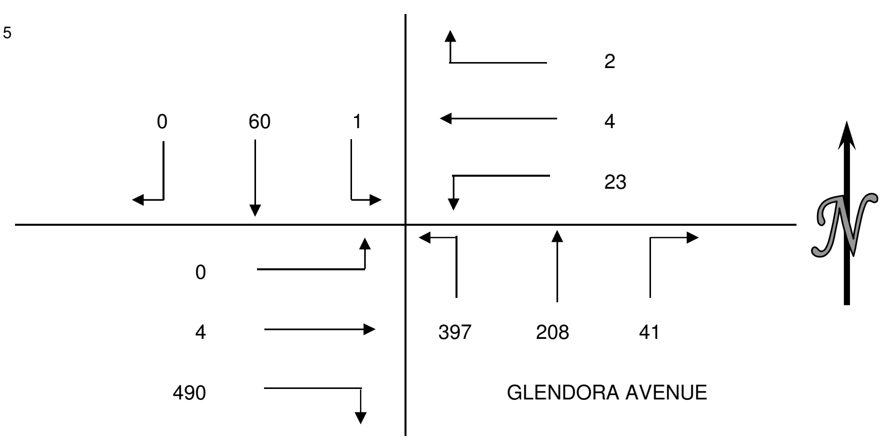
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M HILL, INC.
PROJECT:		FOOTHILL GOLDLINE TRAFFIC OUNTS
DATE:		TUESDAY JUNE 13, 2017
PERIOD:		4:00 PM TO 7:00 PM
INTERSECTION:	N/S	GLENDORA AVENUE
	E/W	WALNUT AVENUE
CITY:		GLENDORA AVENUE

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	0	14	0	0	0	7	8	47	105	107	0	0	288
415-430	0	13	1	0	0	6	10	58	86	117	3	0	294
430-445	0	13	0	1	0	3	8	44	110	111	0	0	290
445-500	0	13	0	1	2	7	11	51	96	135	0	0	316
500-515	0	21	0	0	2	7	12	55	105	127	1	0	330
515-530	0	13	1	2	0	2	6	46	105	109	0	0	284
530-545	0	11	0	0	0	4	7	34	110	98	0	0	264
545-600	0	13	1	2	0	4	12	57	94	96	0	0	279
600-615	0	20	0	0	0	5	4	55	83	89	1	1	258
615-630	0	13	0	0	1	2	8	35	73	87	0	0	219
630-645	1	22	0	0	1	4	5	36	70	86	0	0	225
645-700	0	13	0	1	0	1	4	34	74	83	0	1	211
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	0	53	1	2	2	23	37	200	397	470	3	0	1188
415-515	0	60	1	2	4	23	41	208	397	490	4	0	1230
430-530	0	60	1	4	4	19	37	196	416	482	1	0	1220
445-545	0	58	1	3	4	20	36	186	416	469	1	0	1194
500-600	0	58	2	4	2	17	37	192	414	430	1	0	1157
515-615	0	57	2	4	0	15	29	192	392	392	1	1	1085
530-630	0	57	1	2	1	15	31	181	360	370	1	1	1020
545-645	1	68	1	2	2	15	29	183	320	358	1	1	981
600-700	1	68	0	1	2	12	21	160	300	345	1	2	913

AM PEAK HOUR: 415-515



WALNUT AVENUE

PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-415	0	0	0	0	0
415-430	0	0	0	0	0
430-445	0	0	0	0	0
445-500	0	0	1	0	1
500-515	0	2	0	0	2
515-530	0	0	0	1	1

BICYCLE COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-415	0	0	0	0	0
415-430	0	0	0	0	0
430-445	0	0	0	0	0
445-500	0	0	0	0	0
500-515	0	0	0	0	0
515-530	0	0	0	0	0

530-545	0	3	0	0	3
545-600	0	1	0	0	1
600-615	0	0	0	0	0
615-630	0	0	0	0	0
630-645	0	0	0	0	0
645-700	0	0	0	0	0
HOUR TOTALS PERIOD	NORTH LEG	EAST LEG	SOUTH LEG	WEST LEG	TOTAL
400-500	0	0	1	0	1
415-515	0	2	1	0	3
430-530	0	2	1	1	4
445-545	0	5	1	1	7
500-600	0	6	0	1	7

530-545	0	0	0	1	1
545-600	0	1	0	0	1
600-615	0	0	0	0	0
615-630	0	0	0	0	0
630-645	0	0	0	0	0
645-700	0	0	0	0	0
HOUR TOTALS PERIOD	NORTH LEG	EAST LEG	SOUTH LEG	WEST LEG	TOTAL
400-500	0	0	0	0	0
415-515	0	0	0	0	0
430-530	0	0	0	0	0
445-545	0	0	0	1	1
500-600	0	1	0	1	2

Synchro Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	34	315	41	216	756	207	96	376	210	103	294	41
Future Volume (veh/h)	34	315	41	216	756	207	96	376	210	103	294	41
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	52	339	49	270	859	246	130	522	221	137	320	71
Adj No. of Lanes	1	2	1	1	2	1	1	2	1	1	2	0
Peak Hour Factor	0.65	0.93	0.84	0.80	0.88	0.84	0.74	0.72	0.95	0.75	0.92	0.58
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	67	759	339	215	1055	472	159	1476	852	129	1156	253
Arrive On Green	0.04	0.21	0.21	0.12	0.30	0.30	0.09	0.42	0.42	0.07	0.40	0.40
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	3539	1583	1774	2888	632
Grp Volume(v), veh/h	52	339	49	270	859	246	130	522	221	137	194	197
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1583	1774	1770	1751
Q Serve(g_s), s	3.0	8.6	2.6	12.5	23.2	13.3	7.4	10.4	7.7	7.5	7.6	7.8
Cycle Q Clear(g_c), s	3.0	8.6	2.6	12.5	23.2	13.3	7.4	10.4	7.7	7.5	7.6	7.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.36
Lane Grp Cap(c), veh/h	67	759	339	215	1055	472	159	1476	852	129	708	701
V/C Ratio(X)	0.78	0.45	0.14	1.26	0.81	0.52	0.82	0.35	0.26	1.06	0.27	0.28
Avail Cap(c_a), veh/h	124	996	445	215	1177	527	188	1476	852	129	708	701
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	49.2	35.2	32.8	45.3	33.5	30.1	46.1	20.5	12.8	47.8	20.8	20.9
Incr Delay (d2), s/veh	17.5	0.4	0.2	147.0	4.1	0.9	21.0	0.7	0.7	96.6	1.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	4.2	1.1	14.9	11.9	6.0	4.6	5.2	3.5	7.1	3.9	4.0
LnGrp Delay(d),s/veh	66.6	35.6	33.0	192.3	37.7	31.0	67.1	21.2	13.5	144.6	21.8	21.9
LnGrp LOS	E	D	C	F	D	C	E	C	B	F	C	C
Approach Vol, veh/h		440			1375			873			528	
Approach Delay, s/veh		39.0			66.8			26.1			53.7	
Approach LOS		D			E			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	47.5	17.0	26.6	13.7	45.8	8.4	35.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.5	43.0	12.5	29.0	10.9	39.6	7.2	34.3
Max Q Clear Time (g_c+I1), s	9.5	12.4	14.5	10.6	9.4	9.8	5.0	25.2
Green Ext Time (p_c), s	0.0	7.4	0.0	8.7	0.0	7.4	0.0	5.5

Intersection Summary	
HCM 2010 Ctrl Delay	49.8
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	283	37	194	679	135	86	321	189	93	264	37
Future Volume (veh/h)	31	283	37	194	679	135	86	321	189	93	264	37
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	48	304	44	242	772	161	116	446	199	124	287	64
Adj No. of Lanes	1	2	1	1	2	1	1	2	1	1	2	0
Peak Hour Factor	0.65	0.93	0.84	0.80	0.88	0.84	0.74	0.72	0.95	0.75	0.92	0.58
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	65	681	304	221	992	444	144	1518	876	133	1219	268
Arrive On Green	0.04	0.19	0.19	0.12	0.28	0.28	0.08	0.43	0.43	0.07	0.42	0.42
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	3539	1583	1774	2886	634
Grp Volume(v), veh/h	48	304	44	242	772	161	116	446	199	124	174	177
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1583	1774	1770	1751
Q Serve(g_s), s	2.7	7.6	2.3	12.5	20.1	8.2	6.4	8.3	6.4	7.0	6.3	6.5
Cycle Q Clear(g_c), s	2.7	7.6	2.3	12.5	20.1	8.2	6.4	8.3	6.4	7.0	6.3	6.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.36
Lane Grp Cap(c), veh/h	65	681	304	221	992	444	144	1518	876	133	747	739
V/C Ratio(X)	0.74	0.45	0.14	1.09	0.78	0.36	0.80	0.29	0.23	0.93	0.23	0.24
Avail Cap(c_a), veh/h	127	1023	458	221	1211	542	193	1518	876	133	747	739
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	47.8	35.8	33.6	43.9	33.2	28.9	45.3	18.7	11.4	46.1	18.6	18.6
Incr Delay (d2), s/veh	14.8	0.5	0.2	88.0	2.7	0.5	16.1	0.5	0.6	58.3	0.7	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	3.8	1.0	11.5	10.2	3.6	3.8	4.1	3.0	5.6	3.2	3.3
LnGrp Delay(d),s/veh	62.6	36.2	33.9	131.9	35.9	29.4	61.4	19.2	12.0	104.5	19.3	19.4
LnGrp LOS	E	D	C	F	D	C	E	B	B	F	B	B
Approach Vol, veh/h		396			1175			761			475	
Approach Delay, s/veh		39.2			54.8			23.8			41.6	
Approach LOS		D			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	47.5	17.0	23.8	12.7	46.8	8.2	32.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.5	43.0	12.5	29.0	10.9	39.6	7.2	34.3
Max Q Clear Time (g_c+I1), s	9.0	10.3	14.5	9.6	8.4	8.5	4.7	22.1
Green Ext Time (p_c), s	0.0	6.4	0.0	7.7	0.1	6.3	0.0	6.0

Intersection Summary	
HCM 2010 Ctrl Delay	41.9
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	321	42	220	770	153	98	364	214	105	299	42
Future Volume (veh/h)	35	321	42	220	770	153	98	364	214	105	299	42
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	54	345	50	275	875	182	132	506	225	140	325	72
Adj No. of Lanes	1	2	1	1	2	1	1	2	1	1	2	0
Peak Hour Factor	0.65	0.93	0.84	0.80	0.88	0.84	0.74	0.72	0.95	0.75	0.92	0.58
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	69	771	345	214	1060	474	161	1469	848	128	1147	251
Arrive On Green	0.04	0.22	0.22	0.12	0.30	0.30	0.09	0.42	0.42	0.07	0.40	0.40
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	3539	1583	1774	2889	632
Grp Volume(v), veh/h	54	345	50	275	875	182	132	506	225	140	197	200
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1583	1774	1770	1751
Q Serve(g_s), s	3.1	8.7	2.6	12.5	23.8	9.4	7.6	10.1	8.0	7.5	7.8	8.0
Cycle Q Clear(g_c), s	3.1	8.7	2.6	12.5	23.8	9.4	7.6	10.1	8.0	7.5	7.8	8.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.36
Lane Grp Cap(c), veh/h	69	771	345	214	1060	474	161	1469	848	128	702	695
V/C Ratio(X)	0.78	0.45	0.14	1.28	0.83	0.38	0.82	0.34	0.27	1.09	0.28	0.29
Avail Cap(c_a), veh/h	123	991	443	214	1172	524	187	1469	848	128	702	695
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	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	49.3	35.1	32.7	45.5	33.8	28.7	46.3	20.7	13.0	48.0	21.2	21.3
Incr Delay (d2), s/veh	16.8	0.4	0.2	158.6	4.6	0.5	21.8	0.6	0.8	105.5	1.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	4.3	1.2	15.5	12.3	4.2	4.7	5.1	3.6	7.4	4.0	4.1
LnGrp Delay(d),s/veh	66.1	35.5	32.9	204.1	38.3	29.2	68.0	21.3	13.8	153.5	22.2	22.3
LnGrp LOS	E	D	C	F	D	C	E	C	B	F	C	C
Approach Vol, veh/h		449			1332			863			537	
Approach Delay, s/veh		38.9			71.3			26.5			56.5	
Approach LOS		D			E			C			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	47.5	17.0	27.1	13.9	45.6	8.6	35.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.5	43.0	12.5	29.0	10.9	39.6	7.2	34.3
Max Q Clear Time (g_c+I1), s	9.5	12.1	14.5	10.7	9.6	10.0	5.1	25.8
Green Ext Time (p_c), s	0.0	7.4	0.0	8.6	0.0	7.3	0.0	5.2

Intersection Summary	
HCM 2010 Ctrl Delay	52.1
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	898	77	242	589	116	137	486	375	260	455	61
Future Volume (veh/h)	81	898	77	242	589	116	137	486	375	260	455	61
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	112	966	103	257	685	161	156	523	399	317	529	71
Adj No. of Lanes	1	2	1	1	2	1	1	2	1	1	2	0
Peak Hour Factor	0.72	0.93	0.75	0.94	0.86	0.72	0.88	0.93	0.94	0.82	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	134	956	427	257	1200	537	180	1022	686	313	1142	153
Arrive On Green	0.08	0.27	0.27	0.14	0.34	0.34	0.10	0.29	0.29	0.18	0.36	0.36
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	3539	1583	1774	3138	420
Grp Volume(v), veh/h	112	966	103	257	685	161	156	523	399	317	298	302
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1583	1774	1770	1789
Q Serve(g_s), s	9.3	40.5	7.6	21.7	23.8	11.2	13.0	18.5	28.6	26.5	19.3	19.4
Cycle Q Clear(g_c), s	9.3	40.5	7.6	21.7	23.8	11.2	13.0	18.5	28.6	26.5	19.3	19.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.23
Lane Grp Cap(c), veh/h	134	956	427	257	1200	537	180	1022	686	313	644	651
V/C Ratio(X)	0.83	1.01	0.24	1.00	0.57	0.30	0.87	0.51	0.58	1.01	0.46	0.46
Avail Cap(c_a), veh/h	209	956	427	257	1200	537	268	1022	686	313	644	651
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	68.4	54.8	42.7	64.1	40.6	36.5	66.4	44.5	32.2	61.8	36.5	36.5
Incr Delay (d2), s/veh	15.2	31.8	0.3	56.5	0.7	0.3	17.5	1.8	3.6	53.8	2.4	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	24.0	3.4	14.7	11.7	5.0	7.2	9.3	13.2	17.7	9.8	10.0
LnGrp Delay(d),s/veh	83.6	86.6	43.0	120.7	41.3	36.8	83.9	46.4	35.8	115.6	38.8	38.9
LnGrp LOS	F	F	D	F	D	D	F	D	D	F	D	D
Approach Vol, veh/h		1181			1103			1078			917	
Approach Delay, s/veh		82.5			59.1			47.9			65.4	
Approach LOS		F			E			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	31.0	47.8	26.2	45.0	19.7	59.1	15.9	55.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	26.5	43.3	21.7	40.5	22.7	47.1	17.7	44.5
Max Q Clear Time (g_c+I1), s	28.5	30.6	23.7	42.5	15.0	21.4	11.3	25.8
Green Ext Time (p_c), s	0.0	6.8	0.0	0.0	0.2	9.7	0.1	11.7

Intersection Summary		
HCM 2010 Ctrl Delay		64.1
HCM 2010 LOS		E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	806	69	217	529	104	123	437	337	183	389	55
Future Volume (veh/h)	72	806	69	217	529	104	123	437	337	183	389	55
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	100	867	92	231	615	144	140	470	359	223	452	64
Adj No. of Lanes	1	2	1	1	2	1	1	2	1	1	2	0
Peak Hour Factor	0.72	0.93	0.75	0.94	0.86	0.72	0.88	0.93	0.94	0.82	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	125	855	383	229	1064	476	168	1265	771	216	1198	169
Arrive On Green	0.07	0.24	0.24	0.13	0.30	0.30	0.09	0.36	0.36	0.12	0.38	0.38
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	3539	1583	1774	3116	439
Grp Volume(v), veh/h	100	867	92	231	615	144	140	470	359	223	256	260
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1583	1774	1770	1785
Q Serve(g_s), s	6.7	29.0	5.6	15.5	17.7	8.4	9.3	11.8	18.1	14.6	12.5	12.6
Cycle Q Clear(g_c), s	6.7	29.0	5.6	15.5	17.7	8.4	9.3	11.8	18.1	14.6	12.5	12.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.25
Lane Grp Cap(c), veh/h	125	855	383	229	1064	476	168	1265	771	216	680	686
V/C Ratio(X)	0.80	1.01	0.24	1.01	0.58	0.30	0.83	0.37	0.47	1.03	0.38	0.38
Avail Cap(c_a), veh/h	197	855	383	229	1064	476	262	1265	771	216	680	686
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	55.0	45.5	36.6	52.2	35.5	32.3	53.4	28.6	20.4	52.7	26.6	26.6
Incr Delay (d2), s/veh	11.9	34.2	0.3	61.5	0.8	0.4	12.4	0.8	2.0	70.2	1.6	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	18.2	2.5	11.5	8.7	3.7	5.1	5.9	8.3	11.3	6.4	6.5
LnGrp Delay(d),s/veh	66.8	79.7	37.0	113.8	36.3	32.6	65.8	29.4	22.5	122.9	28.2	28.2
LnGrp LOS	E	F	D	F	D	C	E	C	C	F	C	C
Approach Vol, veh/h		1059			990			969			739	
Approach Delay, s/veh		74.8			53.9			32.1			56.8	
Approach LOS		E			D			C			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.1	47.4	20.0	33.5	15.9	50.6	12.9	40.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.6	42.9	15.5	29.0	17.7	39.8	13.3	31.2
Max Q Clear Time (g_c+I1), s	16.6	20.1	17.5	31.0	11.3	14.6	8.7	19.7
Green Ext Time (p_c), s	0.0	8.0	0.0	0.0	0.2	8.3	0.1	7.5

Intersection Summary		
HCM 2010 Ctrl Delay		54.7
HCM 2010 LOS		D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	82	914	78	246	600	118	139	495	382	207	441	62
Future Volume (veh/h)	82	914	78	246	600	118	139	495	382	207	441	62
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	114	983	104	262	698	164	158	532	406	252	513	72
Adj No. of Lanes	1	2	1	1	2	1	1	2	1	1	2	0
Peak Hour Factor	0.72	0.93	0.75	0.94	0.86	0.72	0.88	0.93	0.94	0.82	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	139	900	402	214	1050	470	187	1283	765	200	1153	161
Arrive On Green	0.08	0.25	0.25	0.12	0.30	0.30	0.11	0.36	0.36	0.11	0.37	0.37
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	3539	1583	1774	3119	436
Grp Volume(v), veh/h	114	983	104	262	698	164	158	532	406	252	290	295
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1583	1774	1770	1786
Q Serve(g_s), s	7.6	30.5	6.3	14.5	20.7	9.8	10.5	13.5	21.4	13.5	14.8	15.0
Cycle Q Clear(g_c), s	7.6	30.5	6.3	14.5	20.7	9.8	10.5	13.5	21.4	13.5	14.8	15.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.24
Lane Grp Cap(c), veh/h	139	900	402	214	1050	470	187	1283	765	200	654	660
V/C Ratio(X)	0.82	1.09	0.26	1.22	0.67	0.35	0.85	0.41	0.53	1.26	0.44	0.45
Avail Cap(c_a), veh/h	166	900	402	214	1050	470	279	1283	765	200	654	660
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	54.5	44.8	35.7	52.8	37.0	33.1	52.7	28.7	21.5	53.3	28.5	28.5
Incr Delay (d2), s/veh	23.3	58.6	0.3	134.4	1.6	0.4	14.0	1.0	2.6	151.9	2.2	2.2
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	4.6	22.2	2.8	15.1	10.4	4.3	5.9	6.8	9.9	15.0	7.7	7.8
LnGrp Delay(d),s/veh	77.7	103.3	36.1	187.1	38.6	33.6	66.8	29.7	24.2	205.2	30.7	30.7
LnGrp LOS	E	F	D	F	D	C	E	C	C	F	C	C
Approach Vol, veh/h		1201			1124			1096			837	
Approach Delay, s/veh		95.1			72.5			33.0			83.2	
Approach LOS		F			E			C			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	48.0	19.0	35.0	17.1	48.9	13.9	40.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.5	43.5	14.5	30.5	18.9	38.1	11.2	33.8
Max Q Clear Time (g_c+I1), s	15.5	23.4	16.5	32.5	12.5	17.0	9.6	22.7
Green Ext Time (p_c), s	0.0	8.8	0.0	0.0	0.2	9.0	0.0	8.0

Intersection Summary	
HCM 2010 Ctrl Delay	70.8
HCM 2010 LOS	E

Queuing Analysis at Route 66/Glendora Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	48	304	44	243	772	161	116	446	199	124	351
v/c Ratio	0.41	0.40	0.10	1.14	0.75	0.30	0.67	0.30	0.20	0.97	0.26
Control Delay	59.9	35.8	0.4	145.9	38.7	12.9	66.6	22.0	2.2	122.3	21.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.9	35.8	0.4	145.9	38.7	12.9	66.6	22.0	2.2	122.3	21.6
Queue Length 50th (ft)	32	91	0	~197	251	29	77	106	0	86	78
Queue Length 95th (ft)	51	131	0	#311	311	69	115	118	33	#164	121
Internal Link Dist (ft)		977			958			523			392
Turn Bay Length (ft)	110		110	230		110	160		160	160	
Base Capacity (vph)	123	994	552	214	1176	595	187	1474	1003	128	1366
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.31	0.08	1.14	0.66	0.27	0.62	0.30	0.20	0.97	0.26

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.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	100	867	92	231	615	144	140	470	359	223	516
v/c Ratio	0.60	1.01	0.20	1.01	0.63	0.28	0.67	0.37	0.42	1.04	0.41
Control Delay	67.2	79.6	7.9	115.1	41.8	14.6	65.9	29.6	16.3	122.8	29.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.2	79.6	7.9	115.1	41.8	14.6	65.9	29.6	16.3	122.8	29.7
Queue Length 50th (ft)	75	~363	0	~184	222	28	105	141	137	~186	153
Queue Length 95th (ft)	104	#501	24	#349	274	51	165	187	211	#300	200
Internal Link Dist (ft)		977			958			523			392
Turn Bay Length (ft)	110		110	230		110	160		160	160	
Base Capacity (vph)	196	855	454	228	980	508	261	1265	855	215	1261
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	1.01	0.20	1.01	0.63	0.28	0.54	0.37	0.42	1.04	0.41

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.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	54	345	50	275	875	182	132	506	225	140	397
v/c Ratio	0.47	0.42	0.10	1.31	0.81	0.33	0.76	0.35	0.23	1.11	0.30
Control Delay	63.5	35.8	0.4	207.3	41.1	14.6	74.8	23.3	4.2	161.4	23.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.5	35.8	0.4	207.3	41.1	14.6	74.8	23.3	4.2	161.4	23.0
Queue Length 50th (ft)	37	104	0	~257	296	40	92	131	18	~117	97
Queue Length 95th (ft)	56	147	0	#360	362	85	#130	135	54	#188	138
Internal Link Dist (ft)		977			958			523			392
Turn Bay Length (ft)	110		110	230		110	160		160	160	
Base Capacity (vph)	120	976	544	210	1154	586	183	1447	976	126	1332
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.35	0.09	1.31	0.76	0.31	0.72	0.35	0.23	1.11	0.30

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.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	114	983	104	262	698	164	158	532	406	252	585
v/c Ratio	0.73	1.09	0.21	1.23	0.69	0.30	0.70	0.41	0.48	1.27	0.48
Control Delay	79.1	101.0	3.6	181.6	42.4	9.9	66.3	29.9	17.8	196.7	32.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.1	101.0	3.6	181.6	42.4	9.9	66.3	29.9	17.8	196.7	32.2
Queue Length 50th (ft)	87	~452	0	~250	254	16	118	161	166	~246	183
Queue Length 95th (ft)	118	#584	6	#419	305	38	182	211	251	#362	234
Internal Link Dist (ft)		977			958			523			392
Turn Bay Length (ft)	110		110	230		110	160		160	160	
Base Capacity (vph)	165	899	503	213	1013	550	278	1282	850	199	1215
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	1.09	0.21	1.23	0.69	0.30	0.57	0.41	0.48	1.27	0.48

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.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	52	339	49	270	859	246	130	522	221	137	391
v/c Ratio	0.46	0.42	0.10	1.29	0.80	0.43	0.75	0.36	0.23	1.09	0.29
Control Delay	62.5	35.8	0.4	197.9	40.5	15.3	73.9	23.4	3.8	154.1	22.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.5	35.8	0.4	197.9	40.5	15.3	73.9	23.4	3.8	154.1	22.9
Queue Length 50th (ft)	36	102	0	~250	288	55	91	136	14	~113	95
Queue Length 95th (ft)	55	145	0	#353	354	110	126	139	50	#184	135
Internal Link Dist (ft)		977			958			523			392
Turn Bay Length (ft)	110		110	230		110	160		160	160	
Base Capacity (vph)	121	978	545	210	1156	611	183	1449	980	126	1335
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.35	0.09	1.29	0.74	0.40	0.71	0.36	0.23	1.09	0.29

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.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	113	966	103	257	685	161	156	523	399	317	600
v/c Ratio	0.67	1.01	0.21	1.00	0.61	0.29	0.74	0.51	0.53	1.02	0.50
Control Delay	84.5	85.6	15.0	119.9	46.4	20.6	83.4	46.7	28.2	114.8	40.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	84.5	85.6	15.0	119.9	46.4	20.6	83.4	46.7	28.2	114.8	40.5
Queue Length 50th (ft)	108	~510	20	~257	300	56	149	226	243	~321	241
Queue Length 95th (ft)	136	#657	47	#444	358	80	218	285	347	#448	297
Internal Link Dist (ft)		977			958			523			392
Turn Bay Length (ft)	110		110	230		110	160		160	160	
Base Capacity (vph)	208	955	482	256	1129	561	267	1021	757	312	1206
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	1.01	0.21	1.00	0.61	0.29	0.58	0.51	0.53	1.02	0.50

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.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	113	966	103	257	685	161	156	523	399	317	600
v/c Ratio	0.67	1.01	0.21	1.00	0.61	0.29	0.74	0.51	0.53	1.02	0.50
Control Delay	84.5	85.6	15.0	119.9	46.4	20.6	83.4	46.7	28.2	114.8	40.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	84.5	85.6	15.0	119.9	46.4	20.6	83.4	46.7	28.2	114.8	40.5
Queue Length 50th (ft)	108	~510	20	~257	300	56	149	226	243	~321	241
Queue Length 95th (ft)	136	#657	47	#444	358	80	218	285	347	#448	297
Internal Link Dist (ft)		977			958			523			392
Turn Bay Length (ft)	110		110	230		110	160		160	160	
Base Capacity (vph)	208	955	482	256	1129	561	267	1021	757	312	1206
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	1.01	0.21	1.00	0.61	0.29	0.58	0.51	0.53	1.02	0.50

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.

Queuing Analysis at Glendora Avenue/Walnut Avenue

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	103	9	282	0	3	267
Future Vol, veh/h	103	9	282	0	3	267
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	50	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	112	10	307	0	6	284

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	461	153	0	-	307	0
Stage 1	307	-	-	-	-	-
Stage 2	154	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	529	866	-	0	1250	-
Stage 1	719	-	-	0	-	-
Stage 2	858	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	526	866	-	-	1250	-
Mov Cap-2 Maneuver	526	-	-	-	-	-
Stage 1	719	-	-	-	-	-
Stage 2	854	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.3	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	526	866	1250	-
HCM Lane V/C Ratio	-	0.213	0.011	0.005	-
HCM Control Delay (s)	-	13.7	9.2	7.9	-
HCM Lane LOS	-	B	A	A	-
HCM 95th %tile Q(veh)	-	0.8	0	0	-

Intersection	
Int Delay, s/veh	1.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	82	4	416	0	1	469
Future Vol, veh/h	82	4	416	0	1	469
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	33	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	89	4	452	0	3	539

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	728	226	0	-	452	0
Stage 1	452	-	-	-	-	-
Stage 2	276	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	358	777	-	0	1105	-
Stage 1	608	-	-	0	-	-
Stage 2	746	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	357	777	-	-	1105	-
Mov Cap-2 Maneuver	357	-	-	-	-	-
Stage 1	608	-	-	-	-	-
Stage 2	744	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	357	777	1105	-
HCM Lane V/C Ratio	-	0.25	0.006	0.003	-
HCM Control Delay (s)	-	18.4	9.7	8.3	-
HCM Lane LOS	-	C	A	A	-
HCM 95th %tile Q(veh)	-	1	0	0	-

Intersection	
Int Delay, s/veh	2.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	117	10	320	0	3	303
Future Vol, veh/h	117	10	320	0	3	303
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	50	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	127	11	348	0	6	322

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	521	174	0	-	348	0
Stage 1	348	-	-	-	-	-
Stage 2	173	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	485	839	-	0	1208	-
Stage 1	686	-	-	0	-	-
Stage 2	840	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	483	839	-	-	1208	-
Mov Cap-2 Maneuver	483	-	-	-	-	-
Stage 1	686	-	-	-	-	-
Stage 2	836	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.6	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	483	839	1208	-
HCM Lane V/C Ratio	-	0.263	0.013	0.005	-
HCM Control Delay (s)	-	15.1	9.3	8	-
HCM Lane LOS	-	C	A	A	-
HCM 95th %tile Q(veh)	-	1	0	0	-

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	82	5	472	0	1	532
Future Vol, veh/h	82	5	472	0	1	532
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	33	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	89	5	513	0	3	611

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	825	257	0	-	513	0
Stage 1	513	-	-	-	-	-
Stage 2	312	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	311	742	-	0	1049	-
Stage 1	566	-	-	0	-	-
Stage 2	715	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	310	742	-	-	1049	-
Mov Cap-2 Maneuver	310	-	-	-	-	-
Stage 1	566	-	-	-	-	-
Stage 2	713	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.6	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	310	742	1049	-
HCM Lane V/C Ratio	-	0.288	0.007	0.003	-
HCM Control Delay (s)	-	21.2	9.9	8.4	-
HCM Lane LOS	-	C	A	A	-
HCM 95th %tile Q(veh)	-	1.2	0	0	-

Intersection	
Int Delay, s/veh	2.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	125	10	314	0	3	313
Future Vol, veh/h	125	10	314	0	3	313
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	50	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	136	11	341	0	6	333

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	519	171	0	-	341	0
Stage 1	341	-	-	-	-	-
Stage 2	178	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	486	843	-	0	1215	-
Stage 1	692	-	-	0	-	-
Stage 2	835	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	484	843	-	-	1215	-
Mov Cap-2 Maneuver	484	-	-	-	-	-
Stage 1	692	-	-	-	-	-
Stage 2	831	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.9	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	484	843	1215	-
HCM Lane V/C Ratio	-	0.281	0.013	0.005	-
HCM Control Delay (s)	-	15.3	9.3	8	-
HCM Lane LOS	-	C	A	A	-
HCM 95th %tile Q(veh)	-	1.1	0	0	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑		↰	↑↑
Traffic Vol, veh/h	88	5	487	0	1	523
Future Vol, veh/h	88	5	487	0	1	523
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	33	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	96	5	529	0	3	601

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	836	265	0	-	529	0
Stage 1	529	-	-	-	-	-
Stage 2	307	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	306	733	-	0	1034	-
Stage 1	555	-	-	0	-	-
Stage 2	719	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	305	733	-	-	1034	-
Mov Cap-2 Maneuver	305	-	-	-	-	-
Stage 1	555	-	-	-	-	-
Stage 2	717	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	21.4	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	305	733	1034	-
HCM Lane V/C Ratio	-	0.314	0.007	0.003	-
HCM Control Delay (s)	-	22.1	9.9	8.5	-
HCM Lane LOS	-	C	A	A	-
HCM 95th %tile Q(veh)	-	1.3	0	0	-

SimTraffic Worksheets

Intersection: 3: Glendora Ave. & Route 66

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	131	195	162	68	252	502	466	135	143	188	144	92
Average Queue (ft)	37	114	69	21	168	236	201	70	60	76	46	28
95th Queue (ft)	99	177	142	53	278	491	438	160	119	150	110	64
Link Distance (ft)		1010	1010			980	980			544	544	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	110			110	230			110	160			160
Storage Blk Time (%)	0	11	1		16	1	18	0	1	0	0	0
Queuing Penalty (veh)	0	4	0		58	3	25	0	2	0	0	0

Intersection: 3: Glendora Ave. & Route 66

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (ft)	156	163	127
Average Queue (ft)	74	63	46
95th Queue (ft)	146	124	100
Link Distance (ft)		377	377
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	160		
Storage Blk Time (%)	3	0	
Queuing Penalty (veh)	4	0	

Intersection: 5: Glendora Ave./Glendora Avenue & Vista Bonita Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 6: Glendora Ave. & Avalon

Movement	WB
Directions Served	LR
Maximum Queue (ft)	49
Average Queue (ft)	18
95th Queue (ft)	44
Link Distance (ft)	245
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 9: Glendora Avenue/Glendora Ave. & Walnut Avenue

Movement	WB	WB	SB
Directions Served	L	R	L
Maximum Queue (ft)	69	3	18
Average Queue (ft)	35	0	1
95th Queue (ft)	60	3	10
Link Distance (ft)	54	54	
Upstream Blk Time (%)	2		
Queuing Penalty (veh)	1		
Storage Bay Dist (ft)			90
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 10: Vista Bonita Avenue & Walnut Avenue

Movement	EB	WB	SB
Directions Served	LT	TR	R
Maximum Queue (ft)	28	46	20
Average Queue (ft)	3	20	1
95th Queue (ft)	17	45	13
Link Distance (ft)	54	329	229
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 98

Intersection: 3: Glendora Ave. & Route 66

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	134	862	821	135	252	496	450	135	178	230	249	184
Average Queue (ft)	85	583	550	71	189	234	191	54	92	108	106	93
95th Queue (ft)	159	944	905	167	291	488	420	138	159	183	198	175
Link Distance (ft)		1010	1010			980	980			544	544	
Upstream Blk Time (%)		2	1									
Queuing Penalty (veh)		0	0									
Storage Bay Dist (ft)	110			110	230			110	160			160
Storage Blk Time (%)	6	69	67	0	19	1	15	0	2	1	1	1
Queuing Penalty (veh)	25	50	46	0	51	1	16	0	4	2	4	3

Intersection: 3: Glendora Ave. & Route 66

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (ft)	184	326	286
Average Queue (ft)	133	136	112
95th Queue (ft)	205	273	225
Link Distance (ft)		377	377
Upstream Blk Time (%)		0	0
Queuing Penalty (veh)		0	0
Storage Bay Dist (ft)	160		
Storage Blk Time (%)	17	1	
Queuing Penalty (veh)	34	2	

Intersection: 5: Glendora Ave./Glendora Avenue & Vista Bonita Avenue

Movement	NB	NB	SB	SB
Directions Served	T	TR	T	T
Maximum Queue (ft)	3	4	1	1
Average Queue (ft)	0	0	0	0
95th Queue (ft)	4	4	1	1
Link Distance (ft)	321	321	75	75
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Glendora Ave. & Avalon

Movement	WB	NB	SB
Directions Served	LR	TR	T
Maximum Queue (ft)	31	1	7
Average Queue (ft)	4	0	0
95th Queue (ft)	22	2	9
Link Distance (ft)	245	377	321
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 9: Glendora Avenue/Glendora Ave. & Walnut Avenue

Movement	WB	NB	SB
Directions Served	L	T	L
Maximum Queue (ft)	71	2	4
Average Queue (ft)	35	0	0
95th Queue (ft)	62	2	4
Link Distance (ft)	54	75	
Upstream Blk Time (%)	3		
Queuing Penalty (veh)	1		
Storage Bay Dist (ft)			90
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 10: Vista Bonita Avenue & Walnut Avenue

Movement	WB	SB
Directions Served	TR	R
Maximum Queue (ft)	40	20
Average Queue (ft)	16	1
95th Queue (ft)	41	13
Link Distance (ft)	329	229
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 239

Intersection: 3: Glendora Ave. & Route 66

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	134	204	182	96	255	718	662	135	164	194	163	111
Average Queue (ft)	44	125	80	23	214	395	352	86	72	86	55	32
95th Queue (ft)	111	191	160	61	312	764	701	174	137	161	126	74
Link Distance (ft)		1010	1010			980	980			544	544	
Upstream Blk Time (%)						0	0					
Queuing Penalty (veh)						0	0					
Storage Bay Dist (ft)	110			110	230			110	160			160
Storage Blk Time (%)	0	16	2	0	44	3	30	0	1	1	0	0
Queuing Penalty (veh)	1	5	1	0	170	7	46	1	3	1	0	0

Intersection: 3: Glendora Ave. & Route 66

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (ft)	174	222	180
Average Queue (ft)	94	79	65
95th Queue (ft)	170	172	143
Link Distance (ft)		377	377
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	160		
Storage Blk Time (%)	8	0	
Queuing Penalty (veh)	12	0	

Intersection: 5: Glendora Ave./Glendora Avenue & Vista Bonita Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 6: Glendora Ave. & Avalon Apartments

Movement	WB	NB
Directions Served	LR	T
Maximum Queue (ft)	63	2
Average Queue (ft)	20	0
95th Queue (ft)	49	3
Link Distance (ft)	245	377
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: Glendora Avenue/Glendora Ave. & Walnut Avenue

Movement	WB	WB	NB	SB
Directions Served	L	R	T	L
Maximum Queue (ft)	70	3	2	23
Average Queue (ft)	38	0	0	1
95th Queue (ft)	64	3	2	10
Link Distance (ft)	54	54	75	
Upstream Blk Time (%)	3			
Queuing Penalty (veh)	2			
Storage Bay Dist (ft)				90
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 10: Vista Bonita Avenue & Walnut Avenue

Movement	EB	WB	SB
Directions Served	LT	TR	R
Maximum Queue (ft)	30	56	37
Average Queue (ft)	2	22	2
95th Queue (ft)	15	50	18
Link Distance (ft)	54	329	229
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 249

Intersection: 3: Glendora Ave. & Route 66

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	134	1028	1024	135	255	804	754	135	184	257	288	185
Average Queue (ft)	88	862	841	71	242	523	466	82	104	130	134	117
95th Queue (ft)	161	1234	1232	168	291	967	907	174	181	212	233	202
Link Distance (ft)		1010	1010			980	980			544	544	
Upstream Blk Time (%)		41	38			6	0					
Queuing Penalty (veh)		0	0			0	0					
Storage Bay Dist (ft)	110			110	230			110	160			160
Storage Blk Time (%)	6	71	72	0	63	1	30	0	3	2	2	2
Queuing Penalty (veh)	31	57	56	0	186	3	36	1	7	4	9	6

Intersection: 3: Glendora Ave. & Route 66

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (ft)	185	386	369
Average Queue (ft)	168	261	220
95th Queue (ft)	222	445	401
Link Distance (ft)		377	377
Upstream Blk Time (%)		4	0
Queuing Penalty (veh)		13	1
Storage Bay Dist (ft)	160		
Storage Blk Time (%)	58	1	
Queuing Penalty (veh)	128	2	

Intersection: 5: Glendora Ave./Glendora Avenue & Vista Bonita Avenue

Movement	NB	NB	SB
Directions Served	T	TR	T
Maximum Queue (ft)	3	18	0
Average Queue (ft)	0	1	0
95th Queue (ft)	4	10	0
Link Distance (ft)	321	321	75
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Glendora Ave. & Avalon Apartments

Movement	WB	NB	NB	SB	SB
Directions Served	LR	T	TR	T	T
Maximum Queue (ft)	34	1	2	95	56
Average Queue (ft)	7	0	0	14	5
95th Queue (ft)	27	1	3	80	52
Link Distance (ft)	245	377	377	321	321
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 9: Glendora Avenue/Glendora Ave. & Walnut Avenue

Movement	WB	WB	NB	SB
Directions Served	L	R	T	L
Maximum Queue (ft)	71	2	2	6
Average Queue (ft)	35	0	0	0
95th Queue (ft)	62	0	2	6
Link Distance (ft)	54	54	75	
Upstream Blk Time (%)	4			
Queuing Penalty (veh)	2			
Storage Bay Dist (ft)				90
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 10: Vista Bonita Avenue & Walnut Avenue

Movement	WB	SB
Directions Served	TR	R
Maximum Queue (ft)	48	21
Average Queue (ft)	19	1
95th Queue (ft)	45	11
Link Distance (ft)	329	229
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 540

Intersection: 3: Glendora Ave. & Route 66

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	124	198	164	85	255	606	574	135	163	196	153	100
Average Queue (ft)	39	119	76	22	205	338	297	94	73	88	55	31
95th Queue (ft)	99	182	151	59	307	669	612	175	137	162	121	69
Link Distance (ft)		1010	1010			980	980			544	544	
Upstream Blk Time (%)						0						
Queuing Penalty (veh)						0						
Storage Bay Dist (ft)	110			110	230			110	160			160
Storage Blk Time (%)	0	13	2	0	34	3	25	0	1	1	0	0
Queuing Penalty (veh)	1	4	1	0	129	7	53	1	1	1	0	0

Intersection: 3: Glendora Ave. & Route 66

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (ft)	179	258	236
Average Queue (ft)	99	92	81
95th Queue (ft)	185	221	190
Link Distance (ft)		377	377
Upstream Blk Time (%)		0	0
Queuing Penalty (veh)		0	0
Storage Bay Dist (ft)	160		
Storage Blk Time (%)	12	1	
Queuing Penalty (veh)	18	1	

Intersection: 5: Glendora Ave./Glendora Avenue & Vista Bonita Avenue

Movement	NB	NB	SB	SB
Directions Served	T	TR	T	T
Maximum Queue (ft)	3	3	83	58
Average Queue (ft)	0	0	16	3
95th Queue (ft)	4	3	60	23
Link Distance (ft)	128	128	75	75
Upstream Blk Time (%)			1	0
Queuing Penalty (veh)			2	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Glendora Ave. & Avalon Apartments

Movement	WB	NB	NB
Directions Served	LR	T	TR
Maximum Queue (ft)	51	177	182
Average Queue (ft)	19	16	23
95th Queue (ft)	43	89	102
Link Distance (ft)	244	377	377
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 9: Glendora Avenue/Glendora Ave. & Walnut Avenue

Movement	WB	WB	SB	SB	SB
Directions Served	L	R	L	T	T
Maximum Queue (ft)	71	6	17	42	4
Average Queue (ft)	41	0	1	2	0
95th Queue (ft)	68	5	9	20	5
Link Distance (ft)	54	54		566	566
Upstream Blk Time (%)	5				
Queuing Penalty (veh)	3				
Storage Bay Dist (ft)			90		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Intersection: 10: Vista Bonita Avenue & Walnut Avenue

Movement	EB	WB	SB
Directions Served	LT	TR	R
Maximum Queue (ft)	28	63	38
Average Queue (ft)	2	25	3
95th Queue (ft)	15	52	22
Link Distance (ft)	54	329	229
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 13: Glendora Ave. & Glendora Avenue Crossing

Movement	EB	WB	NB	NB	SB	SB
Directions Served	T	T	T	T	T	T
Maximum Queue (ft)	32	32	126	124	136	137
Average Queue (ft)	4	4	53	64	76	58
95th Queue (ft)	20	20	121	135	162	137
Link Distance (ft)	266	200	101	101	128	128
Upstream Blk Time (%)			4	7	6	1
Queuing Penalty (veh)			13	21	13	3
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 273

Intersection: 3: Glendora Ave. & Route 66

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	134	958	932	135	254	553	498	135	184	371	393	185
Average Queue (ft)	94	750	717	58	222	310	258	71	125	174	185	140
95th Queue (ft)	159	1130	1104	151	296	584	514	163	204	292	322	223
Link Distance (ft)		1010	1010			980	980			544	544	
Upstream Blk Time (%)		13	10								0	
Queuing Penalty (veh)		0	0								0	
Storage Bay Dist (ft)	110			110	230			110	160			160
Storage Blk Time (%)	14	67	68	0	28	3	25	0	6	9	8	5
Queuing Penalty (veh)	65	54	52	0	83	7	30	1	16	12	30	13

Intersection: 3: Glendora Ave. & Route 66

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (ft)	185	388	375
Average Queue (ft)	178	282	234
95th Queue (ft)	206	440	396
Link Distance (ft)		377	377
Upstream Blk Time (%)		6	0
Queuing Penalty (veh)		18	1
Storage Bay Dist (ft)	160		
Storage Blk Time (%)	46	7	
Queuing Penalty (veh)	107	17	

Intersection: 5: Glendora Ave./Glendora Avenue & Vista Bonita Blvd

Movement	NB	NB	SB	SB
Directions Served	T	TR	T	T
Maximum Queue (ft)	2	28	87	71
Average Queue (ft)	0	2	33	9
95th Queue (ft)	3	16	93	44
Link Distance (ft)	136	136	75	75
Upstream Blk Time (%)			4	0
Queuing Penalty (veh)			13	1
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Glendora Ave. & Avalon Apartments

Movement	WB	NB	NB	SB	SB
Directions Served	LR	T	TR	T	T
Maximum Queue (ft)	35	218	240	100	59
Average Queue (ft)	6	36	50	19	5
95th Queue (ft)	26	138	174	81	40
Link Distance (ft)	245	377	377	97	97
Upstream Blk Time (%)				2	0
Queuing Penalty (veh)				8	0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 9: Glendora Avenue/Glendora Ave. & Walnut Avenue

Movement	WB	NB	SB	SB	SB
Directions Served	L	T	L	T	T
Maximum Queue (ft)	70	11	6	157	48
Average Queue (ft)	38	0	0	22	2
95th Queue (ft)	67	5	4	97	30
Link Distance (ft)	54	75		566	566
Upstream Blk Time (%)	7				
Queuing Penalty (veh)	3				
Storage Bay Dist (ft)			90		
Storage Blk Time (%)				1	
Queuing Penalty (veh)				0	

Intersection: 10: Vista Bonita Blvd/Vista Bonita Avenue & Walnut Avenue

Movement	WB	SB
Directions Served	TR	R
Maximum Queue (ft)	50	43
Average Queue (ft)	18	3
95th Queue (ft)	45	23
Link Distance (ft)	329	229
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Glendora Ave.

Movement	EB	WB	NB	NB	SB	SB
Directions Served	T	T	T	T	T	T
Maximum Queue (ft)	38	43	123	136	153	144
Average Queue (ft)	5	5	52	66	98	71
95th Queue (ft)	25	24	125	141	187	161
Link Distance (ft)	155	175	97	97	136	136
Upstream Blk Time (%)			4	8	12	3
Queuing Penalty (veh)			13	25	37	8
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 613

TECHNICAL MEMORANDUM

Metro Gold Line Foothill Extension – Barranca Avenue At-Grade Crossing Queueing Analysis

PREPARED FOR:	Denis Cournoyer, Metro Gold Line Foothill Extension Construction Authority
PREPARED BY:	Loren Bloomberg and Suhasini Kilim, CH2M
DATE:	November 2, 2017
PROJECT NUMBER:	680051.T7.01

The purpose of this technical memorandum is to summarize the results for the traffic analysis performed at the proposed Barranca Avenue at-grade crossing.

Introduction

As part of the project improvements for the construction of the Metro Foothill Gold Line Extension (Phase 2B) at the Barranca Avenue at-grade crossing in Glendora, CA, improvements are planned at the Barranca Avenue/Bennett Avenue intersection to ensure that it can accommodate the growing demand and changes in operations with the implementation of Light Rail Transit (LRT). Figure 1 is a map of the Barranca Avenue at-grade crossing, Sandburg Middle School (north of Bennett Avenue, where the school drop-off/pick-up takes place), and the two study intersections, Barranca Avenue/Bennett Avenue and Barranca Avenue/Elderberry Drive. A detailed engineering drawing is provided as an attachment.

The at-grade crossing is located about 300 feet south of Bennett Avenue and about 100 feet south of Elderberry Drive. Currently, Barranca Avenue is a four-lane undivided roadway with 35 mph posted speed limit. The analysis includes evaluation of existing and future (2035) no-build and build scenarios at the two study intersections listed above. The build scenario includes the future Gold Line LRT service; no-build does not. Both scenarios include the new La Colina development and a traffic signal at the Barranca Avenue/Bennett Avenue intersection.

Traffic Volumes

Table 1 is a summary of traffic volumes for the analysis scenarios. Morning (7 to 9 AM) and midday (12 to 2 PM) peak period traffic counts were collected on Thursday, May 25, 2017 to determine the peak hour volumes at Barranca Avenue/Bennett Avenue intersection during the school pick-up and drop-off periods. Sandburg Middle School and La Fetra Elementary School both have early releases on Thursdays and since school traffic is the main source of congestion in this area, the midday peak period was used as the second period for the analysis (instead of the PM peak). The overall effect of school traffic, in addition to the local traffic, is expected to be the same on all other weekdays. Based on the peak period traffic counts, the AM peak hour was identified as 7:30 to 8:30 AM and the midday peak hour was identified as 12:00 PM to 1 PM. An AM "super peak" (8:00 to 8:15 AM), where school trips were highest, was also analyzed.

Figure 1: Study Area *Source: Google maps*

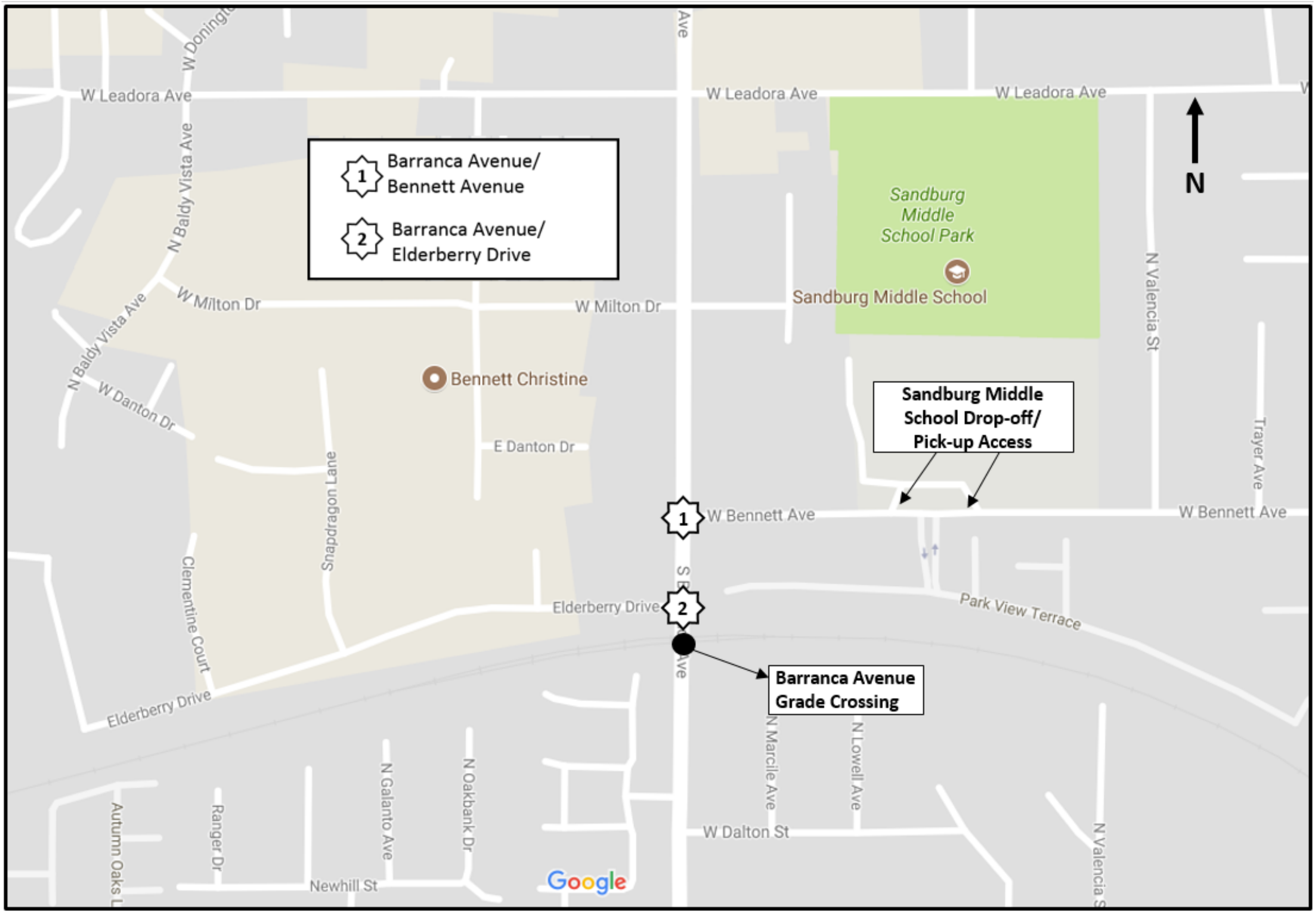


Table 1: Summary of AM and Midday Peak Hour Volumes (Existing, No-Build, and Build)

Barranca Avenue/Bennett Avenue									
Peak Hour	Analysis Scenario	Barranca Avenue		Bennett Avenue		Barranca Avenue			TOTAL
		SBL	SBT	WBL	WBR	NBU*	NBT	NBR	
AM	2017 Existing	61	268	379	102	-	161	239	1210
	2035 No-Build	78	305	433	116	13	183	271	1399
	2035 Build	78	314	443	116	13	183	271	1418
	2035 School	217	314	735	192	13	183	500	2155
Midday	2017 Existing	29	209	222	45	-	190	174	869
	2035 No-Build	39	240	262	51	39	215	197	1043
	2035 Build	40	240	262	51	39	226	205	1063
Barranca Avenue/Elderberry Drive									
Peak Hour	Analysis Scenario	Barranca Avenue		Elderberry Drive		Barranca Avenue			TOTAL
		SBT	SBR	EBR		NBT			
AM	2017 Existing	647	-	-		400			1047
	2035 No-Build	734	17	34		467			1252
	2035 Build	753	17	34		467			1271
Midday	2017 Existing	431	-	-		364			795
	2035 No-Build	490	51	22		452			1015
	2035 Build	490	51	22		470			1033

* *NBU- U-turns from Northbound to Southbound*

Field visits were conducted on May 24, 2017 and August 22, 2017 to confirm that the study area experiences a general increase in traffic during the school pick-up and drop-off periods. The field visit also revealed that some of the school traffic enters from the west of the school locations (via Barranca Avenue) and exits using the streets to the east (Valencia Street and Grand Avenue). Outside of the school pick-up and drop-off periods, the traffic is generally low.

Future volumes for the two study intersections, also summarized in Table 1, were estimated using the traffic forecasting methodology as described in the *Final Environmental Impact Report (FEIR) for the Metro Gold Line Foothill Extension – Azusa to Montclair Project (February 2013)*. As identified in Table 2-12 of the FEIR, a 0.7% annual growth rate was applied to grow the intersection volumes from the existing (2017) to no-build (2035) scenario.

A new residential tract (La Colina – Former Monrovia Nursery) is under construction along Elderberry Drive, west of Barranca Avenue. Based on the latest tract map obtained from City's website (included as an attachment), there will be 74 single-family detached dwelling units within an area of 39.7 acres. ITE Trip Generation, 9th edition (Land Use Code 210), was used to estimate the site generated trips. These trips are considered to be a part of 2035 no-build scenario. Figures 2 and 3 are a summary of inbound and outbound trip distribution used for this analysis. The total trips entering and exiting the site are shown in Table 2.

Table 2: Summary of AM and PM Peak Hour Trips – La Colina Development

Peak period	AM Peak Hour	PM Peak Hour
Total Trips	63	81
Entering	16	51
Exiting	47	30

To calculate the build scenario volumes, a reduction factor of -1.763% (for the City of Glendora as per FEIR Table 2-24) was applied to the no-build volumes. The FEIR also factored some additional trips at intersections around the stations, since intersections surrounding the stations would experience increased vehicular activity because of station operations. As a conservative measure, the turning movement volumes were adjusted to reflect this condition.

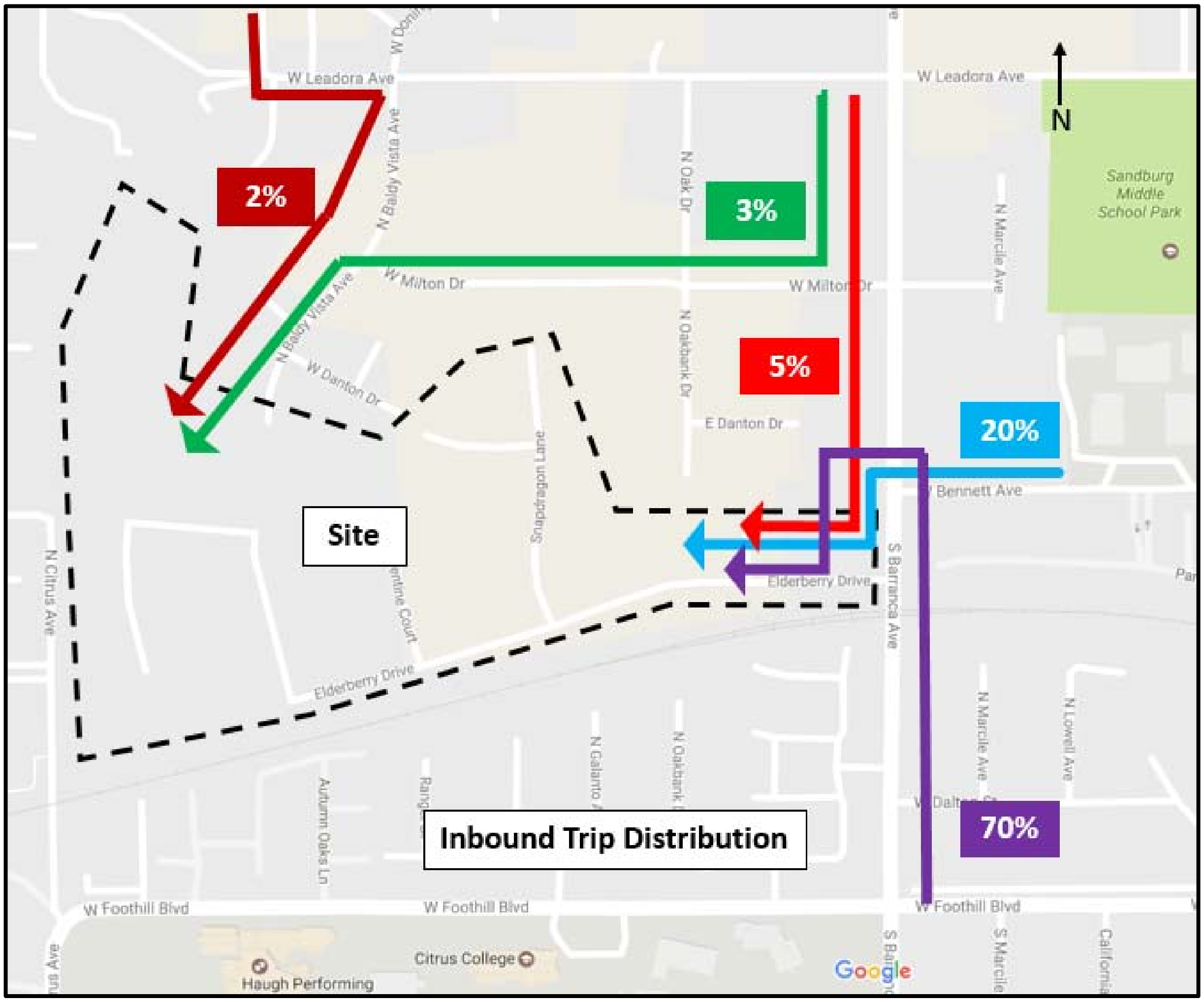


Figure 2: Inbound Trip Distribution – La Colina Development *Source: Google maps*

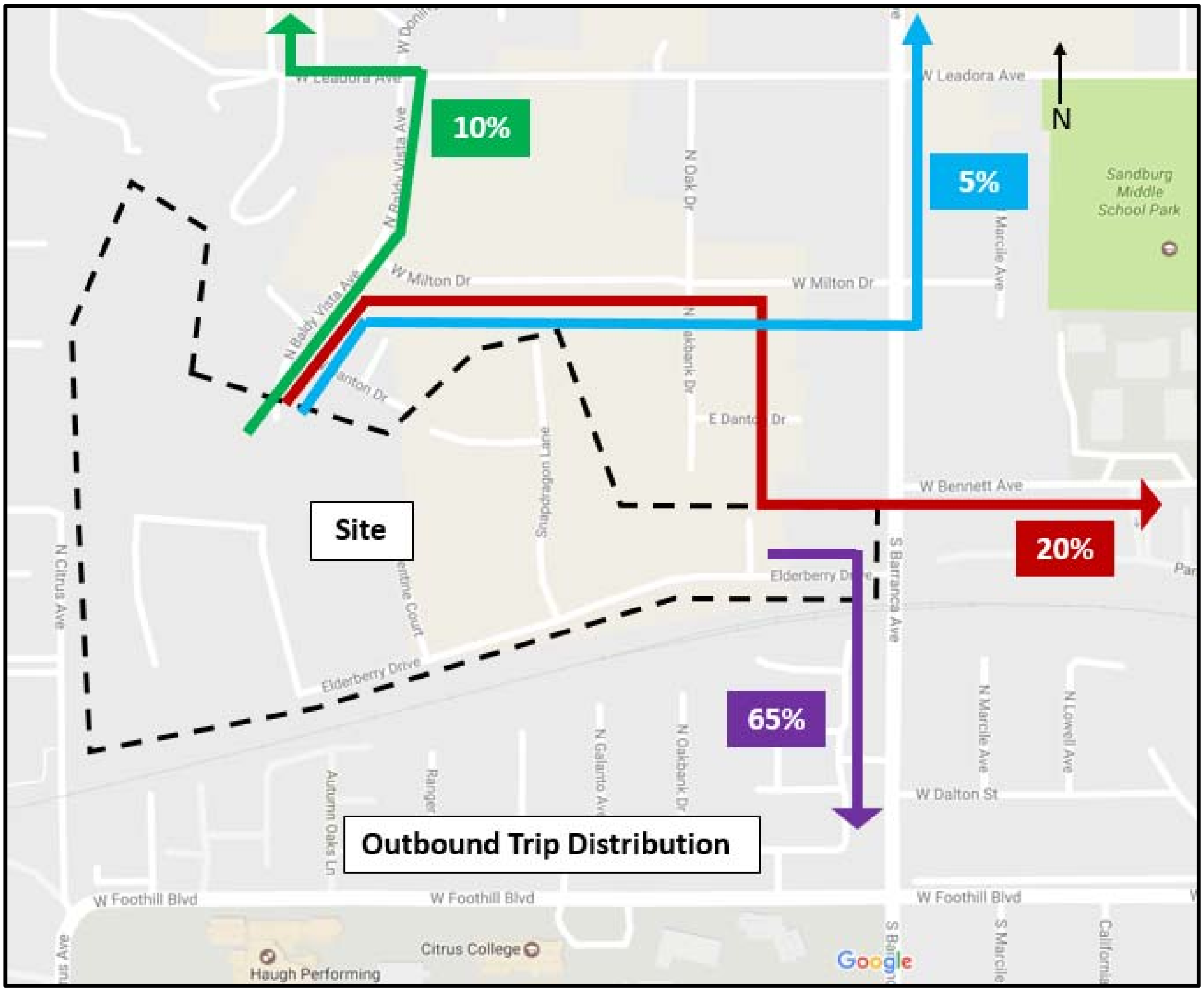


Figure 3: Outbound Trip Distribution - La Colina Development *Source: Google maps*

Queuing Analysis

The Synchro® (version 9.1, Build 908) traffic analysis software was used to analyze the Barranca Avenue intersections under the existing, no-build, and build scenarios during the AM and midday peak hours. Figure 4 is a summary of existing and future lane configurations at the study intersections. The Barranca Avenue/Bennett Avenue intersection currently operates as all-way stop-controlled. The northbound approach currently has two travel lanes: one shared left/through and one shared through/right.

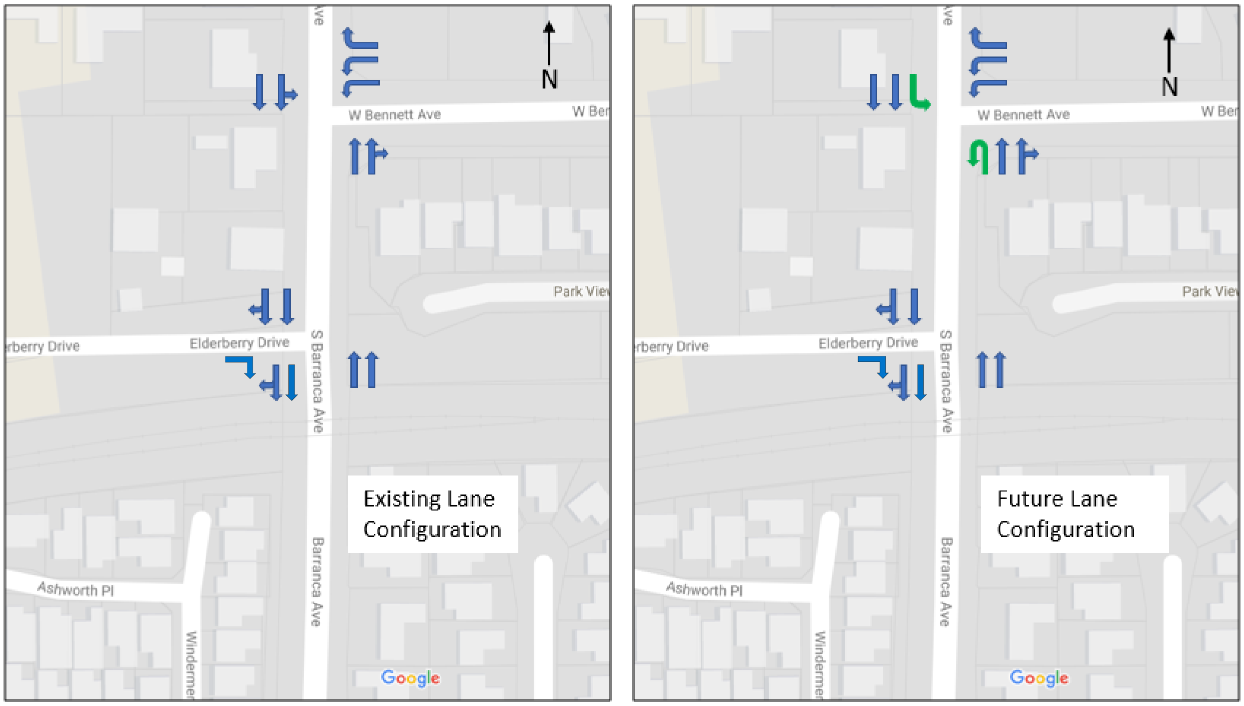


Figure 4: Intersection Lane Configuration *Source: Google maps*

A traffic signal is proposed for future no-build and build conditions, as recommended in the April 2012 "Traffic Signal Warrant Analysis – Barranca Avenue and Bennett Avenue" (KOA Corporation). As part of the intersection improvements, it is proposed that a U-turn lane will be added to the northbound approach for the no-build and build scenarios. The signal phasing information was coded consistent with the proposed traffic signal plan obtained from the City (included as an attachment) and the signal timing was optimized for all scenarios. The developer of the La Colina subdivision is required to install this signal.

Synchro was used to assess operations during train events, and during normal operations. Queuing was assessed at the Barranca Avenue/Bennett Avenue intersection, to evaluate the potential for queues spilling back to the tracks during school pick-up and drop-offs. For the analysis of train events, the focus was on queues from the tracks back to the north that occur during the gate down times. A gate down time of 55 seconds was used to represent train operations condition, consistent with the FEIR. Results are described below; the Synchro and SimTraffic worksheets are included as an attachment.

Northbound Approach at Barranca Avenue/Bennett Avenue

Table 3 is a summary of the queuing analysis for the northbound approach at Barranca Avenue/Bennett Avenue. The "Queues Report" function in Synchro was used to determine the 50th and 95th percentile queues. These queues were compared to the available storage (both through lanes and left turns) to determine if the queues exceed the available storage. The Highway Capacity Manual (HCM) 2000 volume/capacity (v/c) ratio was also reported to determine if the reported queues are underestimated when the ratios are greater than 1.0.

The results in Table 3 indicate that the existing northbound through lanes would be able to accommodate the queues during normal (non-school) traffic periods. (School operations are further discussed in the section below). The queues are not expected to extend across the train tracks 300 feet to the south. No improvements are needed as a result of Gold Line operations.

Table 3: Queuing Analysis at Barranca Avenue/Bennett Avenue - Northbound

Peak Hour	Movement	Lane Group	Storage (ft.)	HCM 2010 Volume/Capacity	50th Percentile Lane Group Queue (ft.)	95th Percentile Lane Group Queue (ft.)
2017 Existing – Northbound Barranca Avenue						
AM	Thru	T	300*	0.33	-	64**
	Thru/Right	TR	300*	0.83	-	92**
Mid-day	Thru	T	300*	0.33	-	61**
	Thru/Right	TR	300*	0.57	-	74**
2035 No-Build – Northbound Barranca Avenue						
AM	U-turn	U	75	0.04	< 25	< 25
	Thru/Right	TR	300*	0.37	47	53
Mid-day	U-turn	U	75	0.09	< 25	27
	Thru/Right	TR	300*	0.35	56	62
2035 Build – Northbound Barranca Avenue						
AM	U-turn	U	75	0.04	< 25	< 25
	Thru/Right	TR	300*	0.50	47	53
AM School Peak	U-turn	U	75	0.05	<25	<25
	Thru	T	300*	0.49	123	157
	Right	R	300*	0.82	176	183
Mid-day	U-turn	U	75	0.09	< 25	27
	Thru/Right	TR	300*	0.42	59	64

**distance to the at-grade crossing; clear storage distance was measured from gate arm to crosswalk*
***SimTraffic results for all-way stop controlled intersection*

Southbound Approach at Barranca Avenue At-Grade Crossing – Train Events

Table 4 is a summary of the queuing analysis for the southbound approach at Barranca Avenue at-grade crossing. The "Queues Report" function in Synchro was used to determine the 50th and 95th percentile queues. These queues were compared to the available storage (both through lanes and left turns) to determine if the queues exceed the available storage. The Highway Capacity Manual (HCM) 2010 volume/capacity (v/c) ratio was also reported to determine if the reported queues are underestimated when the ratios are greater than 1.0.

The results in Table 4 indicate that the existing southbound through lanes would be able to accommodate the queues. The queues are not expected to extend back to the Barranca Avenue/Bennett Avenue intersection, 300 feet to the north. No improvements are needed as a result of Gold Line operations.

Table 4: Queuing Analysis at Barranca Avenue/Barranca Grade Crossing – Southbound – Train Events

Peak Hour	Movement	Lane Group	Storage (ft.)	HCM 2010 Volume/Capacity	50th Percentile Lane Group Queue (ft.)	95th Percentile Lane Group Queue (ft.)
2035 Build – Northbound Barranca Avenue						
AM	Thru	T	300*	0.30	250	226
Mid-day	Thru	T	300*	0.20	132	151

**distance to the Barranca Avenue/Bennett Avenue intersection*

School Zone Operations

A separate analysis was conducted for the AM peak school arrival period. Field observations indicated that there is an existing "super peak" for approximately 15 minutes (around 8:00 AM) where traffic operations are markedly worse. During this period, the northbound right-turn movement (from Barranca Avenue to Bennett Avenue and the school) is over capacity. The capacity deficiency is due to a combination of factors, including the stop sign, platooning of vehicles from the upstream signal, frequent pedestrians on the east leg, and the presence of a school crossing guard. The net result is an extended queue over a short period that can reach south to the tracks and beyond. While the period of the queue is relatively short, there is the potential for conflicts at the tracks with trains in the AM peak, once the Gold Line is in service.

As noted earlier, it is understood that the developer of the subdivision is required to install a signal at the intersection. The signal is needed for both safety and operations associated with the increased traffic from Elderberry Drive. With this signal, operations for the school zone will also improve. The queuing analysis in Table 3 indicated that the northbound queue is expected to remain north of the tracks, even during the "super peak" for AM school operations.

Once the Gold Line is in operation, the signal timing plan should be modified to accommodate pedestrians, general traffic, and regular trains. A school-specific timing plan should be developed for the periods before and after school, with extra green time for the northbound right-turns and westbound left-turns, including an overlap for the right turns and controlled pedestrian crossing movements. Also, it will be beneficial for the crossing guard and/or school to encourage northbound pedestrians to stay on the south side of the street, and instead use the crosswalk in front of the school (to the east) to minimize the pedestrian conflicts on the east leg crosswalk. In addition, a pre-emption ("flush") function could be added to the Barranca Avenue/Bennett Avenue intersection if, after traffic signal installation, queues to the south continue to extend beyond the tracks.

Without the signal, the estimated capacity of the northbound right-turn movement at the stop sign is 600 vehicles/hour. With a signal timing plan that includes the protected (overlap) phase for the northbound right turns, the estimated capacity is 875 vehicles/hour (based on Synchro), an increase of approximately 45 percent. With the signal, the operations will be affected by the percentage of time allocated to green for the northbound right turn. The phasing plan that allows for 875 vehicles/hour provides approximately 60 to 65 seconds of green time for that movement for each 90-second cycle. The remaining time is allocated for the southbound (left-turn and through) movement and pedestrians on the east and north legs. The Synchro analysis allows for sufficient time (18 to 30 seconds) for pedestrians to cross at the two crosswalks. Also, the crosswalk on the north leg (for east-west pedestrian) can operate independently if a separate right-turn phase for northbound traffic is used.

Conclusions

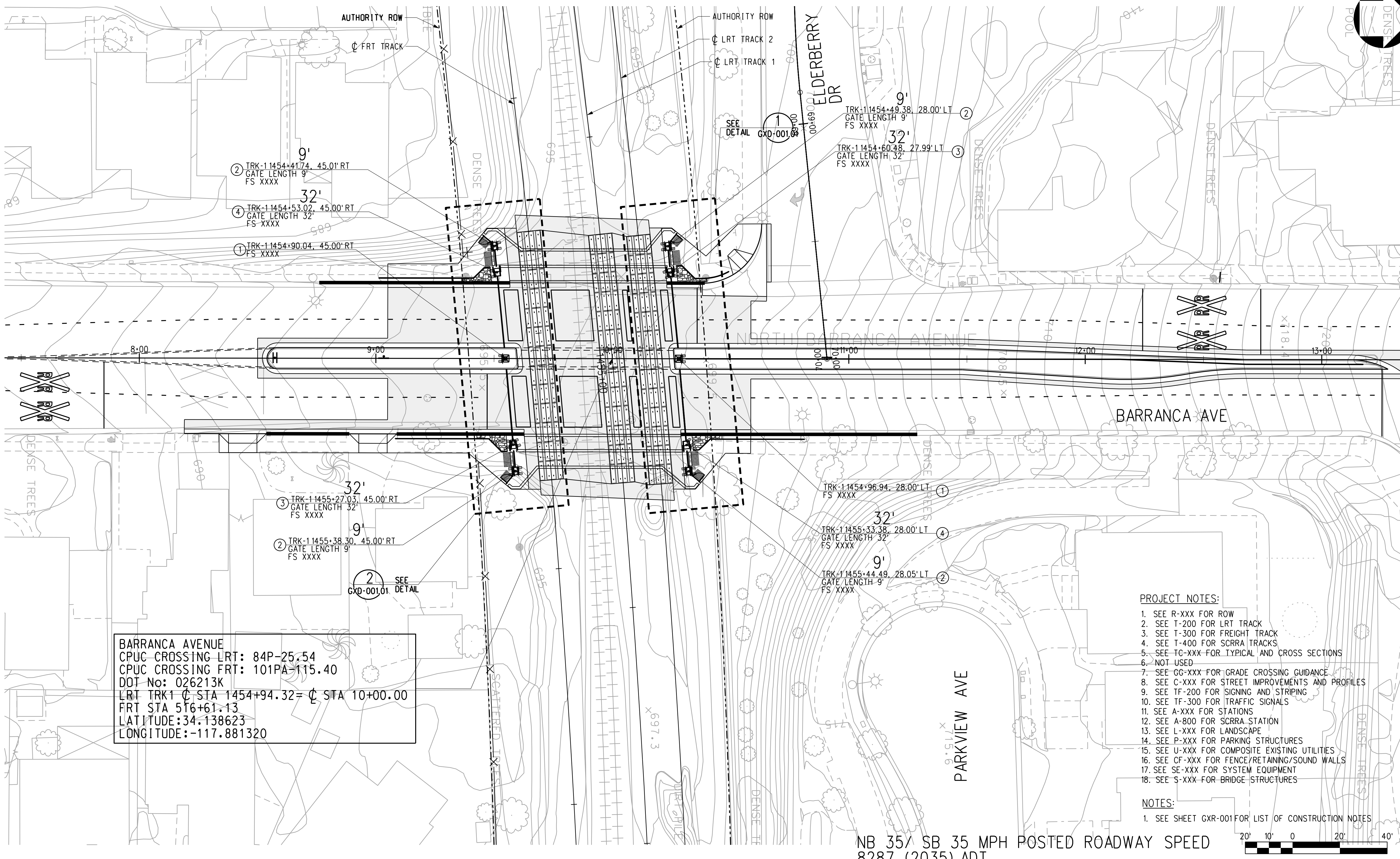
The results of the queuing analysis at Barranca Avenue at-grade crossing indicate that the projected 2035 no-build and build traffic will not result in queues that extend across the train tracks during normal operations. The evaluation was conducted on the approach upstream/downstream of the tracks: northbound at the Barranca Avenue/Bennett Avenue intersection, and southbound at the Barranca Avenue at-grade crossing (train events). No changes to storage lengths are needed as a result of Gold Line operations. During school drop-off and pick-up periods, higher traffic and pedestrian volumes at the Barranca Avenue/Bennett Avenue intersection have the potential to result in extended northbound queues reaching the train tracks. School-specific timing adjustments for the figure signal would address these potential operational issues.

List of Attachments

- Engineering Drawing of Grade Crossing
- Tract Map of La Colina – Former Monrovia Nursery
- Traffic Signal Plan for the Barranca Avenue/Bennett Avenue intersection
- Synchro Output Worksheets
- SimTraffic Output Worksheets

Engineering Plans

Barranca Avenue Crossing



PROJECT NOTES:

1. SEE R-XXX FOR ROW
2. SEE T-200 FOR LRT TRACK
3. SEE T-300 FOR FREIGHT TRACK
4. SEE T-400 FOR SCRRA TRACKS
5. SEE TC-XXX FOR TYPICAL AND CROSS SECTIONS
6. NOT USED
7. SEE GG-XXX FOR GRADE CROSSING GUIDANCE
8. SEE C-XXX FOR STREET IMPROVEMENTS AND PROFILES
9. SEE TF-200 FOR SIGNING AND STRIPING
10. SEE TF-300 FOR TRAFFIC SIGNALS
11. SEE A-XXX FOR STATIONS
12. SEE A-800 FOR SCRRA STATION
13. SEE L-XXX FOR LANDSCAPE
14. SEE P-XXX FOR PARKING STRUCTURES
15. SEE U-XXX FOR COMPOSITE EXISTING UTILITIES
16. SEE CF-XXX FOR FENCE/RETAINING/SOUND WALLS
17. SEE SE-XXX FOR SYSTEM EQUIPMENT
18. SEE S-XXX FOR BRIDGE STRUCTURES

NOTES:

1. SEE SHEET GXR-001 FOR LIST OF CONSTRUCTION NOTES

FileName=> I:\Phase II\009 Phase 2B Documents\Engineering\Drawings\07-Grade-Crossings\C2002_GXD-001.00-Barranca.dgn

10/4/2017 8:04:12 PM

USER=jhuang

REV.	DATE	DESCRIPTION	DES.	ENG.
		DRAFT NOT FOR CONSTRUCTION		

REVISIONS

HILL
Hill International
406 E. HUNTINGTON, SUITE 202
MONROVIA, CA 91016 - 3633

METRO GOLD LINE FOOTHILL EXTENSION CONSTRUCTION AUTHORITY
GOLD LINE FOOTHILL EXTENSION PHASE 2B
GLENDORA TO MONTCLAIR
JUNE 15, 2017

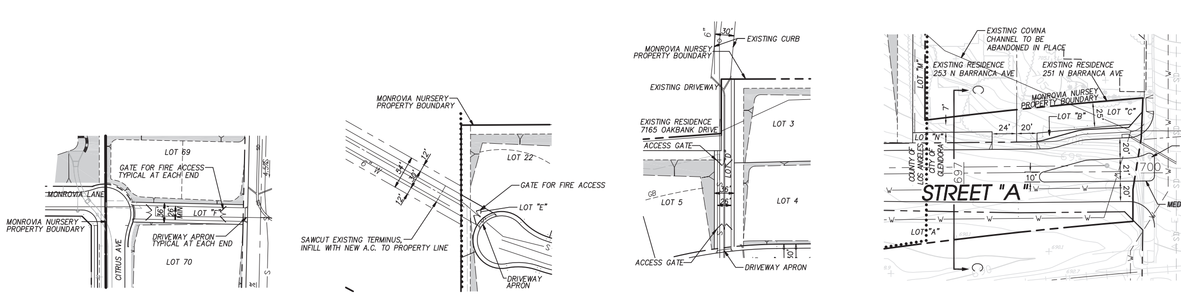
GOLD LINE FOOTHILL EXTENSION
ADVANCED CONCEPTUAL ENGINEERING
PHASE 2B ALIGNMENT
GRADE CROSSING
BARRANCA AVENUE PLAN

DRAWING NO GXD-001.00
REV A
SHEET NO

Tract Map of Monrovia Nursery

MONROVIA NURSERY

Vesting Tentative Tract No. 66609
City of Glendora
County of Los Angeles, State of California



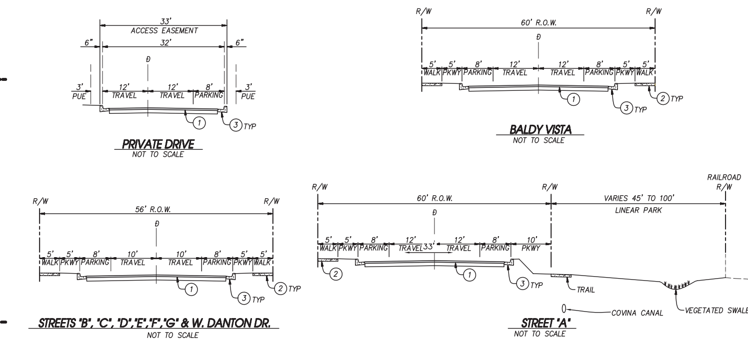
DETAILS

EMERGENCY ACCESS - CITRUS AVENUE — SEE ACCESS SECTION HEREON, NOT TO SCALE

EMERGENCY ACCESS - DANTON DRIVE — NOT TO SCALE

EMERGENCY ACCESS - OAKBANK DRIVE — NOT TO SCALE

LOTS M, N, B & C DETAIL — NOT TO SCALE



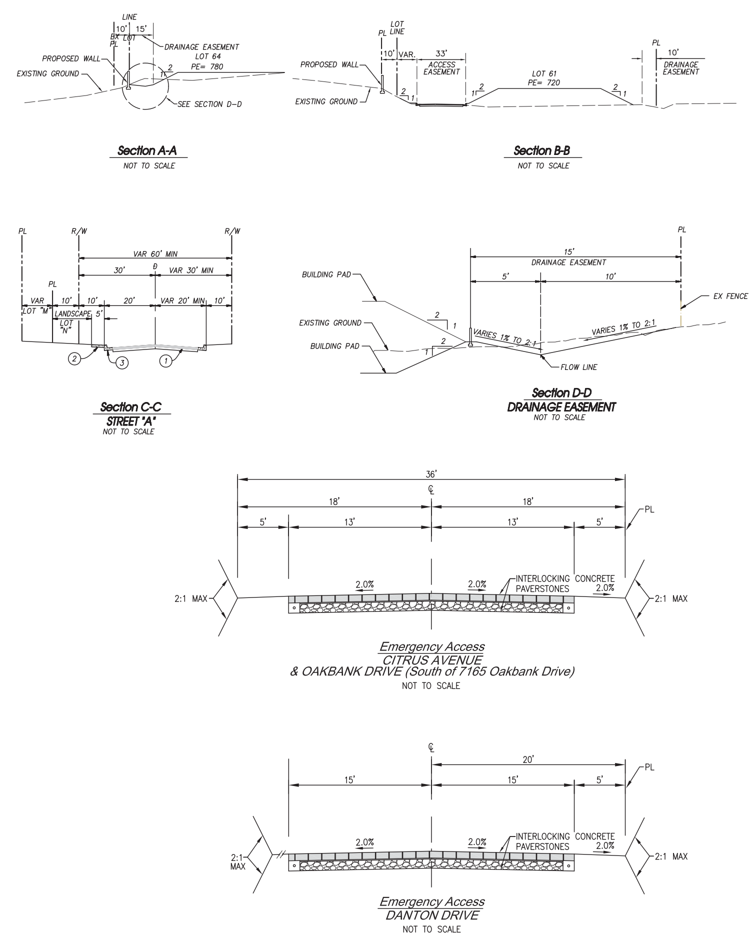
TYPICAL STREET CROSS SECTIONS

PRIVATE DRIVE — NOT TO SCALE

BALDY VISTA — NOT TO SCALE

STREETS "B", "C", "D","E","F","G" & W. DANTON DR. — NOT TO SCALE

STREET "A" — NOT TO SCALE



SECTIONS

Section A-A — NOT TO SCALE

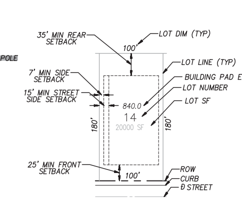
Section B-B — NOT TO SCALE

Section C-C — STREET "A" — NOT TO SCALE

Section D-D — DRAINAGE EASEMENT — NOT TO SCALE

Emergency Access — CITRUS AVENUE & OAKBANK DRIVE (South of 7165 Oakbank Drive) — NOT TO SCALE

Emergency Access — DANTON DRIVE — NOT TO SCALE



TYPICAL LOT DETAIL — NOT TO SCALE

GRAPHIC SCALE 1"=100'

Construction Notes

1. CONSTRUCT AC/AB PAVING USING TYPE C2-AR400 PAVING GRADE ASPHALT
2. CONSTRUCT CONCRETE SIDEWALK PER CITY OF GLENDORA STD. PLAN 1.02
3. CONSTRUCT CURB & GUTTER PER CITY OF GLENDORA STD. PLAN 1.02

Legend

PROPOSED STORM DRAIN SYSTEM SHOWN THUS:	SD
PROPOSED CATCH BASIN SHOWN THUS:	
PROPOSED STREET ELEVATION SHOWN THUS:	761
PROPOSED PUBLIC UTILITY EASEMENTS SHOWN THUS:	
PROPOSED WATER SHOWN THUS:	W
PROPOSED SEWER SHOWN THUS:	S
PROPOSED SEWER FORCE MAIN SHOWN THUS:	FM
PROPOSED CONTOURS SHOWN THUS:	800
PROPOSED PUBLIC RIGHT OF WAY SHOWN THUS:	
PROPOSED LOT LINE SHOWN THUS:	
PROPOSED PAD ELEVATIONS SHOWN THUS:	763.0
PROPOSED LOT NUMBERS SHOWN THUS:	40
PROPOSED RETAINING WALLS SHOWN THUS:	
PROPOSED SLOPES SHOWN THUS:	Top Of Slope / Toe Of Slope
PROPOSED VEGETATED SWALE SHOWN THUS:	
EXISTING STREETS ELEVATIONS SHOWN THUS:	(765.4)
EXISTING STORM DRAIN SYSTEM SHOWN THUS:	EXIST. 18" SD
EXISTING EASEMENTS SHOWN THUS:	
EXISTING WATER SHOWN THUS:	W
EXISTING SEWER SHOWN THUS:	S
CITY / COUNTY BOUNDARY SHOWN THUS:	
FLOW LINE	

Lot Size Table

LOT	AREA(SF)	LOT	AREA(SF)
1	20,640	38	20,007
2	24,740	39	20,001
3	22,735	40	20,001
4	20,192	41	20,010
5	20,308	42	20,000
6	22,450	43	20,001
7	23,745	44	20,044
8	20,039	45	20,271
9	23,081	46	20,005
10	20,957	47	20,447
11	20,672	48	21,052
12	22,372	49	20,035
13	25,183	50	20,005
14	20,317	51	20,000
15	37,313	52	20,002
16	27,191	53	20,021
17	32,766	54	20,000
18	34,589	55	20,008
19	27,514	56	20,008
20	22,733	57	22,299
21	23,606	58	20,515
22	22,324	59	21,503
23	21,086	60	20,494
24	21,638	61	41,151
25	21,385	62	27,287
26	24,078	63	36,538
27	24,267	64	48,145
28	25,037	65	38,224
29	20,008	66	33,971
30	20,350	67	22,848
31	20,117	68	22,512
32	28,918	69	24.058
33	23,184	70	20,573
34	20,007	71	20,049
35	20,004	72	20,022
36	20,019	73	20,265
37	20,002	74	21,295

Legal Description

BEING A SUBDIVISION OF PORTIONS OF THE SOUTHWEST ONE-QUARTER OF SECTION 25, TOWNSHIP 1 NORTH, RANGE 10 WEST, SAN BERNARDINO MERIDIAN.

Incorporation by Reference

THESE APPROVALS REFLECT THE PLANS, STANDARDS AND POLICIES WHICH WERE IN EFFECT AT THIS TIME OF THIS SUBDIVISION APPROVAL. IT IS INTENDED THAT THE DEVELOPMENT AUTHORIZATION BY THIS VESTING TENTATIVE MAP BE CARRIED OUT IN CONFORMANCE WITH THESE DISCRETIONARY APPROVALS UNLESS AMENDED BY THE DEVELOPER OR BY A PUBLIC AGENCY FOR HEALTH OR SAFETY CONSIDERATIONS.

Vicinity Map — NOT TO SCALE

General Information

1. EXISTING LAND USE: AGRICULTURAL (NURSERY)
2. EXISTING ZONING: E-7 20,000
3. ADJACENT LAND USE:
   NORTH: RESIDENTIAL
   SOUTH: RESIDENTIAL
   EAST: RESIDENTIAL
   WEST: RESIDENTIAL
4. PROPOSED LAND USE: SINGLE FAMILY RESIDENTIAL
5. PROPOSED ZONING: SPECIFIC PLAN
6. PROPOSED SEWER SERVICE WILL BE PROVIDED BY THE CITY OF GLENDORA
7. PROPOSED WATER SERVICE WILL BE PROVIDED BY THE CITY OF GLENDORA
8. ALL PUBLIC AND PRIVATE STREETS, WATER, AND SEWER FACILITIES WILL BE IN CONFORMANCE AND CONSTRUCTED PER CITY OF GLENDORA STANDARDS.
9. ALL ON-SITE UTILITIES SHALL BE UNDERGROUND, AND PROVIDED BY:
   GAS............................SOUTHERN CALIFORNIA GAS COMPANY
   ELECTRICAL......................SCE
   TELEPHONE.......................VERIZON CABLE
   T.V.............................CHARTER COMMUNICATION
10. THE PROJECT SITE LIES WITHIN THE GLENDORA UNIFIED SCHOOL DISTRICT.
11. THE SUBDIVIDER RESERVES THE RIGHT TO FILE MULTIPLE FINAL MAPS FOR THIS TENTATIVE TRACT MAP. PURSUANT TO SECTION 66456.1 OF THE CALIFORNIA GOVERNMENT CODE.
12. ALL SLOPES SHALL BE CONSTRUCTED AT A RATIO OF 2:1 MAXIMUM UNLESS OTHERWISE INDICATED.
13. PAD ELEVATIONS SHOWN MAY BE ADJUSTED PLUS IN ACCORDANCE WITH THE SUBSTANTIAL CONFORMANCE SECTION OF THE MONROVIA SPECIFIC PLAN.
14. PRELIMINARY GEOTECHNICAL REVIEW WAS PREPARED BY PACIFIC SOILS.
15. MINIMUM STREET GRADE: 1%.
16. DEVELOPMENT OF TRACT 66609 REQUIRES INSTALLATION OF THE TEMPORARY HICREST DETENTION BASIN LOCATED IN TRACT 66608 OR THE INSTALLATION OF THE OFF-SITE STORM DRAIN IMPROVEMENTS IN BALDY VISTA AVENUE, IN ADDITION TO THE CONSTRUCTION OF THE G-1 DETENTION BASIN LOCATED IN TRACT 66609.
17. FINAL TRACT MAP APPROVAL IS SUBJECT TO FINAL APPROVAL OF A RUNOFF MANAGEMENT PLAN BY THE CITY OF GLENDORA AND THE COUNTY OF LOS ANGELES. THE RUNOFF MANAGEMENT PLAN SHALL INCLUDE AN ANALYSIS OF OFF-SITE DEBRIS FLOWS.
18. GRADING OF LOTS 57-59 AND LOTS 66-69 ARE SUBJECT TO THE APPROVAL BY THE CITY OF AZUSA.
19. OFFSITE GRADING AND MODIFICATION TO THE CITRUS BASIN ARE SUBJECT TO THE APPROVAL BY THE CITY OF AZUSA.
20. DEVELOPMENT OF TRACT 66609 REQUIRES INSTALLATION OF THE TEMPORARY HICREST DETENTION BASIN LOCATED IN TRACT 66608 OR THE INSTALLATION OF THE OFF-SITE STORM DRAIN IMPROVEMENTS IN BALDY VISTA AVENUE, IN ADDITION TO THE CONSTRUCTION OF THE G-1 DETENTION BASIN LOCATED IN TRACT 66609.
21. FINAL TRACT MAP APPROVAL IS SUBJECT TO FINAL APPROVAL OF A RUNOFF MANAGEMENT PLAN BY THE CITY OF GLENDORA AND THE COUNTY OF LOS ANGELES. THE RUNOFF MANAGEMENT PLAN SHALL INCLUDE AN ANALYSIS OF OFF-SITE DEBRIS FLOWS.

Earthwork Summary

	CUT	FILL	NET IMPORT/EXPORT
RAW GRADING:	260,000 C.Y.	130,000 C.Y.	--
REMEDIAL GRADING:	1,040,000 C.Y.	1,040,000 C.Y.	--
SHRINKAGE:	--	130,000 C.Y.	--
TOTAL	1,300,000 C.Y.	1,300,000 C.Y.	0 C.Y.

Lot Summary: Tentative Tract No. 66609

Description	No. of Lots	Area
Numbered Lots:		
Single Family Residence (Lots 1-74)	74	39.7 Ac.
Detention Basin (Lot M)	1	3.6 Ac.
Lettered Lots:		
Public Streets	–	9.0 Ac.
Open Space (Lot J)	1	0.9 Ac.
Landscape (Lots B, C, G, H & N)	5	0.3 Ac.
Linear Park (Lot A)	1	2.6 Ac.
Emergency Access (Lots D, E & F)	3	0.4 Ac.
Other Lettered (Lots I, K , L & O)	4	0.6 Ac.
Gross/Total	90	57.1 Ac.

Statement of Ownership

WE, CV GLENDORA 3 SITE, LLC, DO HEREBY STATE AND DISPOSE THAT WE ARE THE OWNERS OF THE PROPERTY COMPRISING THIS TENTATIVE TRACT MAP AND THAT WE HAVE CONSENTED TO THE PREPARATION AND APPROVAL OF SAID MAP AS SHOWN WITHIN THE DISTINCTIVE BORDER LINE.
DATED THIS____ DAY OF___________

BILL MCREYNOLDS, VP OF DEVELOPMENT, CITY VENTURES

REVISED: JUNE 2012
~~DATE: November 2010~~

DATE	BY	REVISIONS	DATE	ACC'D

PREPARED BY: RBF CONSULTING — PLANNING ■ DESIGN ■ CONSTRUCTION
14725 ALTON PARKWAY
IRVINE, CALIFORNIA 92618-2027
949.472.3505•FAX 949.472.8373•www.RBF.com
PATRICK F. REVERE R.C.E. 62921

REGISTERED PROFESSIONAL ENGINEER — PATRICK F. REVERE — NO. 62921 — CIVIL — STATE OF CALIFORNIA

OWNER/DEVELOPER: MONROVIA NURSERY

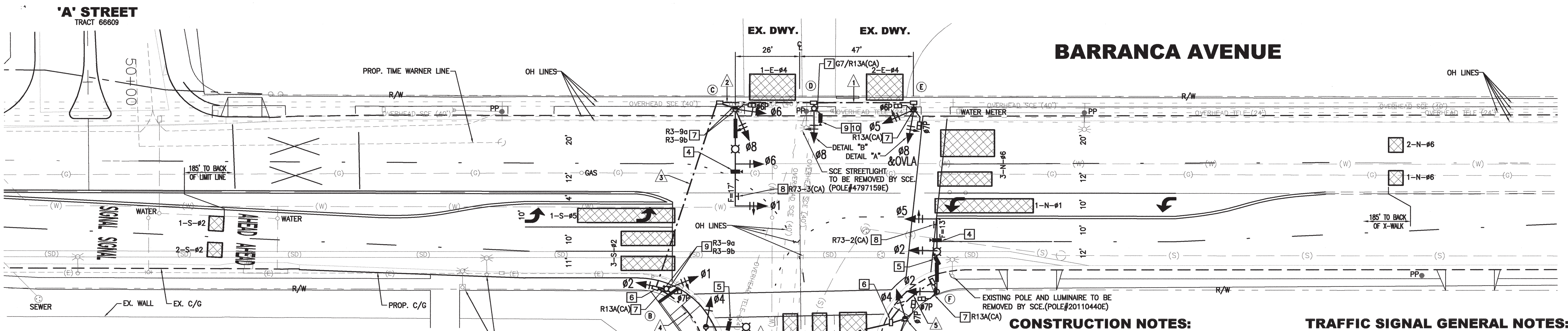
MONROVIA NURSERY
Vesting Tentative Tract No. 66609
City of Glendora
County of Los Angeles, State of California

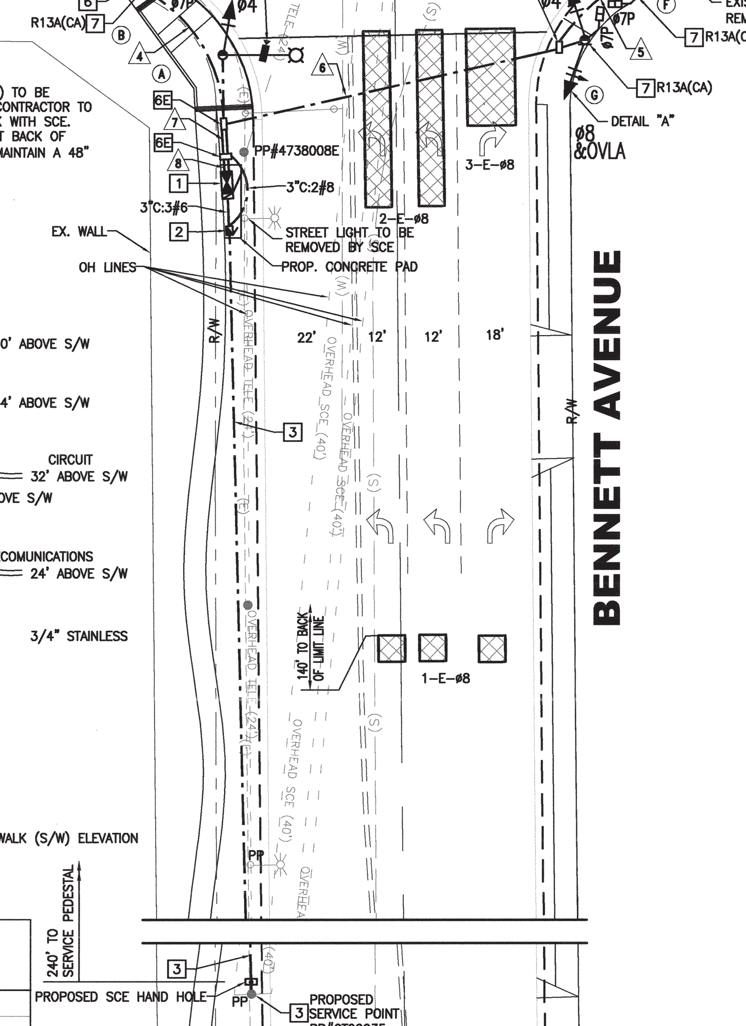
SHEET 1 OF 1

JN: 10-103972

Traffic Signal Plan

Barranca Avenue/Bennett Avenue

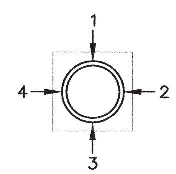




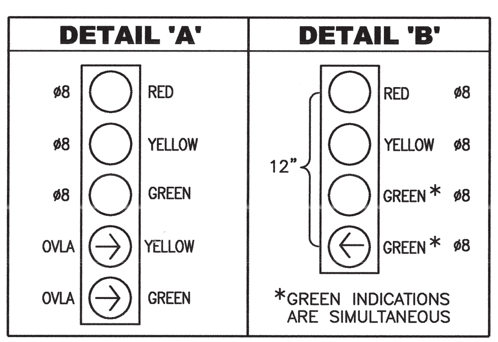
CONDUCTOR SCHEDULE

AWG SIZE OR CABLE TYPE	POLE OR CIRCUIT	3" (1)	3" (2)	4" (3)	2-3" (4)	3" (5)	4" (6)	2-4" (7)	2-4" (8)
12 CONDUCTOR / 3 CONDUCTOR	POLE – A	–/–	–/–	–/–	–/–	–/–	–/–	1/1	1/1
	B	–/–	–/–	–/–	1/–	–/–	–/–	1/–	1/–
	C	–/–	–/–	2/1	2/1	–/–	–/–	2/1	2/1
	D	–/–	1/–	1/–	1/–	–/–	–/–	1/–	1/–
	E	2/2	2/2	2/2	2/2	–/–	–/–	2/2	2/2
	F	–/–	–/–	–/–	–/–	1/1	1/1	1/1	1/1
	G	–/–	–/–	–/–	–/–	–/–	1/1	1/1	1/1
	TOTAL	2/2	3/2	5/3	6/3	1/1	2/2	9/6	9/6
#8	LUMINAIRES	–	–	2	2	2	2	2	–
	SIGNAL COMMON	1	1	1	1	1	1	1	1
	TOTAL	1	1	3	3	3	3	3	1
VIDEO CABLE (POWER+COAX)		–	1	2	2	2	2	5	5
CONDUIT % FILL		15	25	24	25	16	14	25	24

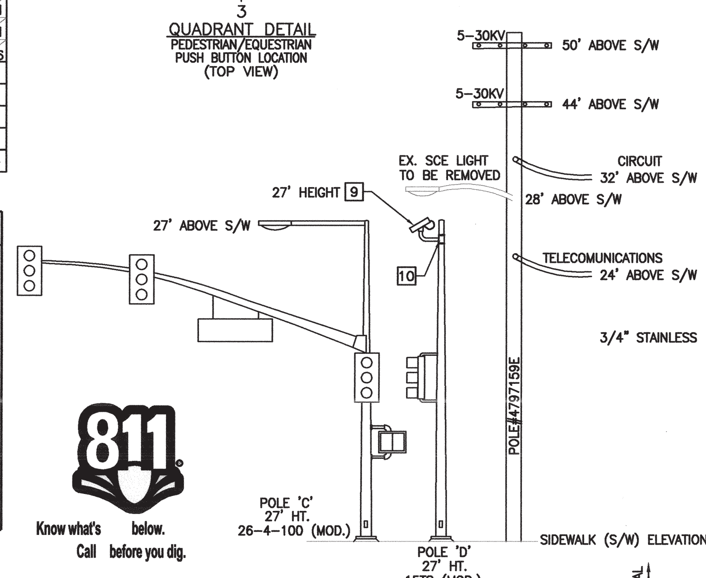
CONDUIT SIZE AND RUN NUMBER (ALL CONDUITS ARE NEW)



QUADRANT DETAIL
PEDESTRIAN/EQUESTRIAN PUSH BUTTON LOCATION
(TOP VIEW)



Know what's below.
Call before you dig.



POLE AND EQUIPMENT SCHEDULE ■

POLE NO.	STANDARDS TYPE	HEIGHT	SIGNAL M.A.	LUMIN. M.A.	VEH. SIGNAL MTG. MAST ARM	VEH. SIGNAL MTG. POLE	PED. SIG. MTG.	P.P.B. ø	P.P.B. QUAD	POLE LOC. A	POLE LOC. B	Luminare H.P.S.V.	COMMENTS
A	15TS	30'	–	15'	–	SV–1–T	–	2	1	14'	3'	250W	–
B	1–A	10'	–	–	–	TV–2–T	SP–1–T	–	–	12'	2.5'	–	–
C	26–4–100 (MOD.)	27'	40'	15'	2–MAS	SV–2–TD	SP–1–T	6	1	AS SHOWN	3'	250W	F=17'; *NEW G7 SIGN "BENNETT"
D	15TS (MOD.)	27'	–	–	–	SV–1–T	–	–	–	AS SHOWN	3'	–	MOD. 27'; *NEW G7 SIGN "BARRANCA"
E	1–A	10'	–	–	–	TV–2–T	SP–2–T	8/6	2/1	AS SHOWN	3'	–	–
F	19–4–100	30'	30'	15'	2–MAS	SV–1–T	SP–1–T	8	4	11'	7'	250W	F=13'; *NEW G7 SIGN "BENNETT"
G	1–A	10'	–	–	–	TV–2–T	SP–1–T	2	1	14'	7'	–	–

* G7 SIGNS SHALL BE 6' LONG, 2-SIDED, AND PER CITY OF GLENDORA STANDARDS. POLE D SIGN SHALL BE SINGLE SIDED AND ATTACHED TO SIGNAL POLE.
■ CONTRACTOR TO POT HOLE BEFORE INSTALLATION OF SIGNAL POLES.

CONSTRUCTION NOTES:

[1] FURNISH AND INSTALL A ECONOLITE ASC-3 CONTROLLER IN A TYPE P CABINET WITH ALL REQUIRED COMPONENTS TO MAKE SIGNAL OPERABLE PER THE PHASE DIAGRAM INCLUDING BATTERY BACK-UP SYSTEM.

[2] FURNISH AND INSTALL 120/240V TYPE III-BF SERVICE EQUIPMENT ENCLOSURE. USE A 50-AMP SIGNAL CIRCUIT BREAKER AND A 30-AMP LIGHTING CIRCUIT BREAKER. SIGNAL CIRCUIT SHALL BE 120V METERED AND LIGHTING SHALL BE 120V UNMETERED. PROVISIONS SHALL BE MADE FOR MOUNTING THE TYPE "V" PHOTOELECTRIC UNIT IN THE SERVICE CABINET.

[3] FURNISH AND INSTALL 3" SCHEDULE 80 PVC CONDUIT AND PULL-ROPE FROM SCE HAND HOLE TO THE SERVICE CABINET PER SCE APPROVED DRAWINGS. AT LEAST 2 WEEKS ADVANCE NOTICE SHALL BE GIVEN TO THE SOUTHERN CALIFORNIA EDISON COMPANY BY CONTACTING THE SERVICE PLANNER (MR. JASON HEAD 909-592-3772).

[4] FURNISH AND INSTALL ECONOLITE AUTOSCOPE SOLO TERRA VIDEO DETECTION SYSTEM ON A 2'-6" EXTENSION ARM ATTACHED TO THE TRAFFIC SIGNAL MAST ARM PER CALTRANS STANDARD PLAN ES-7R (DETAIL A). CONTRACTOR IS REQUIRED TO PROVIDE ALL NECESSARY EQUIPMENT, CABLING AND INSTALLATION FOR PROPER OPERATION AND MAINTENANCE OF VIDEO DETECTION SYSTEM.

[5] FURNISH AND INSTALL ECONOLITE VIDEO DETECTION SYSTEM ON LUMINAIRE MAST ARM. PER CALTRANS STANDARD PLAN ES-7R (DETAIL B). CONTRACTOR IS REQUIRED TO PROVIDE ALL NECESSARY EQUIPMENT, CABLING AND INSTALLATION FOR PROPER OPERATION AND MAINTENANCE OF VIDEO DETECTION SYSTEM.

[6] FURNISH AND INSTALL #6 PULL BOX.

[6E] FURNISH AND INSTALL #6E PULL BOX.

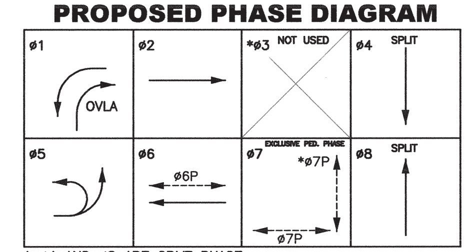
[7] FURNISH AND INSTALL SIGNAL POLE MOUNTED SIGN AS INDICATED ON PLAN PER CALTRANS STANDARD PLANS. PLACE SIGNS ON FRONT AND BACK OF POLE WHERE REQUIRED.

[8] FURNISH AND INSTALL MAST ARM MOUNTED SIGN AS INDICATED ON PLAN PER CALTRANS STANDARD PLAN ES-7N.

[9] FURNISH AND INSTALL ECONOLITE VIDEO DETECTION SYSTEM ON SIGNAL POLE PER CALTRANS STANDARD PLAN ES-7R (DETAIL D) AT A HEIGHT NO HIGHER THAN 27' ABOVE FINISHED GRADE. CONTRACTOR IS REQUIRED TO PROVIDE ALL NECESSARY EQUIPMENT, CABLING AND INSTALLATION FOR PROPER OPERATION AND MAINTENANCE OF VIDEO DETECTION SYSTEM.

[10] FURNISH AND INSTALL 3/4" STAINLESS STEEL BANDS FOR CAMERA MOUNTING ARM ON POLE.

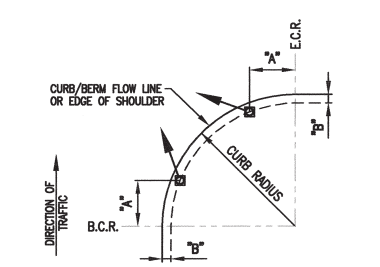
PROPOSED PHASE DIAGRAM



* ø4 AND ø8 ARE SPLIT PHASE.

TRAFFIC SIGNAL GENERAL NOTES:

1. TRAFFIC SIGNAL AND LIGHTING SHALL CONFORM TO CALTRANS STANDARD SPECIFICATION SECTION 86 AND CALTRANS STANDARD PLANS, LATEST EDITION, AND THE SPECIAL PROVISIONS.
2. LOCATION OF ALL UNDERGROUND UTILITIES ARE APPROXIMATE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATIONS AND VERIFY ALL CONDITIONS ON THE JOB SITE. HAND DIG FOUNDATIONS UNTIL CLEAR OF OBSTRUCTIONS. CONTACT UNDERGROUND SERVICE ALERT (USA) AT 811 TWO WORKING DAYS (48 HOURS) PRIOR TO BEGINNING EXCAVATION TO HAVE EXISTING UNDERGROUND UTILITIES LOCATED AND MARKED.
3. OBTAIN APPROVAL FOR EXACT EQUIPMENT LOCATIONS FROM THE CITY ENGINEER PRIOR TO FINAL PLACEMENT.
4. ALL NEW PULL BOXES SHALL BE NO. 5 UNLESS NOTED OTHERWISE ON PLAN.
5. ALL NEW VEHICLE HEADS SHALL HAVE 12" LENSES AND METAL BACKPLATES AND SHALL UTILIZE LIGHT EMITTING DIODE (LED) SIGNAL MODULES BY DIALIGHT CORPORATION.
6. ALL NEW PEDESTRIAN SIGNALS SHALL UTILIZE LIGHT EMITTING DIODE (LED) AND BE THE COUNTDOWN TYPE BY DIALIGHT CORPORATION.



NOTE: FOR "A" AND "B" DIMENSIONS, SEE POLE SCHEDULE OR AS DIRECTED BY ENGINEER

(TYPICAL SIGNAL POLE PLACEMENT, UNLESS SHOWN ON PLANS)
SIGNAL STANDARD PLACEMENT DIMENSIONS AND EQUIPMENT LOCATIONS

SCALE: 1" = 20'
10 0 10 20 30

NO.	DATE	DESCRIPTION	APP'D

REVISIONS

SEAL
REGISTERED PROFESSIONAL ENGINEER
THOMAS JOSEPH WHEAT
No. 69467
Exp. 6/30/14
CIVIL
STATE OF CALIFORNIA

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THOMAS JOSEPH WHEAT R.C.E. No. 69467 Date: 10/15/13 Exp. 6/30/14

SEAL
REGISTERED PROFESSIONAL ENGINEER
JERRY L. BURKE
No. 52114
Exp. 12/31/14
CIVIL
STATE OF CALIFORNIA

CITY OF GLENDORA
Engineering Division

TRAFFIC SIGNAL PLAN
BARRANCA AVENUE at BENNETT AVENUE

Reviewed By: City Engineer RCE: 52114	10/23/2013 Date	Plan No.:	Scale: 1" = 20'
		Drawn By: TJW	Sheet 1 of 1
		Date:	File No.:

Last Update: 10/15/2013 3:43:50 PM
User: ###
Plot Date: 10/15/2013 4:15:21 PM

1151

Synchro Worksheets

Queuing Analysis at Barranca Avenue / Bennett Avenue

Intersection: 4: Barranca Avenue/Barranca Ave & Bennett Avenue

Movement	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	T	TR	LT	T
Maximum Queue (ft)	93	97	65	76	115	118	65
Average Queue (ft)	51	49	35	40	54	59	24
95th Queue (ft)	81	82	55	64	92	100	55
Link Distance (ft)	240	240	240	235	235	358	358
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 6: Barranca Ave./Barranca Avenue & Elderberry Dr.

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 0

Intersection	
Intersection Delay, s/veh	23.6
Intersection LOS	C

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations									
Traffic Vol, veh/h	0	379	102	0	161	239	0	61	268
Future Vol, veh/h	0	379	102	0	161	239	0	61	268
Peak Hour Factor	0.92	0.73	0.73	0.92	0.73	0.73	0.92	0.73	0.73
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	519	140	0	221	327	0	84	367
Number of Lanes	0	2	1	0	2	0	0	0	2

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	3	0
HCM Control Delay	18.7	32.1	20.3
HCM LOS	C	D	C

Lane	NBLn1	NBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	0%	0%	100%	100%	0%	41%	0%
Vol Thru, %	100%	18%	0%	0%	0%	59%	100%
Vol Right, %	0%	82%	0%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	107	293	190	190	102	150	179
LT Vol	0	0	190	190	0	61	0
Through Vol	107	54	0	0	0	89	179
RT Vol	0	239	0	0	102	0	0
Lane Flow Rate	147	401	260	260	140	206	245
Geometry Grp	8	8	7	7	7	8	8
Degree of Util (X)	0.331	0.837	0.579	0.579	0.195	0.486	0.564
Departure Headway (Hd)	8.107	7.52	8.023	8.023	5.022	8.5	8.291
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	443	481	449	449	713	424	436
Service Time	5.862	5.276	5.765	5.765	2.763	6.258	6.049
HCM Lane V/C Ratio	0.332	0.834	0.579	0.579	0.196	0.486	0.562
HCM Control Delay	14.8	38.4	21.3	21.3	9	19.1	21.3
HCM Lane LOS	B	E	C	C	A	C	C
HCM 95th-tile Q	1.4	8.3	3.6	3.6	0.7	2.6	3.4

Intersection: 4: Barranca Avenue/Barranca Ave & Bennett Avenue

Movement	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	T	TR	LT	T
Maximum Queue (ft)	73	69	55	73	93	93	52
Average Queue (ft)	40	34	25	40	45	46	18
95th Queue (ft)	62	58	50	61	74	74	47
Link Distance (ft)	240	240	240	235	235	358	358
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 6: Barranca Ave./Barranca Avenue & Elderberry Dr.

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 0

Intersection	
Intersection Delay, s/veh	13.9
Intersection LOS	B

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations									
Traffic Vol, veh/h	0	222	45	0	190	174	0	29	209
Future Vol, veh/h	0	222	45	0	190	174	0	29	209
Peak Hour Factor	0.92	0.72	0.72	0.92	0.72	0.72	0.92	0.72	0.72
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	308	63	0	264	242	0	40	290
Number of Lanes	0	2	1	0	2	0	0	0	2

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	3	0
HCM Control Delay	12.3	15.3	13.4
HCM LOS	B	C	B

Lane	NBLn1	NBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	0%	0%	100%	100%	0%	29%	0%
Vol Thru, %	100%	27%	0%	0%	0%	71%	100%
Vol Right, %	0%	73%	0%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	127	237	111	111	45	99	139
LT Vol	0	0	111	111	0	29	0
Through Vol	127	63	0	0	0	70	139
RT Vol	0	174	0	0	45	0	0
Lane Flow Rate	176	330	154	154	62	137	194
Geometry Grp	8	8	7	7	7	8	8
Degree of Util (X)	0.326	0.564	0.312	0.312	0.075	0.272	0.375
Departure Headway (Hd)	6.678	6.158	7.282	7.282	4.305	7.135	6.985
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	537	583	492	492	825	502	513
Service Time	4.449	3.929	5.048	5.048	2.069	4.913	4.764
HCM Lane V/C Ratio	0.328	0.566	0.313	0.313	0.075	0.273	0.378
HCM Control Delay	12.7	16.7	13.3	13.3	7.4	12.6	13.9
HCM Lane LOS	B	C	B	B	A	B	B
HCM 95th-tile Q	1.4	3.5	1.3	1.3	0.2	1.1	1.7

Lane Group	WBL	WBR	NBU	NBT	SBL	SBT
Lane Group Flow (vph)	593	159	14	622	107	418
v/c Ratio	0.43	0.22	0.04	0.50	0.33	0.29
Control Delay	17.6	3.9	12.2	10.1	15.5	16.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.6	3.9	12.2	10.1	15.5	16.2
Queue Length 50th (ft)	92	0	4	47	29	62
Queue Length 95th (ft)	128	19	13	53	44	92
Internal Link Dist (ft)	230			222		320
Turn Bay Length (ft)			75		150	
Base Capacity (vph)	1485	774	392	1682	322	1674
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	0.40	0.21	0.04	0.37	0.33	0.25

Intersection Summary

Lane Group	WBL	WBR	NBU	NBT	SBL	SBT
Lane Group Flow (vph)	364	71	42	573	54	333
v/c Ratio	0.28	0.11	0.09	0.40	0.15	0.25
Control Delay	18.3	5.3	11.8	10.3	12.4	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.3	5.3	11.8	10.3	12.4	18.0
Queue Length 50th (ft)	68	0	11	56	14	63
Queue Length 95th (ft)	78	16	27	62	26	73
Internal Link Dist (ft)	230			222		320
Turn Bay Length (ft)			75		150	
Base Capacity (vph)	1404	689	478	1621	361	1583
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	0.26	0.10	0.09	0.35	0.15	0.21

Intersection Summary

Lane Group	WBL	WBR	NBU	NBT	SBL	SBT
Lane Group Flow (vph)	607	159	14	622	107	430
v/c Ratio	0.44	0.22	0.04	0.50	0.33	0.30
Control Delay	17.7	3.9	12.2	10.1	15.5	16.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.7	3.9	12.2	10.1	15.5	16.2
Queue Length 50th (ft)	94	0	4	47	29	64
Queue Length 95th (ft)	131	19	13	53	44	94
Internal Link Dist (ft)	230			222		320
Turn Bay Length (ft)			75		150	
Base Capacity (vph)	1485	774	390	1682	322	1674
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	0.41	0.21	0.04	0.37	0.33	0.26

Intersection Summary

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	735	192	13	183	500	217	314
Future Volume (vph)	735	192	13	183	500	217	314
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.95
Frt	1.00	0.85	1.00	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	1770	1863	1583	1770	3539
Flt Permitted	0.95	1.00	0.50	1.00	1.00	0.38	1.00
Satd. Flow (perm)	3433	1583	934	1863	1583	706	3539
Peak-hour factor, PHF	0.73	0.73	0.92	0.73	0.73	0.73	0.73
Adj. Flow (vph)	1007	263	14	251	685	297	430
RTOR Reduction (vph)	0	162	0	0	0	0	0
Lane Group Flow (vph)	1007	101	14	251	685	297	430
Turn Type	Prot	Perm	pm+pt	NA	pm+ov	pm+pt	NA
Protected Phases	8		5	2	8	1	6
Permitted Phases		8	2		2	6	
Actuated Green, G (s)	32.9	32.9	22.8	21.9	54.8	41.1	34.2
Effective Green, g (s)	32.9	32.9	22.8	21.9	54.8	41.1	34.2
Actuated g/C Ratio	0.38	0.38	0.27	0.25	0.64	0.48	0.40
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1313	605	256	474	1119	500	1407
v/s Ratio Prot	c0.29		0.00	0.13	c0.23	c0.09	0.12
v/s Ratio Perm		0.06	0.01		0.20	0.19	
v/c Ratio	0.77	0.17	0.05	0.53	0.61	0.59	0.31
Uniform Delay, d1	23.2	17.5	23.4	27.6	9.3	14.9	17.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.7	0.1	0.1	1.1	1.0	1.9	0.1
Delay (s)	25.9	17.6	23.5	28.7	10.3	16.8	17.9
Level of Service	C	B	C	C	B	B	B
Approach Delay (s)	24.2			15.3			17.5
Approach LOS	C			B			B

Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1007	263	14	251	685	297	430
v/c Ratio	0.72	0.33	0.05	0.65	0.63	0.61	0.29
Control Delay	24.7	3.7	14.5	38.6	10.3	20.8	16.9
Queue Delay	0.0	0.0	0.0	0.0	2.1	0.0	0.0
Total Delay	24.7	3.7	14.5	38.6	12.4	20.8	16.9
Queue Length 50th (ft)	220	0	4	123	176	99	71
Queue Length 95th (ft)	239	18	14	157	183	123	103
Internal Link Dist (ft)	230			222			320
Turn Bay Length (ft)			75			150	
Base Capacity (vph)	1492	836	304	509	1136	513	1518
Starvation Cap Reductn	0	0	0	0	300	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.31	0.05	0.49	0.82	0.58	0.28

Intersection Summary

Lane Group	WBL	WBR	NBU	NBT	SBL	SBT
Lane Group Flow (vph)	364	71	42	599	56	333
v/c Ratio	0.28	0.11	0.09	0.42	0.16	0.25
Control Delay	18.3	5.3	11.8	10.5	12.5	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.3	5.3	11.8	10.5	12.5	18.0
Queue Length 50th (ft)	68	0	11	59	14	63
Queue Length 95th (ft)	78	16	27	64	26	73
Internal Link Dist (ft)	230			222		320
Turn Bay Length (ft)			75		150	
Base Capacity (vph)	1404	689	478	1628	350	1583
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	0.26	0.10	0.09	0.37	0.16	0.21

Intersection Summary

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	7	7	511	557
v/c Ratio	0.02	0.02	0.20	0.22
Control Delay	85.5	85.5	14.6	14.9
Queue Delay	0.0	0.0	0.0	3.4
Total Delay	85.5	85.5	14.6	18.2
Queue Length 50th (ft)	11	11	174	193
Queue Length 95th (ft)	31	31	201	220
Internal Link Dist (ft)	269	324	263	30
Turn Bay Length (ft)				
Base Capacity (vph)	462	462	2524	2524
Starvation Cap Reductn	0	0	0	1843
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.02	0.02	0.20	0.82

Intersection Summary

SimTraffic Worksheets

Queuing Analysis at Barranca Avenue Elderberry Drive

Intersection: 4: Barranca Avenue/Barranca Ave & Bennett Avenue

Movement	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	U	T	TR	L	T	T
Maximum Queue (ft)	166	165	71	67	138	172	102	153	105
Average Queue (ft)	82	79	32	10	66	70	36	79	31
95th Queue (ft)	137	142	60	38	115	132	72	133	77
Link Distance (ft)	234	234	234		235	235		358	358
Upstream Blk Time (%)	0	0				0			
Queuing Penalty (veh)	0	0				0			
Storage Bay Dist (ft)				75			150		
Storage Blk Time (%)				0	7		0	0	
Queuing Penalty (veh)				0	1		0	0	

Intersection: 6: Barranca Ave./Barranca Avenue & Elderberry Dr.

Movement	EB	NB
Directions Served	R	T
Maximum Queue (ft)	53	4
Average Queue (ft)	22	0
95th Queue (ft)	48	4
Link Distance (ft)	446	423
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 1

Intersection: 4: Barranca Avenue/Barranca Ave & Bennette Avenue

Movement	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	U	T	TR	L	T	T
Maximum Queue (ft)	108	117	55	87	144	151	60	137	99
Average Queue (ft)	57	50	21	24	70	61	24	67	26
95th Queue (ft)	95	97	49	63	124	117	54	117	68
Link Distance (ft)	234	234	234		235	235		358	358
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)				75			150		
Storage Blk Time (%)				0	8			0	
Queuing Penalty (veh)				0	3			0	

Intersection: 6: Barranca Ave./Barranca Avenue & Elderberry Dr.

Movement	EB
Directions Served	R
Maximum Queue (ft)	37
Average Queue (ft)	16
95th Queue (ft)	41
Link Distance (ft)	446
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 3

Intersection: 4: Barranca Avenue & Bennett Avenue

Movement	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	U	T	TR	L	T	T
Maximum Queue (ft)	179	185	74	78	196	240	116	184	138
Average Queue (ft)	87	82	33	12	78	97	41	84	36
95th Queue (ft)	148	152	61	47	160	201	86	147	92
Link Distance (ft)	234	234	234		235	235		358	358
Upstream Blk Time (%)	0	0			0	0			
Queuing Penalty (veh)	0	0			0	1			
Storage Bay Dist (ft)				75			150		
Storage Blk Time (%)				0	10		0	1	
Queuing Penalty (veh)				0	1		0	1	

Intersection: 6: Barranca Ave./Barranca Avenue & Elderberry Dr.

Movement	EB	NB	NB	SB	SB
Directions Served	R	T	T	T	TR
Maximum Queue (ft)	81	5	29	251	255
Average Queue (ft)	27	0	2	124	115
95th Queue (ft)	60	6	15	276	269
Link Distance (ft)	446	26	26	235	235
Upstream Blk Time (%)		0	0	3	2
Queuing Penalty (veh)		0	1	11	8
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 8: Barranca Ave. & Barranca Grade Crossing

Movement	EB	WB	NB	NB	SB	SB
Directions Served	T	T	T	T	T	T
Maximum Queue (ft)	37	41	201	253	37	42
Average Queue (ft)	5	6	62	92	22	23
95th Queue (ft)	23	27	154	222	40	44
Link Distance (ft)	509	446	304	304	26	26
Upstream Blk Time (%)				0	25	23
Queuing Penalty (veh)				0	96	91
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 210

Intersection: 4: Barranca Avenue & Bennett Avenue

Movement	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	U	T	TR	L	T	T
Maximum Queue (ft)	115	115	56	94	204	218	71	142	93
Average Queue (ft)	57	47	21	29	85	84	25	68	28
95th Queue (ft)	98	94	48	80	169	179	59	121	72
Link Distance (ft)	234	234	234		235	235		358	358
Upstream Blk Time (%)					0	0			
Queuing Penalty (veh)					0	1			
Storage Bay Dist (ft)				75			150		
Storage Blk Time (%)				0	10			0	
Queuing Penalty (veh)				0	4			0	

Intersection: 6: Barranca Ave./Barranca Avenue & Elderberry Dr.

Movement	EB	NB	NB	SB	SB
Directions Served	R	T	T	T	TR
Maximum Queue (ft)	46	7	30	217	200
Average Queue (ft)	16	0	2	69	58
95th Queue (ft)	42	7	16	178	162
Link Distance (ft)	447	46	46	235	235
Upstream Blk Time (%)		0	0	0	0
Queuing Penalty (veh)		0	1	0	0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 8: Barranca Ave. & Barranca Grade Crossing

Movement	EB	WB	NB	NB	SB	SB
Directions Served	T	T	T	T	T	T
Maximum Queue (ft)	46	43	211	243	52	59
Average Queue (ft)	8	6	78	78	35	33
95th Queue (ft)	31	28	185	194	66	66
Link Distance (ft)	306	358	310	310	46	46
Upstream Blk Time (%)			0	0	20	18
Queuing Penalty (veh)			0	0	52	46
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 106

Metro Gold Line Foothills Extension – Elwood and Glenwood
(at Foothill Boulevard) Signal Warrant Analysis

TECHNICAL MEMORANDUM

Metro Gold Line Foothill Extension – Elwood and Glenwood (at Foothill Boulevard) Signal Warrant Analysis

PREPARED FOR:	Denis Cournoyer/Metro Gold Line Foothill Extension Construction Authority
PREPARED BY:	Loren Bloomberg/CH2M
DATE:	January 3, 2017
PROJECT NUMBER:	680051.16.01

The purpose of this memorandum is to evaluate the potential impacts on the Foothill Boulevard intersections at Elwood Avenue and Glenwood Avenue due to the closure of the at-grade crossings at either Glenwood Avenue or Elwood Avenue in the city of Glendora. The general study area is illustrated in Figure 1.

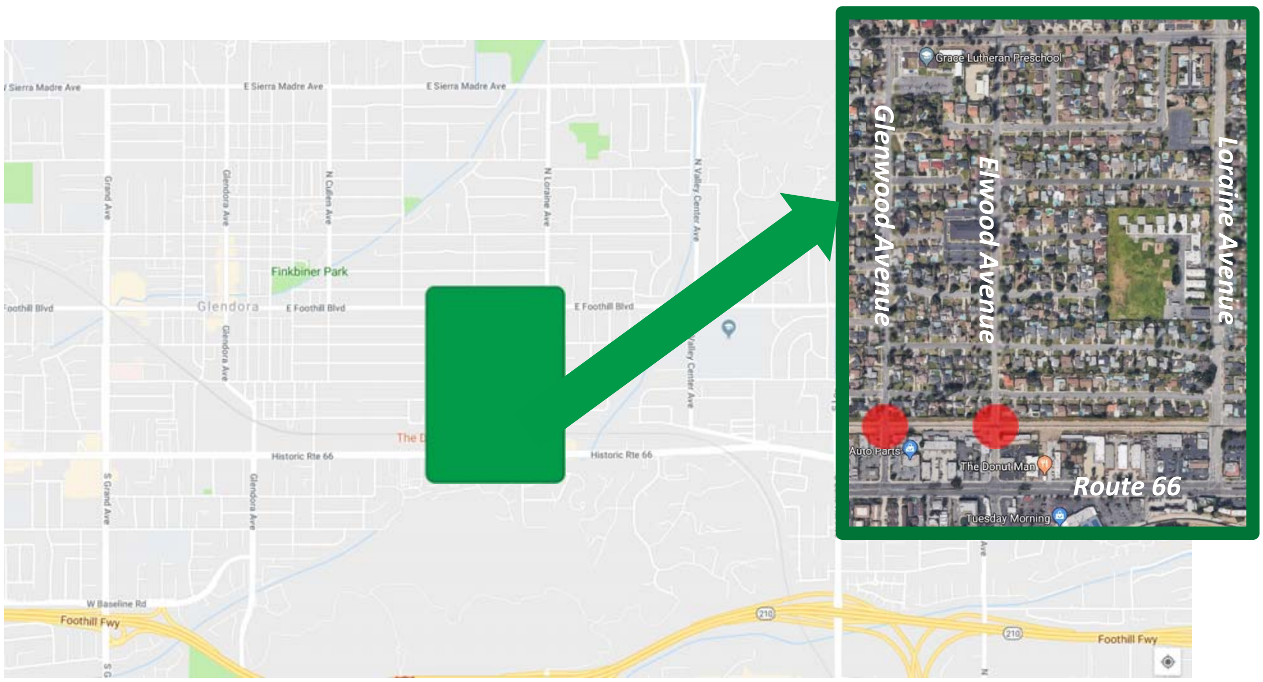


Figure 1: Study Area

The closures (shown in red on Figure 1) would be located at the proposed at-grade crossings with the Foothill Gold Line extension light rail transit (LRT) tracks. At these locations, the proposed LRT tracks will be adjacent to an existing freight track. Because the two crossings are less than 700 feet apart, closing one of the two crossings to traffic is being recommended by the California Public Utilities Commission (CPUC). Only one of the two crossings would be closed; the other would remain open to traffic.

With the closures, there is the potential for changes in traffic patterns. This memorandum assesses the potential effects on Foothill Boulevard, north of the closures.

Background Information

The "Task R: Metro Gold Line Foothill Extension –Glenwood Avenue and Elwood Avenue Closure Circulation Analysis" (AECOM, November 4, 2016) includes traffic count data and forecasts (2035). The analysis in this memorandum focused on the intersections with Route 66, immediately south of the railroad tracks. Because the study area is residential, and all the major land uses and transportation facilities (e.g., I-210) are located to the south, the traffic effects are more pronounced on Route 66. However, the city of Glendora has expressed an interest in the operations at Foothill Boulevard (to the north), so this memorandum addresses that technical issue.

Traffic volumes were derived for existing conditions, 2035 baseline, and the closure scenarios for Elwood and Glenwood Avenues (see Attachments 1 to 4). The AECOM analysis only considered Lemon Avenue and Route 66 – no intersections to the north were evaluated. Also, it was assumed that all of the southbound traffic from the north would not detour to other routes until they reached Lemon Avenue.

The City of Glendora provided daily traffic volumes for 2017, as shown in Table 1:

Street	Segment	Daily Volume	Peak Hour	Total Peak Hour Volume	Direction Peak Hour Volume
Elwood Avenue	Ada Avenue – Foothill Boulevard	2661 vehicles	5 PM	271 vehicles/hour (vph)	173 vph northbound (NB)
Glenwood Avenue	Route 66 – Foothill Boulevard	3347 vehicles	2:15 PM	415 vph	282 vph NB
Foothill Boulevard	Cullen Avenue-Elwood Avenue	9792 vehicles	7:45 AM	922 vph	535 vph westbound (WB)

Table 1: Segment Traffic Volumes, per City of Glendora Traffic Counts

Additional traffic counts (turning movements) were collected at the intersections of Elwood Avenue/Foothill Boulevard and Glenwood Avenue/Foothill Boulevard in December 2017. Table 2 is a summary of those counts; details are provided in Attachment 5.

In general, counts are higher on Glenwood Avenue, by approximately 25 percent. Also, traffic volumes increase to the south on both Glenwood Avenue and Elwood Avenue, as they approach Route 66.

Table 3 is a summary of projected 2035 volumes. AM peak volumes are used, because they are higher. The volumes used for warrant analysis are highlighted in bold.

Intersection	Leg	Peak Hours	Total Peak Hour Volume	Directional Peak Hour Volume
Elwood Avenue/ Foothill Boulevard	North	7:45-8:45 AM and 5-6 PM	121 vph AM 96 vph PM	64 vph NB AM 66 vph NB PM
	South		124 vph AM 89 vph PM	72 vph NB AM 46 vph NB PM
	East		1330 vph AM 1214 vph PM	761 vph WB AM 686 vph eastbound (EB) PM
	West		1363 vph AM 1261 vph PM	784 vph WB AM 726 vph EB PM
Glenwood Avenue/ Foothill Boulevard	South		224 vph AM 138 vph PM	120 vph NB AM 70 vph NB PM
	East		1359 vph AM 1267 vph PM	778 vph WB AM 731 vph EB PM
	West		1191 vph AM 1256 vph PM	752 vph WB AM 724 vph EB PM

Table 2: Peak Hour Traffic Volumes at the Glenwood and Elwood Intersections at Foothill Boulevard, December 2017

Intersection	Leg	Total Peak Hour Volume	Directional Peak Hour Volume
Elwood Avenue/ Foothill Boulevard	North	136 vph	72 vph NB
	South	139 vph	**81 vph NB**
	East	1490 vph	852 vph WB
	West	**1527 vph**	878 vph WB
Glenwood Avenue/ Foothill Boulevard	South	251 vph	**134 vph NB**
	East	1522 vph	871 vph WB
	West	1333 vph	842 vph WB

Table 3: 2035 Peak Hour Traffic Volumes at the Glenwood and Elwood Intersections at Foothill Boulevard

Foothill Avenue Analysis

Baseline Analysis – No Closure

A preliminary baseline signal warrant analysis was conducted for the two intersections, using 2035 volumes from Table 3, as follows:

- Foothill Boulevard: 1527 vehicles/hour (both directions)
- Elwood Avenue: 81 vehicles/hour (NB)
- Glenwood Avenue: 134 vehicles/hour (NB)

Next, a baseline 2035 signal warrant analysis was conducted using the procedures in the California Manual on Uniform Traffic Control Devices (CA MUTCD). Figure 2 presents the results of MUTCD Warrant 3, the peak hour warrant. The circles indicate the estimated future traffic volumes, which should be compared to the lowest black curve. The yellow circle is the Glenwood Avenue/Foothill Boulevard intersection, which suggests that the warrant will likely be satisfied in 2035. The green circle is the Elwood Avenue/Foothill Boulevard, which suggests that the warrant could be satisfied for 2035, but it is not definitive. However, if the Elwood Avenue intersection were signalized, traffic would shift from Glenwood Avenue, and the warrant definitively would be satisfied. Also, when one of the two intersections is signalized, traffic will be reduced on the other street, so only one intersection will meet the warrant. The conclusion is that there is evidence, based on the peak hour warrant, that **installation of a traffic signal should be considered at one (but only one) of these two locations.**

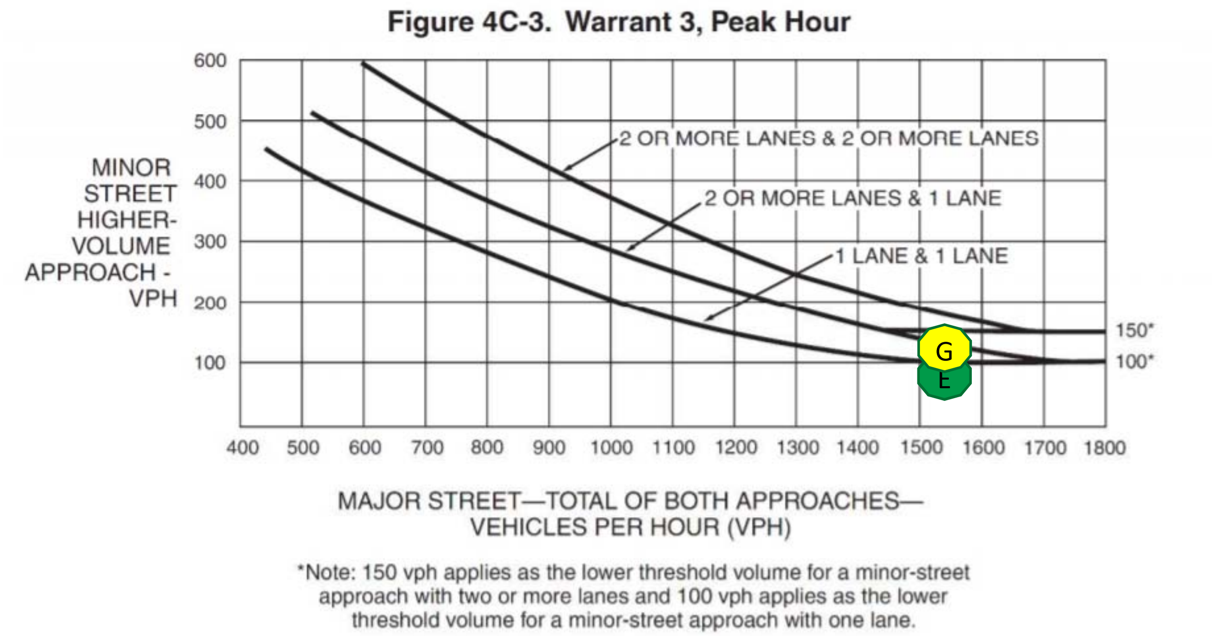
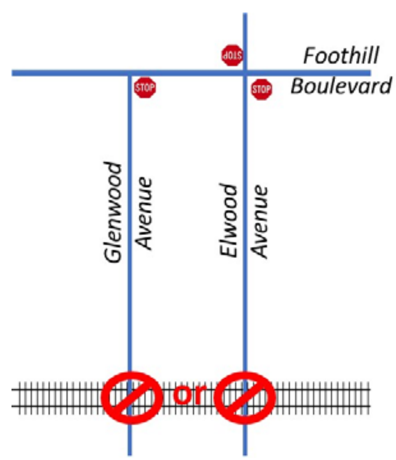


Figure 2: Peak Hour Warrant – Baseline (No Closure) for Glenwood (G) and Elwood (E) Avenue Intersections with Foothill Boulevard

Closure Analysis

The next step was to consider the impact of closing either of the railroad grade crossings south of Lemon Avenue. As noted earlier, the 2016 AECOM analysis did not consider any changes in traffic volumes on Glenwood or Elwood Avenues. For this analysis, that assumption was revisited to determine if there would be some traffic shift.



Stop-Controlled Intersections on Foothill Boulevard

First, an assessment was made assuming the two intersections on Foothill Boulevard would remain stop-controlled, and either street was closed at the rail crossing. This scenario is illustrated in the graphic to the right.

The analysis suggests that the shift in traffic would be minimal if either street were closed:

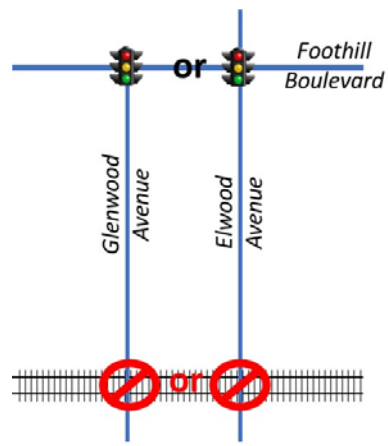
- The predominant traffic patterns in the area are to and from the south. While there a few non-residential land uses, most of the land use north of Lemon Avenue is residential. For work and shopping trips, almost all of the traffic will go south away from their homes. For these trips, the trip generation is likely south of Foothill Boulevard. The closure of either street could shift traffic to the other street, but would not affect the traffic at the Foothill Boulevard intersections, because it was generated further south.

- Extending that logic, the only trips that might shift between the Elwood Avenue and Glenwood Avenue intersections are those trips that currently use one of those trips and travel on both Foothill Boulevard and Route 66. Those drivers would have to be coming to or from a residential area north of Foothill Boulevard. While it is possible that there are a few drivers using Elwood Avenue or Glenwood Avenue as a cut-through route, they are more likely to use Loraine Avenue (a four-lane street) if they are coming from north and east of Elwood Avenue or Glenwood Avenue. For trips to the west, drivers are unlikely to go back to the east unless they have destinations in that direction.

Based on that assessment, and the residential land use along these streets, the likely change in volume is a maximum of 10 percent. During the peak hour, that would equate to a maximum of 10 to 20 vehicles. It is likely that the volume shifts would be even less. However, with those changes, the effects on the warrant analysis in Figure 2 would be inconsequential. In other words, the driver for a signal will be future volumes on those streets, and not a potential closure at the tracks several blocks to the south.

Either Signalized Intersection on Foothill Boulevard

The next assessment assumed that one of the two intersections on Foothill Boulevard would be signalized, but not both. Again, one of the two streets would be closed at the rail crossing. This scenario is illustrated in the graphic to the right.

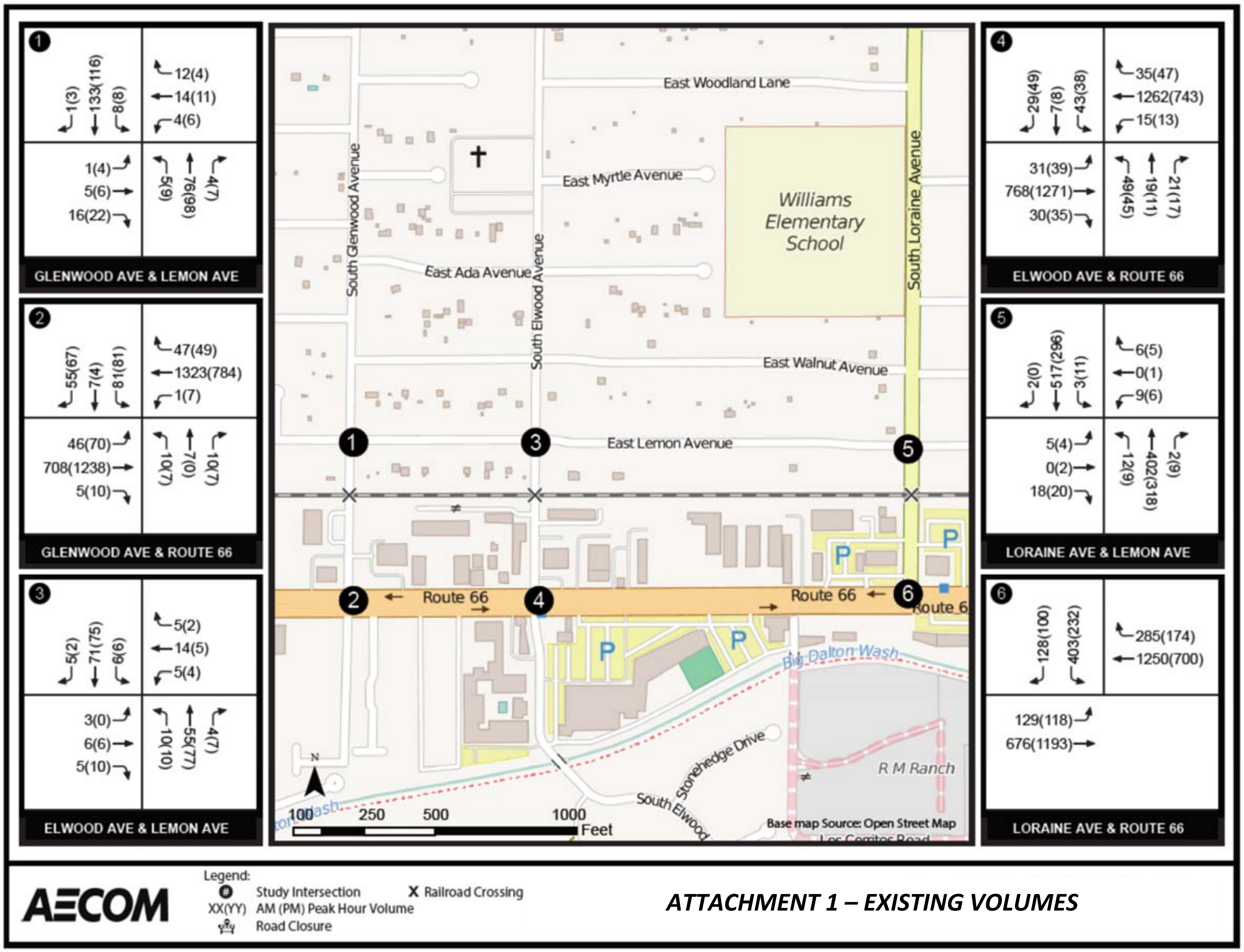


In this case, signalizing the intersection at Foothill Boulevard would attract traffic from the other intersection. This change would have a bigger effect because it occurs at the intersection, not 2000 feet away. If either Glenwood or Elwood Avenue were signalized, traffic would shift from the other street (with the stop sign at Foothill Boulevard), reducing the volume and eliminating the warrant. In other words, it will never be necessary to signalize both intersections.

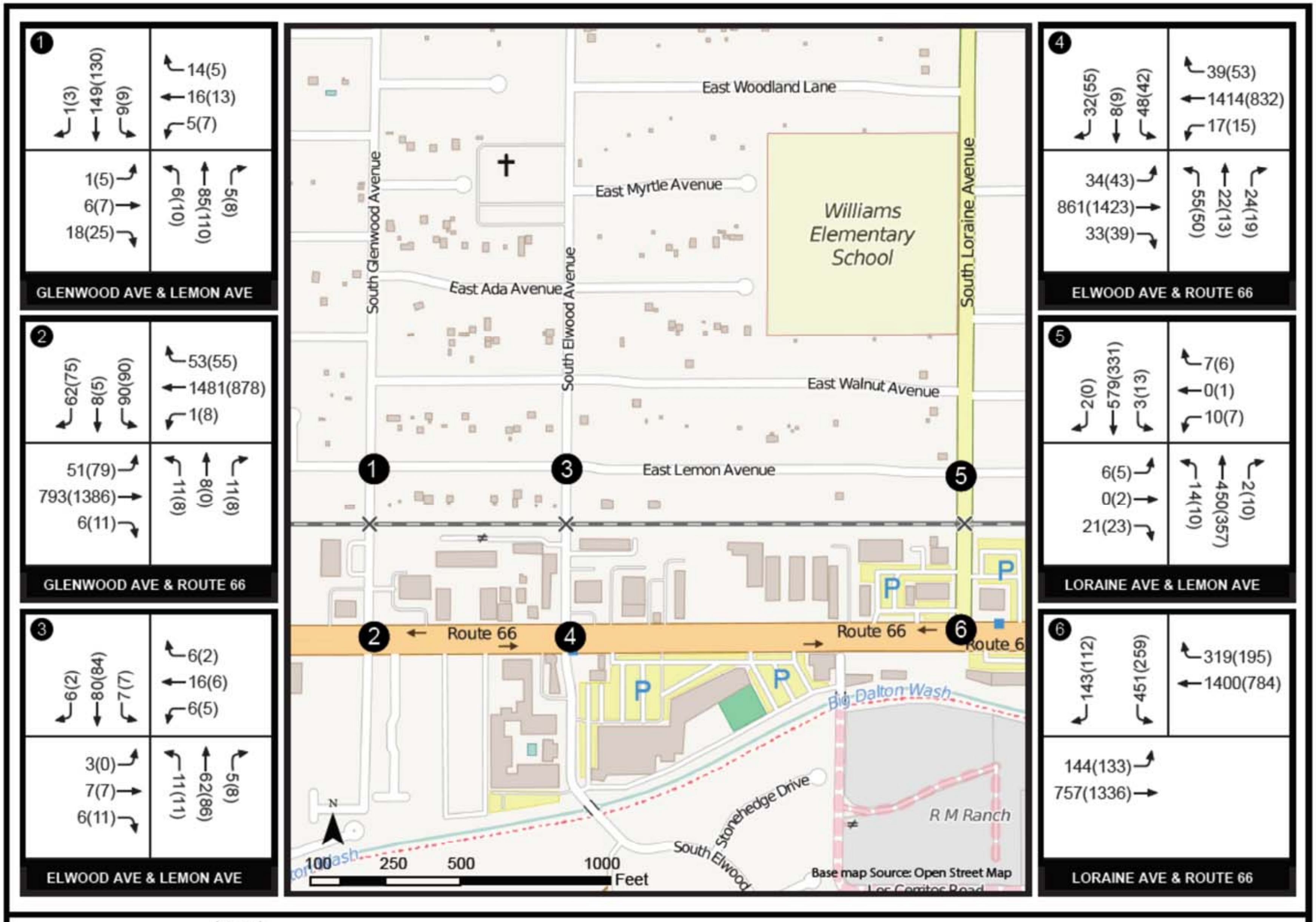
Another consideration is that Elwood Avenue is a through street north of Foothill Boulevard and south of Route 66. Glenwood Avenue terminates at Foothill Boulevard and connects to a driveway south of Route 66. Therefore, Elwood Avenue serves more through traffic than Glenwood Avenue.

Recommendation/Conclusions

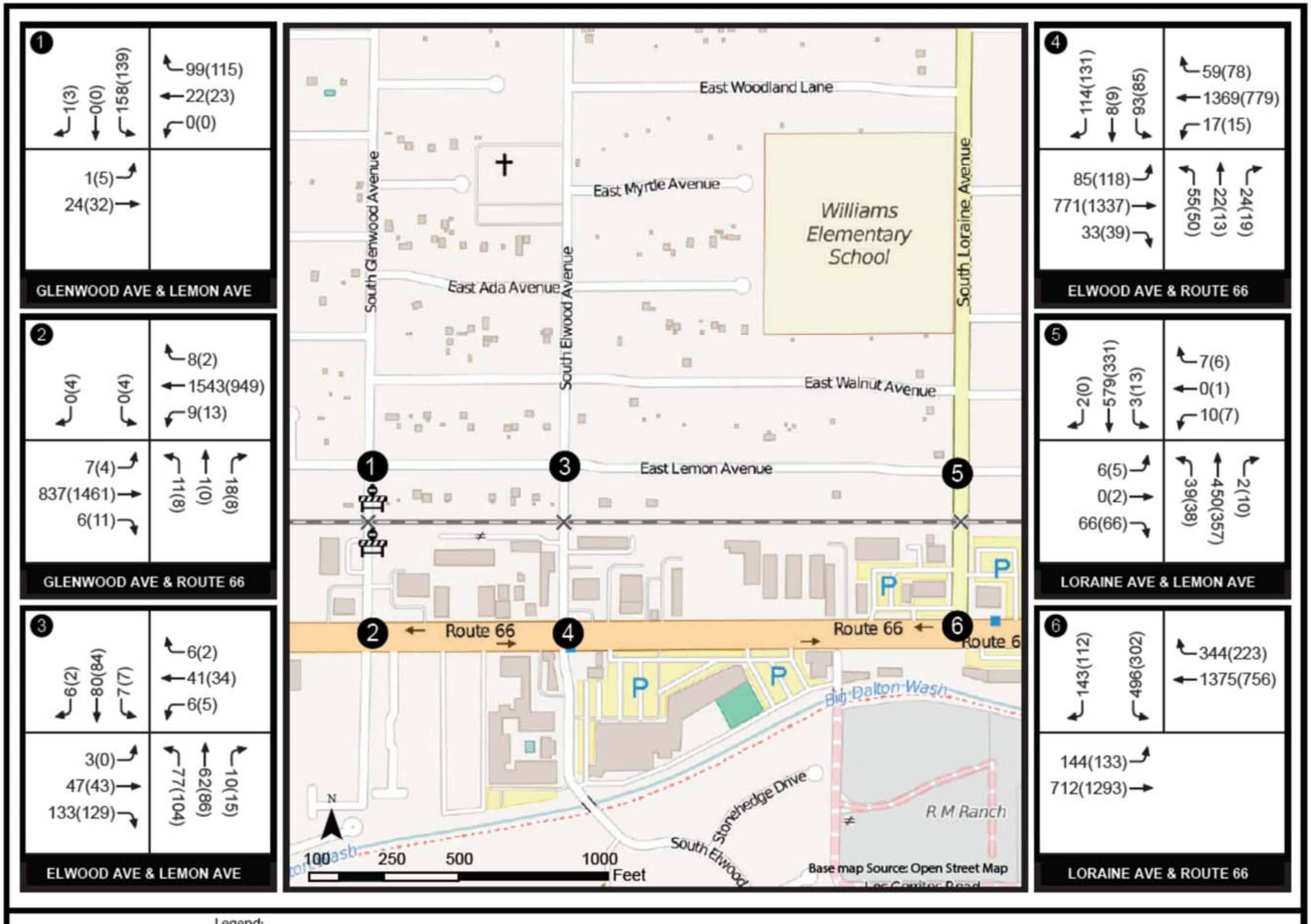
The preliminary signal warrant analysis suggested that the projected volumes at the two study intersections on Foothill Boulevard (at Elwood Avenue and Glenwood Avenue) may be high enough to indicate the need to consider a signal in the future. Closing the grade crossing to the south will not result in a substantive change to the signal warrant. The grade crossing decision should be based on the connectivity to the local street network. The signal at Foothill Boulevard should be considered on the opposite street as the railroad crossing closure.



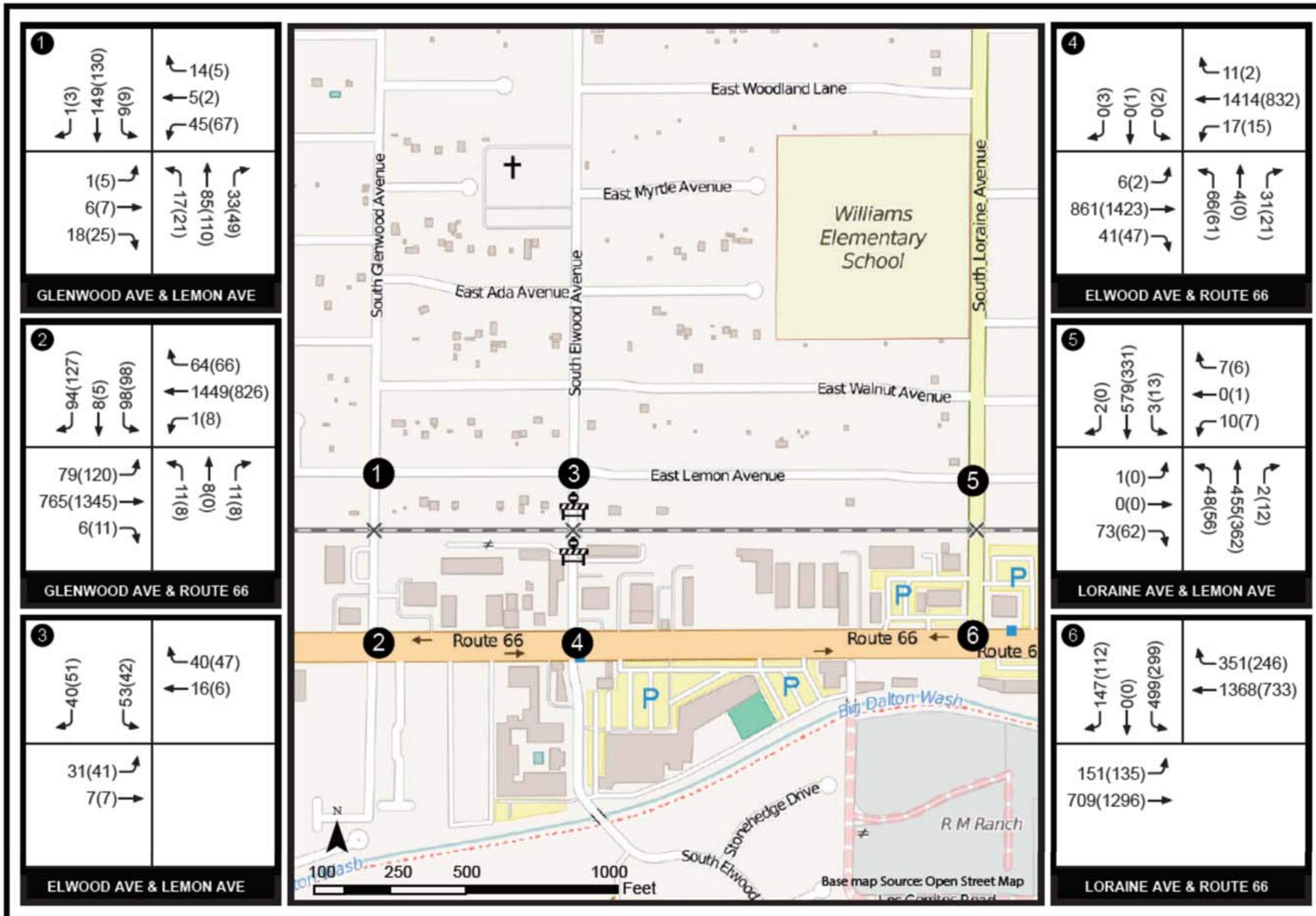
ATTACHMENT 1 – EXISTING VOLUMES



ATTACHMENT 2 – 2035 BASELINE VOLUMES



ATTACHMENT 3 – 2035 DETOUR VOLUMES (GLENWOOD)



AECOM

Legend:
- Study Intersection
- XX(YY) AM (PM) Peak Hour Volume
- Road Closure

ATTACHMENT 4 – 2035 DETOUR VOLUMES (ELWOOD)

ATTACHMENT 5

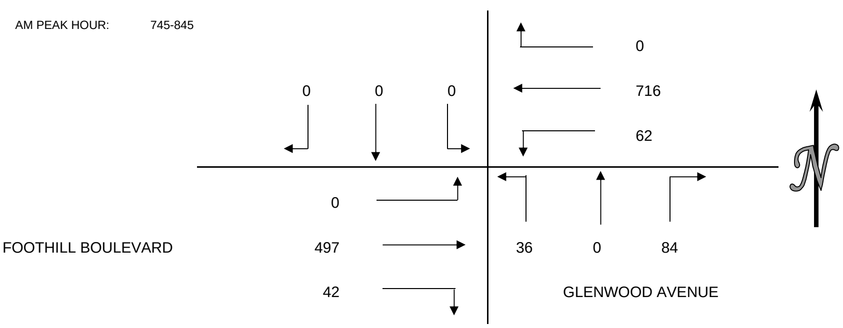
WILTEC Phone: (626) 564-1944 Fax: (626) 564-0969 info@wiltecusa.com

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M Hill
PROJECT:		FOOTHILL GOLDLINE
DATE:		TUESDAY DECEMBER 12, 2017
PERIOD:		6:00 AM TO 9:00 AM
INTERSECTION:	N/S	GLENWOOD AVENUE
	E/W	FOOTHILL BOULEVARD
CITY:		GLENDORA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-615	0	0	0	0	90	5	2	0	3	0	24	0	124
615-630	0	0	0	0	108	4	1	0	3	3	23	0	142
630-645	0	0	0	0	110	2	4	0	4	5	40	0	165
645-700	0	0	0	0	137	5	16	0	3	3	86	0	250
700-715	0	0	0	0	147	7	7	0	1	4	45	0	211
715-730	0	0	0	0	146	5	2	0	1	9	45	0	208
730-745	0	0	0	0	132	5	15	0	4	4	79	0	239
745-800	0	0	0	0	179	11	28	0	4	7	118	0	347
800-815	0	0	0	0	183	21	27	0	12	7	156	0	406
815-830	0	0	0	0	181	19	12	0	2	18	127	0	359
830-845	0	0	0	0	173	11	17	0	18	10	96	0	325
845-900	0	0	0	0	127	1	7	0	4	4	75	0	218
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-700	0	0	0	0	445	16	23	0	13	11	173	0	681
615-715	0	0	0	0	502	18	28	0	11	15	194	0	768
630-730	0	0	0	0	540	19	29	0	9	21	216	0	834
645-745	0	0	0	0	562	22	40	0	9	20	255	0	908
700-800	0	0	0	0	604	28	52	0	10	24	287	0	1005
715-815	0	0	0	0	640	42	72	0	21	27	398	0	1200
730-830	0	0	0	0	675	56	82	0	22	36	480	0	1351
745-845	0	0	0	0	716	62	84	0	36	42	497	0	1437
800-900	0	0	0	0	664	52	63	0	36	39	454	0	1308



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
600-615	0	0	0	0	0
615-630	0	0	0	0	0
630-645	0	0	0	0	0
645-700	0	0	1	0	1
700-715	0	0	0	0	0
715-730	0	0	0	0	0
730-745	0	0	1	0	1
745-800	0	0	0	0	0
800-815	0	0	1	0	1
815-830	0	0	3	0	3
830-845	0	0	0	0	0
845-900	0	3	0	0	3
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
600-700	0	0	1	0	1
615-715	0	0	1	0	1
630-730	0	0	1	0	1
645-745	0	0	2	0	2
700-800	0	0	1	0	1
715-815	0	0	2	0	2
730-830	0	0	5	0	5
745-845	0	0	4	0	4
800-900	0	3	4	0	7

BICYCLE COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
600-615	0	0	0	0	0
615-630	0	0	0	0	0
630-645	0	0	0	0	0
645-700	0	0	0	0	0
700-715	0	0	0	0	0
715-730	0	0	0	0	0
730-745	0	0	0	0	0
745-800	0	0	1	0	1
800-815	0	0	0	0	0
815-830	0	0	2	0	2
830-845	0	1	0	0	1
845-900	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
600-700	0	0	0	0	0
615-715	0	0	0	0	0
630-730	0	0	0	0	0
645-745	0	0	0	0	0
700-800	0	0	1	0	1
715-815	0	0	1	0	1
730-830	0	0	3	0	3
745-845	0	1	3	0	4
800-900	0	1	2	0	3

WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969 info@wiltecusa.com

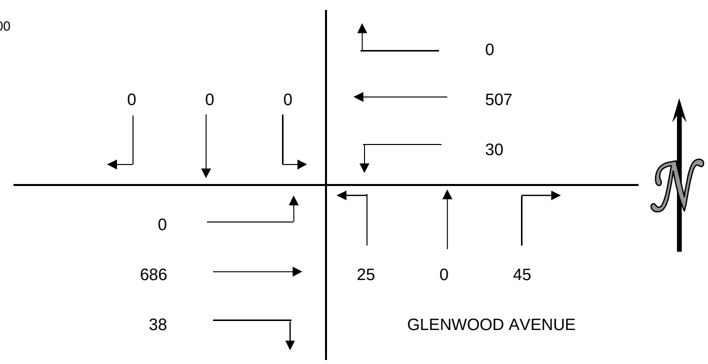
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M Hill
PROJECT:		FOOTHILL GOLDLINE
DATE:		TUESDAY DECEMBER 12, 2017
PERIOD:		4:00 PM TO 7:00 PM
INTERSECTION:	N/S	GLENWOOD AVENUE
	E/W	FOOTHILL BOULEVARD
CITY:		GLENDORA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	0	0	0	0	92	3	9	0	3	8	136	0	251
415-430	0	0	0	0	107	9	11	0	6	1	140	0	274
430-445	0	0	0	0	105	10	13	0	6	10	146	0	290
445-500	0	0	0	0	94	7	10	0	7	7	161	0	286
500-515	0	0	0	0	104	3	8	0	8	8	185	0	316
515-530	0	0	0	0	126	6	11	0	5	10	172	0	330
530-545	0	0	0	0	136	12	11	0	3	6	165	0	333
545-600	0	0	0	0	141	9	15	0	9	14	164	0	352
600-615	0	0	0	0	106	4	7	0	5	6	145	0	273
615-630	0	0	0	0	80	6	5	0	4	5	127	0	227
630-645	0	0	0	0	75	2	18	0	0	2	131	0	228
645-700	0	0	0	0	85	5	8	0	4	8	114	0	224
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	0	0	0	0	398	29	43	0	22	26	583	0	1101
415-515	0	0	0	0	410	29	42	0	27	26	632	0	1166
430-530	0	0	0	0	429	26	42	0	26	35	664	0	1222
445-545	0	0	0	0	460	28	40	0	23	31	683	0	1265
500-600	0	0	0	0	507	30	45	0	25	38	686	0	1331
515-615	0	0	0	0	509	31	44	0	22	36	646	0	1288
530-630	0	0	0	0	463	31	38	0	21	31	601	0	1185
545-645	0	0	0	0	402	21	45	0	18	27	567	0	1080
600-700	0	0	0	0	346	17	38	0	13	21	517	0	952

AM PEAK HOUR: 500-600



FOOTHILL BOULEVARD

PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-415	0	1	24	0	25
415-430	0	3	0	0	3
430-445	0	5	2	0	7
445-500	0	0	0	0	0
500-515	0	0	0	0	0
515-530	0	2	2	0	4
530-545	0	1	0	0	1
545-600	0	0	2	0	2
600-615	0	0	2	0	2
615-630	0	0	0	0	0
630-645	0	0	0	0	0
645-700	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-500	0	9	26	0	35
415-515	0	8	2	0	10
430-530	0	7	4	0	11
445-545	0	3	2	0	5
500-600	0	3	4	0	7

BICYCLE COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-415	0	0	2	0	2
415-430	0	0	0	0	0
430-445	0	0	0	0	0
445-500	0	0	3	0	3
500-515	0	0	0	0	0
515-530	0	0	0	0	0
530-545	0	0	0	0	0
545-600	0	0	0	0	0
600-615	0	0	0	0	0
615-630	0	0	0	0	0
630-645	0	0	0	0	0
645-700	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-500	0	0	5	0	5
415-515	0	0	3	0	3
430-530	0	0	3	0	3
445-545	0	0	3	0	3
500-600	0	0	0	0	0

WILTEC
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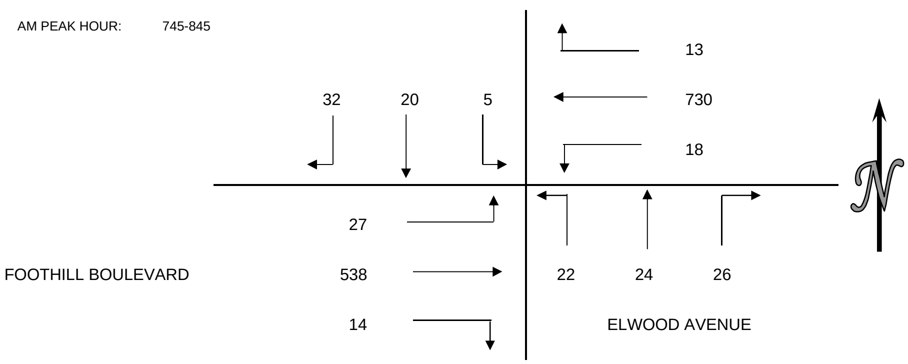
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M Hill
PROJECT:		FOOTHILL GOLDLINE
DATE:		TUESDAY DECEMBER 12, 2017
PERIOD:		6:00 AM TO 9:00 AM
INTERSECTION:	N/S	ELWOOD AVENUE
	E/W	FOOTHILL BOULEVARD
CITY:		GLENDORA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-615	2	0	2	0	85	1	3	2	5	1	20	3	124
615-630	4	1	1	0	106	1	2	1	5	1	24	3	149
630-645	3	1	2	0	103	1	0	2	4	4	35	1	156
645-700	1	2	1	1	134	4	1	3	5	2	100	2	256
700-715	3	3	2	4	152	0	3	0	2	0	53	1	223
715-730	2	1	1	0	144	1	4	3	4	0	42	1	203
730-745	3	2	1	1	139	1	0	1	3	3	85	5	244
745-800	11	2	2	2	174	3	7	8	6	2	136	8	361
800-815	7	4	1	4	193	3	11	8	4	3	163	12	413
815-830	10	7	1	4	192	4	7	5	7	5	148	5	395
830-845	4	7	1	3	171	8	1	3	5	4	91	2	300
845-900	4	6	4	0	119	0	0	3	6	10	71	3	226
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-700	10	4	6	1	428	7	6	8	19	8	179	9	685
615-715	11	7	6	5	495	6	6	6	16	7	212	7	784
630-730	9	7	6	5	533	6	8	8	15	6	230	5	838
645-745	9	8	5	6	569	6	8	7	14	5	280	9	926
700-800	19	8	6	7	609	5	14	12	15	5	316	15	1031
715-815	23	9	5	7	650	8	22	20	17	8	426	26	1221
730-830	31	15	5	11	698	11	25	22	20	13	532	30	1413
745-845	32	20	5	13	730	18	26	24	22	14	538	27	1469
800-900	25	24	7	11	675	15	19	19	22	22	473	22	1334

AM PEAK HOUR: 745-845



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
600-615	1	0	0	0	1
615-630	2	1	2	0	5
630-645	0	0	0	1	1
645-700	0	0	1	0	1
700-715	2	0	0	0	2
715-730	0	0	0	0	0
730-745	2	0	1	0	3
745-800	0	0	1	0	1
800-815	0	0	1	0	1
815-830	1	0	2	0	3
830-845	2	0	1	0	3
845-900	2	0	0	0	2
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
600-700	3	1	3	1	8
615-715	4	1	3	1	9
630-730	2	0	1	1	4
645-745	4	0	2	0	6
700-800	4	0	2	0	6

BICYCLE COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
600-615	0	0	0	0	0
615-630	0	0	0	0	0
630-645	0	0	0	0	0
645-700	0	0	1	0	1
700-715	0	0	0	0	0
715-730	0	0	0	0	0
730-745	0	0	0	0	0
745-800	0	0	2	0	2
800-815	0	0	0	0	0
815-830	0	0	3	0	3
830-845	0	0	0	0	0
845-900	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
600-700	0	0	1	0	1
615-715	0	0	1	0	1
630-730	0	0	1	0	1
645-745	0	0	1	0	1
700-800	0	0	2	0	2

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INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

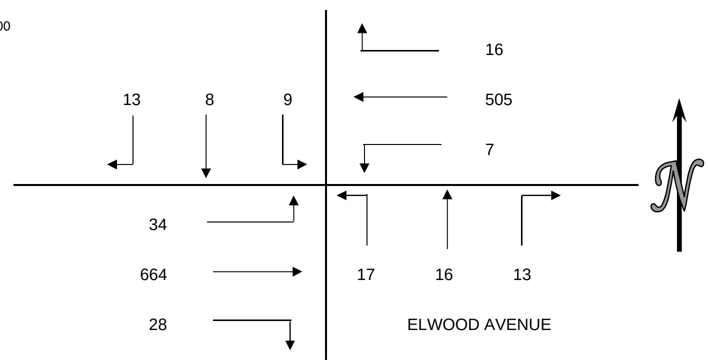
CLIENT: CH2M Hill
PROJECT: FOOTHILL GOLDLINE
DATE: TUESDAY DECEMBER 12, 2017
PERIOD: 4:00 PM TO 7:00 PM
INTERSECTION: N/S ELWOOD AVENUE
E/W FOOTHILL BOULEVARD
CITY: GLENDORA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	1	6	3	2	90	3	6	2	3	4	127	9	256
415-430	5	4	4	3	108	4	6	4	3	8	136	5	290
430-445	4	2	2	1	106	7	2	2	1	9	139	9	284
445-500	5	4	6	5	92	2	3	1	8	11	153	8	298
500-515	2	2	2	2	102	2	4	6	0	7	169	12	310
515-530	2	2	4	7	126	1	4	4	5	6	171	4	336
530-545	6	1	2	3	137	3	4	1	4	6	166	7	340
545-600	3	3	1	4	140	1	1	5	8	9	158	11	344
600-615	4	3	0	2	103	1	5	5	5	8	141	7	284
615-630	0	1	0	1	83	1	3	4	3	2	104	8	210
630-645	1	2	2	8	67	2	1	1	6	4	136	11	241
645-700	2	0	0	2	85	1	5	2	4	10	104	8	223
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	15	16	15	11	396	16	17	9	15	32	555	31	1128
415-515	16	12	14	11	408	15	15	13	12	35	597	34	1182
430-530	13	10	14	15	426	12	13	13	14	33	632	33	1228
445-545	15	9	14	17	457	8	15	12	17	30	659	31	1284
500-600	13	8	9	16	505	7	13	16	17	28	664	34	1330
515-615	15	9	7	16	506	6	14	15	22	29	636	29	1304
530-630	13	8	3	10	463	6	13	15	20	25	569	33	1178
545-645	8	9	3	15	393	5	10	15	22	23	539	37	1079
600-700	7	6	2	13	338	5	14	12	18	24	485	34	958

AM PEAK HOUR: 500-600

FOOTHILL BOULEVARD



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-415	3	0	24	0	27
415-430	3	0	7	1	11
430-445	3	0	2	0	5
445-500	0	0	0	0	0
500-515	0	0	2	0	2
515-530	0	0	2	0	2
530-545	0	0	1	0	1
545-600	0	0	1	0	1
600-615	0	0	2	0	2
615-630	0	0	0	0	0
630-645	0	0	0	2	2
645-700	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-500	9	0	33	1	43
415-515	6	0	11	1	18
430-530	3	0	6	0	9
445-545	0	0	5	0	5
500-600	0	0	6	0	6

BICYCLE COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-415	0	0	0	1	1
415-430	0	0	0	0	0
430-445	0	0	0	0	0
445-500	0	0	2	0	2
500-515	0	0	0	0	0
515-530	0	0	0	0	0
530-545	0	0	0	0	0
545-600	0	0	0	0	0
600-615	0	0	0	0	0
615-630	0	0	0	0	0
630-645	0	0	0	0	0
645-700	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-500	0	0	2	1	3
415-515	0	0	2	0	2
430-530	0	0	2	0	2
445-545	0	0	2	0	2
500-600	0	0	0	0	0

TECHNICAL MEMORANDUM

Metro Gold Line Foothill Extension –Traffic Analysis of Bonita Avenue and San Dimas Avenue

PREPARED FOR:	Denis Cournoyer/Metro Gold Line Foothill Extension Construction Authority
PREPARED BY:	Loren Bloomberg/CH2M Kavita Boddu/CH2M
DATE:	January 15, 2018
PROJECT NUMBER:	680051.T8.01

The purpose of this memorandum is to summarize the results of a comprehensive traffic operations analysis, to assess traffic operations for the LRT and freight crossings in San Dimas, on Bonita Avenue, San Dimas Avenue, and other local streets/intersections. VISSIM microsimulation analysis was performed to analyze the operations of the intersections, under a variety of scenarios, including with and without grade separation of the LRT, new traffic signals, and other geometric changes.

Proposed Geometric Improvements

The analysis included the intersections shown in **Figure 1**. The analysis was conducted using a microsimulation model, and was focused on the future year 2035 weekday PM peak hour traffic operations. Potential geometric changes are described below.

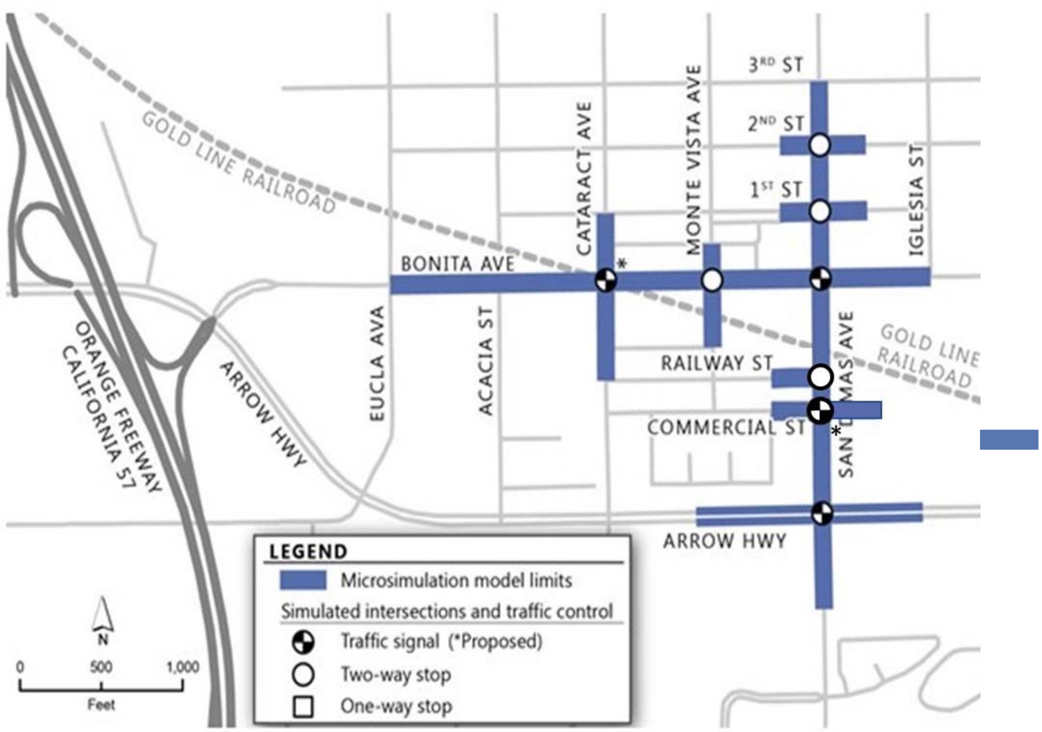


Figure 1: Microsimulation Model Limits

Bonita Avenue/Cataract Avenue Intersection

The Bonita Avenue/Cataract Avenue intersection is currently controlled with a four-way stop. The baseline proposed concept for the intersection is to remain as an at-grade crossing, but would be converted from all-way stop control to signalized control. A second option was analyzed where the Gold Line would be grade-separated (the freight tracks would remain at-grade).

East of Acacia Street, Bonita Avenue would curve south and use a portion of the vacant parcel southwest of the Bonita Avenue/Cataract Avenue intersection to allow for a less skewed crossing of the existing freight track and of the proposed LRT tracks. Bonita Avenue would maintain two through lanes in both the eastbound and westbound directions at the intersection. Eastbound Bonita Avenue would drop one lane east of Cataract Avenue and parking would be eliminated on the south side of Bonita Avenue (from the grade crossing to Monte Vista Avenue). This configuration is similar to the existing lane drop condition, but it would allow the merge point to be further east. (In the scenario with the Gold Line grade-separated, the eastbound lane drop would occur at the intersection.)

Both right turning movements from Bonita Avenue to Cataract Avenue would be accommodated by new slip lanes. Cataract Avenue would maintain one northbound and one southbound lane, but would add left turn bays on both approaches. The northbound and southbound left turn bays would allow for protected left signal phasing to avoid vehicles waiting on the railroad tracks.

San Dimas Avenue Intersections

The San Dimas Avenue study area includes the intersections from 2nd Street to Arrow Highway. Currently, the intersections at Bonita Avenue and Arrow Highway are signalized. The following changes are anticipated as part of the improvements:

- The lane configuration along San Dimas Avenue will be modified to include two northbound lanes from Arrow Highway to 1st Street to allow sufficient queue storage during railroad preemption and queue cutter[1] operations.
- The geometry at the San Dimas Avenue/Bonita Avenue intersection will be modified to convert the northbound right-turn lane to a shared through/right, and add a dedicated southbound right-turn bay.
- The existing driveway on northbound San Dimas Avenue (into CVS) north of the railroad tracks will be closed per the requirements of California Public Utilities Commission (CPUC).
- A queue cutter signal would be installed south of the tracks near the San Dimas Avenue/Railway Street intersection. Queue cutter operations are necessary because the approximately 325 feet of storage on northbound San Dimas Avenue (between the railroad tracks and Bonita Avenue) would require too much time to clear during every preemption call without queue detection.
- The Commercial Street/San Dimas Avenue intersection would be converted from stop control to a full signalized intersection. This signal will provide better access to the east and west, help control northbound queues at the Bonita Avenue/San Dimas Avenue intersection, and better accommodate pedestrians.

[1] ITE's "Recommended Practice for Pre-Emption of Traffic Signals near Railroad Crossings" defines a queue cutter as a "pre-signal [that is] used wherever traffic could queue across the tracks." In short, queue cutter signals allow for changes in signal timing and phasing during train operations to clear queues and prevent new queues from forming across the tracks.

Microsimulation Analysis

A microsimulation analysis was performed for the study area intersections to determine whether satisfactory traffic operations could be maintained with at-grade train operations, and assess the operations of the proposed geometric improvements, including the potential grade separation at the Bonita Avenue/Cataract Avenue intersection.

A VISSIM microsimulation model was updated to conduct the analysis. The original analysis was detailed in the "Task Z: Bonita/Cataract Operational Analysis and VISSIM Microsimulation" memorandum (AECOM, December 27, 2016), but the substantial modifications were made to the model.

Overview of the VISSIM Model

VISSIM is one of the few tools that can capture the complex operations of train operations, preemption, and other complex interactions between train and vehicle operations. It is a simulation model where precise details about the trains, at-grade crossings, vehicles, roadway geometry, and signals can be coded.

VISSIM is a stochastic (random) model, so the results vary with each run. Traffic volumes are an input (in vehicles/hour), but the specific vehicles vary with each cycle. To smooth out changes due to random variation, 30 simulation runs, with different random number seeds, were conducted as the source of the results. The reported results represent the average for the runs (i.e., 30 hours). Since there is much variation in traffic patterns and volumes in real life, the VISSIM simulation is an excellent representation of the random effects and the overall operations.

To conduct the stochastic runs, the 30 runs are identical apart from using different random seed. Simulation runs with identical input files and random seeds generate identical results. With a different random seed, the subsequent random numbers used by the simulation then generate different vehicle departure times for each entry link, paths, and behavior (within defined ranges), yielding different overall results. Those results are averaged.

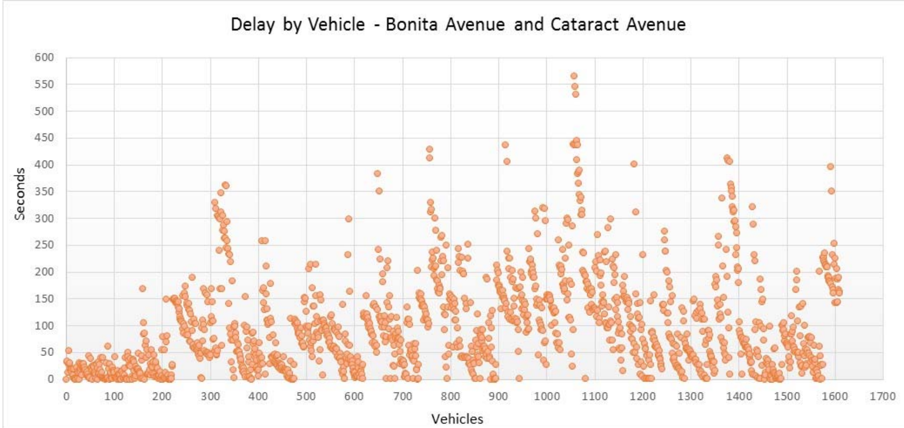
A starting random seed (52915) and increments of 42 (i.e., 52957, 52999, etc.) for the 30 runs was used. These values are arbitrary, but based on guidance from the software developer (PTV) and professional practice. Different seeds and increments will yield slightly different results, but using multiple (30) runs minimizes those differences.

VISSIM Modeling Approach

A VISSIM base model, representing 2035 operations, was coded to conduct the analysis. Assumptions in the base model included:

- 2035 weekday PM peak hour vehicular traffic (based on May 2016 traffic counts extrapolated to 2035). The forecasts were developed using a citywide annual growth factor for San Dimas (0.9%) growth factor and then reducing by 2.12% to reflect the change in traffic due to the addition of the LRT line, per the 2012 FEIR. The net effect is a growth rate from existing to 2035 of approximately 15%.
- The simulation is a representative PM peak hour for a weekday. The PM peak hour is 4:30 to 5:30 PM.
- Routing is specified at each intersection to distribute the volume for the appropriate movements.

- Train headways of 5 minutes were coded to reflect typical operations. However, it was recognized that trains do not arrive exactly at 5-minute intervals. Therefore, up to 2.5 minutes of random train delay (up to half of the train headway) was coded for each train arrival. This variation in arrival times reflects the fact that trains do not arrive exactly on schedule. The exact variation time varied for each train.
- At the crossings, train operations were modeled by stopping traffic in all directions with an all-red signal phase. All-red times were set at 80 seconds (about 55 seconds of warning/vehicle clearance time, which include 30 seconds of warning time, and about 25 seconds of train clearance time). That red time was determined using a combination of the train speeds and standard engineering and operating procedures for the gates.
- Advanced preemption occurs before the all-red period, when the train signals that it is in the vicinity. During advanced pre-emption, one phase is held in green for a defined period (26 seconds at the Bonita Avenue/Cataract Avenue intersection) to clear vehicles and allow pedestrians to cross the street.
- The LRT train stops for 20 seconds at the station east of San Dimas.
- Occasional freight trains were modeled. One freight train was simulated, crossing during the middle of the peak hour. This freight train is representative only, and is a conservative assumption to assess impacts, because most peak hours will not have any freight trains. The overall approach was endorsed by the California Public Utilities Commission (CPUC).
- Based on input from BNSF, the maximum number of freight cars was 23. This estimate was rounded to 24 to allow for any potential growth in the freight deliveries.
- Intersection delay was reported is the average of 30 runs. The output from the VISSIM mode is an average of the delay for each run and then for all the 30 runs. Delay is determined for each individual vehicle in the simulation. In other words, the delay time for each simulated vehicle entering the intersection is recorded, so the delay is calculated for thousands of vehicles.
- Three train schedule scenarios were evaluated, because the model results showed that the schedule affects performance. The offsets of the train schedules (at five-minute headways) were varied from 0 to 150 seconds (0/75/150 seconds) in the three scenarios.
- The scenarios with a 75-second offset were the most likely to have both eastbound and westbound trains crossings at the same time, which minimizes delay. However, the random delay (schedule variations) also affected the results. Apart from the variations in the schedule offset, the rest of the parameters were kept constant between the three scenarios.
- The average results do not reflect any one vehicle, but the average. A vehicle who arrives on a green signal would have a delay of zero. Another vehicle who arrives just as a multi-train sequence starts might have a delay of several minutes. To illustrate, the range of vehicle delays for one sample run is shown in the graphics below. Each of the orange dots represent one vehicle, and the blue bars are composite number of vehicles in each "bin" of delay, but all for the same intersection.



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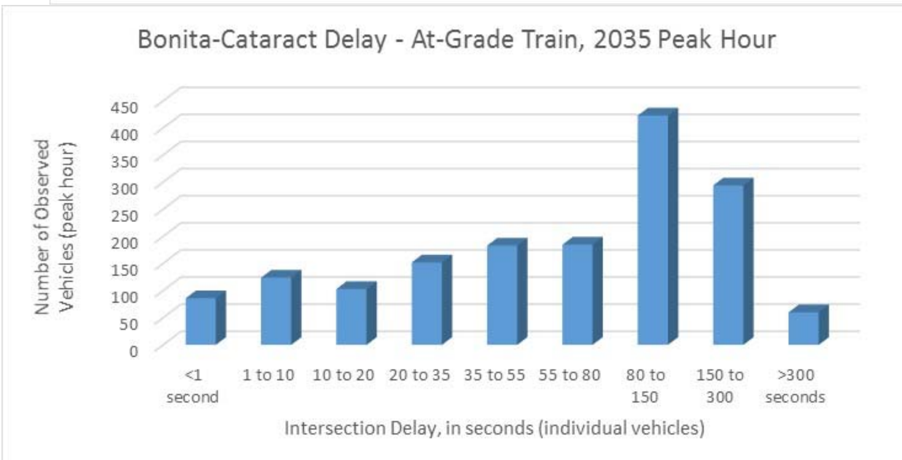


Microsimulation Results

Table 1 summarizes the overall intersection average delay per vehicle and Level of Service (LOS) for the existing (2017) and future year (2025 and 2035) PM peak hours. Delay is the average over the peak hour, including periods with and without trains (LRT and freight), for 30 simulation runs. The 2025 and 2035 operations include a new grade-separated crossing at the Bonita Avenue/Cataract Avenue intersection. There is a fair degree of variation in delay between scenarios in the peak hour, but all will be LOS D or worse. Without the grade-separated LRT, the Bonita Avenue/Cataract Avenue intersection will operate at LOS F.

Table 1: Signalized Intersection LOS – New Gold Line Grade-Separated Crossing

Intersection Name	Access/Geometry	2017	2025	2035
Bonita Avenue/ Cataract Avenue	Existing geometry (all-way stop and freight at-grade)	14/B		
	New signal/eastbound lane drop near Monte Vista		15/B	18/B
	New signal; only one eastbound through lane		21/C	41/D
San Dimas Avenue/Bonita Avenue	Existing geometry	22/C	27/C	32/C
	Modified geometry with Gold Line		21/C	24/C
San Dimas Avenue/ Commercial Street	Existing geometry	2/A	7/A	7/A
	New signal at Commercial/close Railway		21/C	38/D
San Dimas Avenue/ Arrow Highway	Existing geometry	27/C	25/C	35/D

An analysis was conducted to assess projected queues at the three key intersections (Bonita Avenue/Cataract Avenue, Bonita Avenue, San Dimas Avenue, and Commercial Street/San Dimas Avenue). The available storage lengths were measured to next upstream controlled intersection, excluding the intersection space within the limits, and the results reflect the average of 30 runs.

The queuing evaluation is based on the 95th percentile queue, or the queue that occurs in no more than 5 percent of the cycles. These "maximum" queues might be expected to occur approximately twice per hour, but could be more or less in any individual hour. 95th percentile queues that cross the tracks or reach the upstream intersection might occur 10 times per day, or thousands of times per year.

The results in **Table 2** indicate that the new grade-separated crossing will result in acceptable queues at all four approaches. The option to modify the eastbound lane drop has a minimal effect on queuing.

Table 2: Queuing Summary at Bonita Avenue/Cataract Avenue (with New Gold Line Grade-Separated Crossing)

Analysis Year	Access/Geometry	Bonita Avenue		Cataract Avenue	
		EB[1]	WB[2]	NB	SB
2017	Existing geometry (all-way stop and freight at-grade)	280	180	110	60
2025	New signal at Bonita/Cataract[3]	250	175	120	90
	New signal at Bonita/Cataract, plus eastbound lane drop[4]	730	190	120	90
2035	New signal at Bonita/Cataract[3]	325	250	120	100
	New signal at Bonita/Cataract, plus eastbound lane drop[4]	960	240	130	110

[1]1380 feet to upstream intersection at Eucla Street
[2]1350 feet to upstream intersection at San Dimas Avenue
[3]Extends the lane drop to the east near Monte Vista, eliminating parking.
[4]Moves the lane drop west, at intersection, reducing eastbound to one through lane

The results in **Table 3** suggest a need to modify the intersection configuration at Bonita/San Dimas Avenue. The northbound queues will spill back to the tracks with this configuration. Those queues are highlighted in light brown (where the 95th percentile queue will reach the tracks) and dark brown, where the queues extend 75 feet or more past the tracks. A queue cutter is recommended with this configuration. A modified geometry, with improvements to the northbound and southbound approaches, eliminates the queuing issues.

Table 3: Queuing Summary at Bonita Avenue/San Dimas Avenue (with New Gold Line Grade-Separated Crossing)

Analysis Year	Access/Geometry	Bonita Avenue		San Dimas Avenue	
		EB[1]	WB[2]	NB[3]	SB[4]
2017	Existing geometry (freight at-grade)	580	270	390	310
2025	Existing intersection configuration	600	280	400[6]	770
	Future modified geometry[5]	520	280	210	250
2035	Existing intersection configuration	750	340	460[6]	1110
	Future modified geometry[5]	710	310	240	330

[1]1145 feet to upstream intersection at Cataract Avenue
[2]575 feet to upstream intersection at Iglesia Street
[3]325 feet to tracks
[4]1220 feet to upstream intersection at 4th Street
[5]Modifies the NB right-turn lane to a shared through/right; adds a dedicated SB right-turn bay
[6]Queue cutter required

The results in **Table 4** suggest a similar need for a queue cutter at the Commercial Street/San Dimas Avenue intersection, although the queues are only slightly longer than available storage. The queues at the other approaches are satisfactory.

Table 4: Queuing Summary at Commercial Street/San Dimas Avenue (with New Gold Line Grade-Separated Crossing)

Analysis Year	Access/Geometry	Commercial Street		San Dimas Avenue	
		EB	WB	NB[1]	SB[2]
2017	Existing geometry (freight at-grade)	120	40	0	0
2025	New signal; channelization at Commercial/San Dimas; Railway closed	100	40	330	290[3]
2035	Existing intersection configuration	150	50	400	320[3]

[1]490 feet to upstream intersection at Arrow Highway
[2]250 feet to tracks
[3]Queue cutter required

Summary

A comprehensive traffic simulation analysis was conducted to assess the traffic operations on San Dimas Avenue and Bonita Avenue. Hundreds of simulation runs were conducted to assess different configurations at the intersections, variations in train arrivals, and different horizon year. Both freight (at-grade) and Gold Line (grade-separated) operations were assessed.

The following are conclusions from that analysis.

- Grade separation will be needed at the Bonita Avenue/Cataract Avenue intersection to provide acceptable traffic operations.
- Reducing the eastbound movement to one through lane (or reducing the storage until the lane drop) will affect operations, but it still will be acceptable.
- Improvements to the northbound and southbound approaches will be needed at the Bonita Avenue/San Dimas Avenue intersection.
- Queue cutters are recommended in both directions between the Bonita Avenue and Commercial Street intersections on San Dimas Avenue.

With these improvements, LOS/delay and queuing will be satisfactory at the study area intersections.

Application Submitted by the Metro Gold Line Foothill Extension Construction Authority

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Application of the Metro Gold Line Foothill Extension Construction Authority for an order authorizing construction of two light rail tracks and one SCRRA track and one freight track at White Avenue highway-rail crossing in the **City of La Verne** in Los Angeles County, California.	Application ____________

APPLICATION
SUBMITTED BY THE METRO GOLD LINE FOOTHILL EXTENSION CONSTRUCTION AUTHORITY

The Metro Gold Line Foothill Extension Construction Authority (Authority), acting for and on behalf of Los Angeles County Metropolitan Transportation Authority (LACMTA), files this application and respectfully requests authorization from the Public Utilities Commission of California (CPUC or Commission) to construct two Light Rail Transit (LRT) tracks, one Southern California Regional Rail Authority (SCRRA) commuter rail track, and one Freight Rail Transit (FRT) track for White Avenue highway rail grade crossing.

In support of its request, the Authority asserts:

I (Applicant Information)

The Metro Gold Line Foothill Extension Construction Authority (Authority) was created by the legislature pursuant to Section 132400 et seq. of the Public Utilities Code of the State of California (PU Code) to award and oversee all design and construction contracts for completion of the Los Angeles - Pasadena Foothill Extension Gold Line light rail project extending from Union Station in the City of Los Angeles to Sierra Madre Villa (Madre Street) in the City of Pasadena (known as Phase I) and any mass transit guideway planned east of Sierra Madre

Boulevard along the former Atchison Topeka and Santa Fe Railway right-of-way extending to the City of Montclair in the County of San Bernardino (known as Phase II).

The authority sought in this application is requested pursuant to Section 9.08 of the Commission General Order 143-B and is made in accordance with Rule 3.9 of the Commission's Rules of Practice and Procedure.

II (Applicant Address)

Applicants' exact legal name is Metro Gold Line Foothill Extension Construction Authority with its principle place of business at:

406 East Huntington Drive, Suite 202

Monrovia, California 91016

III (Correspondence)

Correspondence in regard to this application should be addressed to:

Mr. Christopher Burner

Chief Project Officer

Metro Gold Line Foothill Extension Construction Authority

406 East Huntington Drive, Suite 202

Monrovia, CA 91016

626-305-7022

cburner@foothillgoldline.org

IV (Crossing Ownership)

Pursuant to Sections 132425 and 132430 of the PU Code, LACMTA has transferred to the Authority all real and personal property, and other assets, as well as the unencumbered balance of all local funds accumulated for completion of the project. Phase I of the project extended from Union Station to Sierra Madre Villa and was turned back to LACMTA for operation in July 2003. Phase II, Segment A of the project extended from Sierra Madre Villa to Glendora was completed and turned back to LACMTA for operation in September 2015. Phase II, Segment B of the project extends from Glendora to Montclair and is currently under design.

The Authority owns the railroad right-of-way through the Trust Agreement between the LACMTA and the Authority and has the right to occupy and construct on the property, including the subject crossings within the railroad right-of-way formerly owned by the Atchison Topeka and Santa Fe (AT & SF) Railway, now known as the Pasadena and San Gabriel Subdivisions.

V (Interested Parties)

The LACMTA was created by the legislature pursuant to Section 130050.2 of the PU Code to be the successor agency to the Southern California Rapid Transit District and the Los Angeles County Transportation Commission (LACTC), and which two agencies ceased to exist as of April 1, 1993.

Pursuant to Section 132400, et seq. of the PU Code, the Authority is proceeding with contracting for completion of the design and the construction of the 12.3-mile Phase II Segment B of the Metro Gold Line between the interim terminal station at Citrus Avenue and the eastern boundary of the City of Montclair in San Bernardino County. Upon completion of Phase II Segment B, LACMTA will maintain and operate the LRT system including the San Bernardino County segment.

Southern California Regional Rail Authority (SCRRA), acting on behalf of its member agency the LACMTA, is responsible for the dispatch and maintenance of the active freight tracks, signal and crossings along the Pasadena Subdivision and San Gabriel Subdivision. BNSF railway operates typically one round-trip freight train each weekday (excluding Saturdays and Sundays), to serve customers over the Pasadena and San Gabriel Subdivision.

On February 21, 2018, on-site field and office crossing diagnostics were discussed with interested parties, including members from LACMTA, SCRRA, BNSF railway, City of La Verne, CPUC, and the Authority. The interested parties did not object to the application. Meeting minutes from the crossing diagnostic meetings are documented in Exhibit I.

The Authority, LACMTA, SCRRA, BNSF railway, City of La Verne, and CPUC are considered interested parties for document service purposes.

VI (Project Description)

The Metro Gold Line Foothill Extension project Phase II, is approximately 24 miles in length and constructed in two segments. This first segment, Segment A, continued the Metro Gold Line from East Pasadena for approximately 11.5 miles of double LRT tracks with six (6) stations located in the cities of Arcadia, Monrovia, Duarte, Irwindale, and Azusa, and a Maintenance Operations Campus in Monrovia within the County of Los Angeles. Segment A was completed and turned back to LACMTA for operation in September 2015.

The second segment, Segment B is currently under design and crossings are subject to this application. Segment B continues the Metro Gold Line from its current terminus in Azusa for approximately 12.3 miles of double LRT track with six (6) stations located in the cites of Glendora, San Dimas, La Verne, Pomona, and Claremont in the County of Los Angeles and City of Montclair in the County of San Bernardino. Segment B will also improve and relocate approximately 10.4 miles of FRT track and 1.9 miles of SCRRA track to allow room for the LRT tracks.

East of Citrus Avenue, the right-of-way will continue as a shared corridor with both LRT and FRT operations utilizing their separate designated tracks. Continuing eastward, the existing FRT tracks will be relocated south within the ROW (right-of-way) to make room for the dual LRT tracks and one LRT station (Glendora) to the north half of the typical 100-foot ROW until Lone Hill Avenue. At Lone Hill Avenue LRT will be grade separated above the FRT tracks & roadway and FRT will continue at-grade, but will be relocated and re-aligned south-to-north within the ROW to continue rail service for, Miller and QB foods, typically one round-trip per day. The LRT will transition from north of the ROW to the south as well to service three LRT Stations (San Dimas, La Verne, and Pomona).

The LRT tracks remain south of FRT tracks within the railroad ROW to approximately Towne Avenue, where FRT transitions from north to south within the ROW to join the San Gabriel Subdivision west of Cambridge Avenue at approximate FRT MP 32.15. Within the San Gabriel Subdivision the exist SCRRA tracks will be relocated to the south of the ROW to make room for the dual LRT tracks and two LRT stations (Claremont and Montclair). The SCRRA commuter rail/freight tracks remain at-grade through the transition to end the project in Montclair.

LRT remains to the north of the typical 100-foot right of way until the terminus point in Montclair. The SCRRA commuter rail/freight tracks are separate and independent of the LRT system, except for the integrated gates and signals operations at the at-grade highway rail crossings.

Once the crossings are complete, LACMTA will operate on and maintain two LRT tracks. SCRRA will continue to maintain the one FRT track and signal equipment for BNSF operations on the Pasadena Subdivision and two SCRRA main line tracks and signal equipment on the San Gabriel Subdivision until the terminus point of the Gold Line in Montclair. SCRRA commuter and FRT service continue easterly.

This application is for the construction and alteration of the White Avenue highway-rail crossings of approximately 50 crossings of Segment B of the project. Additional crossings are subject of separate CPUC approvals. The construction of the project including the subject crossings is expected to begin during the year 2019, with revenue service projected in 2027.

VII (Crossing Descriptions)

The Authority requests authorization to construct the White Avenue highway rail crossing in the City of La Verne, County of Los Angeles. The proposed CPUC identification numbers and crossing types are summarized in Table 1 below:

Table 1 – Crossings Subject to Approval				
No.	**Crossing**	**PUC Numbers**	**Clearances**	**Summary of Equipment**
1	White Avenue	LRT 84P-33.39 FRT 101PA-107.50 DOT 026187X SCRRA 101SG-30.32 DOT 747330W	Typical 19-ft. to overhead catenary wire Typical 10-ft. to 15-ft. from crossing equipment to track centerline	CPUC No 9 entry and exit gates, raised medians, CPUC No 9 Pedestrian gates, swing gate and Channelization

VIII (Crossing Alterations)

Standard Highway Rail Safety Equipment

Standard highway-rail safety equipment for at-grade crossings include a minimum of:

1. Commission Standard No. 9 automatic (automotive) gates with flashing lights;
2. Commission Standard No. 9E automatic "Exit" gates with flashing lights and loop protection;
3. Raised curb medians typically 100-feet in length with "No U-turn" signs, and raised medians between LRT and SCRRA/FRT tracks as space permits;
4. Commission Standard No. 9 automatic pedestrian gates with flashing lights, bells, and emergency swing gates;
5. Advance preemption and automatic train protection and for the at-grade crossing equipment;
6. Raised pavement markers and striping along pedestrian crossing/road edge;
7. Handrails and fencing to channelize pedestrians to the designated crossing;
8. Detectible warning strips, appropriate pavement and "wait here" striping; and
9. Standard California Manual on Uniform Traffic Control Devices (CA-MUTCD) rail crossing signage, such as the "RAILROAD CROSSING" Cross-buck sign referred as R15-1, number of rail tracks sign referred to as R15-2, and pavement markings.

Reference Exhibit C drawings GXT-001 through GXT-006 for crossing details.

The Authority is evaluating the detectable directional tile as shown in Detail A of the GXT-006 and GG-series drawings. Should the white detectable directional tile not be warranted or not approved by Metro and SCRRA, the project will include the standard white striping in place of the detectable directional tile for the pedestrian crossing.

White Avenue

The White Avenue (84P-33.39) highway-rail at-grade crossing alterations include addition of two LRT tracks and additional highway-rail and pedestrian crossing safety equipment. The existing FRT track (crossing DOT 026187X) will be relocated to the north of the right-of-way to allow room for the two new LRT tracks on the south. The centerline of FRT tracks is approximately 30-feet from LRT track number 2. The existing at-grade SCRRA Metrolink commuter rail track (crossing DOT 747330W) south of the crossing will remain and not relocated. Provisions will be included for a second SCRRA track, including location of the north pedestrian crossing equipment to adjacent to the SCRRA track.

Currently the White Avenue crossing operates on separate activation for FRT and SCRRA, such that northbound motorists may clear the SCRRA tracks to stop for FRT train, and southbound motorist clear the FRT track to stop for SCRRA trains. The crossing will operate as a single "sealed "crossing, as a there is not room between the tracks for the design vehicle (WB-65 truck). The sealed crossing will have the standard highway-rail safety equipment *(Standard No. 9 & 9E gates, raised medians, pedestrian gates, and CA-MUTCD signage/ striping)*. There will not be (interior) gates located between the tracks. Raised medians will be located between the tracks, along with the existing medians north and south of the crossing. See Exhibit D drawings for details of crossing equipment, street improvements, and signing and striping.

Due to the unique configuration of the White Avenue crossing, two traffic studies have been conducted including the *White Avenue At-grade Safety Report* (See Exhibit F) and *La Verne Multi-location Study* (See Exhibit G) and. In summary, the reports support safe at-grade operations for White Avenue with recommended mitigations including, installing queue cutter at the crossing and increasing White Avenue to 4-lanes. The *La Verne Multi-location Study* also included several recommendations for Arrow Highway and adjacent crossings that do not directly affect safety of the White Avenue crossing and will be addressed as separate CPUC applications. The Memo for the La Verne Traffic Signal Interconnection and Parameters provides an analysis for five crossings and seven traffic signals in the City of La Verne (See Exhibit G). In summary, the Memo demonstrates how adjacent eight traffic signals will prevent queuing onto the five crossings by use of advance preemption and queue loops. The crossing modifications for other (4) crossings are subject to separate CPUC approvals.

For White Avenue, a queue cutter traffic signal will be provided for southbound traffic with queue loops located south of the crossing. Should queuing occur south of the tracks as a result of White Avenue/Arrow Highway intersection south of the crossing, backup prevention queue loops are located south of the crossing that provide a Stop signal at the crossing signal (phase 6) to stop movement for southbound motorists prior to crossing the tracks. This will help prevent southbound motorists queuing onto the tracks.

- By means of interconnection, the queue cutter will notify Arrow Highway traffic signal will also be notified of the backup prevention queue loop activation and begin prioritizing southbound and left turn movements to clear traffic away from the track.
- As supplemental measure to help with traffic flow, the White Avenue/Arrow Highway traffic signal will also receive signal from the advance radar zones or cut loops, which supports southbound motorist movements (clearance) away from the track.
- During train preemption, the queue cutter traffic signal will stop southbound motorists prior to crossing the tracks, along with the Standard No. 9 gate activation.

The design-build contractor will determine the final locations of the backup prevention queue loops accounting for traffic flow, loop detection delay and traffic signal cycle time, in efforts to prevent motorists from queuing on the tracks. The loop locations will be included in the compliance submission of 100% design level drawings.

The White Avenue queue cutter signal and adjacent traffic signal interconnection is clarified in the Memo: La Verne Traffic Signal Network and Design Parameters (see Exhibit H).

<u>Vehicle Turning Movements</u>

The driveways and intersections adjacent to the White Avenue crossing have been evaluated for truck turning movements and generally supports truck turning moves for applicable design trucks WB-65, WB-50 or Single Unit (SU) as applicable. Residential driveways support SU turning moves or automobile as applicable. See Exhibits D drawings for truck turning details.

The Design-Build Contractor

The Authority will award a design-build contract to advance the design, construct the crossing and support the Authority with coordination among crossing stakeholders and CPUC as necessary. The design-builder must not compromise crossing safety of the designs documented in this application. The design-build contractor will advance designs following required standards and provide a compliance submission of 100% design level drawings to the stakeholders no later than 60 days prior to commencing crossing construction. The compliance submission will serve to ensure safety is not compromised, such that:

- Crossing gates, traffic signals, signs and other equipment locations maybe adjusted, but cannot result in equipment removal or restrict visibility as specified in Note 2 of the traffic signal drawings;
- Drainage, utilities, street grade, track profiles, alignment, and other preliminary designs provided in this application must be finalized to determine final locations for crossing and traffic equipment, and if additional safety measures are necessary;
- Width of traffic lanes, crossing, crosswalks, sidewalks, medians, and similar features maybe adjusted, but cannot compromise the minimum width required by design criteria, CA-MUTCD, ADA or other requirements without prior approval;
- Additional safety enhancements such as additional traffic signals heads, signage, striping, etc. maybe considered;
- Railroad flashers must be adequate to warn in the directions of oncoming pedestrians and motorists as shown in GXD-***.01 drawings;
- Final traffic signals designs, specifications, phasing, timing, preemption, etc. must be provided for both 100% design and the as-built configuration;
- Pavement markings and striping to be complaint with CA-MUTCD, city and design criteria requirements, and documented analysis and approval if criteria cannot be met;
- Landscaping, walls, fencing, channelization, LRT bridges, and other features near crossings must not interfere with line of sight or result in other safety concerns.

No significant changes to the CPUC approved crossing designs can be made without securing CPUC staff approval. In the event the design-build contractor does not comply with the abovementioned bullets and significantly changes the crossing safety design approved by the CPUC, the design-build contractor must attain formal CPUC modification approval or reconstruct the crossing to meet CPUC approved plans.

IX (Public Benefit)

As required by the CPUC Rules of Practice and Procedures 3.7c, the public will benefit from the delivery of supplementary public transportation by extending the Metro Gold Line Foothill Extension LRT from Azusa to Montclair, resulting in lower greenhouse gas effects and reducing traffic congestion in the San Gabriel Valley and Inland Empire. The proposed crossings improvements, in connection with the LRT service, will increase safety and provide transportation benefits to system users.

X (Grade Separation Practicability)

Due to the restricted distance between crossing and existing roads, residences, and the clearance requirements, grade separation at the existing White Ave crossing is not practicable. The at-grade crossing are in the immediate proximity (less than 50 feet) to the existing streets, neighboring homes, parking lot and existing buildings that result in constraints and prevent grade separation. The adjacent access needed for the grade separation may prevent access to neighboring residences, buildings etc.

The existing SCRRA and FRT operations is at-grade and has not resulted in accident as referenced in the FRA crossing inventory. The project has given significant consideration to grade separations and is providing several grade separations for the LRT alignment. Additionally, the traffic at each crossing has been evaluated and analysis results in safe at-grade operation.

XI (Authorization)

This application requests authorization for alterations of the White Avenue highway-rail crossing. In general, the application request provides addition of two (2) LRT tracks and grade crossing alterations, within the existing railroad right-of-way, therefore, authority sought in this application is requested pursuant to PU Code 99152 and is made in accordance with Rule 3.7 through 3.11 of the Commission's Rules of Practice and Procedure.

XII (Environmental clearance)

In accordance with CPUC Rules of Practice and Procedure 3.9(a), the project's Final Environmental Impact Report (FEIR) for Segment A&B extension was certified in 2013. A copy of the letter of transmittal of the FEIR to the State and the Gold Line Foothill Extension Board of Director's certification of the FEIR is attached as Exhibit J.

A copy of the full FEIR, including addenda are also provided in attached the one (1) Archival Grade DVD and copies to six (6) CD-ROMs attached as Exhibit J. Alterations of the subject crossing requested herein are within the scope of the FEIR cited above. If there are changes to the FEIR, the revised requirements will be incorporated by an addendum.

XIII (Exhibits)

The Following Exhibits are transmitted as required by the CPUC Rules of Practice and Procedures 3.7:

Exhibit A: Vicinity map showing the crossings in relation to the existing roads

Exhibit B: Aerial intersection map

Exhibit C: Typical At-Grade Pedestrian Crossing Details

Exhibit D: White Avenue Grade Crossing Drawings

Exhibit E: Memo: At Grade Safety Studies and La Verne Analysis

Exhibit F: White Avenue At-Grade Crossing Safety Study Analysis

Exhibit G: La Verne Multi-location Traffic

Exhibit H: Memo: La Verne Traffic Signal Network and Design Parameters

Exhibit I: Meeting Minutes from Crossing Diagnostic (agreement of interested parties)

Exhibit J: The Final Environmental Impact Report (FEIR) legal description letter, FEIR copied to one (1) Archival Grade DVD and FEIR copied to six (6) CD-ROMs

Exhibit K: The Scoping Memo Information for the Application.

XIV (Temporary Traffic Controls)

The design-build contractor will be responsible in meeting the terms and conditions of the prescriptive specifications of the contract that will require submittal of a Traffic Maintenance Plan design that maintains traffic movements, private entrance access, safety mitigations and minimizes congestion. The Traffic Maintenance Plan shall comply with all applicable rules including CPUC General Orders and temporary traffic controls as described in the CA-MUTCD, as amended.

XV (Order)

WHEREFORE, the Metro Gold Line Foothill Construction Authority respectfully requests that the California Public Utilities Commission (CPUC) issue an order authorizing:

1. The Metro Gold Line Foothill Construction Authority (Authority) to construct and alter the White Avenue highway-rail grade crossing consisting of two light rail transit (LRT) tracks, one Southern California Regional Rail Authority (SCRRA) commuter rail track, and one Freight Rail Transit (FRT).

2. The crossing shall have the configurations described and specified in this application and its attachments. The crossing shall be identified by the following CPUC and Department of Transportation (DOT) Crossing Numbers:

No.	Crossing	CPUC Number	DOT Number
1	White Avenue	LRT 84P-33.39 FRT 101PA-107.50 SCRRA 101SG-30.32	026187X 747330W

3. The Metro Gold Line Foothill Extension Construction Authority shall have its design-build contractor provide a compliance filing of 100% design level drawings for the at-grade crossings to the CPUC's Safety and Enforcement Division, Rail Crossings and Engineering Branch no later than 60 days prior to commencing construction. The compliance filing will serve to demonstrate conformance with the crossing designs approved in this Order.

4. Requests that the authorization shall be effective for five (5) years, unless time is extended.

Dated this 17th day of May, 2018 at Monrovia, California by:

Christopher Burner
Chief Project Officer

CERTIFICATE OF SERVICE

I, Christopher Burner, certify on behalf of Metro Gold Line Foothill Extension Construction Authority, that this application with attachments is served to the interested parties on the below service list by e-mail as specified by Rule 1.9 of the Commission's Rules of Practice and Procedure.

I declare, under penalty of perjury, that the foregoing is true and correct.

Dated this 17th day of May, 2018 at Monrovia, California by:

Christopher Burner
Chief Project Officer

Mathew Bond California Public Utilities Commission 320 W. Fourth Street, Suite 500 Los Angeles, CA 90013 mathew.bond@cpuc.ca.gov	Jose Pereyra California Public Utilities Commission 320 W. Fourth Street, Suite 500 Los Angeles, CA 90013 jose.pereyra@cpuc.ca.gov
Antranig G. Garabetian California Public Utilities Commission 320 W. Fourth Street, Suite 500 Los Angeles, CA 90013 antranig.garabetian@cpuc.ca.gov	Shanna Foley California Public Utilities Commission 320 W. Fourth Street, Suite 500 Los Angeles, CA 90013 Shanna.Foley@cpuc.ca.gov
Candice Bowcock City of La Verne 3660 "D" Street La Verne, CA 91750 candice@ci.la-verne.ca.us	
Vijay Khawani Los Angeles County Metropolitan Transportation Authority One Gateway Plaza Los Angeles, CA 90012-2952 KhawaniV@metro.net	Steve Moini Los Angeles County Metropolitan Transportation Authority One Gateway Plaza Los Angeles, CA 90012-2952 MoiniS@metro.net
Andy Althorp Southern California Regional Rail Authority 2558 Supply Street Pomona, CA 91767 AlthorpA@scrra.net	Justin Fornelli Southern California Regional Rail Authority 2558 Supply Street Pomona, CA 91767 FornelliJ@scrra.net
Tiera Adams BNSF 740 East Carnegie Dr. San Bernardino, CA 92408 Tiera.Adams@BNSF.com	Walter Smith BNSF 740 East Carnegie Dr. San Bernardino, CA 92408 Walter.Smith1@BNSF.com

VERIFICATION

I, Christopher Burner, an employee of applicant, Metro Gold Line Foothill Extension Construction Authority, and authorized to make this verification on its behalf. The statements in the foregoing document are true to my own knowledge, or believed, by myself, to be true.

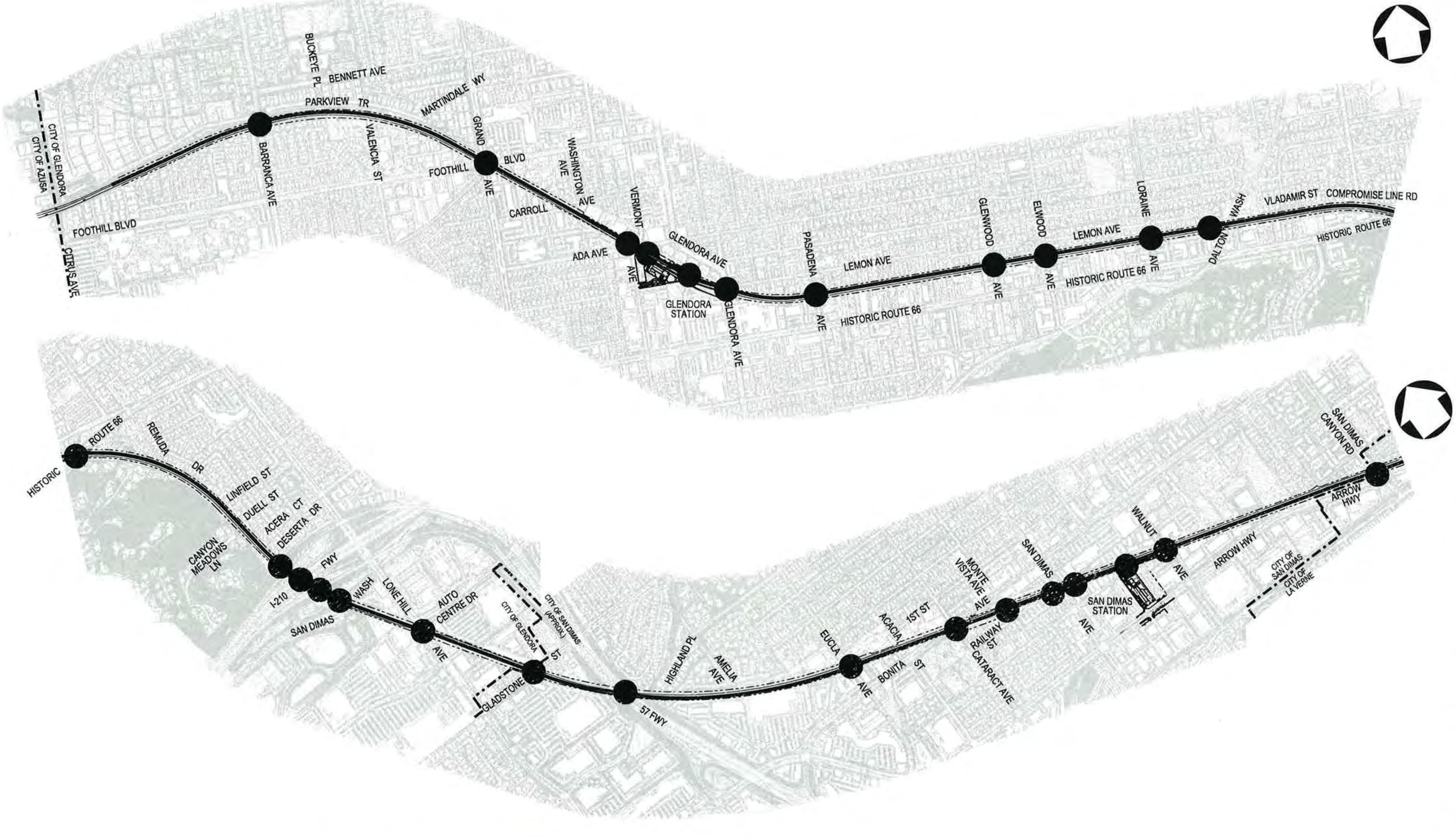
I declare under penalty of perjury that the foregoing is true and correct.

Dated this 17th day of May, 2018 at Monrovia, California by:

Christopher Burner
Chief Project Officer
Metro Gold Line Foothill Extension Construction Authority
406 E. Huntington Drive, Suite 202
Monrovia, CA 91016
cburner@foothillgoldline.org

Exhibit A:

Vicinity Map



REVISIONS				
		NOT FOR CONSTRUCTION		
REV.	DATE	DESCRIPTION	DES.	ENG.

HILL
Hill International
406 E. HUNTINGTON, SUITE 202
MONROVIA, CA 91016 - 3633

METRO GOLD LINE FOOTHILL EXTENSION CONSTRUCTION AUTHORITY
PHASE 2B ALIGNMENT DESIGN-BUILD PROJECT
REQUEST FOR PROPOSAL (RFP) C2002

ADVANCED CONCEPTUAL ENGINEERING
GLENDORA TO MONTCLAIR

VICINITY MAP 1 OF 2

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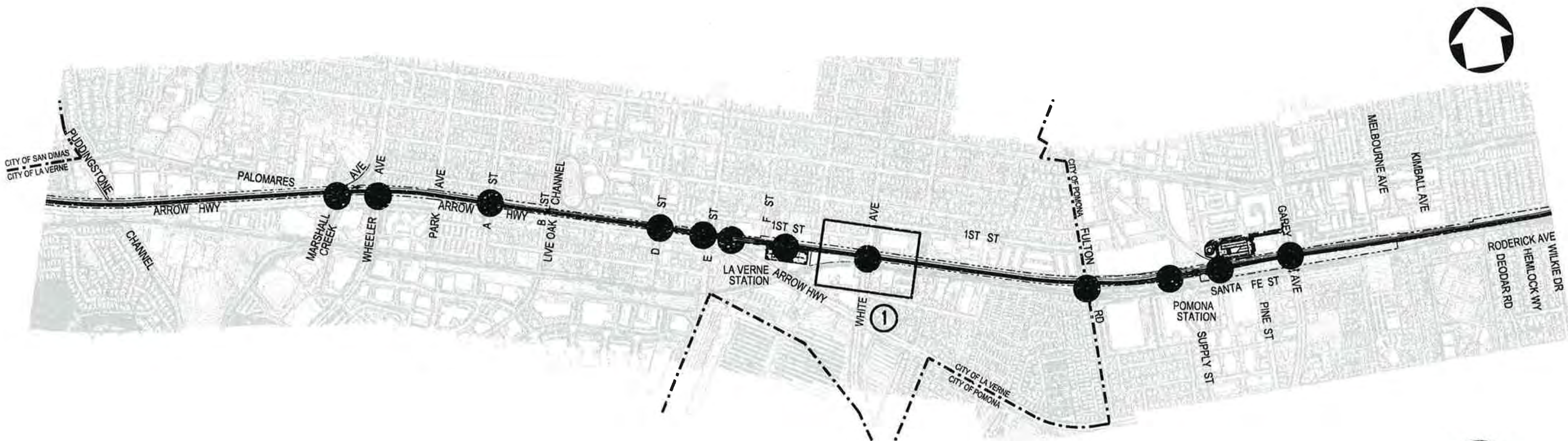

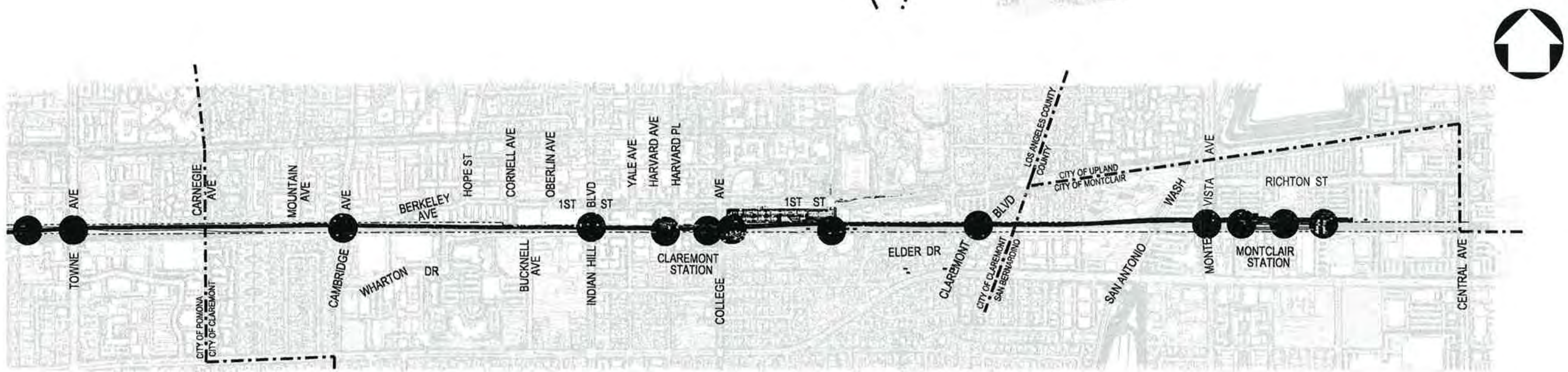

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Hill International
406 E. HUNTINGTON, SUITE 202
MONROVIA, CA 91016 - 3633

METRO GOLD LINE FOOTHILL EXTENSION CONSTRUCTION AUTHORITY
PHASE 2B ALIGNMENT DESIGN-BUILD PROJECT
REQUEST FOR PROPOSAL (RFP) C2002

ADVANCED CONCEPTUAL ENGINEERING
GLENDORA TO MONTCLAIR

VICINITY MAP 2 OF 2

DRAWING NO. G-202
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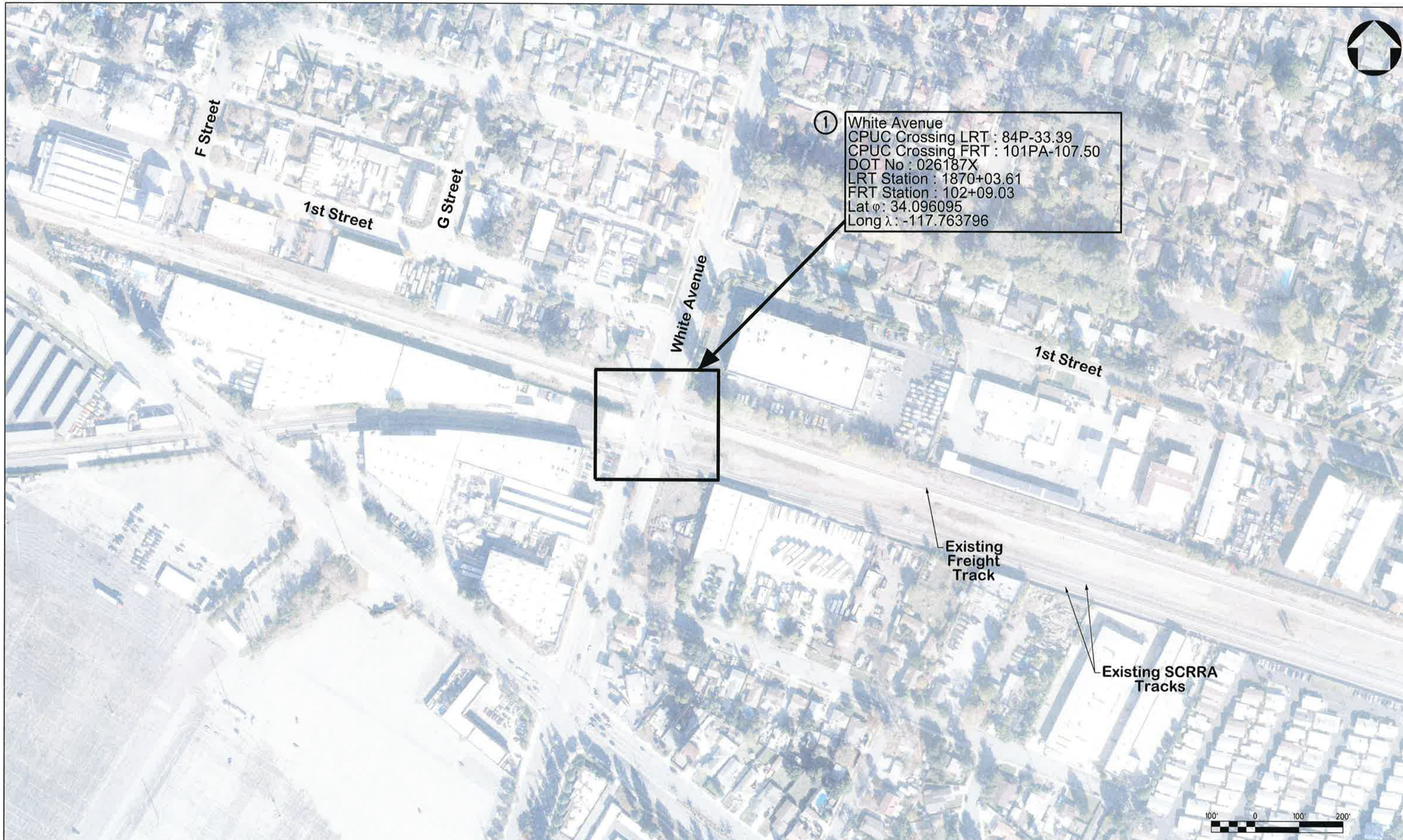
Exhibit B:

Aerial Intersection Description Maps



REVISIONS				
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Hill International
406 E. HUNTINGTON, SUITE 202
MONROVIA, CA 91016 - 3633

METRO GOLD LINE FOOTHILL EXTENSION CONSTRUCTION AUTHORITY
PHASE 2B ALIGNMENT DESIGN-BUILD PROJECT
REQUEST FOR PROPOSAL (RFP) C2002

ADVANCED CONCEPTUAL ENGINEERING
GLENDORA TO MONTCLAIR

INTERSECTION DESCRIPTION
WHITE AVENUE

DRAWING NO: ID-WHITE
REV
SHEET NO

Exhibit C:

Typical At-Grade Crossing Details

(GXR-001, GXT-001, 002, 003, 004 & 006)

CONSTRUCTION NOTES

GRADE CROSSINGS

(1) CPUC STANDARD NO. 8 FLASHING LIGHT SIGNAL ASSEMBLY
(2) CPUC STANDARD NO. 9 FLASHING LIGHT SIGNAL ASSEMBLY
(3) CPUC STANDARD NO. 9 FLASHING LIGHT SIGNAL ASSEMBLY WITHOUT AUDIBLE DEVICE
(4) CPUC STANDARD NO. 9E FLASHING LIGHT SIGNAL
(5) CPUC STANDARD NO. 9A FLASHING LIGHT SIGNAL ASSEMBLY WITH OVERHEAD FLASHING LIGHT SIGNALS ON A CANTILEVERED MAST ARM WITH GATE
(6) 4' WIDE EMERGENCY SWING GATE
(7) RAILROAD CONCRETE PANELS
(8) TACTILE TILE
(9) 12" 'WAIT HERE' AREA STRIPING
(10) DIRECTIONAL NOISE SHROUD
(11) DIRECTIONAL TILE
(12) RAILING
(13) TRAFFIC LOOP
(14) BALLAST #5
(15) UNEVEN FINISH TEXTURE TBD
(16) RETAINING WALL
(17) SOUNDWALL
(18) FIRE HYDRANT
(19) BOLLARD
(20) LANDSCAPE AREA
(21) DURA CURB (ON CURB)

STREET IMPROVEMENTS

(31) INSTALL RAISED MEDIAN
(32) CURB AND GUTTER
(33) CURB AND GUTTER (MEDIAN)
(34) CURB ONLY
(35) CONCRETE CURB AND GUTTER W=XX AND CF=XX PER PLAN
(36) CROSS AND LONGITUDINAL GUTTERS
(37) CONCRETE SIDEWALK
(38) STAMPED CONCRETE
(39) CURB RAMP
(40) DRIVEWAY
(41) PORTLAND CEMENT CONCRETE PAVEMENT
(42) ASPHALT CONCRETE PAVEMENT ON BASE
(43) AGGREGATE BASE
(44) AC MILL AND OVERLAY
(45) PROTECT IN PLACE

SIGNING AND STRIPING

(51) EXISTING TO REMAIN
(54) INSTALL SIGN ON EXISTING SIGN POST
(55) PAINTED RED CURB
(56) INSTALL SIGN AND POST
(57) INSTALL SIGN ON POLE
(58) INSTALL RAILROAD CROSSING SYMBOL
(59) INSTALL PAVEMENT MARKING PER CALTRANS STANDARD PLANS A24C, A24D AND A24E
(60) PAINT MEDIAN NOSE - YELLOW
(61) INSTALL 24" LIMIT LINE
(62) INSTALL YIELD LINE
(63) INSTALL 12" WHITE CHEVRON STRIPE
(64) INSTALL 12" SOLID YELLOW STRIPE PER CALTRANS /CITY STANDARD PLANS
(65) INSTALL 4" SOLID WHITE STRIPE PER CALTRANS STANDARD PLANS
(66) INSTALL 12" SOLID WHITE LINE PER CALTRANS STANDARD PLANS
(67) INSTALL TYPE I ARROW PER CALTRANS STANDARD PLANS
(68) INSTALL TYPE IV (L) OR (R) ARROWS PER CALTRANS STADNARD PLANS
(69) INSTALL TYPE VI (L) OR (R) ARROWS PER CALTRANS STANDARD PLANS
(70) INSTALL TYPE VII (L) OR (R) ARROWS PER CALTRANS STANDARD PLANS
(71) INSTALL STRIPE PER CALTRANS STANDARD PLANS A20A DETAIL 5
(72) INSTALL STRIPE PER CALTRANS STANDARD PLANS A20A DETAIL 8
(73) INSTALL STRIPE PER CALTRANS STANDARD PLANS A20A DETAIL 11
(74) INSTALL STRIPE PER CALTRANS STANDARD PLANS A20B DETAIL 28
(75) INSTALL STRIPE PER CALTRANS STANDARD PLANS A20A DETAIL 22
(76) INSTALL STRIPE PER CALTRANS STANDARD PLANS A20B DETAIL 29
(77) INSTALL STRIPE PER CALTRANS STANDARD PLANS A20B DETAIL 32
(78) INSTALL STRIPE PER CALTRANS STANDARD PLANS A20D DETAIL 38
(79) INSTALL STRIPE PER CALTRANS STANDARD PLANS A20D DETAIL 38B
(80) INSTALL STRIPE PER CALTRANS STANDARD PLANS A20B DETAIL 25A OR DETAIL 26
(81) INSTALL STRIPE PER CALTRANS STANDARD PLANS A20B DETAIL 27B
(82) INSTALL STRIPE PER CALTRANS STANDARD PLANS A20D DETAIL 40
(83) INSTALL STRIPE PER CALTRANS STANDARD PLANS A20A DETAIL 9
(84) INSTALL STRIPE PER CALTRANS STANDARD PLANS A20D DETAIL 39 OR DETAIL 39A

REMOVAL NOTES:

[52] REMOVE CONFLICTING STRIPING AND RAISED PAVEMENT MARKERS BY WET SANDBLASTING OR GRINDING

STREET SIGNS

(A) RAILROAD CROSSING (W10-1)
(A1) RAILROAD CROSSBUCK (R15-1)
(B1) RAILROAD NUMBER OF TRACKS (W48 (CA))
(B2) RAILROAD NUMBER OF TRACKS (R15-2P)
(C) TRACK CROSSING AT INTERSECTION (W10-2R)
(D) TRACK CROSSING AT INTERSECTION (W10-2L)
(E) TRACK CROSSING AT "T" INTERSECTION (W10-4L)
(F) TRACK CROSSING AT "T" INTERSECTION (W10-4R)
(G) THRU TRAFFIC MERGE LEFT (W4-7)
(H) TYPE K REFLECTIVE OBJECT MARKER
(I) TYPE N (CA) OBJECT MARKER
(J) NO TURN ON RED (R10-11)
(K) NO TURN ON RED (R13A (CA))
(L) NO U TURN (R3-4)
(M) NO PARKING ANYTIME (R26A (CA))
(N) DO NOT STOP ON TRACKS (R8-8)
(O) STOP HERE ON RED (R10-6 (L) OR (R))
(P) KEEP RIGHT (R4-7)
(Q) ONE WAY (R6-1R OR R6-1L)
(R) RIGHT TURN ONLY (R3-5R)
(S) LEFT TURN ONLY (R3-5L)
(T) STOP (R1-1)
(U) YIELD (R1-2)
(V) NO LEFT TURN (R3-2)
(W) WRONG WAY (R5-1A)
(X) DO NOT ENTER (R5-1)
(Y) PEDESTRIAN CROSSING (W11-2)
(Z) NO PEDESTRIAN CROSSING (R9-3A)
(AA) USE CROSSWALK (R9-3B (LT))
(AB) USE CROSSWALK (R9-3B (RT))
(AC) LEFT ONLY, LEFT ONLY, RIGHT ONLY (R61-13 (CA))
(AD) LEFT ONLY, THROUGH, RIGHT ONLY (R3-8B)
(AE) BLANKOUT SIGN (R3-1) (NO RIGHT)
(AF) BLANKOUT SIGN (R3-2) (NO LEFT)
(AG) LEFT ONLY, THROUGH RIGHT (R61-5 (CA))
(AH) THROUGH LEFT, RIGHT ONLY (R61-7)
(AJ) LEFT ONLY, RIGHT ONLY (RE61-19 (CA))
(AK) LEFT ONLY, THROUGH LEFT, RIGHT ONLY (R3-18)
(AL) ONE WAY (R6-2)
(AM) ROUND ABOUT (R6-5P)
(AN) RIGHT LANE ENDS (W9-1)
(AO) AHEAD (H16-9P)
(AP) RIGHT LANE MUST TURN RIGHT (R3-7)
(AQ) NO PARKING ANY TIME (R28 (S) (CA))
(AR) TRUCK ROUTE (R14-1)
(AS) OBJECT MARKER (OM4-1)
(AT) MERGE LANE SIGN (W4-1)
(AU) TAPER LANE (W4-2)
(AV) DEAD END SIGN (W14-1)
(AW) END SIGN (W31 (CA))
(AX) REPORT EMERGENCY OR PROBLEM (I-13)
(AY) SPEED LIMIT XX (R2-1)
(AZ) NO LEFT OR U-TURN (R3-18)
(AY) LEFT ONLY, LEFT ONLY, THROUGH, THROUGH (R3-8 (MOD))
(AY) THROUGH, THROUGH, RIGHT ONLY (R3-8 (MOD))
(AY) LEFT ONLY, THROUGH, THROUGH, RIGHT ONLY (R3-8 (MOD))

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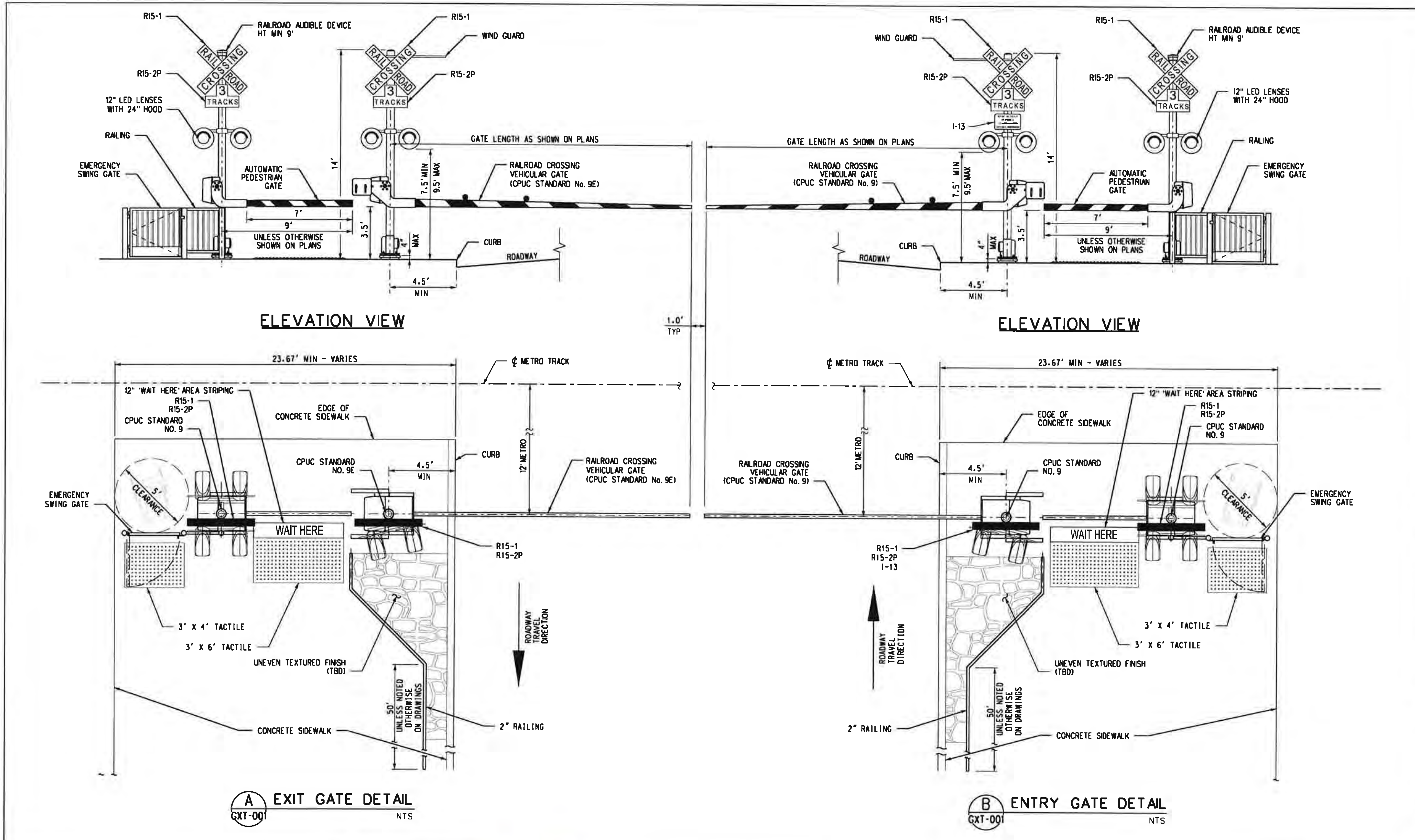
PHASE 2B ALIGNMENT DESIGN-BUILD PROJECT
REQUEST FOR PROPOSAL (RFP) C2002
MAY 30, 2018

ADVANCED CONCEPTUAL ENGINEERING
GLENDORA TO MONTCLAIR

GRADE CROSSING
CONSTRUCTION NOTES

DRAWING NO: GXR-001
REV: A
SHEET NO



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MAY 30, 2018

ADVANCED CONCEPTUAL ENGINEERING
GLENDORA TO MONTCLAIR

GRADE CROSSING
TYPICAL METRO GATE DETAILS

DRAWING NO: GXT-001 | REV: A
SHEET NO

5/16/2018 2:34:14 PM
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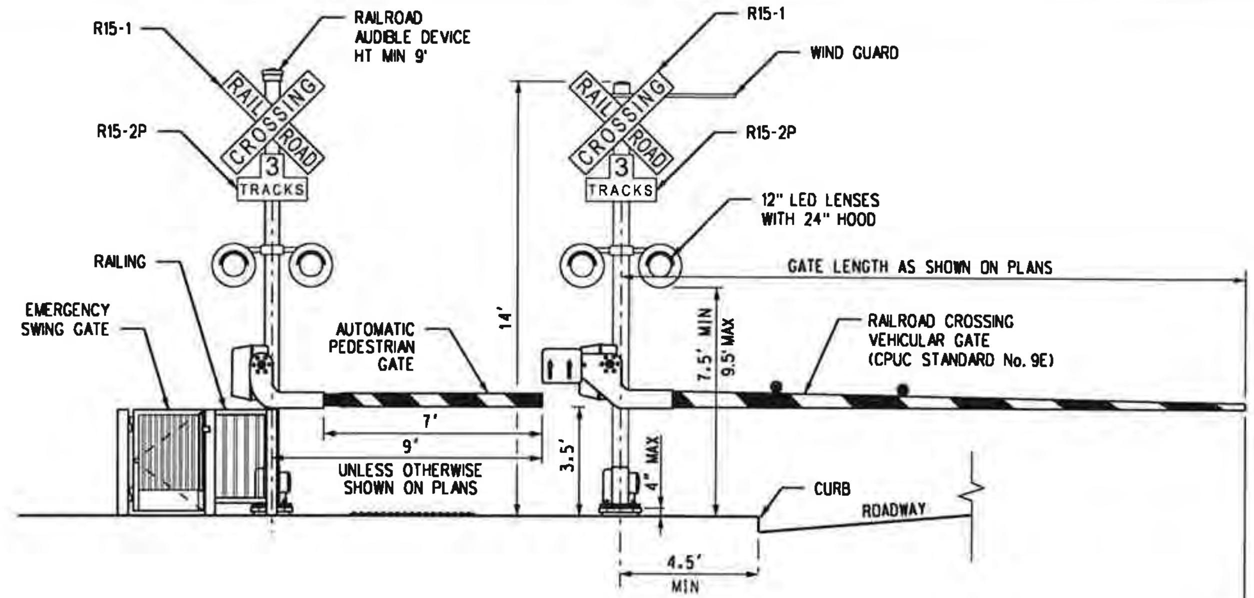
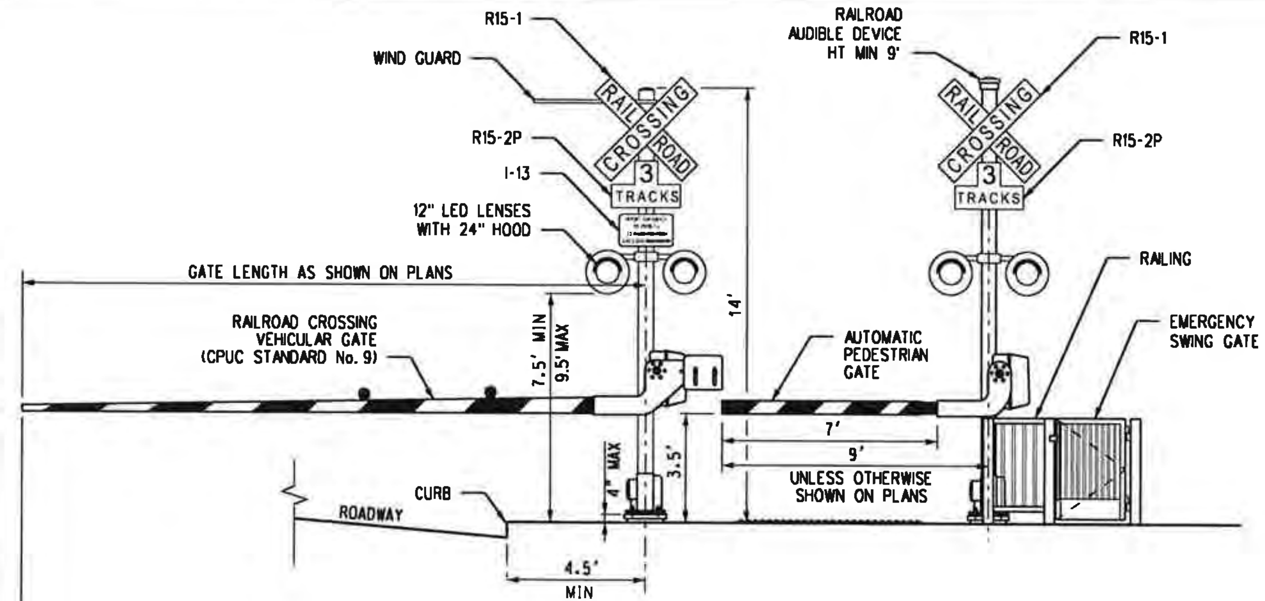
USER=>jluong

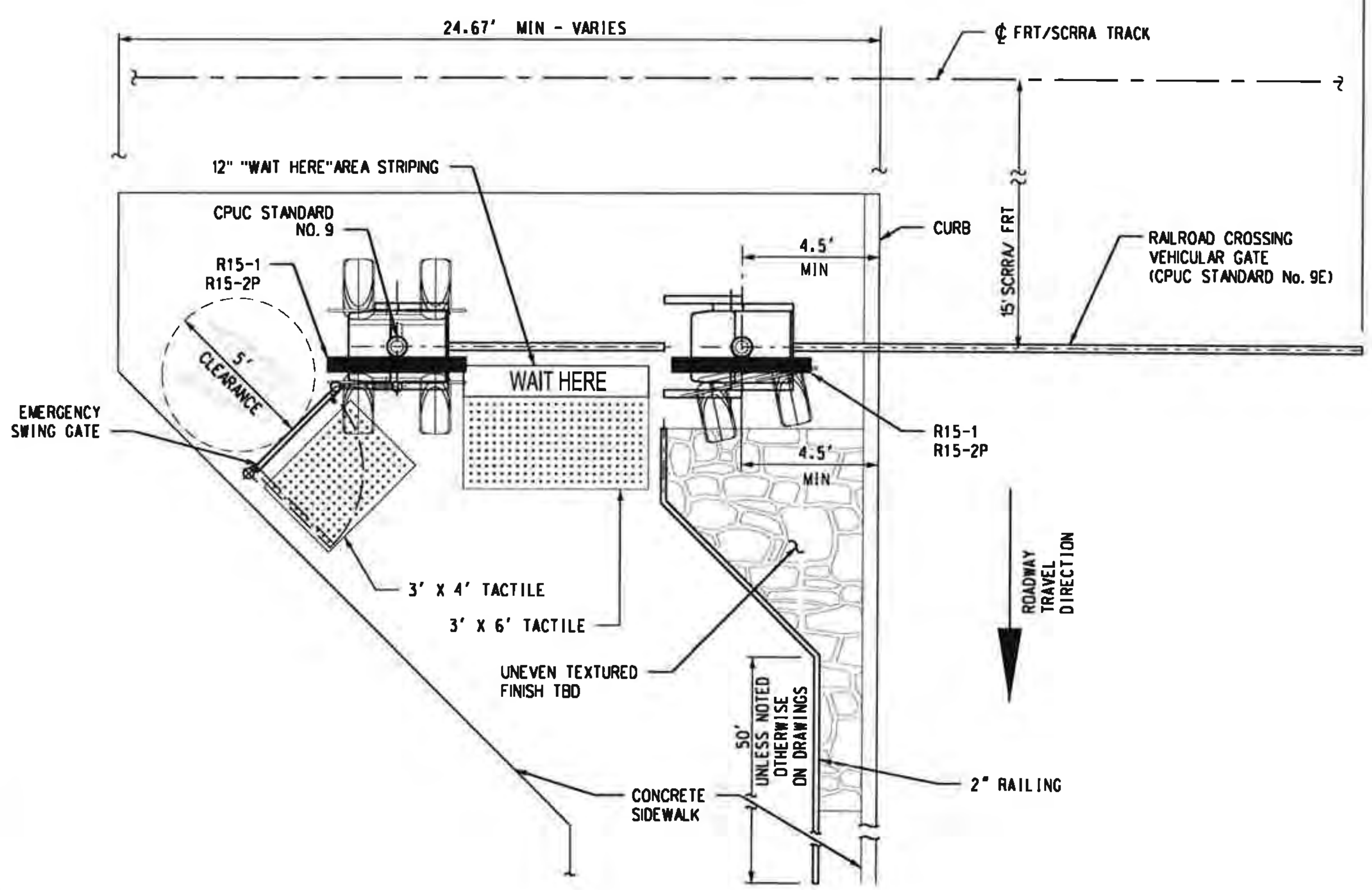


ELEVATION VIEW

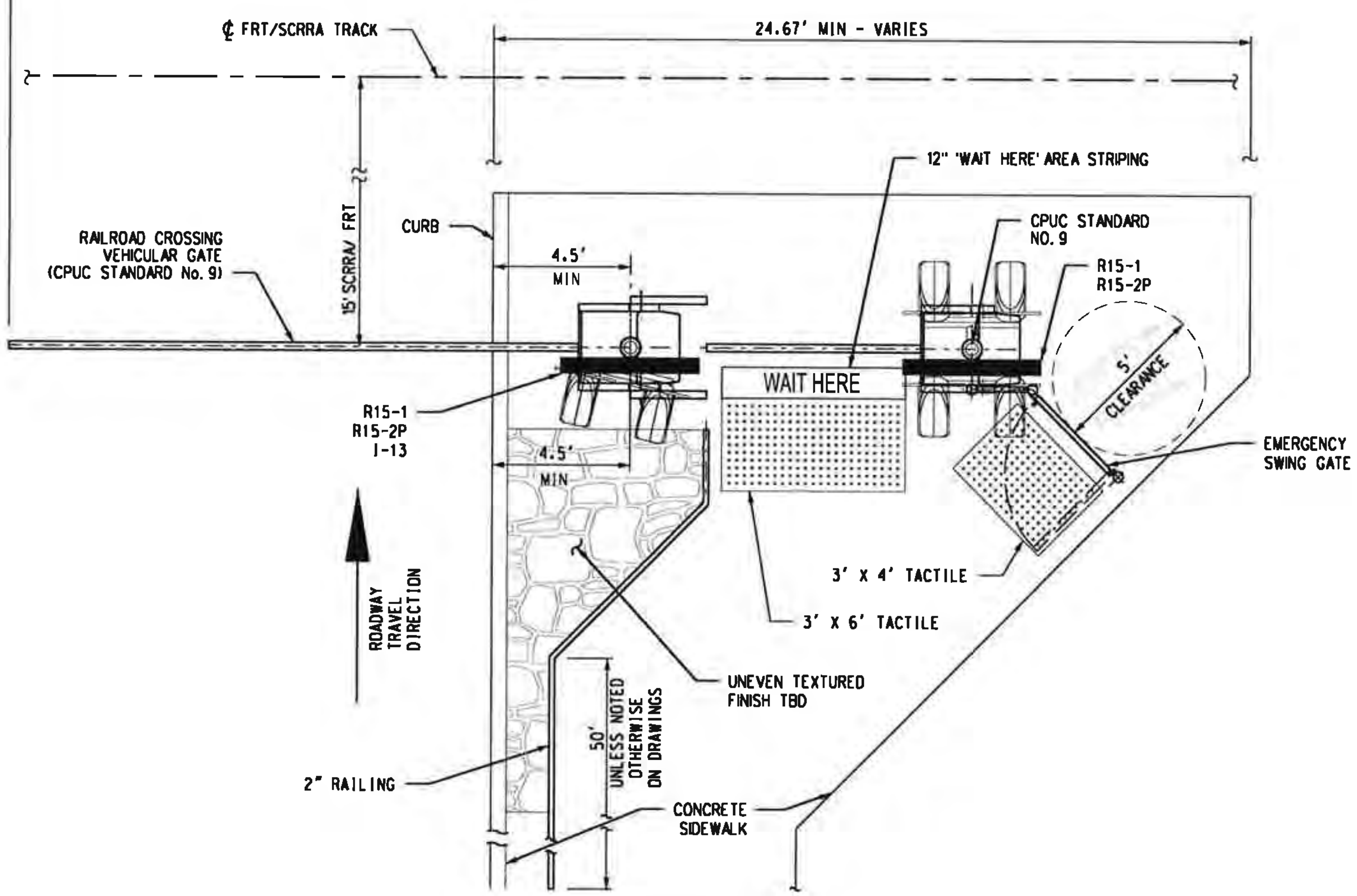


ELEVATION VIEW

1.0' TYP



C GXT-002 EXIT GATE DETAIL
NTS



D GXT-002 ENTRY GATE DETAIL
NTS

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PHASE 2B ALIGNMENT DESIGN-BUILD PROJECT
REQUEST FOR PROPOSAL (RFP) C2002
MAY 30, 2018

ADVANCED CONCEPTUAL ENGINEERING
GLENDORA TO MONTCLAIR

GRADE CROSSING
TYPICAL FRT/ SCRRA GATE DETAILS

DRAWING NO GXT-002
REV A
SHEET NO

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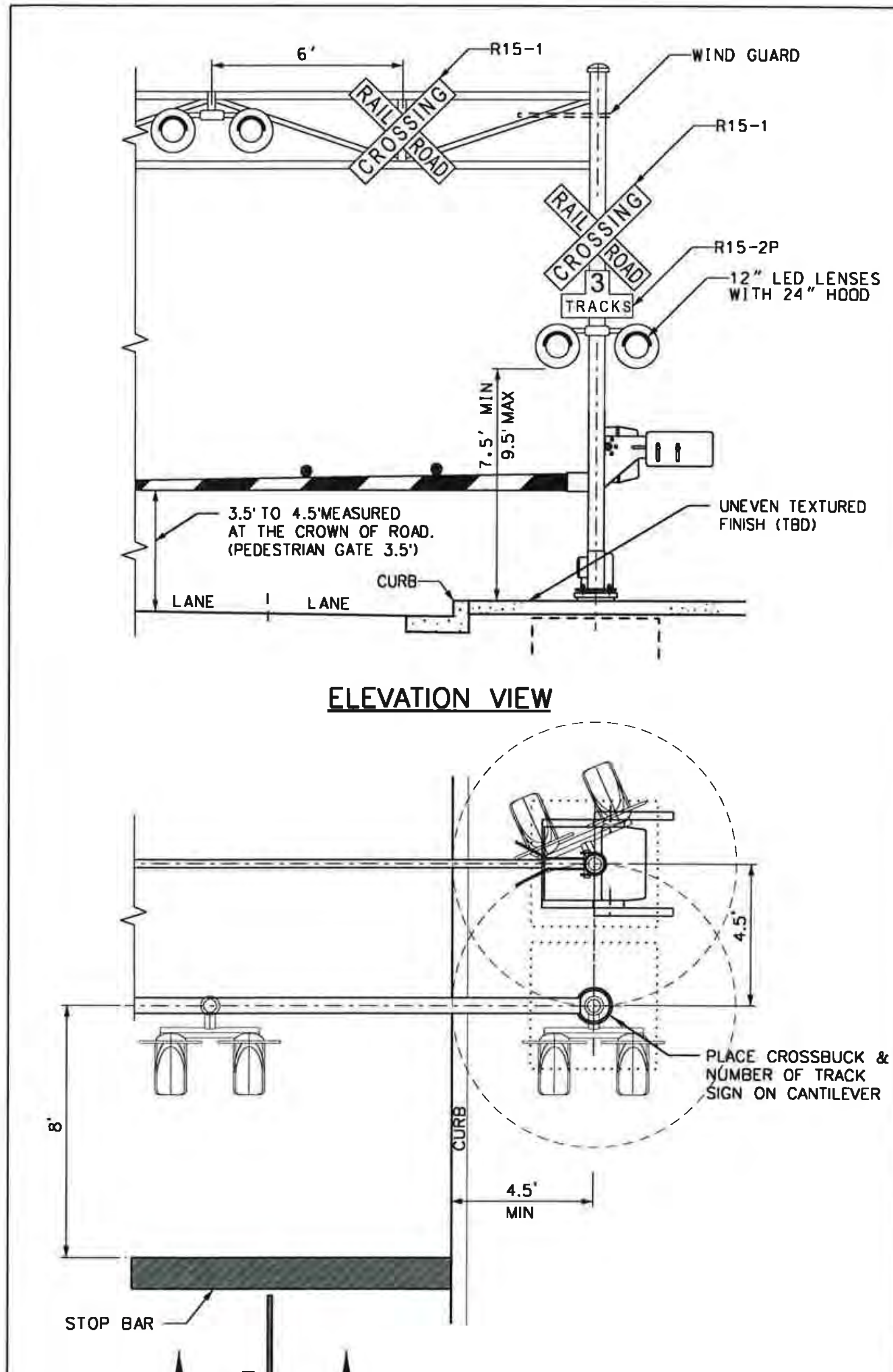
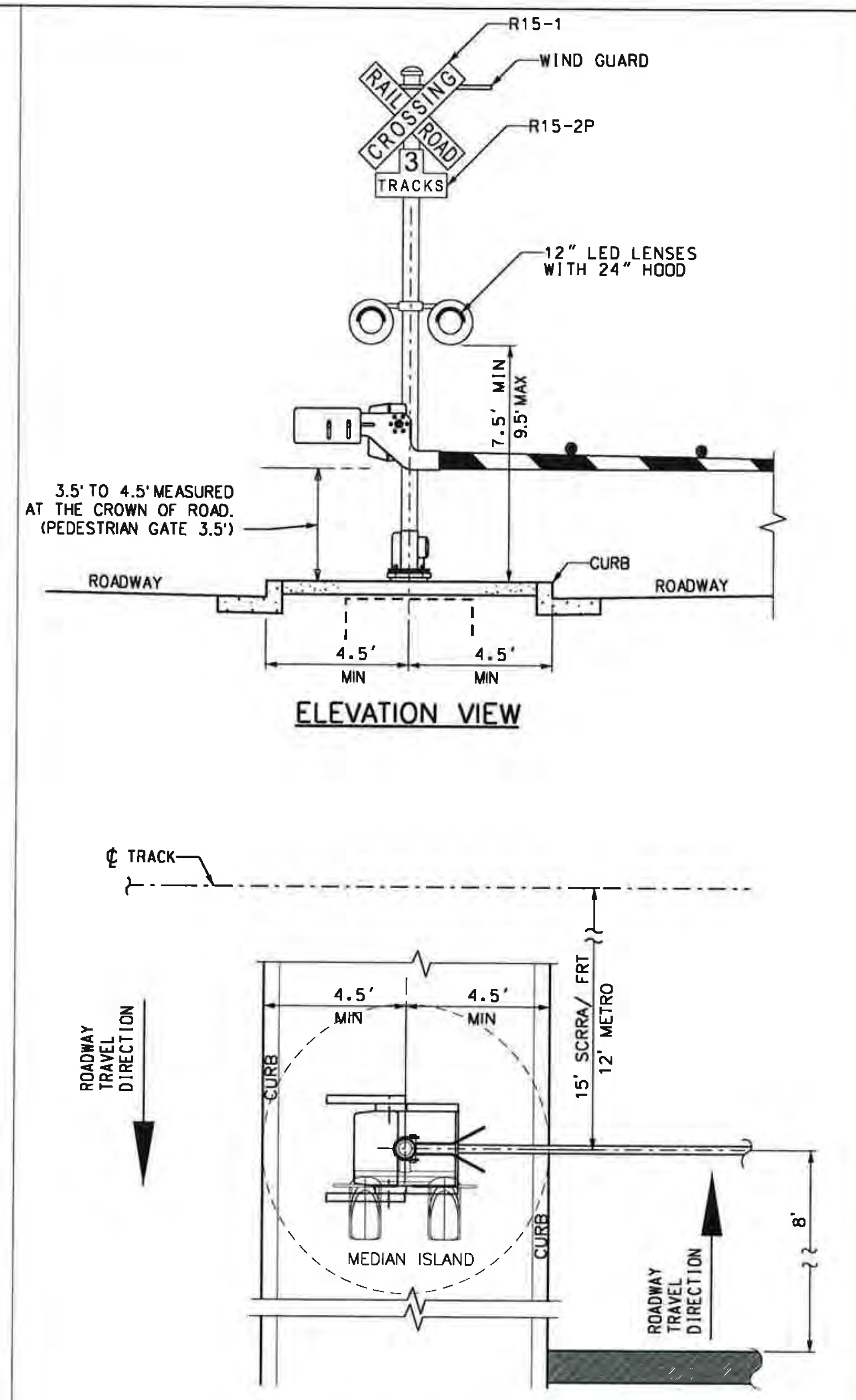
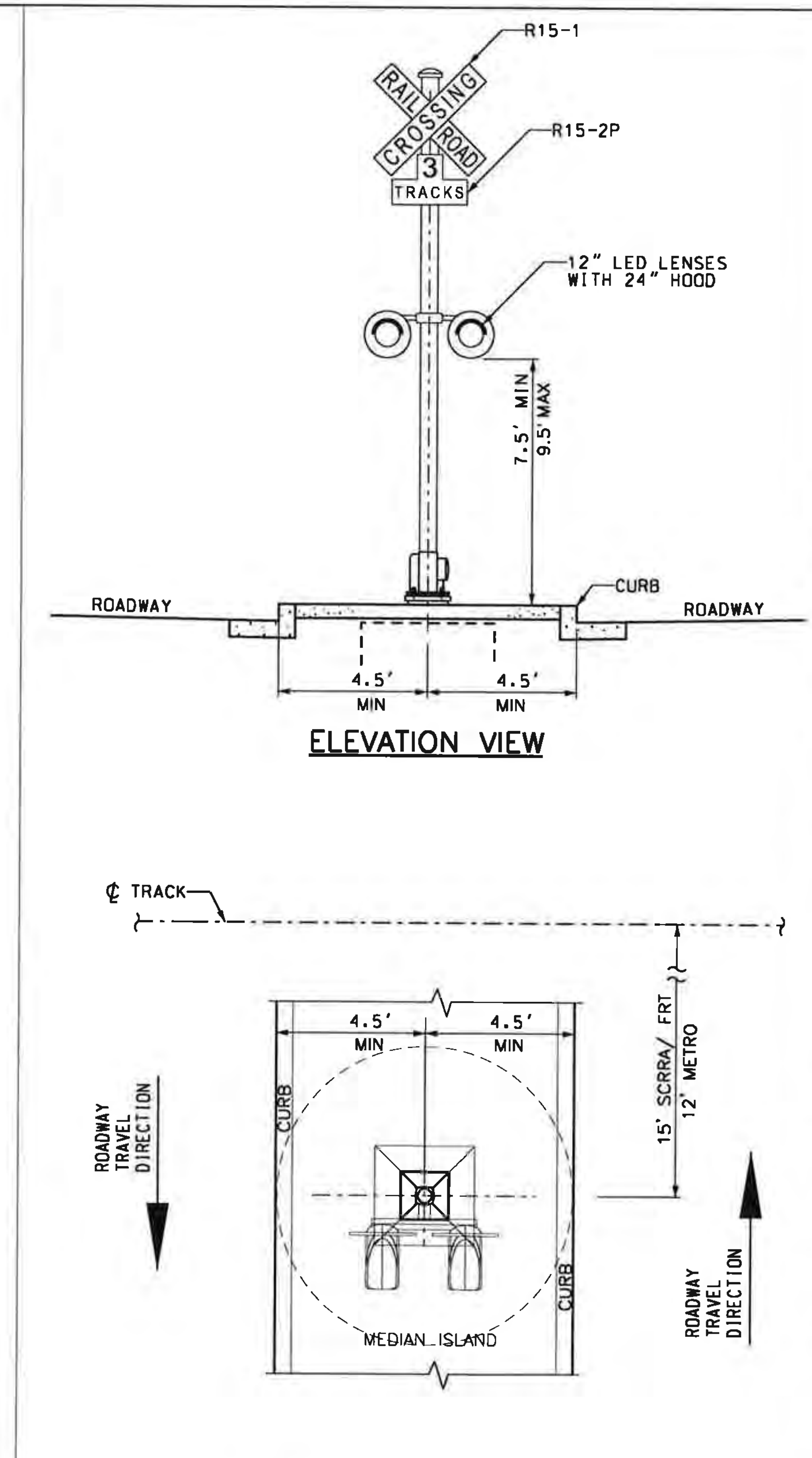


E GXT-003 CANTILEVER CPUC NO. 9A
NTS



F GXT-003 MEDIAN MOUNTED CPUC NO. 9
NTS



G GXT-003 MEDIAN MOUNTED CPUC NO.8
NTS

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MAY 30, 2018

ADVANCED CONCEPTUAL ENGINEERING
GLENDORA TO MONTCLAIR

GRADE CROSSING
TYPICAL GATE DETAILS, SHEET 1

DRAWING NO. GXT-003
REV A
SHEET NO.

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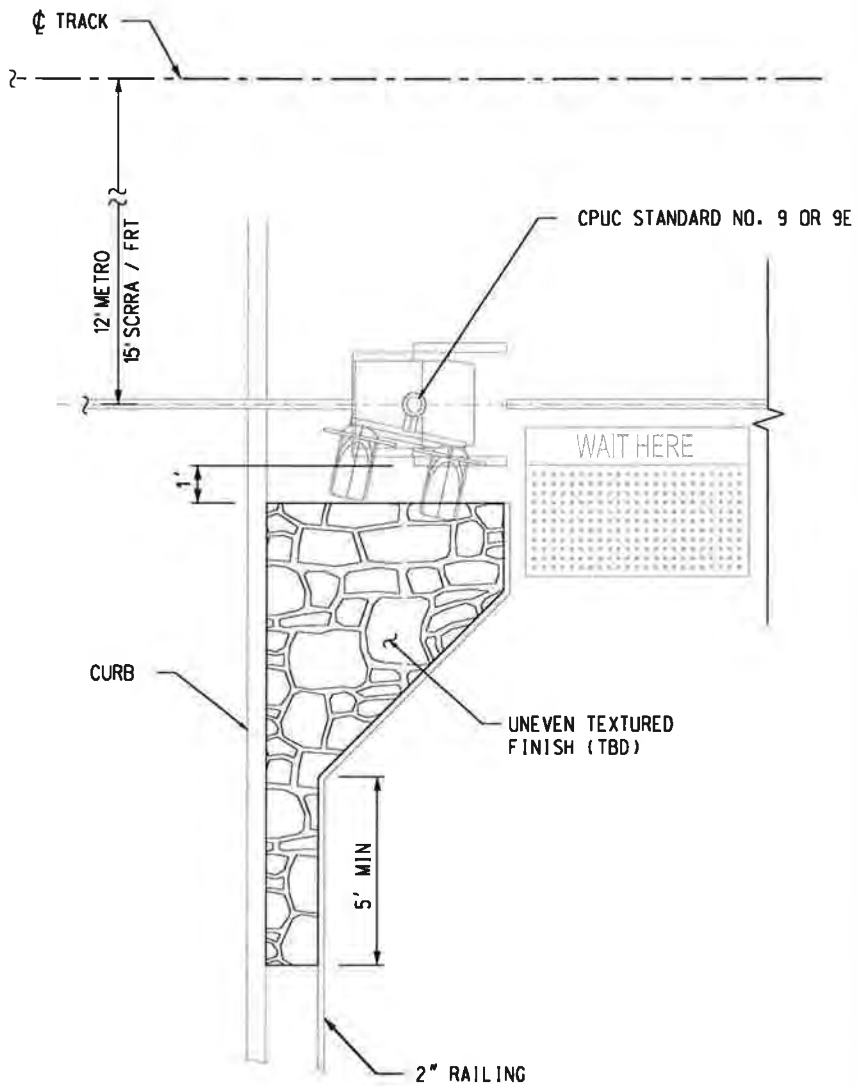
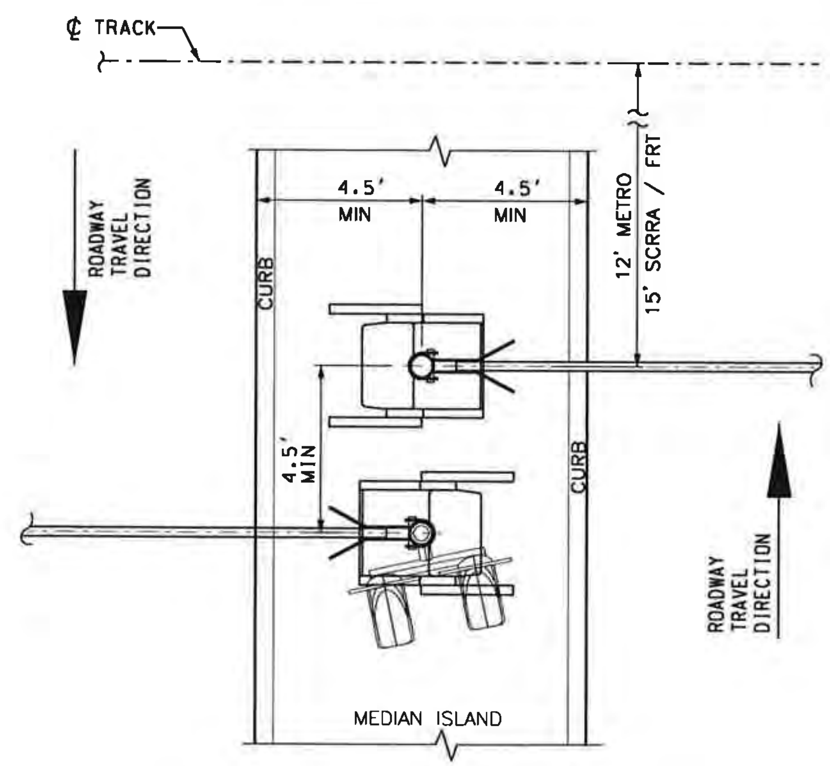
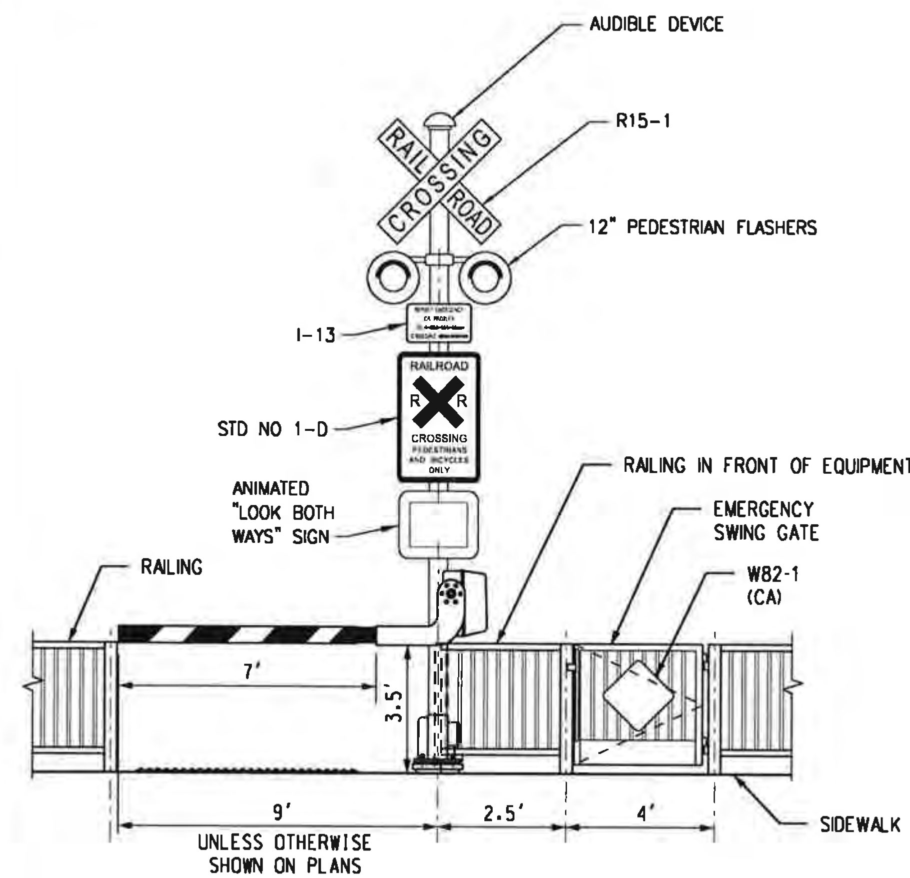


H GXT-004 TEXTURED FINISH (TBD)
NTS



I GXT-004 STACKED MEDIAN MOUNTED CPUC STANDARD NO. 9 GATES
NTS



J GXT-004 ELEVATION - STATION ENTRANCE
NTS

REV.	DATE	DESCRIPTION	DES.	ENG.
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MAY 30, 2018

ADVANCED CONCEPTUAL ENGINEERING
GLENDORA TO MONTCLAIR

GRADE CROSSING
TYPICAL GATE DETAILS, SHEET 2

DRAWING NO GXT-004
REV A
SHEET NO

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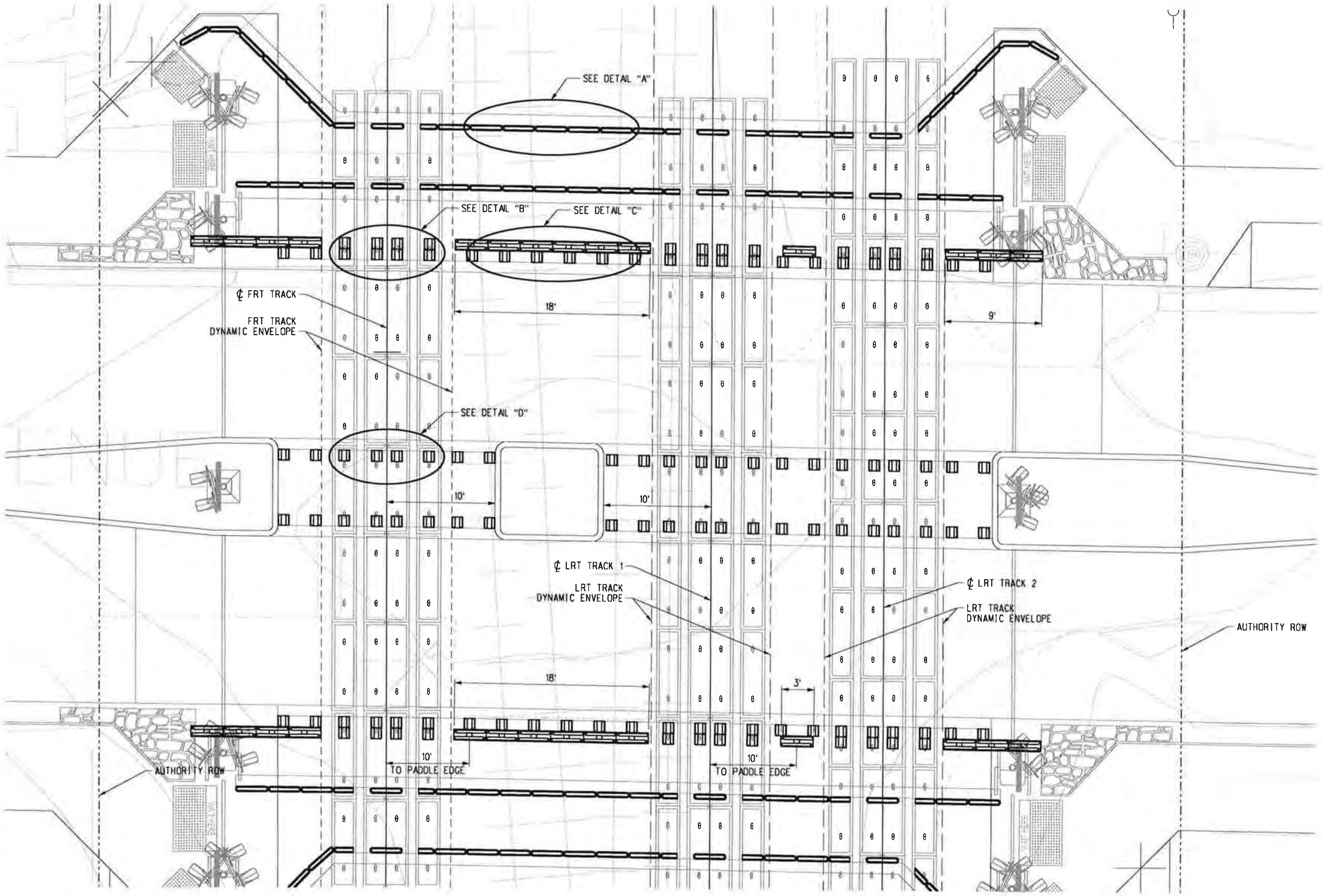
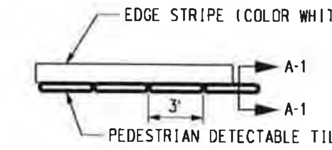
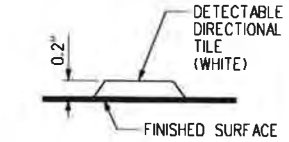
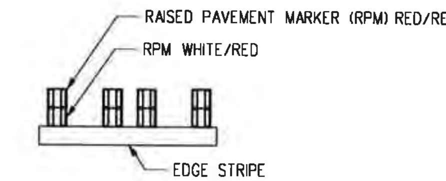




DETAIL "A"



A-1 (TYPICAL SECTION)



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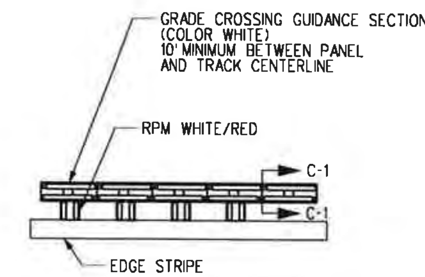
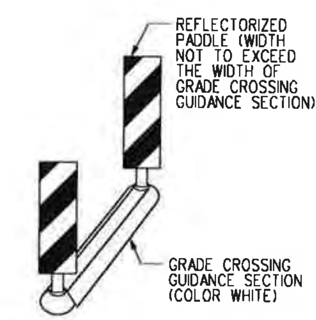
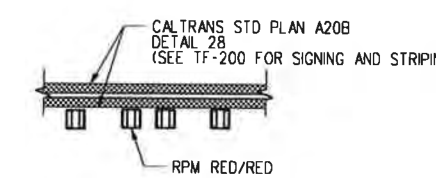


DETAIL "C"



C-1 (ISOMETRIC VIEW)



DETAIL "D"

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PHASE 2B ALIGNMENT DESIGN-BUILD PROJECT
REQUEST FOR PROPOSAL (RFP) C2002
MAY 30, 2018

ADVANCED CONCEPTUAL ENGINEERING
GLENDORA TO MONTCLAIR

GRADE CROSSING
GRADE CROSSING GUIDANCE DETAILS

DRAWING NO GXT-006
REV A
SHEET NO

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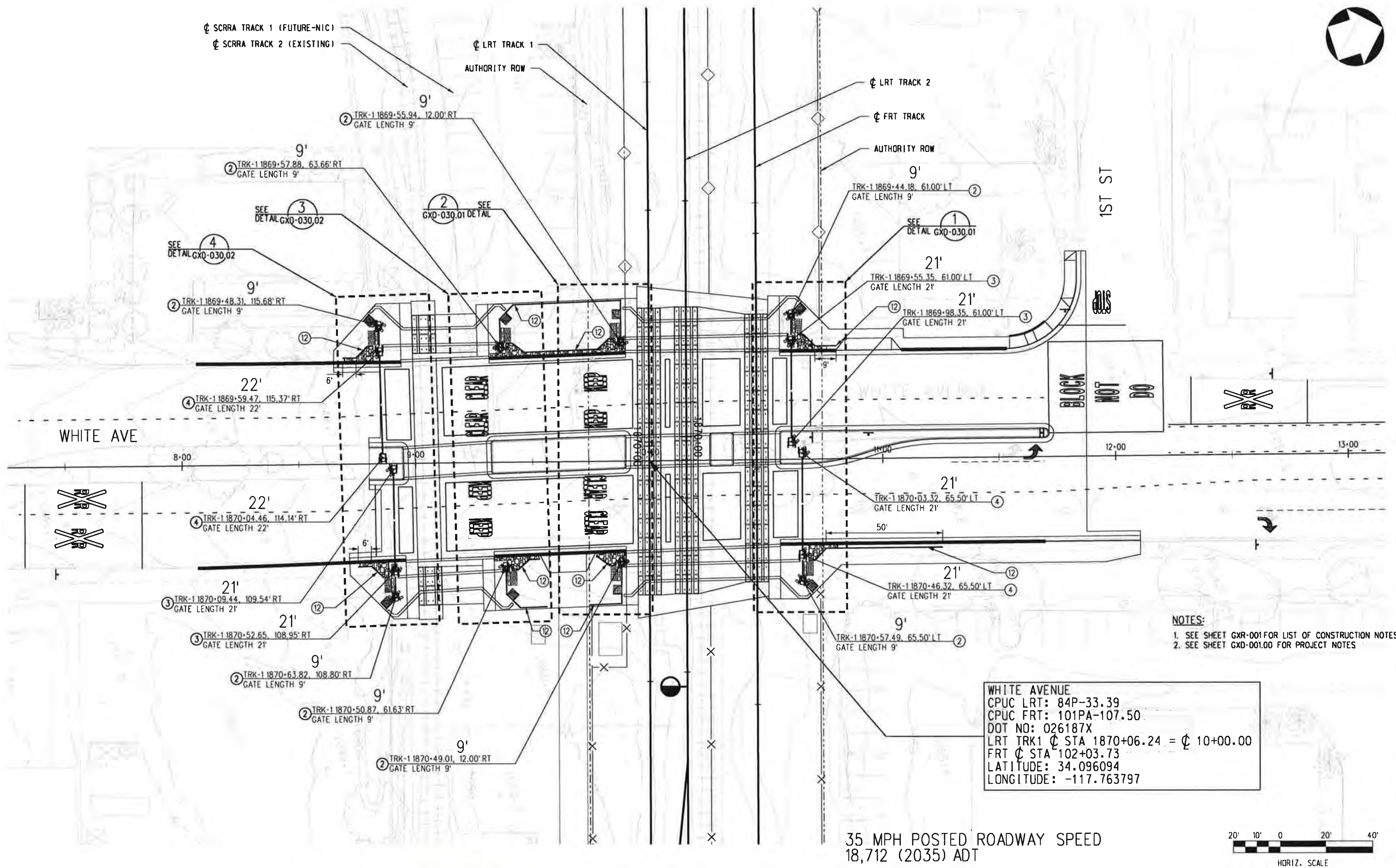
5/16/2018 2:35:47 PM
USER: jhuang

Exhibit D:

White Avenue Grade Crossing Drawings



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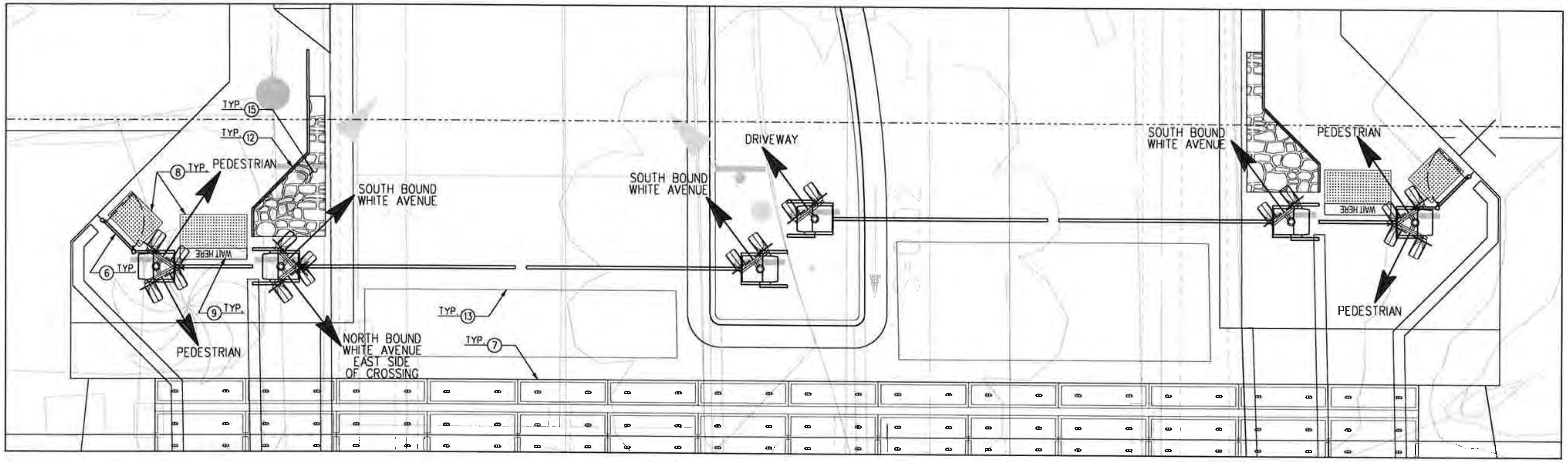
REQUEST FOR PROPOSAL (RFP) C2002
MAY 30, 2018

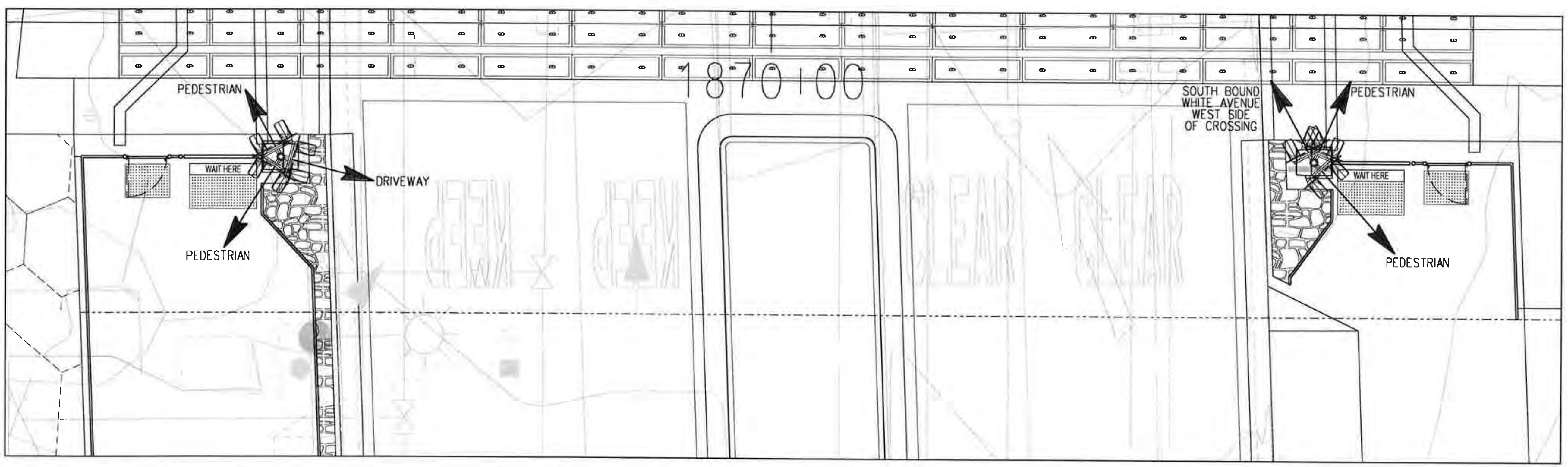
ADVANCED CONCEPTUAL ENGINEERING
GLENDORA TO MONTCLAIR

GRADE CROSSING
WHITE AVENUE PLAN

DRAWING NO: GXD-030.00
REV: A
SHEET NO



1 DETAIL PLAN
GXD-030.01 SCALE: 1" = 5'



2 DETAIL PLAN
GXD-030.01 SCALE: 1" = 5'

NOTES:
1. SEE SHEET GXR-001 FOR LIST OF CONSTRUCTION NOTES
2. SEE SHEET GXD-001.00 FOR PROJECT NOTES

REV.	DATE	DESCRIPTION	DES.	ENG.
		NOT FOR CONSTRUCTION		

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PHASE 2B ALIGNMENT DESIGN-BUILD PROJECT
REQUEST FOR PROPOSAL (RFP) C2002
MAY 30, 2018

ADVANCED CONCEPTUAL ENGINEERING
GLENDORA TO MONTCLAIR

GRADE CROSSING
WHITE AVENUE DETAILS (LRT/FRT)

DRAWING NO. GXD-030.01
REV. A
SHEET NO.

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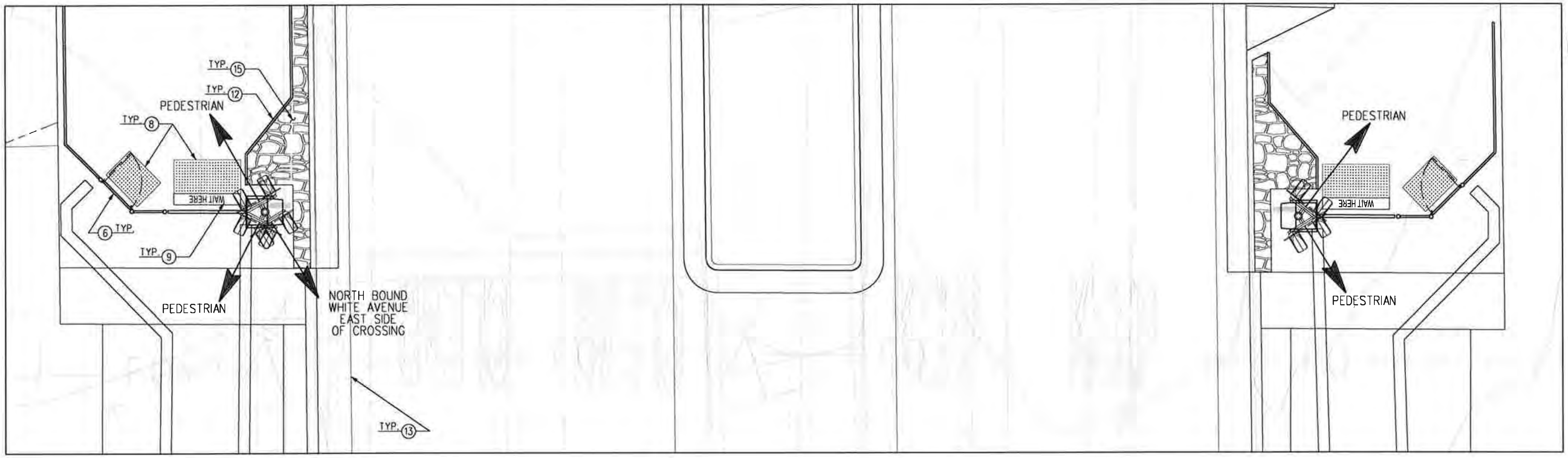
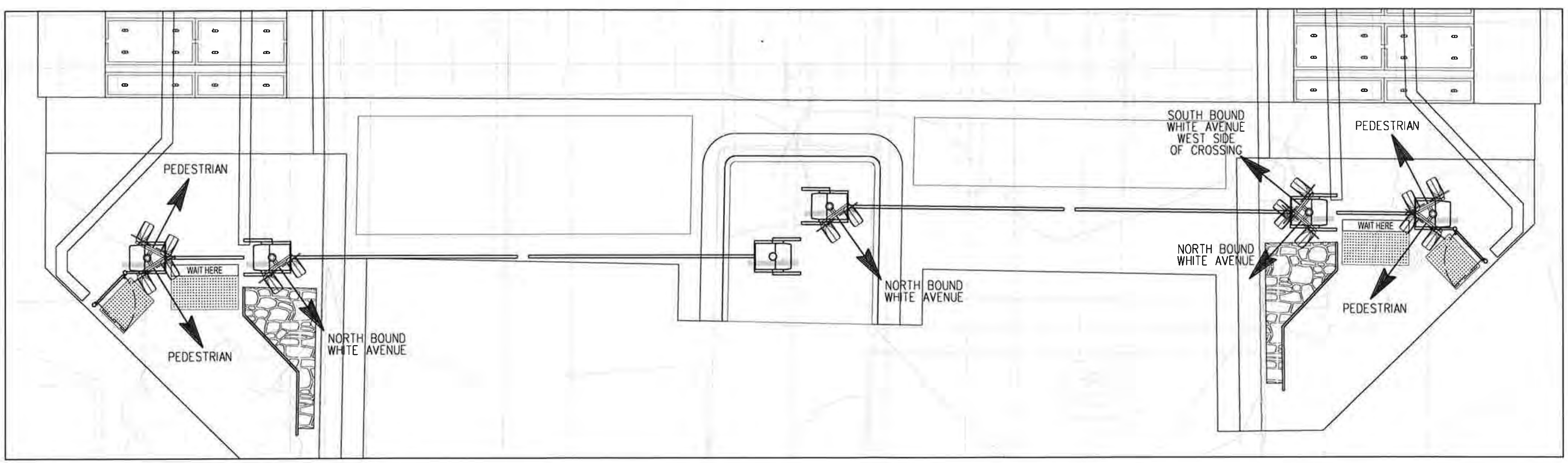


3 DETAIL PLAN
GXD-030.01 SCALE: 1" = 5'



4 DETAIL PLAN
GXD-030.02 SCALE: 1" = 5'

NOTES:
1. SEE SHEET GXR-001 FOR LIST OF CONSTRUCTION NOTES
2. SEE SHEET GXD-001.00 FOR PROJECT NOTES

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REV.	DATE	DESCRIPTION	DES.	ENG.

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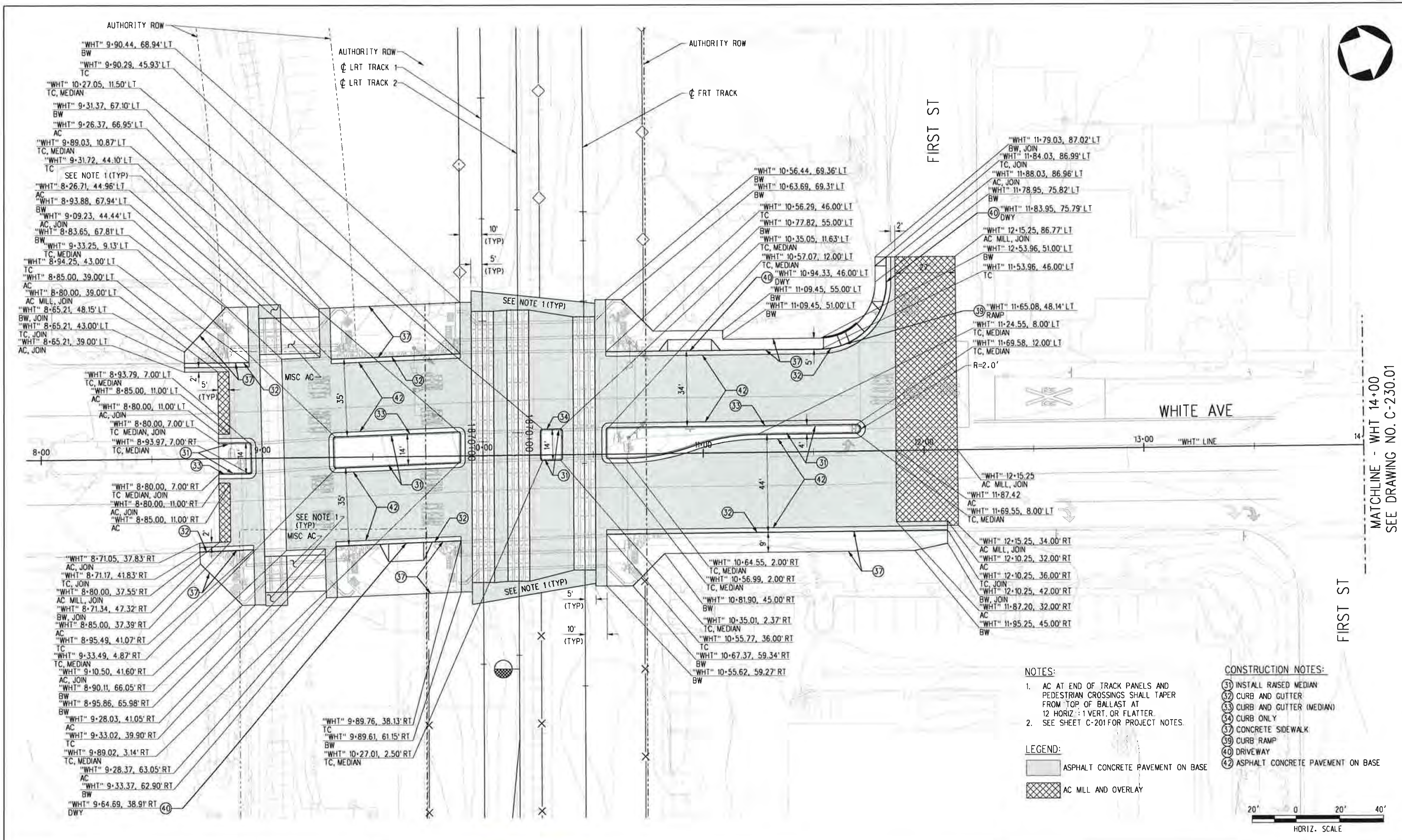
PHASE 2B ALIGNMENT DESIGN-BUILD PROJECT
REQUEST FOR PROPOSAL (RFP) C2002
MAY 30, 2018

ADVANCED CONCEPTUAL ENGINEERING
GLENDORA TO MONTCLAIR

GRADE CROSSING
WHITE AVENUE DETAILS (SCRRA)

DRAWING NO. GXD-030.02
REV A
SHEET NO.



NOTES:

1. AC AT END OF TRACK PANELS AND PEDESTRIAN CROSSINGS SHALL TAPER FROM TOP OF BALLAST AT 12 HORIZ : 1 VERT. OR FLATTER.
2. SEE SHEET C-201 FOR PROJECT NOTES.

LEGEND:

- ASPHALT CONCRETE PAVEMENT ON BASE
- AC MILL AND OVERLAY

CONSTRUCTION NOTES:

- 31 INSTALL RAISED MEDIAN
- 32 CURB AND GUTTER
- 33 CURB AND GUTTER (MEDIAN)
- 34 CURB ONLY
- 37 CONCRETE SIDEWALK
- 39 CURB RAMP
- 40 DRIVEWAY
- 42 ASPHALT CONCRETE PAVEMENT ON BASE

REVISIONS				
REV.	DATE	DESCRIPTION	DES.	ENG.

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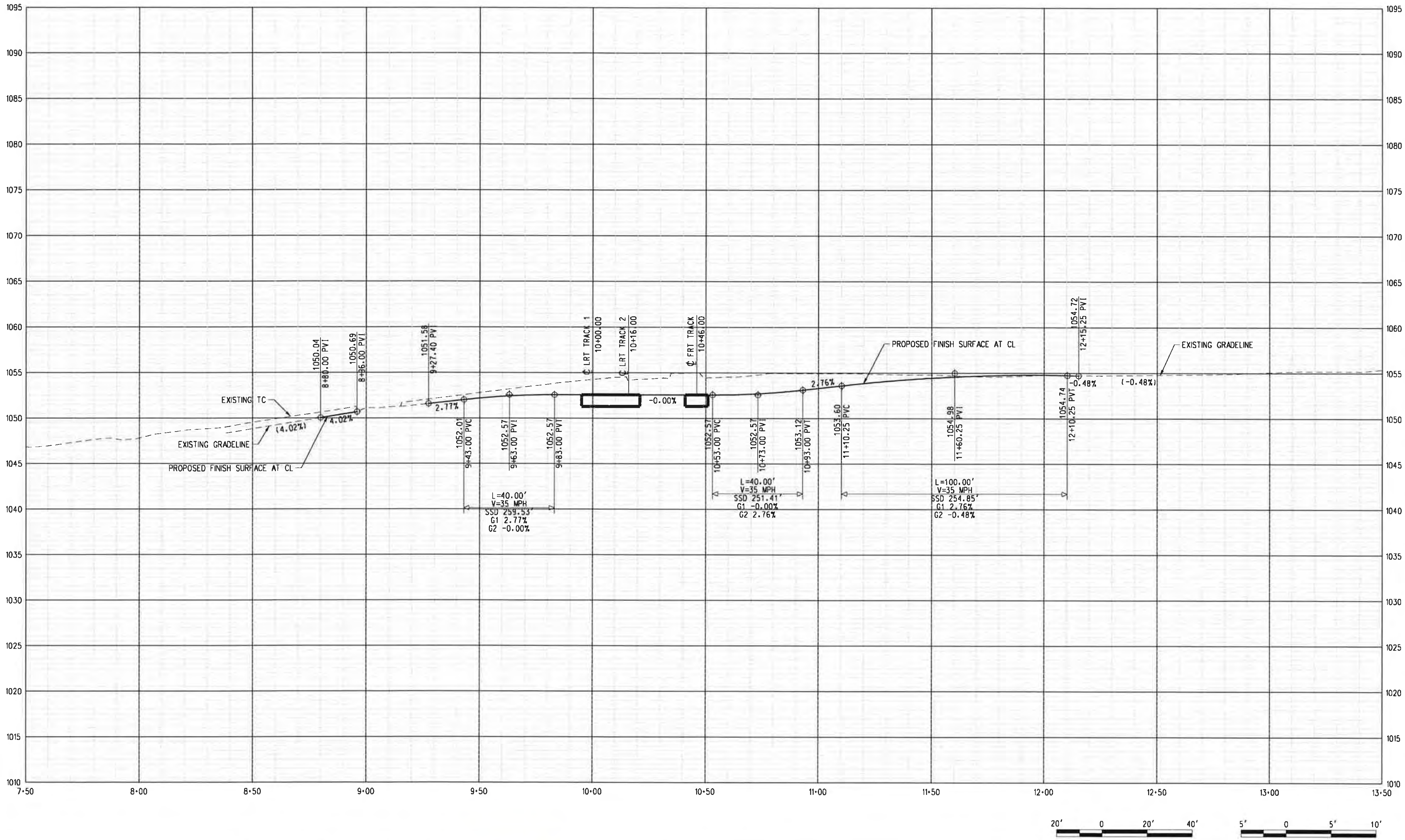
PHASE 2B ALIGNMENT DESIGN-BUILD PROJECT
REQUEST FOR PROPOSAL (RFP) C2002
MAY 30, 2018

ADVANCED CONCEPTUAL ENGINEERING
GLENDORA TO MONTCLAIR

STREET IMPROVEMENTS
WHITE AVENUE PLAN

DRAWING NO: C-230.00
REV: A
SHEET NO:



REVISIONS				
		NOT FOR CONSTRUCTION		
REV.	DATE	DESCRIPTION	DES.	ENG.

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METRO GOLD LINE FOOTHILL EXTENSION CONSTRUCTION AUTHORITY
PHASE 2B ALIGNMENT DESIGN-BUILD PROJECT
REQUEST FOR PROPOSAL (RFP) C2002
MAY 30, 2018

ADVANCED CONCEPTUAL ENGINEERING
GLENDORA TO MONTCLAIR

STREET IMPROVEMENTS
WHITE AVENUE PROFILE

DRAWING NO. C-230.10
REV A
SHEET NO.

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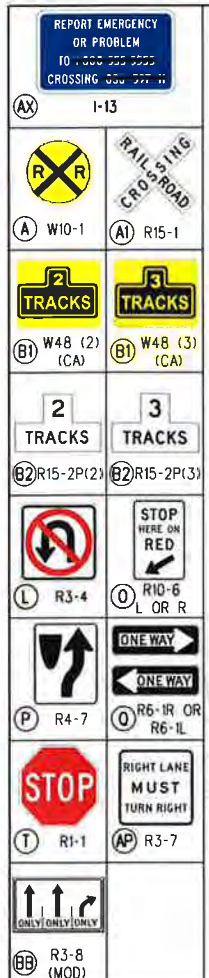


CONSTRUCTION NOTES:

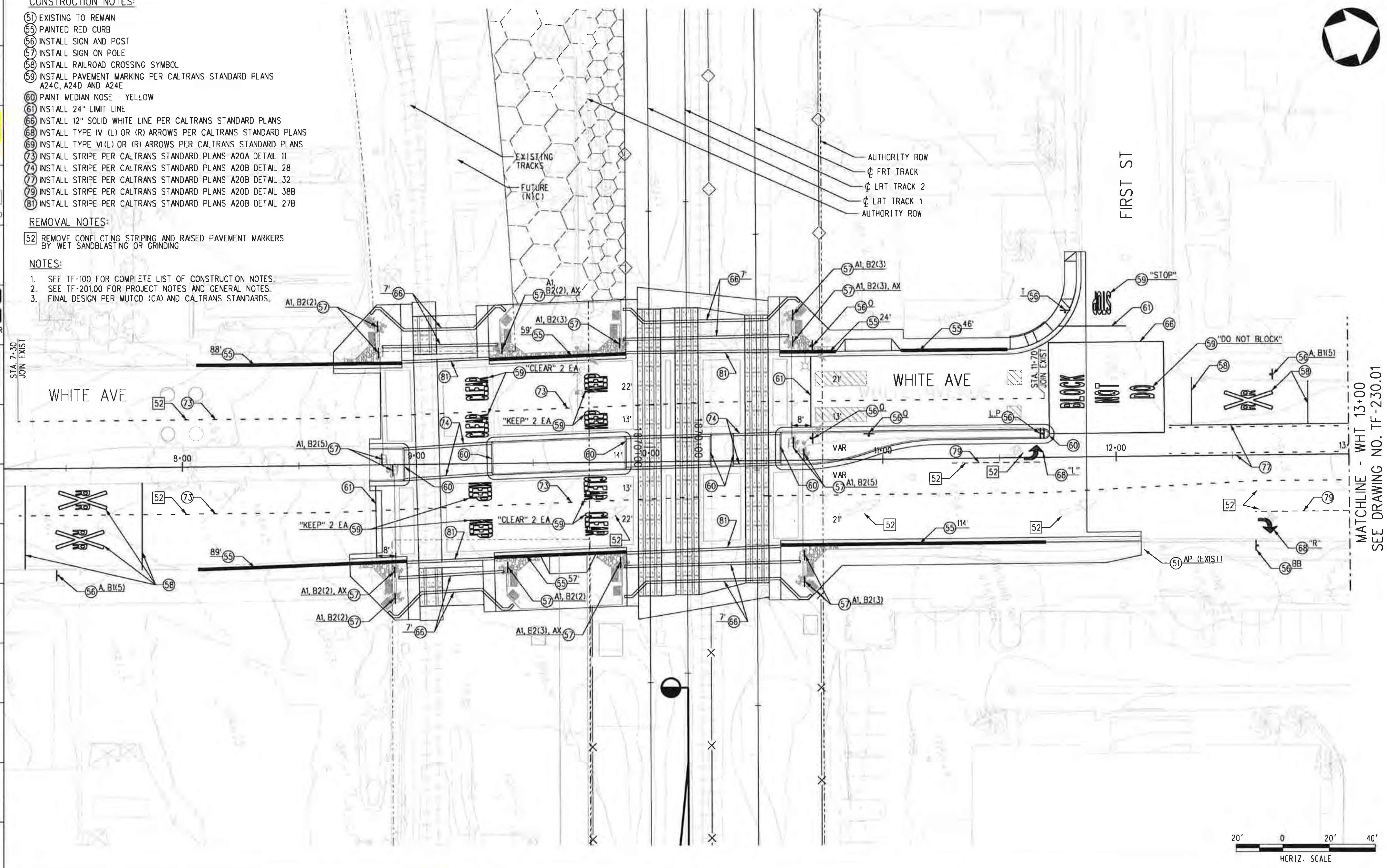
(51) EXISTING TO REMAIN
(55) PAINTED RED CURB
(56) INSTALL SIGN AND POST
(57) INSTALL SIGN ON POLE
(58) INSTALL RAILROAD CROSSING SYMBOL
(59) INSTALL PAVEMENT MARKING PER CALTRANS STANDARD PLANS A24C, A24D AND A24E
(60) PAINT MEDIAN NOSE - YELLOW
(61) INSTALL 24" LIMIT LINE
(66) INSTALL 12" SOLID WHITE LINE PER CALTRANS STANDARD PLANS
(68) INSTALL TYPE IV (L) OR (R) ARROWS PER CALTRANS STANDARD PLANS
(69) INSTALL TYPE VI(L) OR (R) ARROWS PER CALTRANS STANDARD PLANS
(73) INSTALL STRIPE PER CALTRANS STANDARD PLANS A20A DETAIL 11
(74) INSTALL STRIPE PER CALTRANS STANDARD PLANS A20B DETAIL 28
(77) INSTALL STRIPE PER CALTRANS STANDARD PLANS A20B DETAIL 32
(79) INSTALL STRIPE PER CALTRANS STANDARD PLANS A20D DETAIL 38B
(81) INSTALL STRIPE PER CALTRANS STANDARD PLANS A20B DETAIL 27B

REMOVAL NOTES:

[52] REMOVE CONFLICTING STRIPING AND RAISED PAVEMENT MARKERS BY WET SANDBLASTING OR GRINDING

NOTES:

1. SEE TF-100 FOR COMPLETE LIST OF CONSTRUCTION NOTES.
2. SEE TF-201.00 FOR PROJECT NOTES AND GENERAL NOTES.
3. FINAL DESIGN PER MUTCD (CA) AND CALTRANS STANDARDS.



REVISIONS				
		NOT FOR CONSTRUCTION		
REV.	DATE	DESCRIPTION	DES.	ENG.

HILL
Hill International
406 E. HUNTINGTON, SUITE 202
MONROVIA, CA 91016 - 3633

METRO GOLD LINE FOOTHILL EXTENSION CONSTRUCTION AUTHORITY
PHASE 2B ALIGNMENT DESIGN-BUILD PROJECT
REQUEST FOR PROPOSAL (RFP) C2002
MAY 30, 2018

ADVANCED CONCEPTUAL ENGINEERING
GLENDORA TO MONTCLAIR

SIGNING AND STRIPING
WHITE AVENUE PLAN

DRAWING NO: TF-230.00
REV: A
SHEET NO

PROPOSED PHASE DIAGRAM

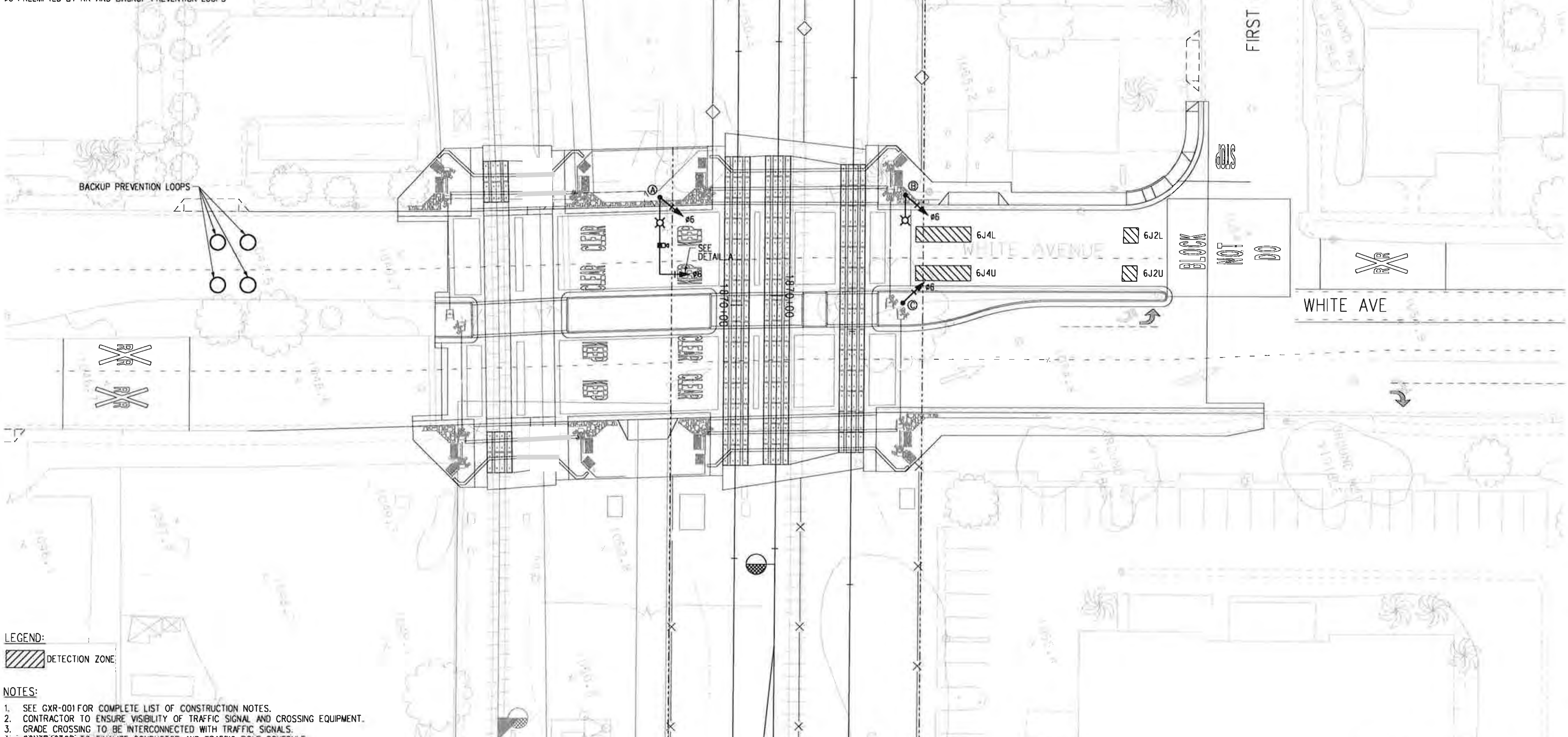
1	2	3	4
5	6	7	8

OPERATION
ø6 ON VEHICLE RECALL
ø6 PREEMPTED BY RR AND BACKUP PREVENTION LOOPS

DETAIL A

STANDARD NOTES AND ABBREVIATIONS:

- AB ABANDON. IF APPLIED TO CONDUIT REMOVE CONDUCTORS.
- BC INSTALL PULLBOX IN EXISTING CONDUIT RUN.
- CB INSTALL CONDUIT INTO EXISTING PULLBOX.
- CC JOIN NEW AND EXISTING CONDUIT.
- RR REMOVE AND REUSE EQUIPMENT.
- RS REMOVE AND SALVAGE EQUIPMENT.



LEGEND:

DETECTION ZONE

NOTES:

1. SEE GXR-001 FOR COMPLETE LIST OF CONSTRUCTION NOTES.
2. CONTRACTOR TO ENSURE VISIBILITY OF TRAFFIC SIGNAL AND CROSSING EQUIPMENT.
3. GRADE CROSSING TO BE INTERCONNECTED WITH TRAFFIC SIGNALS.
4. CONTRACTOR TO FINALIZE CONDUCTOR AND TRAFFIC POLE SCHEDULE.

20' 0 20' 40'
HORIZ. SCALE

REVISIONS

NOT FOR CONSTRUCTION

REV.	DATE	DESCRIPTION	DES.	ENG.

HILL
Hill International
406 E. HUNTINGTON, SUITE 202
MONROVIA, CA 91016 - 3533

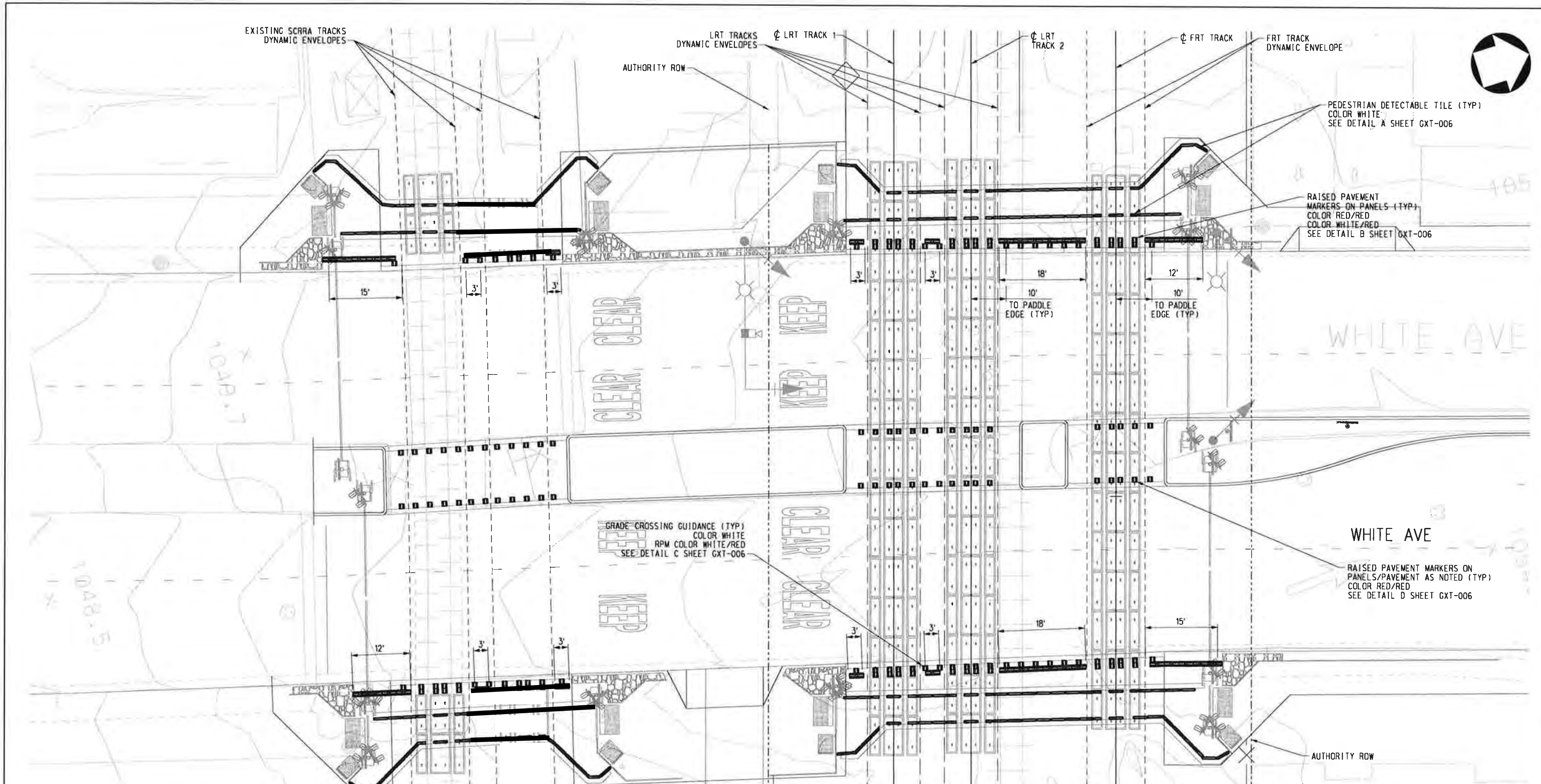
METRO GOLD LINE FOOTHILL EXTENSION CONSTRUCTION AUTHORITY
PHASE 2B ALIGNMENT DESIGN-BUILD PROJECT
REQUEST FOR PROPOSAL (RFP) C2002
MAY 30, 2018

ADVANCED CONCEPTUAL ENGINEERING
GLENDORA TO MONTCLAIR

TRAFFIC SIGNALS
WHITE AVENUE RAILROAD CROSSING

DRAWING NO TF-330.00 REV A
SHEET NO

5/16/2018 2:38:39 PM
FileName-> I:\Phase II\009 Phase 2B Documents\Engineering\Drawings\09-Traffic Signals\C2002_TF-330.00-White-RR_Crossing.dgn
USER: jhuang



NOTES:

1. METRO TO MAINTAIN RAISED PAVEMENT MARKERS AND GRADE CROSSING GUIDANCE
2. DRAWINGS ONLY FOR GRADE CROSSING GUIDANCE/ RAISED PAVEMENT MARKER
3. MINIMUM DISTANCE TO PANEL EDGE ON GRADE CROSSING GUIDANCE MUST BE 10' FROM TRACK CENTER LINE
4. SEE TF-200 SERIES FOR STRIPING

10' 0 10' 20'
HORIZ. SCALE

5/16/2018 2:41:25 PM

REVISIONS				
		NOT FOR CONSTRUCTION		
REV.	DATE	DESCRIPTION	DES.	ENG.

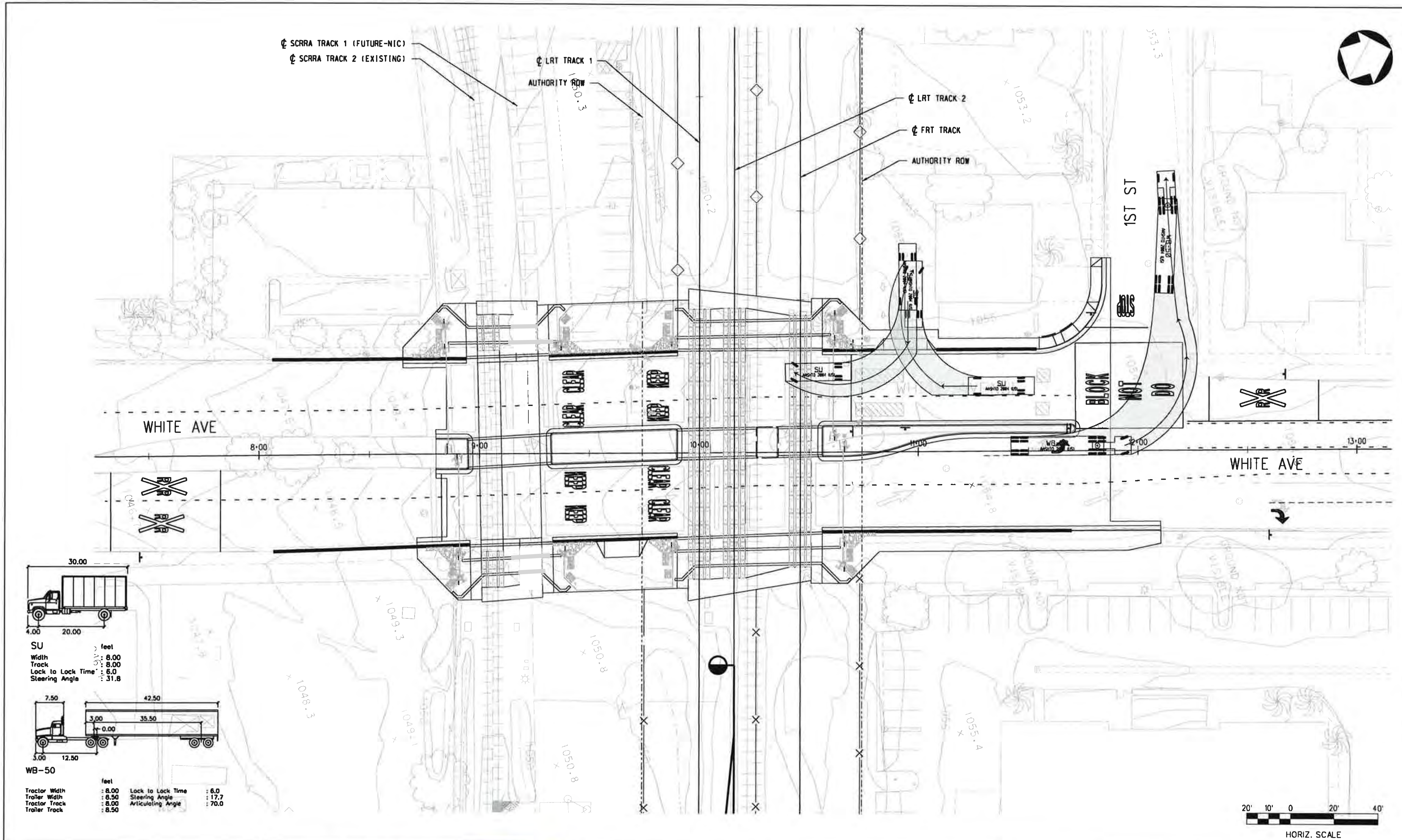
HILL
Hill International
406 E. HUNTINGTON, SUITE 202
MONROVIA, CA 91016 - 3633

METRO GOLD LINE FOOTHILL EXTENSION CONSTRUCTION AUTHORITY
PHASE 2B ALIGNMENT DESIGN-BUILD PROJECT
REQUEST FOR PROPOSAL (RFP) C2002
MAY 30, 2018

ADVANCED CONCEPTUAL ENGINEERING
GLENDORA TO MONTCLAIR

GRADE CROSSING GUIDANCE
WHITE AVENUE PLAN

DRAWING NO. GG-230
REV A
SHEET NO.



REV.	DATE	DESCRIPTION	DES.	ENG.
		NOT FOR CONSTRUCTION		

REVISIONS

HILL
Hill International
406 E. HUNTINGTON, SUITE 202
MONROVIA, CA 91016 - 3633

METRO GOLD LINE FOOTHILL EXTENSION CONSTRUCTION AUTHORITY
PHASE 2B ALIGNMENT DESIGN-BUILD PROJECT
REQUEST FOR PROPOSAL (RFP) C2002
MAY 30, 2018

ADVANCED CONCEPTUAL ENGINEERING
GLENDORA TO MONTCLAIR

VEHICLE TURNING MOVEMENT
WHITE AVENUE PLAN

DRAWING NO. VTM-030.00 | REV A
SHEET NO.

Exhibit E:

Memo: At Grade Safety Studies and La Verne Analysis

Memo

To: **City of La Verne Crossing Stakeholders**

From: **Metro Gold Line Construction Foothill Authority**

Date: **4/23/2018**

Subject: **White Avenue Grade Crossing Safety Analysis and Traffic Study**

Introduction

The Metro Gold Line Foothill Construction Authority (Authority) has conducted several traffic studies for the Metro Gold Line Foothill Extension Phase 2B Glendora to Montclair Project (Project) to demonstrate safe operations for the at-grade crossings. The purpose of this Memo is to summarize *the White Avenue Grade Crossing Safety Analysis* (Safety Analysis), conducted by CH2M Hill dated March 2018, and the *La Verne Traffic Simulation and Modeling Analysis Report* (La-Verne Study), which includes White Avenue, conducted by Jacobs Engineering dated April 18, 2018.

Background

Grade Crossing Safety Analysis

In coordination with appropriate regulatory authorities and project stakeholders to design safe, efficient grade crossings on the project, the Construction Authority agreed to perform detailed engineering/Grade Crossing Safety Analysis for six crossings shown in Table 1 below.

Table 1 –Grade Crossing Safety Analysis

City	Crossings	DOT #
La Verne	White Avenue	026187X
Pomona	Fulton Avenue	026186R
Claremont	Cambridge Avenue	026730Y
	Indian Hill Boulevard	026180A
	College Avenue	026179F
	Claremont Boulevard	026178Y

The six crossings in the Safety Analysis contain up to five tracks including a combination of one freight track, two SCRRA Metrolink commuter rail tracks and two proposed Light Rail Transit (LRT) tracks. The Safety Analysis references the future 2035 traffic counts (obtained from the 2013 FEIR), five-minute LRT headways, peak SCRRA Metrolink traffic (obtained from SCRRA 10-Year Strategic Plan 2015-2025), and one roundtrip freight train.

The purpose of the Grade Crossing Safety Analysis was to evaluate the LRT impacts for the at-grade crossings and determine if at-grade operations is safe. The analysis was informed by multiple standards, recommended practices, and guidance produced by the crossing stakeholders. The Los Angeles MTA Grade Crossing Policy for LRT was used as the overall methodology and improvements with specific factors, timings, and criteria taken from the SCRRA Design Criteria Manual.

The result of the Safety Analysis recommends grade separation for Indian Hill Boulevard, and safe at-grade operations for the remaining five crossings including:

- White Avenue
- Fulton Avenue
- Cambridge Avenue
- College Avenue
- Claremont Boulevard

La Verne Study

In addition to the above mention studies, the Authority conducted the *Multi-Location La Verne Traffic Simulation and Modeling Analysis Study (La Verne Study).* This La Verne Study included five crossings and five intersections shown in Table 2 below:

Table 2 – La Verne Study	
Location	**Notes**
D Street & Arrow Hwy	Intersection 1
E Street & Arrow Hwy	Intersection 2
White Ave & Arrow Hwy	Intersection 3
White Ave & Bonita Ave	Intersection 4
Fairplex Dr. & Puddingstone Dr.	Intersection 5
D Street	Crossing 1
E Street	Crossing 2
White Ave	Crossing 3
Arrow Hwy at SCRRA Tracks	Crossing 4
Fairplex Dr. at SCRRA Track	Crossing 5

The criteria for both Studies included future 2035 traffic counts, five-minute LRT headways, peak SCRRA Metrolink headway, and one freight train during PM peak hour, Additionally, the La Verne Study factored in the La Verne Old Town Specific Plan, Gold Line Parking and background growth as applicable.

White Avenue Safety Analysis and La Verne Study Comparison

The White Avenue Safety Analysis supports safe at-grade LRT operations, but does recommend that "Further detailed study of the operation and interaction of the White Ave. and Arrow Hwy intersection with both the Arrow Hwy grade crossing and the White Ave. crossing should be performed to determine if advanced pre-emption can provide the queue management required by the longer gate down times."

The La Verne Study was conducted to address the "Further detailed study" recommendation.

The scope and focus are different for the two independent studies, and the resulting parameters, such as vehicle queuing, are different among the separate studies for a various reasons.

- The White Ave. Safety Analysis uses detailed train traffic information to calculate the longest gate down time that coincides with the most vehicular traffic to evaluate queuing and other parameters.

- The La Verne Study includes additional potential traffic counts, such as the Old Town La Verne Specific Plan, and used VISSM models for standard peak hour.
- The La Verne study also accounts for traffic distribution through various intersections. The White Ave. Safety Analysis assumes the worst case that all predicted traffic will queue as a result of crossing activation

Conclusion

Although the parameters calculated in the two studies are different, both reports consistently support safe LRT at-grade operations with recommendations. For White Avenue specifically, La Verne Study recommends:

- A pre-signal (queue cutter) be included for southbound approach at White Ave crossing
- Provide a four-lane roadway to increase queue capacity on White Ave between 1st and 6th Streets

The abovementioned La Verne Study recommendations reduce existing queuing to further support safe at-grade operations. The Authority is coordinating with the City of La Verne to ensure the La Verne Study recommendations are implemented prior to LRT revenue service scheduled for 2027.

To further ensure White Avenue grade crossing safety, The Authority has also developed the *Memo: La Verne Traffic Signal Interconnection and Parameters* (dated April 2018), which summarizes the preemption and interconnection design for the adjacent five crossings and five intersections in the City of La Verne, including White Avenue. This Memo, among other studies, is included as part of the CPUC White Avenue Application.

Exhibit F:

White Avenue At-Grade Crossing Safety Report

GRADE CROSSING ANALYSIS REPORT

White Avenue

Prepared for

Metro Gold Line Foothill Extension Construction Authority

March 2018

1770 Iowa Ave
Suite 200
Riverside, CA 92507

Authorization

Prepared by:

Erin Trahan, PE

Michael Loehr

Reviewed by:

Sam Daleo, PE

Approved by:

Hany Haroun, PE

Revision	Purpose of Submittal	Date (MM/DD/YYYY)	Comments
0	Draft Submission	07/31/2017	
1	Draft Final Submission	12/19/2017	
2	Final Submission	3/30/2018	Incorporated Metrolink Comments

Executive Summary

The Analysis Team was charged with the analysis of six grade crossings in the Gold Line extension from Glendora to Montclair: White Ave., Fulton, Rd., Cambridge Ave., Indian Hill Blvd., College Ave., and Claremont Blvd. Each crossing has an individual Grade Crossing Analysis Report to provide a complete standalone study for each crossing. The reports are organized following the analysis process starting with the collection of data and ending with the study conclusions.

The two rail corridors within the project are the Gold Line Rail Corridor which includes freight (FRT) operations (the Pasadena Sub for FRA reporting purposes), and the joint FRT and Metrolink San Bernardino Line (the San Gabriel Sub for FRA reporting purposes). The two lines have differing milepost designations and directions, and merge at CP Cambridge, just west of Cambridge Ave. For the purposes of this report, all of the mile posts are reported based on the San Gabriel Sub numbering to provide a continuous milepost sequence through the study area. The stationing of the Gold Line is used to reference specific locations where detailed distances are required. The analysis graphs use the Gold Line stationing to provide a continuous baseline through the study area. The crossings all are active crossings in the Federal Railroad Administration's (FRA) Grade Crossing Inventory.

White Ave. Grade Crossing Data

The White Ave. grade crossing is located at milepost 30.33 of the San Gabriel Sub at Station 1870+00 of the Gold Line Foothill Extension. White Ave. is a four-lane median separated road that crosses one SCRRA Track and a single freight track. The crossing is currently two separate crossings in the FRA database. Both crossings are interconnected and activate as a single crossing. Figure ES-1 shows the existing conditions at the White Ave. crossing.

Figure ES-1 - Google Earth Aerial View of White Ave.

The proposed improvements contained in the Advanced Concept Plans are shown in Figure ES - 2.

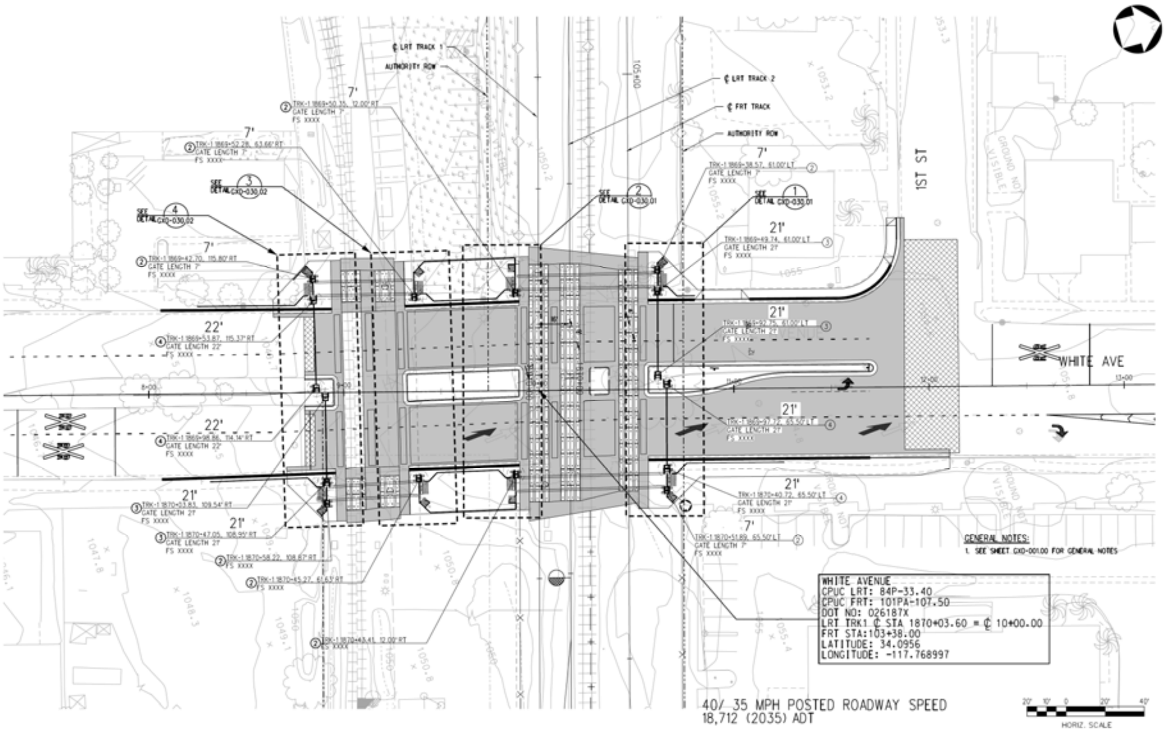


Figure ES-2 - White Ave. Improvements

Methodology

The Analysis Team was tasked to perform a series of analyses as part of the review. Our analysis was informed by multiple standards, recommended practices, and guidance produced by the stakeholders involved at the crossing. Ultimately, the regulations of the CPUC and FRA were considered the minimum acceptable standards since these two agencies have the regulatory authority. The MTA Grade Crossing Policy for Light Rail Transit is used for the overall methodology and improvements with specific factors, timings, and criteria taken from the SCRRA Design Criteria Manual.

The data collected, developed, or sourced for these analyses is described below:

a. Future Year 2035 train count data (LRT, FRT, SCRRA) – full day and peak hour.
b. Projected train lengths (LRT = 3-car, FRT = 14-car, SCRRA = 7-car)
c. The results from the following studies:
   - Metrolink San Bernardino Line Infrastructure Improvement Strategic Study
   - Metrolink 10-Year Strategic Plan 2015-2025
d. Future traffic (2035) ADT generally for the project's design year as provided in existing studies.
e. Known developments, including access to project's parking structures.

The MTA Grade Crossing Policy utilizes a series of calculations to determine the applicability of the crossing to be an at-grade crossing. The calculations focus on the highway and rail traffic flows through the crossing and ultimately determine the amount of time that the crossing gates are down and highway traffic queues.

Warning Time

To operate safely, the grade crossing warning devices must provide adequate warning time for both pedestrians and vehicles to move off (clear) the crossing before the train arrives at the crossing. The minimum warning time is regulated by the FRA and the CPUC at 20 seconds. Metrolink designs their crossings to provide an additional buffer time of ten seconds to the FRA and the CPUC minimum. Metrolink uses automated devices to provide this minimum warning time regardless of the approaching train's speed (constant warning time). MTA uses conventional circuitry with timers to provide the minimum warning time at maximum speed. For the six at-grade crossing analysis we have assumed constant warning time at all locations. In the majority of cases the difference between the two would be minimal.

The clearance time for the pedestrian and vehicles is based on the physical dimensions of the crossing according to a defined set of calculations. For pedestrians, the distance between the entrance and exit gates divided by the walking speed provides the pedestrian clearance time. For the vehicles, the minimum 20 seconds warning time includes the time needed for a vehicle to clear a 35-foot-wide crossing. For wider crossings, one second is added for every ten feet of width, or portion there of after 35-feet, with 28 seconds as the minimum warning time per MTA standards. The crossing analysis conservatively used a consistent 30 seconds minimum warning time for all trains and adjusted the minimum warning time upward to address any additional clearance time required. White Ave. is proposed to be 184' wide to the vehicle stop bars, so the total vehicle clearance time is 45 seconds.

The total warning time is the greater of the 1) calculated clearance time, or 2) the minimum warning time making the total warning time at White Ave. 45 seconds.

Gate Down Time

Gate Down Time, as used in this document, is the time from the start of gate flashers turning onto the time that the gates are rising and are in a mostly vertical position after the train has passed through the crossing, when pedestrian, bicycle and vehicular traffic can safely cross the railroad crossing.

At White Ave., the warning time does vary due to the deceleration and acceleration of the Gold Line trains after the crossing circuits have been activated, which affects the gate down time. To address this phenomenon, we performed a simplified train performance calculation where the train performance was based on a fixed rate of acceleration and/or deceleration. Figure ES - 3 depicts the speed distance curve of an outbound Gold Line train stopping at the La Verne Station and then continuing east. The solid line is the leading vehicle, while the dotted line represents the end of the last car in the train. The timings included in the calculations are labelled on the speed / distance graph.

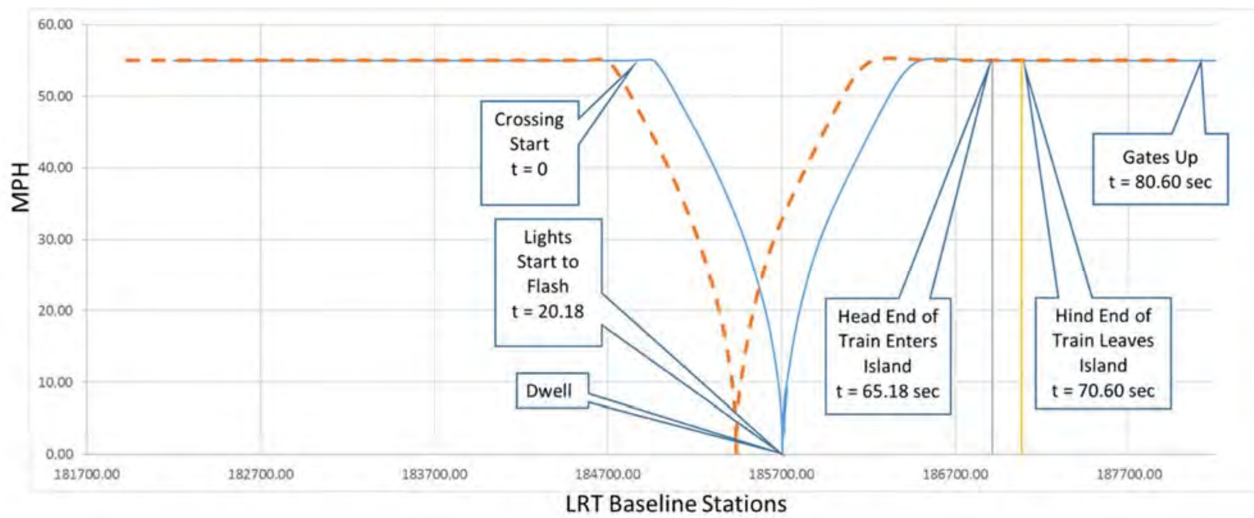


Figure ES-3 - Outbound LRT Speed/Distance Curve

Speed/Distance curves were calculated for each of the train types. The grade crossing warning devices were modelled on the curves by using the 40 mph crossing start for a through commuter train and a 55 mph LRT, adding five seconds for equipment activation, plus an offset due to the constant warning time to indicate when the lights start flashing. The time that the head end of the train enters the island circuit was calculated to include the minimum warning time plus the necessary additional clearance time and checked to verify that the gates are down at least 30 seconds before the head end of the train enters the crossing. The gate release was modelled by allowing ten seconds for the gates to raise after the train has left the island circuit.

The Speed/Distance curve provides the length of time that the gates are down at the crossing and includes all of the data needed for a single train

Multiple Trains at Crossings

Calculating the gate down time for a single train is instructional, but it does not reflect the reality of the operations in the real world. Trains can arrive at a crossing sequentially, simultaneously, or in random patterns. To determine how the trains would operate at the crossings, we took the proposed headways and schedules for the proposed Gold Line (five-minute headways at peak hours), the Metrolink headways discussed in SCRRA's 2025 plan, and the worst-case schedule of the freight train in the PM peak.

The multiple train gate down times are based on schedule assumptions and normal operating procedures. This analysis does not account for emergency or unplanned situations that occur as a part of regular train operations.

The schedules were converted into stringline graphs. A stringline is a time distance graph of a train schedule. The grade crossings were then located on the stringline graph along with typical locations where train arrivals would lead to longer gate down times.

Figure ES - 4 depicts the PM peak combined schedules for the Gold Line and the Metrolink trains. The freight train was scheduled to run in a slot between the outbound Metrolink Train during the Peak Hour, as worst-case scenario. The labelled ovals are typical schedule locations where multiple trains operated over the crossings at closely spaced times and indicate the various cases where the gate down times were calculated in order to determine the maximum time expected.

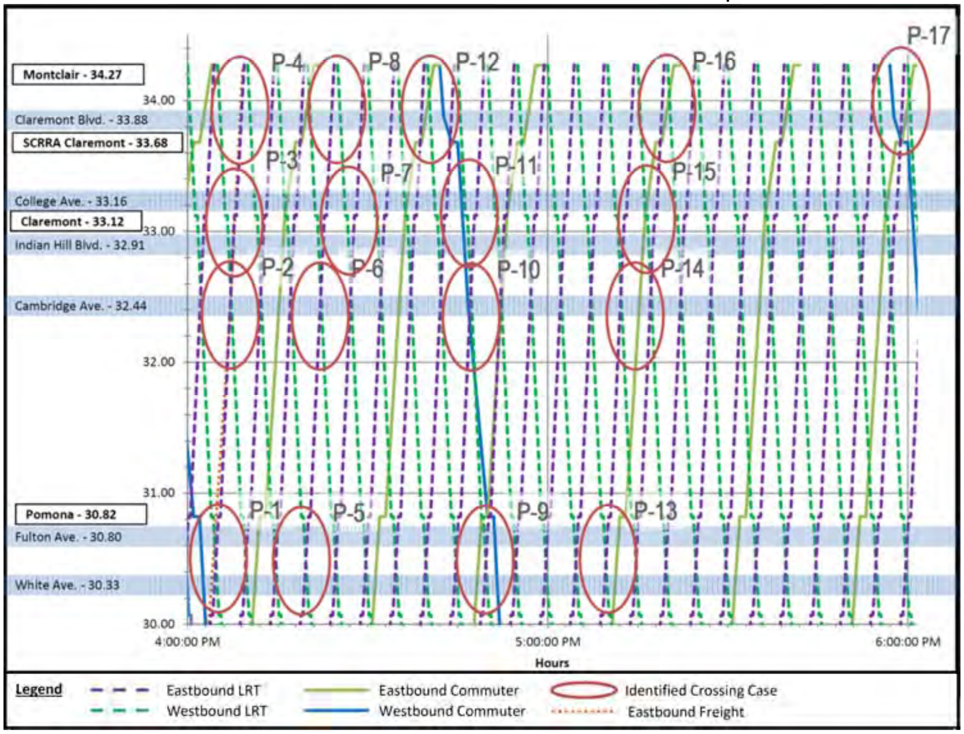


Figure ES-4 - PM Peak Stringlines with Study Cases

Table ES - 1 lists the PM Peak Hour cases at White Ave. and the corresponding schedule times.

Table ES – 1 PM Peak Study Cases

Case	Crossing	Train	Type	Direction	Schedule	Description
P1	White Ave.	1305	LRT	In	4:04:54 PM	3 Simultaneous Trains
	White Ave.	1252	LRT	Out	4:04:31 PM	
	White Ave.	FRT	FRT	Out	4:04:01 PM	
P5	White Ave.	1311	LRT	In	4:19:54 PM	2 Simultaneous Trains
	White Ave.	1258	LRT	Out	4:19:31 PM	
P9	White Ave.	331	CRT	In	4:51:34 PM	3 Simultaneous Trains and 1 Sequential Train
	White Ave.	1323	LRT	In	4:49:54 PM	
	White Ave.	1270	LRT	Out	4:49:31 PM	
	White Ave.	318	CRT	Out	4:48:15 PM	
P13	White Ave.	1331	LRT	In	5:09:54 PM	2 Simultaneous Trains and 1 Sequential Train
	White Ave.	1278	LRT	Out	5:09:31 PM	
	White Ave.	386	CRT	Out	5:11:15 PM	

To evaluate the gate down time, a train activation versus time graphic was created. Figure ES - 5 depicts the train activation vs. time graph and shows the timings of the grade crossing warning devices taken from the train speed/distance graphs.

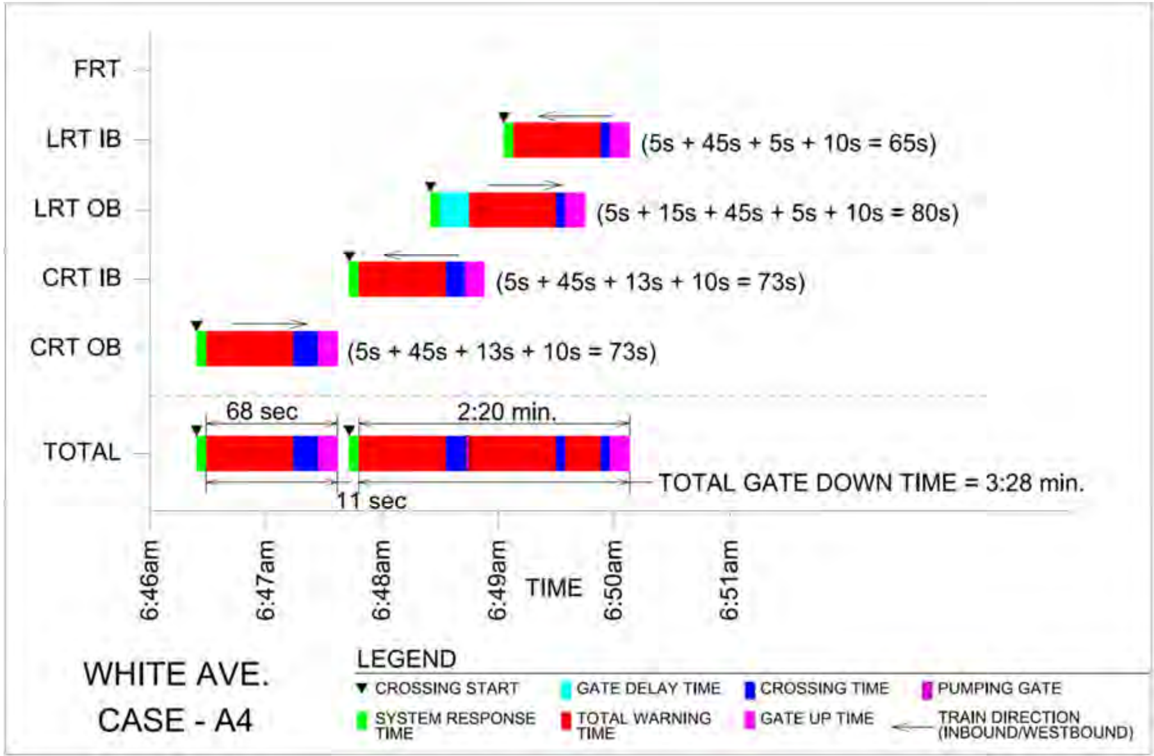


Figure ES – 5 Train Activation vs. Time Graph

The total line in the graphic shows what conditions are present at the warning device controller. There is a short gate up time in the middle of the activations in this study case. The three blue bars in the second group of activations indicate that the crossing island circuit is released between the trains, but the intervening red indicates that the approach circuit is occupied and would hold the gates in the down position until they are released after the third train. The total gate down time is then determined. For this case, it is three minutes, 28 seconds with a short 11 second gate rise in the middle.

FEIR Gate Down Time

The calculated gate down times in this study are longer than those in the FEIR. The reason behind this difference is that the FEIR analysis used single trains and did not account for the interaction of multiple trains and second train logic on the gate down time.

Traffic Queue Lengths

Once the gate down times were determined, the longest gate down time could be used to determine the traffic queueing conditions at the crossing. The MTA crossing policy looks at two queue conditions; the back up queue location from adjacent intersections (the influence queue), and the queue at the crossing itself. If the length of either queue individually is longer than the available storage space, additional pre-emption studies are required. Additionally, if the total length of the influence queue plus the crossing queue is longer than the storage space for that travel direction, additional pre-emption studies are required. The pre-emption is required to provide adequate space to clear the crossing upon the approach of the train, and to prevent queues that do not empty from one gate down cycle and subsequently using space required for the next gate cycle. The analysis of White Ave. did not indicate that any pre-emption was required.

Crossing Features

Pavement markings, signage, delineators, bollards, sidewalk widening and similar improvements are planned at this crossing. These improvements are consistent with the Gold Line Phase 2A crossing features employed for the extension in Azusa that were approved by CPUC and have had no FRA reportable incidents since their installation.

Conclusions

Based on the analysis of the data and the proposed improvements at the White Ave. crossing the designed warning devices will function as required by both the MTA and CPUC.

The Analysis Team has recommended minor adjustments to the crossing based on our review of the site and visibility of the crossing. Due to the distance between the two set of tracks, the crossing should be operated as a single crossing for vehicles. This includes additional illumination of the crossing be provided, and that a cantilever signal head be added to control the queue over the White Ave. crossing.

Further detailed study of the operation and interaction of the White Ave. and Arrow Hwy. intersection with both the Arrow Hwy. grade crossing and the White Ave. crossing should be performed to determine if advanced pre-emption can provide the queue management required by the longer gate down times.

Contents

Section Page

Tables

Section Page

Figures

Acronyms and Abbreviations

AADT – Annual Average Daily Traffic

ADA – Americans with Disability Act

ADAAG - ADA Accessibility Guidelines

ADT – Average Daily Traffic

ANSI – American National Standards Institute

APM – Accident Prediction Model

AREMA – American Railway Engineering and Maintenance of Way Association

BT - Buffer Time

CA MUTCD – California Manual of Uniform Traffic Control Devices

CP – Railroad Control Point

CPUC – California Public Utilities Commission

CRT – Commuter Rail Train

CT – Clearance Time

CWT – Constant Warning Time

DCM – Design Criteria Manual

DMU – Diesel Multiple Unit

DOT – Department of Transportation

Dynamic EGOM - Dynamic Exit Gate Operating Mode

ES – Engineering Standard

ETT – Employee Timetable

FEIR – Final Environmental Impact Report for Metro Gold Line Foothill Extension from Azusa to Montclair Project

FHWA - Federal Highway Administration

FRA Federal Railroad Administration

FRT – Freight Rail Train

GO 75 – CPUC General Order 75

HSR – High Speed Rail

IESNA - Illuminating Engineering Society of North America

LABSL - City of Los Angeles Department of Public Works Bureau of Street Lighting Design

LOS – Level of Service

LRT – Light Rail Transit

LRV – Light Rail Vehicle

MAS – Maximum Authorized Speed

Metrolink - Southern California Regional Rail Authority

MP – Milepost

MT – Main Track

MTA/Metro – Los Angeles County Metropolitan Transportation Authority

MUTCD - Manual of Uniform Traffic Control Devices

MWT – Minimum Warning Time

NB – Northbound

NCHRP - National Cooperative Highway Research Program

PF – Peaking Factor

PTC – Positive Train Control

RP – Recommended Practice

SB - Southbound

SCRRA - Southern California Regional Rail Authority

TWT – Total Warning Time

USDOT – United States Department of Transportation

WT – Warning Time

WBAPS – Web Based Accident Prediction Systems

SECTION 1

Project Overview

1.1 Overview of Grade Crossing Engineering Review

The analysis will review six proposed at-grade crossings on the proposed Foothill Gold Line between Glendora and Montclair as depicted in Figure 1-1. The crossings in the study are generally where two existing commuter rail tracks and two proposed light rail tracks occupy the same crossing area. The purpose of the analysis is to determine if it is appropriate to keep these crossings at-grade or to grade separate the future light rail tracks. The conceptual design of the grade crossing warning equipment is generally considered to be sufficient. The primary objectives of this analysis are to determine if the four tracks (five tracks at Fulton and White) at the proposed at-grade crossings can be safely navigated by pedestrians and motor vehicles along with the local traffic impacts that result from the added rail service. Appendix A provides the analysis team biographies.

Figure 1-1. Gold Line Extension Project Map

The two rail corridors within the project are the Gold Line Rail Corridor which includes freight (FRT) operations (the Pasadena Sub for FRA reporting purposes), and the joint FRT and Metrolink San Bernardino Line (the San Gabriel Sub for FRA reporting purposes) The two lines have differing milepost designations and directions, and merge at CP Cambridge, just west of Cambridge Ave. For the purposes of this report, all of the mile posts are reported based on the San Gabriel Sub numbering to provide a continuous milepost sequence through the study area. The stationing of the Gold Line is used to reference specific locations where detailed distances are required. The analysis graphs use the Gold Line stationing to provide a continuous baseline through the study area.

The crossings all are active crossings in the Federal Railroad Administration's (FRA) Grade Crossing Inventory. Table 1-1 contains the DOT Crossing Numbers. We have downloaded the current inventory forms and have included them in Appendix C.

Table 1-1 DOT Grade Crossing Numbers

City	Crossing Name	Pasadena Sub Crossing DOT #	San Gabriel Sub Crossing DOT #
La Verne	White Avenue*	026187X	747330W
Pomona	Fulton Road*	026186R	747331D
Claremont	Cambridge Avenue	n/a	026730Y
	Indian Hill Boulevard	n/a	026180A
	College Avenue	n/a	026179F
	Claremont Boulevard	n/a	026178Y
* Indicates crossing over both Pasadena and San Gabriel sub divisions.			

1.2 Key Data Inputs

The Review Team was tasked to perform a series of analyses as part of the review. The data collected, developed, or sourced for these analyses is described below:

a. Future Year 2035 train count data (LRT, FRT, SCRRA) – full day and peak hour.
b. Known train lengths (LRT = 3-car, FRT = 14-car, SCRRA 7-car)
c. The results from the following studies:
   - Metrolink San Bernardino Line Infrastructure Improvement Strategic Study
   - Metrolink 10-Year Strategic Plan 2015-2025
d. Future traffic (2035) ADT generally for the project's design year as provided in existing studies.
e. Known developments, including access to project's parking structures.

1.3 Report Organization

Each crossing has an individual Grade Crossing Analysis Report to provide a complete standalone study for each crossing. The reports are organized following the analysis process starting with the collection of data and ending with the study conclusions.

SECTION 2

White Ave. Grade Crossing Data

2.1 Physical Layout

The White Ave. grade crossing is located at milepost 30.33 of the San Gabriel Sub at Station 1870+00 of the Gold Line Foothill Extension. Figure 2-1 shows the existing conditions at the White Ave. crossing.

The crossing has a skew angle of 90 degrees. The north and south approaches to White Ave. are tangent. Gates and flashing light signals are provided on both the northbound and southbound approaches to each of the two crossings for warning.

Sidewalks are present in all four quadrants; however, on the east side of the crossing the sidewalk does not extend through the railroad Right of Way.

Figure 2-1 Google Earth Aerial View of White Ave.

Figure 2-2 depicts the configuration proposed in the Advanced Conceptual Engineering drawings dated June 15, 2017.

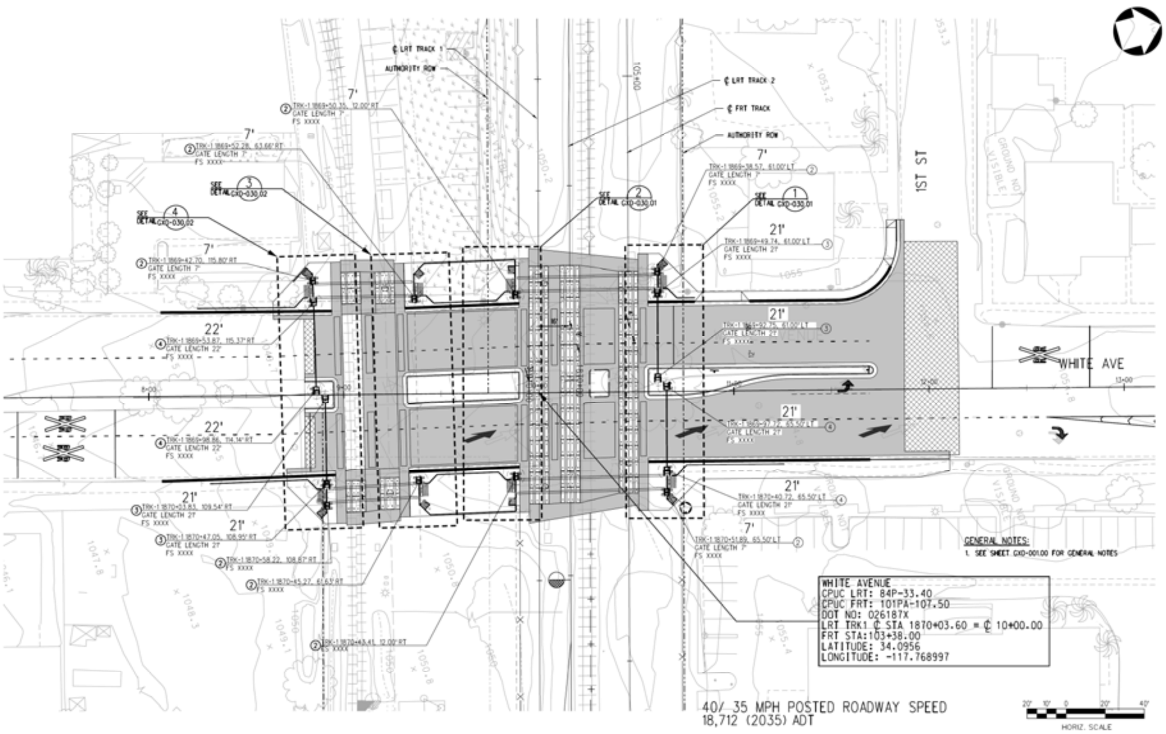


Figure 2-2 Proposed White Ave.

2.1.1 Geometric configuration of White Ave.

Tables 2-1 and 2-2 present the key dimensions and data for both the existing and proposed crossing.

Table 2-1 White Ave. Tracks

	Trk-1	Centerline Distance	Trk-2	Centerline Distance	Trk-3	Centerline Distance	Trk-4	Centerline Distance	Trk-5
Existing	FRT 1	115'	SCRRA MT1	---	---	---	---	---	---
Proposed	FRT 1	30.00'	LRT 2	16.00'	LRT 1	76.7' to 78.6'	SCRRA MT2	17.20'	SCRRA MT1
Note: Tracks listed and numbered from North to South.									

Table 2-2 White Ave. Roadway

	Sidewalk	# Lanes	Total Pavement Width	Median	Width	# Lanes	Total Pavement Width	Sidewalk	Total Xing (Length of Track)
Exist. North of Tracks	4.55'	2	33.60'	yes	5.60'	2	43.10'	5.60'	92.45'
Between Xings	5.65'	2	34.90'	yes	14.33'	4	34.67'	n/a	89.55'
Exist. South of Tracks	5.0'	2	35.25'	yes	14.10'	4	35.40'	5.14'	94.89'
Prop. North of Tracks	5.0'	2	34.0'	yes	14.0'	2	34.0'	9.0'	96.0'
Between Xings	23.0'	2	35.0'	yes	14.0'	4	35.0'	23.0'	130.0'
Prop. South of Tracks	15.80'	2	35.20'	yes	13.90'	4	35.70'	5.50'	106.10'
Note: Lanes listed and numbered from West to East and measured perpendicularly to roadway centerline.									

2.1.2 Visibility of Warning Devices

The approaches to the crossing are both tangent with generally good visibility to the warning devices. Several trees in the median may require trimming to improve the visibility.

2.1.3 Nighttime Illumination

The desirable nighttime illumination levels required are not specifically enumerated in the MTA or SCRRA crossing manuals, however the California MUTCD references ANSI/IESNA RP-8-14 Roadway Lighting. The most detailed local practice is contained in the City of Los Angeles Department of Public Works Bureau of Street Lighting Design (LABSL) Standards and Guidelines. The LABSL guidelines go on to refer to the requirements of ANSI/IESNA RP-8-14 Roadway Lighting. The LABSL modifies RP-8 for grade crossings as follows;

> *Lighting on roadway of track crossing area, starting 30 meters before the crossing and ending 30 meters beyond the crossing, should be 1.5 times the roadway illuminance value for a continuous lit roadway, but never less than illuminance of .9 footcandles. This requirement shall extend to full length of roadways and sidewalks along non-separated/unguarded railroad tracks. Uniformity and veiling luminance criteria shall be in accordance with Table D1.*

Based on the LABSL and RP-8 criteria the analysis team observed that the existing crossing area does not comply for both illumination levels and uniformity ratios. The observed illumination levels varied dramatically across the crossings and into the 100-feet approach areas with readings as low as 0.1 footcandles.

2.1.4 Distance between the crossing and existing traffic signals

Table 2-3 presents the distances between the crossing and adjacent existing traffic signals.

Table 2-3 White Ave. Adjacent Existing Traffic Signals

Intersection	Traffic Control	Distance	Notes
North - W. Bonita Ave	Signalized	1240’	Gate to near side stop bar

South - Arrow Hwy	Signalized	490'	Gate to near side stop bar

2.2 Train Movements

2.2.1 General

The northernmost existing track through the White Ave. crossing is on SCRRA's Pasadena Sub. The southernmost existing track White Ave. crossing is on SCRRA's San Gabriel Sub.

Currently, only Metrolink trains and local freight trains operate through the White Ave. crossing. There is a nearby freight siding on the west side of the crossing on the San Gabriel Sub. where switching movements will require the local freight to occupy or make multiple freight movements across the crossing. The freight siding is lightly used, generally during non-peak hours, and its effects are limited. There are no adjacent stations stops that affect the speed of the trains over White Ave. The La Verne station is far enough west that the LRT trains will be at full speed before reaching White Ave. The curve to the west of White Ave. on the San Gabriel Sub. has a permanent speed restriction of 40 mph.

2.2.2 Existing Track Chart and Time Tables

The SCRRA Metrolink Timetable No. 11 is the current employee timetable (ETT) in effect. ETT No. 11 covers both the Pasadena and San Gabriel Subs. Figure 2-3 is adapted from ETT No. 11 to show the Pasadena Sub. Table 2-4 presents the Maximum Authorized Speed (MAS) on the Pasadena Sub.

←WESTWARD | EASTWARD→

SIDING LENGTH	TRACK DIAGRAM	Radio Channel 087-087 **PASADENA SUBDIVISION**	METHOD OF OP.	RULE 4.3	MILEPOST
		CP CAMBRIDGE (Jct. San Gabriel Sub)	CTC	J	32.3
		1.08	TWC ABS		**105.64
3079		**NORTH POMONA**			**106.7**
		1.2			
		LA VERNE			**107.9**
		2.3			
		SAN DIMAS			**110.2**
		4.2			
2820		**GLENDORA**			**114.4**
		2.5			
		AZUSA			**116.9**
		1.3			
		IRWINDALE			**118.2**
		1.1	*6.28		*118.4
		END OF TRACK			**119.3**
		(13.66 miles)			

*Rule 6.28 milepost limits **milepost end of subdivision

Figure 2-3 Pasadena Sub Track Chart

Table 2-4 Pasadena Sub. MAS

ITEM 1. MAXIMUM AUTHORIZED SPEED FOR TRAINS

MP LOCATION BETWEEN	Psgr.	Frt.
105.64 and 118.4	40	40
118.4 and 119.3	10	10

ITEM 2. OTHER MAXIMUM SPEEDS

MP LOCATION BETWEEN	Psgr.	Frt.
THROUGH SIDINGS AND TURNOUTS:		
NORTH POMONA	10	10
GLENDORA	10	10
ALL OTHER TRACKS, CROSSOVERS AND TURNOUTS	10	10

Figure 2-4 is adapted from ETT No. 11 to show the San Gabriel Sub.

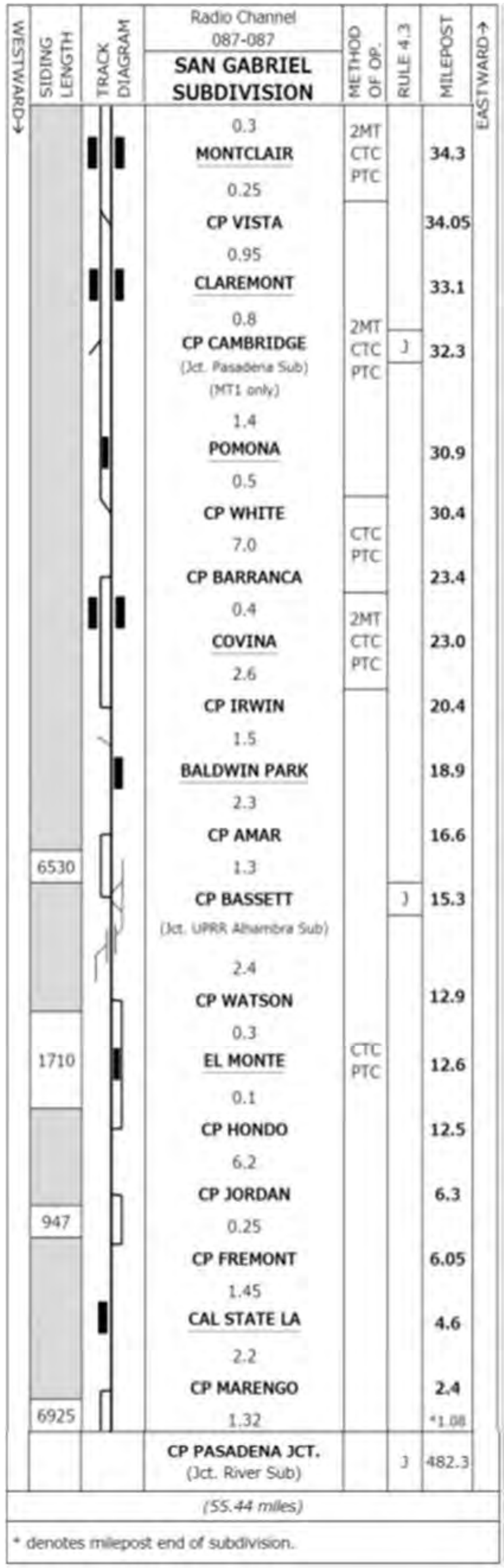


Figure 2-4 San Gabriel Sub. Track Chart

Table 2-5 was adapted from the ETT No. 11, and presents the Maximum Authorized Speed (MAS) on the San Gabriel Sub. through the study area.

Table 2-5 San Gabriel Sub. MAS

ITEM 1. MAXIMUM AUTHORIZED SPEED FOR TRAINS

BETWEEN CP VERNON AND CP PASADENA JCT.						
MP LOCATION BETWEEN:	MAIN		MT 1		MT 2	
	P	F	P	F	P	F
57.66 and 56.43			25	10	25	10
56.43 and 56.25**			25	10	25	10
56.25 and 55.27**	45#	15				
55.27 and 55.07	45#*2	30				
55.07 and 47.54	79	55				
47.54 and 44.67			79	55	79	55
44.67 and 34.6	79	55				
34.6 and 32.45			79	55	79	55
32.45 and 31.12			79#	30	79#	30
31.12 and 30.36			40#*1	30	40#*1	30
30.36 and 29.85	40 *2	30				
* Protected by IIATS						
*1 – Protected by IIATS Westward only						
*2 – Protected by IIATS Eastward only						
** All equipment operated between MP 56.4 and MP 55.3 must have operative air brakes, train line connected and cut into all cars.						
#: Refer to System Special Instructions Section S - Speed for Equipment and Wind Restrictions.						

ITEM 2. OTHER MAXIMUM SPEEDS

LOCATION	P	F
CP CAMBRIDGE: THROUGH TURNOUT	30	20
CP WHITE: THROUGH TURNOUT	40	30

CP White is located just east of the crossing and there is a speed change point under the current operations east of CP White at MP 31.12. Eastbound (outbound) trains on the San Gabriel Sub have speed restrictions depending on the type of train. Eastbound San Gabriel Sub. passenger trains are limited to 40 mph and freight trains are limited to 30 mph.

Metrolink currently has plans to improve the speeds on the San Gabriel Sub and will be adding a second track through the White Ave. crossing.

Table 2-6 lists the train movement data for White Ave.

Table 2-6 White Ave. Train Movements

	Freight FRT		**Metrolink CRT**		**Gold Line LRT**	
	Existing	**2035**	**Existing**	**2035**[1]	**Existing**[5]	**2035**[2]
Max Authorized Speed	30/40	40	40	40	55	55
Hours of Operation	11:00 to 18:00	11:00 to 18:00	04:00 to 23:00	04:00 to 23:00	04:00 to 01:00	03:00 to 01:00
Off Peak Headways	n/a	n/a	45-60	45-60	14 to 40	7 to 20
Peak Headways	n/a	n/a	20-30	20-30	7	5
Single Train Gate Down Time[4]	1:14	1:14	1:08[6]	1:08[3]	n/a	1:00

Notes:

1 - Assumed Schedule based on Planned Headways and Service Levels

2 – Assumed Schedule based on Planned Headways

3 – Worst case based on curve speed restriction

4 – Assumed 14-car freight train (average; 20 car max)

5 – Existing Gold Line reflects current service on Phase 2A

6 – Existing Metrolink Single Train Gate Down Time was calculated using a TPC curve based on current schedule, timetable and vehicle characteristics.

SECTION 3

Analysis

3.1 General

Our hazard analysis was informed by multiple standards, recommended practices, and guidance produced by the stakeholders involved at the crossing. Ultimately, the regulations of the CPUC and FRA were considered the minimum acceptable standards since these two agencies have the regulatory authority. The MTA Grade Crossing Policy for Light Rail Transit is used for the overall methodology and improvements with specific factors, timings, and criteria taken from the SCRRA Design Criteria Manual.

The factors taken from the SCRRA Design Criteria Manual include the use of the 30 second warning time, and variable walking speeds used to determine pedestrian clearance time. Deviations from the SCRRA Design Criteria Manual include the pedestrian gate placement and the use of the MTA Grade Crossing Policy.

The Analysis Team used the following criteria to determine where grade separations should be considered by the Design Team. If these parameters are met, grade separation is not recommended:

a. The crossing falls within the "at grade operation should be feasible" section of the MTA Grade Separation nomograph
b. The queues empty between activations
c. The per vehicle delay results in a level of service (LOS) D or greater
d. The accidents predicted are lower than existing

3.1.1 Grade Separation Criteria

3.1.1.1 MTA Policy on Grade Crossing for Light Rail Transit

The original FEIR used the MTA Policy on Grade Crossing for Light Rail Transit to make the initial determinations. The nomograph contained in the MTA policy is based on a similar nomograph created by the Institute of Transportation Engineers, but it reduces the threshold criteria, making the MTA policy more conservative. Figure 3-1 presents the data for the White Ave. crossing. The indication from the nomograph is “possible at grade operation – engineering study required to define at-grade operation”.

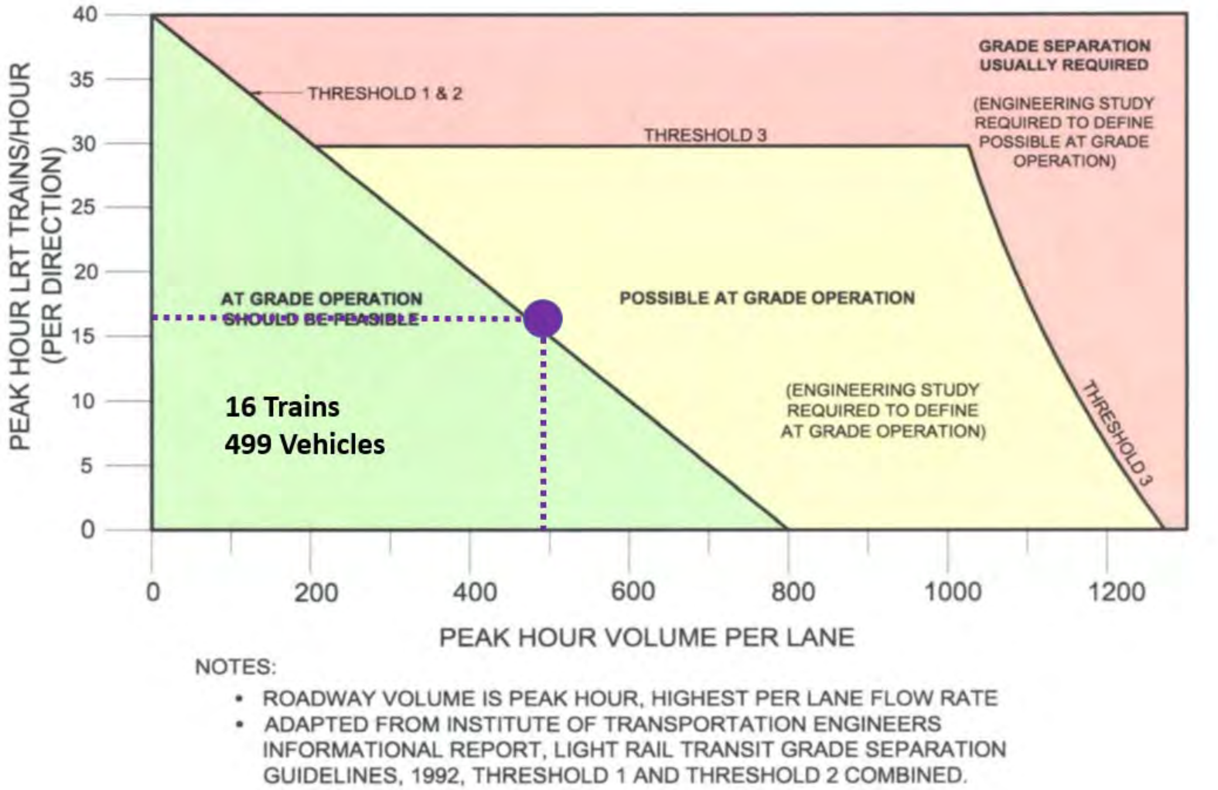


Figure 3-1 MTA Grade Separation Nomograph

3.1.1.2 FHWA Grade Crossing Handbook

The FHWA Grade Crossing Handbook contains a series of criteria that should be considered when deciding when to grade separate. The consideration chart has two sections with similar considerations, the major difference being that the first section has no economic component. Because this report is focused on safety and operations, the economic considerations will not be reviewed. The section applicable to this report states that highway-rail grade crossings should be considered for grade separation or otherwise eliminated across the railroad right of way whenever one or more of the conditions listed in Table 3-1 exist.

Table 3-1 FHWA Grade Separation Considerations

Consideration	White Ave. Data	Threshold Met
A.Non-Economic Related Criteria		
i. The highway is a part of the designated Interstate Highway System.	No	No
ii. The highway is otherwise designed to have full controlled access.	No	No
iii. The posted highway speed equals or exceeds 113 km/hr. (70 mph).	35 mph	No
iv. AADT exceeds 100,000 in urban areas or 50,000 in rural areas.	18,712 (2035)	No
v. Maximum authorized train speed exceeds 177 km/hr. (110 mph).	79 mph	No
vi. An average of 150 or more trains per day or 300 million gross tons per year.	420 trains/day	Yes
vii. An average of 75 or more passenger trains per day in urban areas or 30 or more passenger trains per day in rural areas.	Urban, 418 trains	Yes
viii. Crossing exposure (the product of the number of trains per day and AADT) exceeds 1 million in urban areas or 250,000 in rural areas; or	7,859,040	Yes
ix. Passenger train crossing exposure (the product of the number of passenger trains per day and AADT) exceeds 800,000 in urban areas or 200,000 in rural areas.	7,821,616	Yes
x. The expected accident frequency for active devices with gates, as calculated by the U.S. DOT Accident Prediction Formula including five-year accident history, exceeds 0.5.	0.025	No
xi. Vehicle delay exceeds 40 vehicle hours per day.	~136 hrs[1]	Yes

[1] Based on average delay per vehicle x AADT

In addition to the items in the preceding table, the FHWA guidance includes an LRT specific data table reproduced here as Table 3-2;

Table 3-2 FHWA LRT Specific Grade Separation Considerations

LRT Grade Separation	
Trains per hour	Peak-hour volume (vehicles per lane)
40	900
30	1000
20	1100
10	1180
5	1200

A review of the considerations that White Ave. satisfies shows that they are mostly related to the volume of trains over the crossing. Comparing those items to the grade separation table is interesting, because, although White Ave. meets certain considerations, it does not meet the FHWA LRT table since there are only 16 trains in the peak hour (per direction) and the Peak Hour Lane volume of 499 automobiles per lane is lower than the traffic levels on the chart.

The FHWA grade crossing handbook provides evaluation criteria to determine if a grade separation should be considered. Chapter 5, Section A states the evaluation criteria "is intended to provide guidance to assist engineers in the selection of traffic control devices or other measures at highway-rail grade crossings. It is not to be interpreted as policy or standards and is not mandatory." Once the crossing is noted for grade separation consideration, further engineering analysis is required to finalize the recommendation. As such, the FHWA evaluation was not used as criteria for determining the need for the grade separation.

Perhaps the most important consideration is the accident prediction levels. The accident prediction derivation is discussed later in this report, however the predicted accidents for the crossing are only 20% of the 0.5 threshold in the consideration, indicating that the level of warning devices proposed results in a very safe crossing.

This outcome is consistent with the outcome of applying the MTA Policy.

3.1.1.3 CPUC Section 190 Criteria

The CPUC Section 190 Criteria were reviewed to determine its applicability to these crossings. The CPUC criteria are established as a financial ranking methodology, not a decision tool to determine if a grade separation is required. The numerator contains technical parameters, but the score of those parameters is then divided by the percentage of state funding. This means that, mathematically, a crossing whose technical rating was lower than another, could receive a higher ranking if it used adequate local funds. The CPUC Section 190 Criteria was removed from consideration in this evaluation.

3.2 Gate Down Time

Gate Down Time, as used in this document, is the time from the start of gate flashers turning on to the time that the gates are rising and are in a mostly vertical position after the train has passed through the crossing, when pedestrian, bicycle and vehicular traffic can safely cross the railroad crossing.

Gate down Crossing Warning Times could be viewed as a simple exercise of calculating distance and time based on speed, but would understate the actual times that are likely to be experienced by the roadway users. The Analysis Team realized that the longer gate down times would result from several factors. The trains operate in a complex environment of civil speed limits based on track configurations, and their required acceleration into and out of scheduled station stops. Furthermore, the operating schedules of the three train types could result in multiple trains operating through the crossing at nearly the same time causing the gate down times to be longer than those for single trains.

More formally the gate down time includes;

- Minimum Warning Time (MWT)
- Buffer Time (BT)
- Clearance Time (CT) – additional above base included in MWT
- Island Time - The time it takes the train to traverse the island circuit through the crossing from head end to hind end of the train.
- Release Time – The time for the circuit to detect that the train is off of the island circuit and the time for the gates to raise.

Metrolink sets the Warning Time (WT) at 30 seconds to accommodate accelerating trains. WT = MWT + BT + CT (if needed). The Gold Line uses the CPUC minimum warning time of 20 seconds and adds the required clearance times with a minimum of 28 seconds of warning time.

3.2.1 Clearance Times

Clearance times for vehicles at grade crossings are well defined, and the specific guidance used in California is based on the Minimum Warning Time (MWT) of 20 seconds, which allows any vehicle to cross a distance of 35 feet, a typical width for a two-track crossing. The SCRRA Grade Crossing Guidelines, MUTCD and AREMA address cases for crossings that are wider either from having more tracks, greater track centers, or a combination of both, by adding an additional second of clearance time for every additional 10 feet of width or portion thereof, with minimum warning time of 28 seconds for LRT movements and 35 seconds for the freight movements. The crossing analysis consistently uses 30 seconds minimum warning time for all trains and adjusted the minimum warning time upward to address any additional clearance time required.

There is not definitive guidance or regulation on determining the clearance time for pedestrians. The Analysis Team researched applicable guidelines for pedestrian walking speed at highway-rail grade crossings as shown in Appendix F. A walking speed of 3.5 feet per second (FPS) was selected based on the CPUC, CAMUTCD and SCRRA published guidelines. The distance used to calculate pedestrian clearance time was from the “wait here” marker to the other “wait here” marker on the outside of the pedestrian crossing gates. This is a more conservative distance for calculations and prevents persons from being at 8' 6" from track centerline, but not outside of pedestrian gates.

Table 3-3 White Ave. Clearance Times

	Location	**Distance**	**Walking Speed**	**Total Time to Clear Crossing**
Pedestrian.	East – LRT & FRT	81'	3.5 f/s	24 s
	West – LRT & FRT	76'	3.5 f/s	22 s
	East – CRT	51’	3.5 f/s	16 s
	West – CRT	55’	3.5 f/s	16 s
Vehicles	East	183’	n/a	45 s
	West	184’	n/a	45 s
			Required CT	**45 s**

The vehicular CT is the minimum clearance time for the entire width of the two existing crossings. The crossing will continue to operate as a single crossing to avoid trapping long design vehicles between the tracks. The pedestrian crossing time is based on having refuge areas that reduce the distance. The vehicle CT is greater than the pedestrian CT at a pedestrian walking speed of 3.5 fps.

3.2.2 Constant Warning Time

Constant Warning Time (CWT) equipment is used at crossings to standardize the warning times experience by the roadway users, regardless of train operations that have trains operating at different speeds. This situation exists most often when faster passenger trains share the tracks with slower freight trains, but can exist when local passenger trains are making station stops while express trains continue past the stations.

The CWT equipment detects the speed and location of an approaching train, and based on those criteria, delays (offsets) the activation of the crossing until the train is going fast enough and is close enough to the crossing to meet the criteria for starting the warning time. When trains are decelerating, the CWT equipment does an activation that results in a conservative (longer) warning time. If the train is accelerating, the CWT activates the crossing at the proper time for the speed and distance at the time it passes the crossing start, however the train continues to accelerate and arrives at the crossing slightly earlier than the WT but later than the MWT. This is a known condition, and various agencies add different amounts of BT to the MWT to ensure that the MWT is never violated.

Metrolink adds 10 seconds of BT to the 20 second MWT to set the WT at a minimum of 30 seconds.

At White Ave., the freight and Metrolink train speeds are limited to 40 mph by the maximum speed allowed on the Pasadena Sub., and by a permanent speed restriction on the San Gabriel Sub. due to the curve just west of the White Ave. crossing. The Gold Line trains are on their own tracks and have no speed restriction that would lead to accelerating or decelerating through the crossing.

The location of CP White is within the crossing start circuits for westward trains. To accommodate this, the CWT devices at White Ave. are supplemented with remote units in CP White that handle the detection and warning time functions for eastward trains and provide input to the White Ave. CWT device. This may be a temporary condition until SCRRA installs the second track through White Ave. SCRRA may eliminate CP White or may keep the interlocking and make the single turnout a crossover to facilitate the freight switching operations.

3.2.3 Single Train Gate Down Time

To develop the single train down times, the Analysis Team modelled theoretical performance characteristics of each train type at each crossing. The modelling included acceleration characteristics of the train, the proposed physical dimensions of the new crossings, adjacent station stops, and the required clearance times for vehicles and pedestrians.

3.2.3.1 Freight Train

The calculations for the freight train at White Ave. were based on a consist length of 970 feet. The train consist length was developed based on various anecdotal accounts about the typical consist and YouTube videos of the freight train operating in the area. The theoretical consist has four 85’ locomotives, six 65’ covered hoppers, and four 60’ tank cars. The maximum consist length is 22 cars, but 14 is used as an average consist. The acceleration and deceleration characteristics of the freight train was assumed to be 1 mphps.

Speed/Distance (S/D) curves for both the eastward and westward trains were developed. Figure 3-2 depicts the eastward S/D curve at White Ave. for the freight train. The crossing start location was set for 40 mph on the Pasadena Sub. The start location includes a 5 second equipment response time. For a freight train operating on the Pasadena sub, the lights are flashing from 5.0 seconds to 79.44 seconds for a total single train gate down time of 74 seconds. The solid line is the leading locomotive, while the dotted line represents the end of the last car in the train. The timings included in the calculations are labelled on the speed / distance graph.

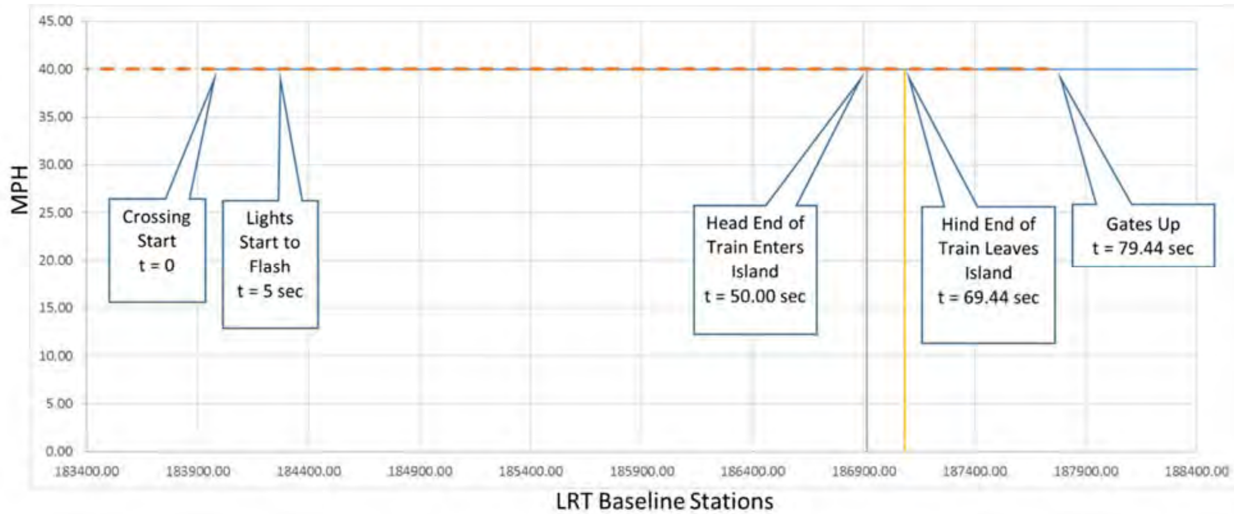


Figure 3-2 White Ave. Eastward Freight

Figure 3-3 depicts the westward S/D curve. The crossing start location was set for 40 mph with a 5 second equipment response time. For a freight train operating on the San Gabriel Sub, the remote CWT equipment detects a 40-mph train approaching and activates the crossing. The lights are flashing from 5.00 seconds to 79.44 seconds for a total single train gate down time of 74 seconds.

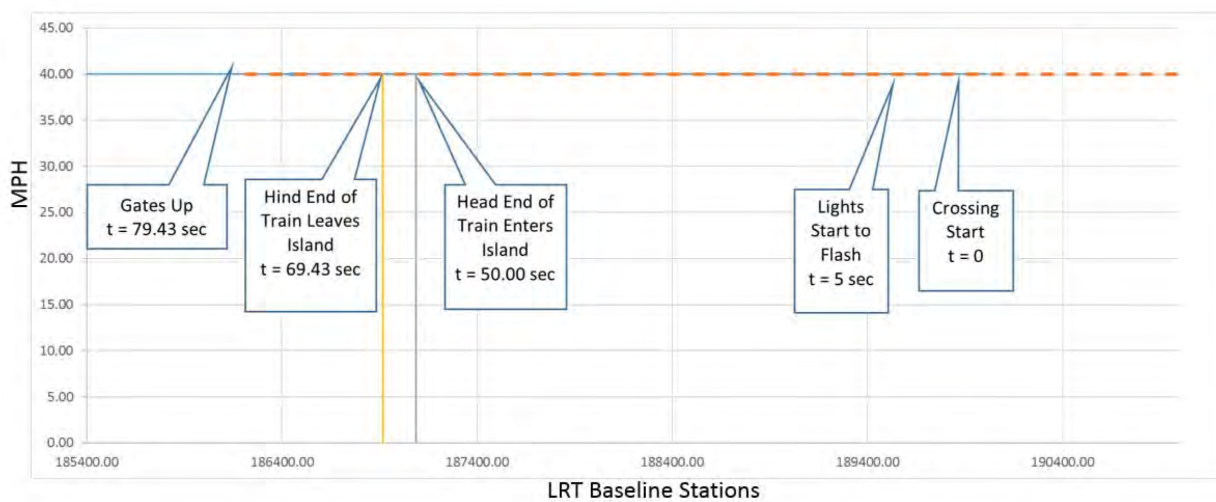


Figure 3-3 White Ave. Westward Freight

3.2.3.2 Commuter Train

The calculations for the commuter train at White Ave. were based on a consist length of 578 feet. The consist length was developed based on the longest consist currently operating. We have not used longer train lengths since they would require rebuilding station platforms to accommodate the longer trains and the Metrolink 2025 plan did not include that work. The theoretical consist has one 68' locomotive, two 85' Rotem bi-levels, three 85' Bombardier bi-levels, and an 85' Rotem Cab car. The acceleration (1.25 mphps) and deceleration (1.50 mphps) characteristics of the commuter train were based on the values used in the MTA's DMU study that compared DMU and locomotive hauled technologies. These values are lower than values used for both SunRail and TriRail systems in Florida (2.0 mphps for both). The deceleration values used do match the specifications for the Bombardier bi-level cars.

S/D curves for both the eastward and westward trains were developed. Figure 3-4 depicts the eastward curve at White Ave. The crossing start location was set for 40 mph with a 5 second equipment response time. The CWT equipment detects a 40-mph train approaching and activates the crossing. The lights are flashing from 5.0 seconds to 72.75 seconds for a total single train gate down time of 68 seconds.

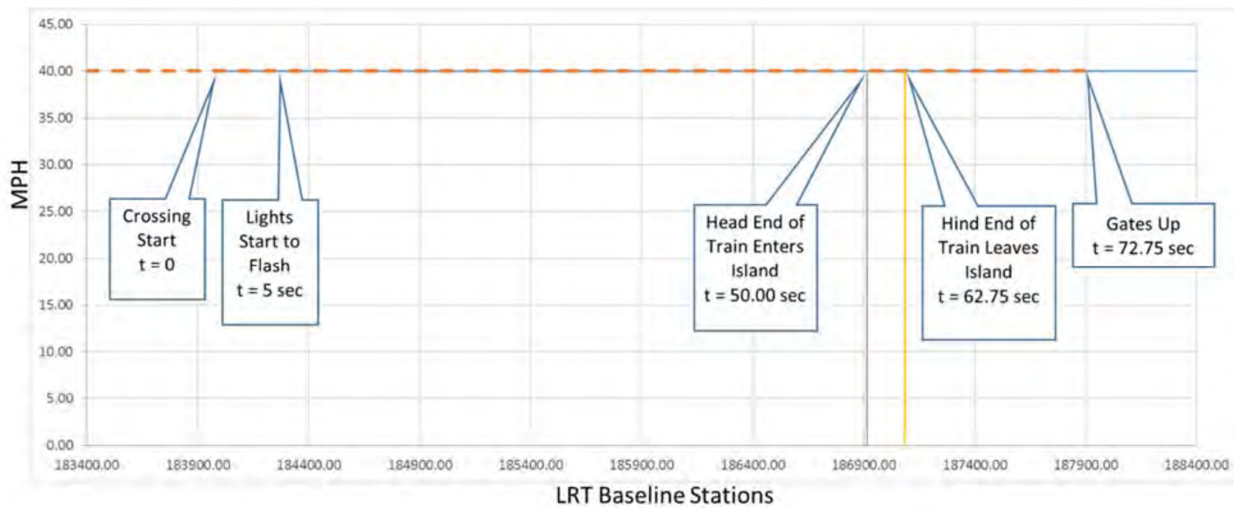


Figure 3-4 White Ave. Eastward Commuter

Figure 3-5 depicts the westward Speed/Distance curve. The crossing start location was set for 40 mph with a 5 second equipment response time. The CWT equipment detects a 40-mph train approaching and activates the crossing. The lights are flashing from 5.00 seconds to 72.75 seconds for a total single train gate down time of 68 seconds.

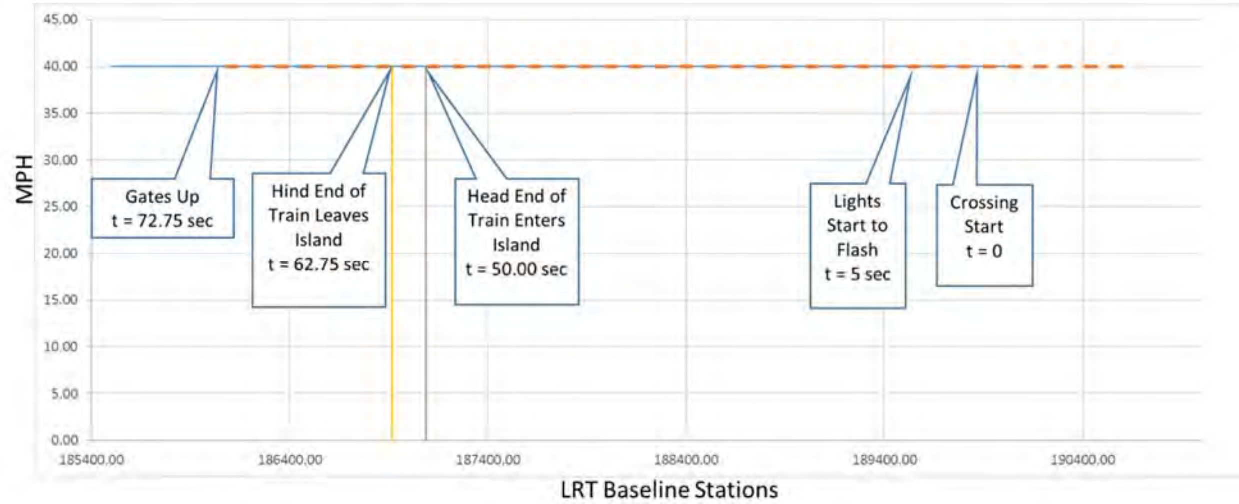


Figure 3-5 White Ave. Westward Commuter

3.2.3.3 Gold Line Train

The calculations for the Gold Line train at White Ave. were based on a consist length of 267 feet. The consist length was developed based on the design criteria. The theoretical consist has three 89' AnsoldoBreda LRV. The acceleration (3.0 mphps) and deceleration (3.0 mphps) characteristics of the LRV were obtained from the design criteria as well.

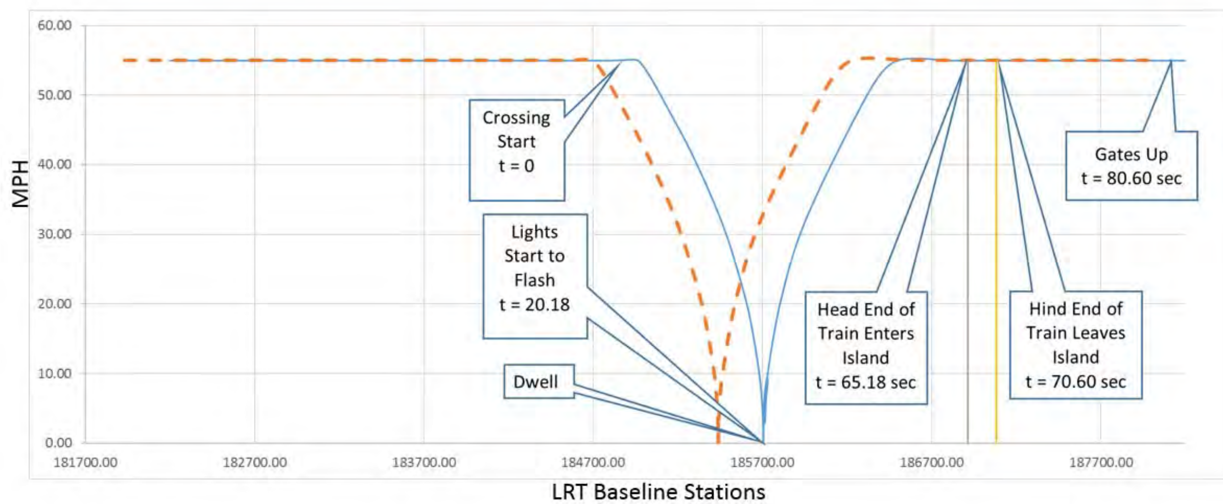


Figure 3-6 White Ave. Eastward LRT

Figure 3-6 depicts the eastward S/D curve. The crossing start location was set using a proposed signal block ahead of the La Verne station. MTA uses standard crossing circuits with timers to set the TWT. The track circuit detects a train approaching and activates the timer. The lights are flashing from 20.18 seconds to 80.60 seconds for a total single train gate down time of 60 seconds.

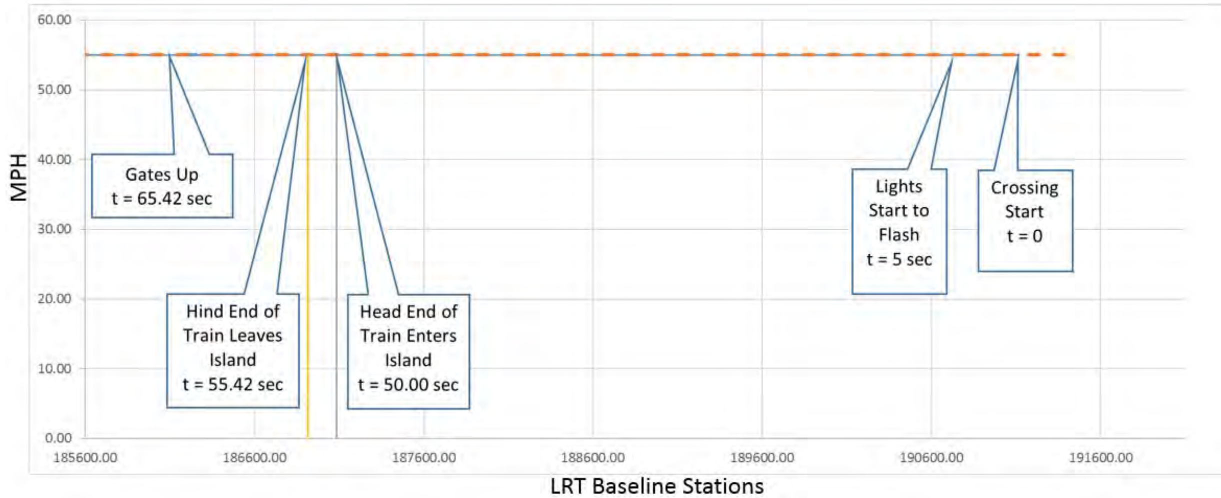


Figure 3-7 White Ave. Westward LRT

Figure 3-7 depicts the westward S/D curve. The crossing start location was set for 55 mph with a 5 second equipment response time. MTA uses standard crossing circuits with timers to set the TWT. The track circuit detects a train approaching and activates the timer. The lights are flashing from 5.00 seconds to 65.42 seconds for a total single train gate down time of 60 seconds.

3.2.4 Multiple Train Gate Down Time

To develop the gate down times, the Analysis Team developed a theoretical schedule for each of the train types and used them to determine when multiple trains were simultaneously or sequentially at the White Ave. crossing during the Peak AM and PM times.

The single train gate down times developed above will be assigned to each crossing gate down time case to determine the cumulative effect of the trains and to generate a case by case timing scenario for the crossings. Some cases have time between the activations internal to the case.

Using the overall length of the case (from first gate activation to last gate up) overstates the gate down time. To address this issue, the analysis team used the minimum green values recommended in NCHRP REPORT 812, Signal Timing Manual Second Edition for local roads. The longest recommended time for the minimum green was selected (10 secs.). The criteria for the minimum green time is based on driver expectations, so it should be applicable to the situation at a railroad grade crossing. The gate down time was then determined to be the total length of the case minus the total of green intervals with lengths greater than 10 seconds.

Second train logic, consisting of the standard practice of holding the gates down when a train is on the crossing approach, is incorporated into the analysis. The analysis did not adjust the crossing starts to provide additional warning time to address the potential of gates releasing and quickly starting back down (pumping) if the second train is seconds away from activating the crossing approach. This should be considered in the detailed design and during the field reviews during the integrated testing phase of the grade crossing certification. The analysis did include the short pumping times in the total gate down time.

3.2.4.1 Schedules

The schedules were based on the existing schedules, but include changes to the headways and train counts. The Freight schedule is based on anecdotal information about the typical operational times. The exact time is not critical since there is only the one freight train forecasted out to 2035. The repetitive and consistent passenger headways throughout the day, means that whenever the freight train is slotted between the commuter trains on the line, the conditions at the crossings are replicated.

The Commuter schedule adjusted the existing train times to provide slots for the new trains presented in the report as increased numbers and reduced headways in the SCRRA 2025 planning document.

The Gold Line trains were treated similarly to the commuter trains. The five-minute peak hour headways anticipated for the 2035 operating plan were accommodated by extending the existing trains, and shifting them as need to provide the new headways and slots for new trains.

The tabular schedules that the Analysis Team developed for this analysis are provided in Appendix D. The schedules are presented in the following section as stringline (Distance/Time) graphs.

The multiple train gate down times are based on schedule assumptions and normal operating procedures. This analysis does not account for emergency or unplanned situations that occur as a part of regular train operations.

Simultaneous and sequential scenarios are considered for both AM and PM cases. Simultaneous is considered a case in which there is more than one train in the crossing at a time. Simultaneous is used to describe a case in which the gates do not rise between two trains. Sequential is used to describe a scenario in which the gates rise for a short time between trains but may not allow the traffic queue to clear. In the scenarios where there is a short gate raise (less than 10 seconds), the gate down time is considered to be continuous.

3.2.4.2 AM Peak String Lines

Figure 3-8 depicts the peak AM stringlines for the study area. There are two sets of trains of interest at White Ave. Cases A-1 and A-4 represent the worst-case cases for gate down time at the crossing.

Information about the two scenarios is presented in Table 3-4.

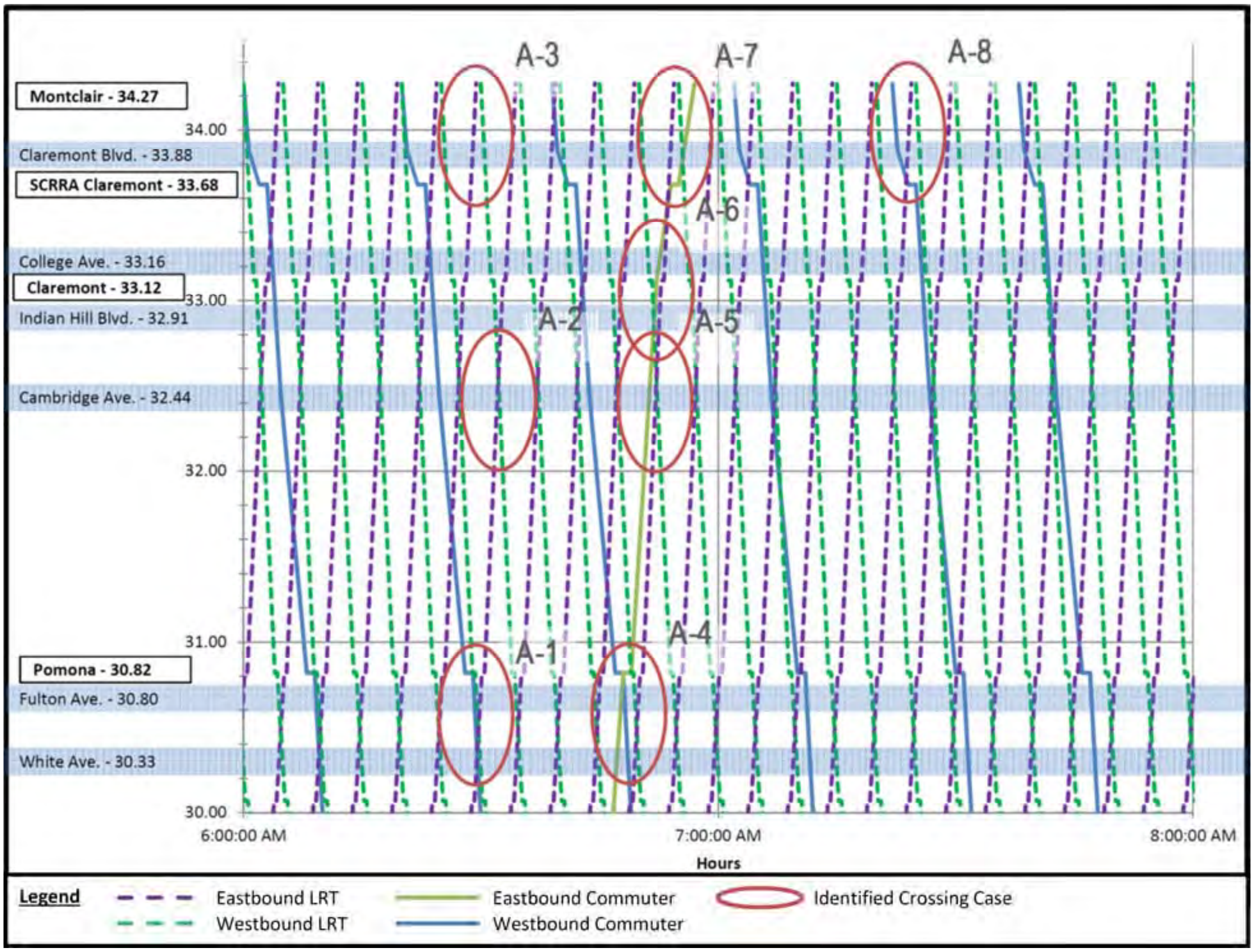


Figure 3-8 AM Peak Stringlines

Table 3-4 White Ave. AM Cases

Case	Crossing	Train	Type	Direction	Schedule	Description
A1	White Ave.	1075	LRT	In	6:29:54 AM	3 Simultaneous Trains
	White Ave.	1022	LRT	Out	6:29:31 AM	
	White Ave.	369	CRT	IN	6:29:34 AM	
A4	White Ave.	311	CRT	In	6:48:34 AM	3 Simultaneous Trains and 1 Sequential Train
	White Ave.	1083	LRT	In	6:49:54 AM	
	White Ave.	1030	LRT	Out	6:49:31 AM	
	White Ave.	300	CRT	Out	6:47:15 AM	

Case A1

The resulting gate down time for Case A1 is 83 seconds (1:23 min) compared to the 60 seconds needed for a single LRT.

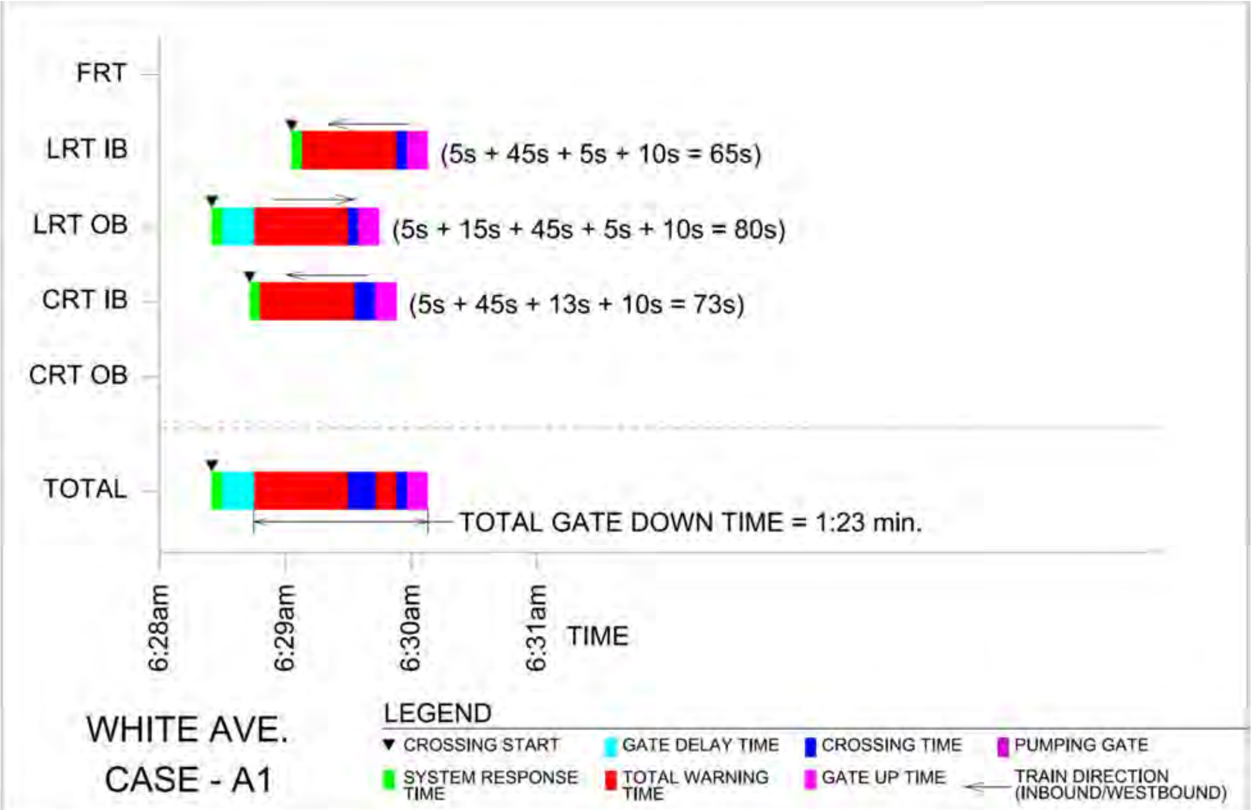


Figure 3-9 White Ave. Gate Down Time Case A1

Case A4

The resulting gate down time for Case A4 is 208 seconds (3:28 min) compared to the 60 seconds needed for a single LRT, or 68 seconds for a single CRT.

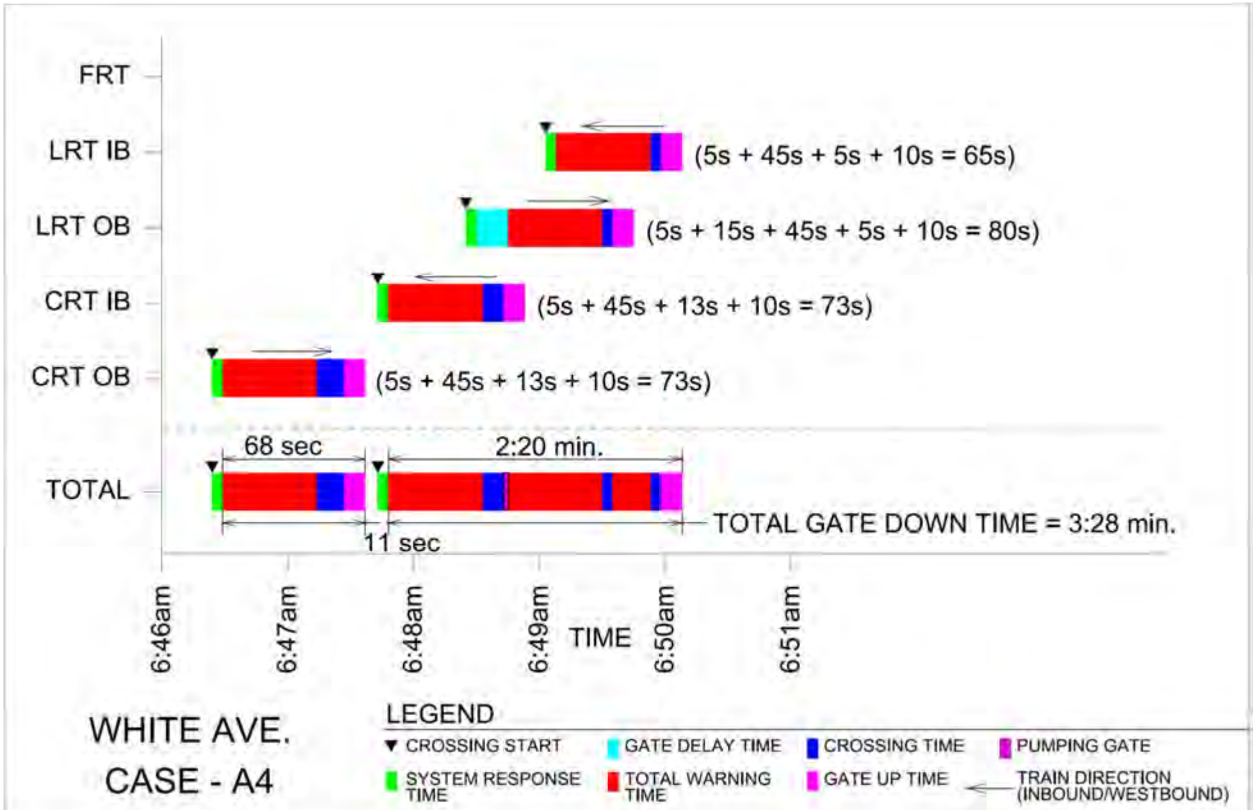


Figure 3-10 White Ave. Gate Down Time Case A4

3.2.4.3 PM Peak String Lines

Figure 3-11 depicts the peak PM stringlines for the study area. There are four sets of trains of interest at White Ave. Cases P-1, P-5, P-9, and P-13 represent the worst-case scenarios for gate down time at the crossing.

Information about the four cases is presented in Table 3-5.

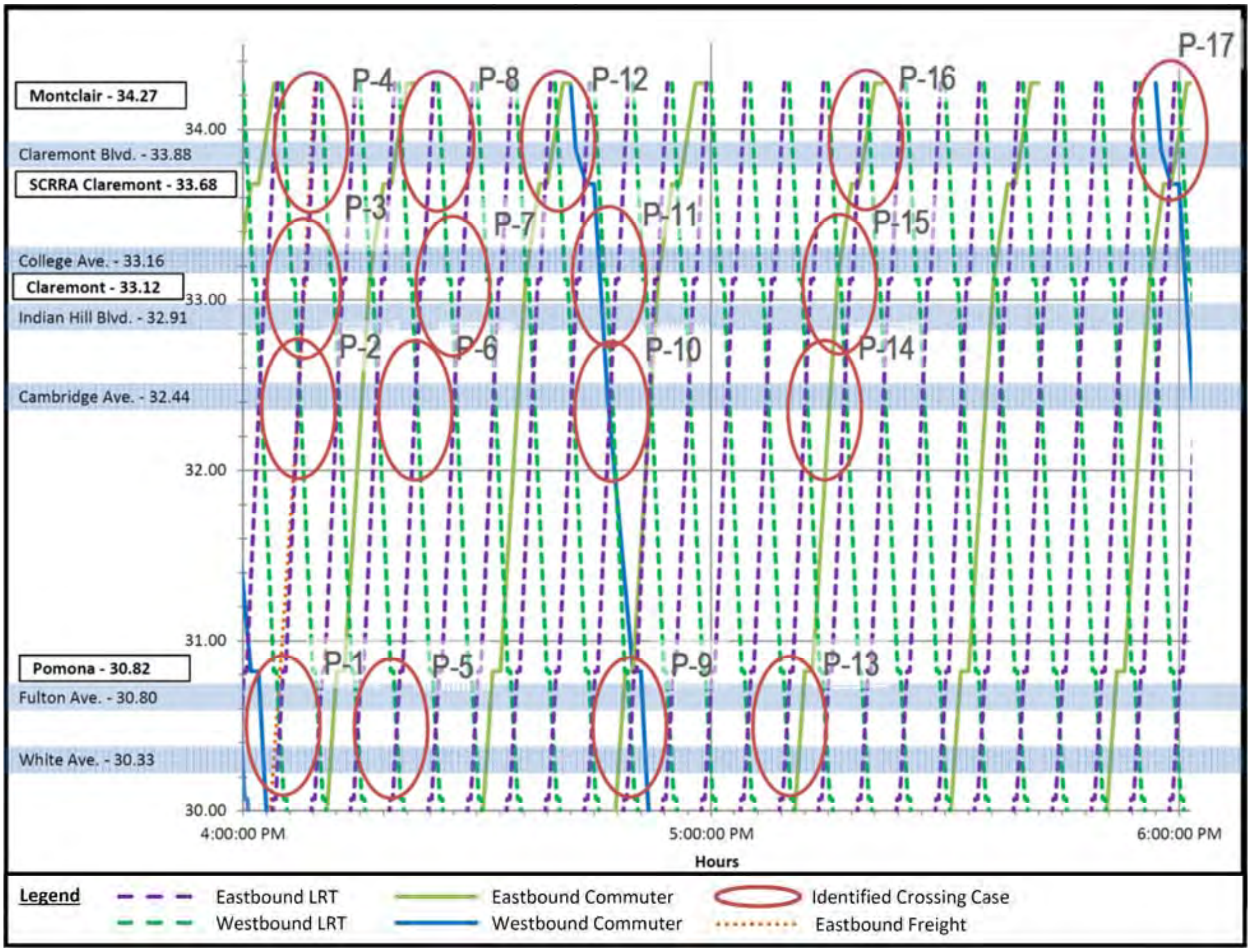


Figure 3-11 PM Peak Stringlines

Table 3-5 White Ave. PM Cases

Case	Crossing	Train	Type	Direction	Schedule	Description
P1	White Ave.	1305	LRT	In	4:04:54 PM	3 Simultaneous Trains
	White Ave.	1252	LRT	Out	4:04:31 PM	
	White Ave.	FRT	FRT	Out	4:04:01 PM	
P5	White Ave.	1311	LRT	In	4:19:54 PM	2 Simultaneous Trains
	White Ave.	1258	LRT	Out	4:19:31 PM	
P9	White Ave.	331	CRT	In	4:51:34 PM	3 Simultaneous Trains and 1 Sequential Train
	White Ave.	1323	LRT	In	4:49:54 PM	
	White Ave.	1270	LRT	Out	4:49:31 PM	
	White Ave.	318	CRT	Out	4:48:15 PM	
P13	White Ave.	1331	LRT	In	5:09:54 PM	2 Simultaneous Trains and 1 Sequential Train
	White Ave.	1278	LRT	Out	5:09:31 PM	
	White Ave.	386	CRT	Out	5:11:15 PM	

Case P1

The resulting gate down time for Case P1 is 113 seconds (1:53 min) compared to the 60 seconds needed for a single LRT.

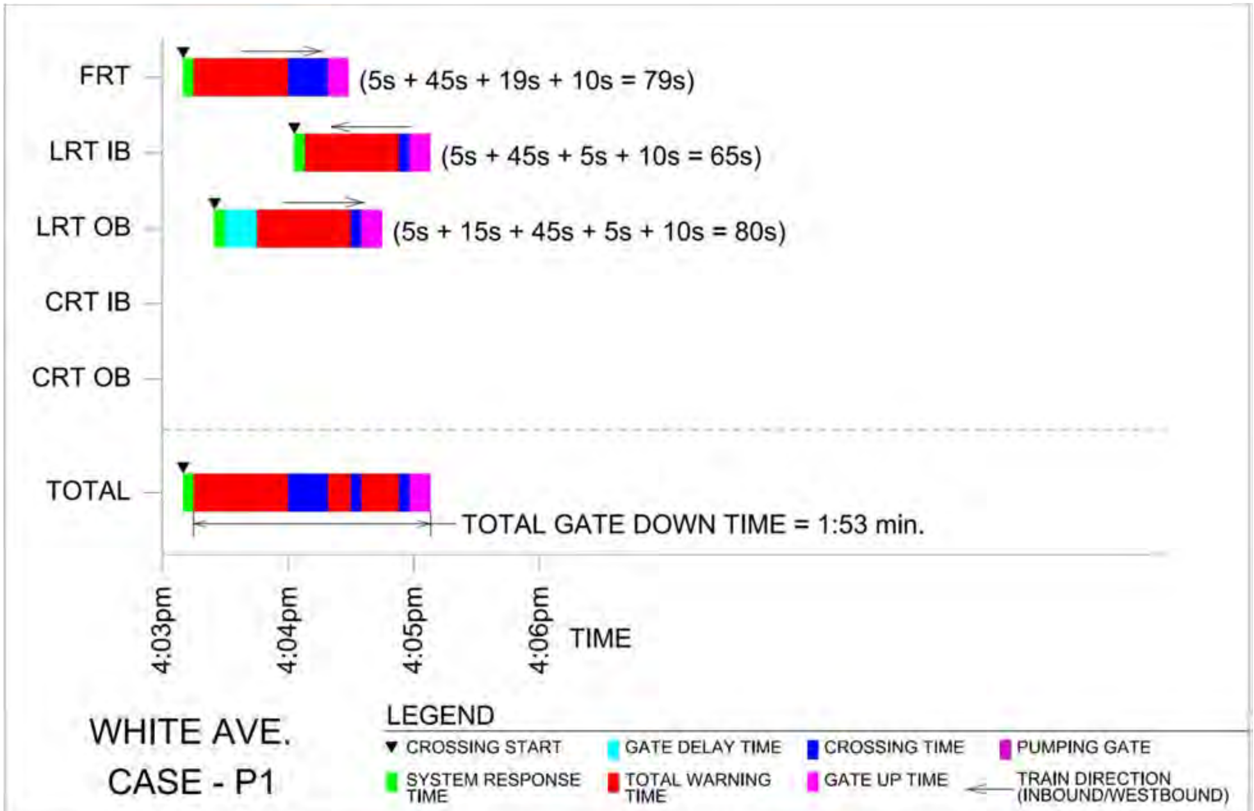


Figure 3-12 White Ave. Gate Down Time Case P1

Case P5

The resulting gate down time for Case P5 is 83 seconds (1:23 min) compared to the 60 seconds needed for a single LRT.

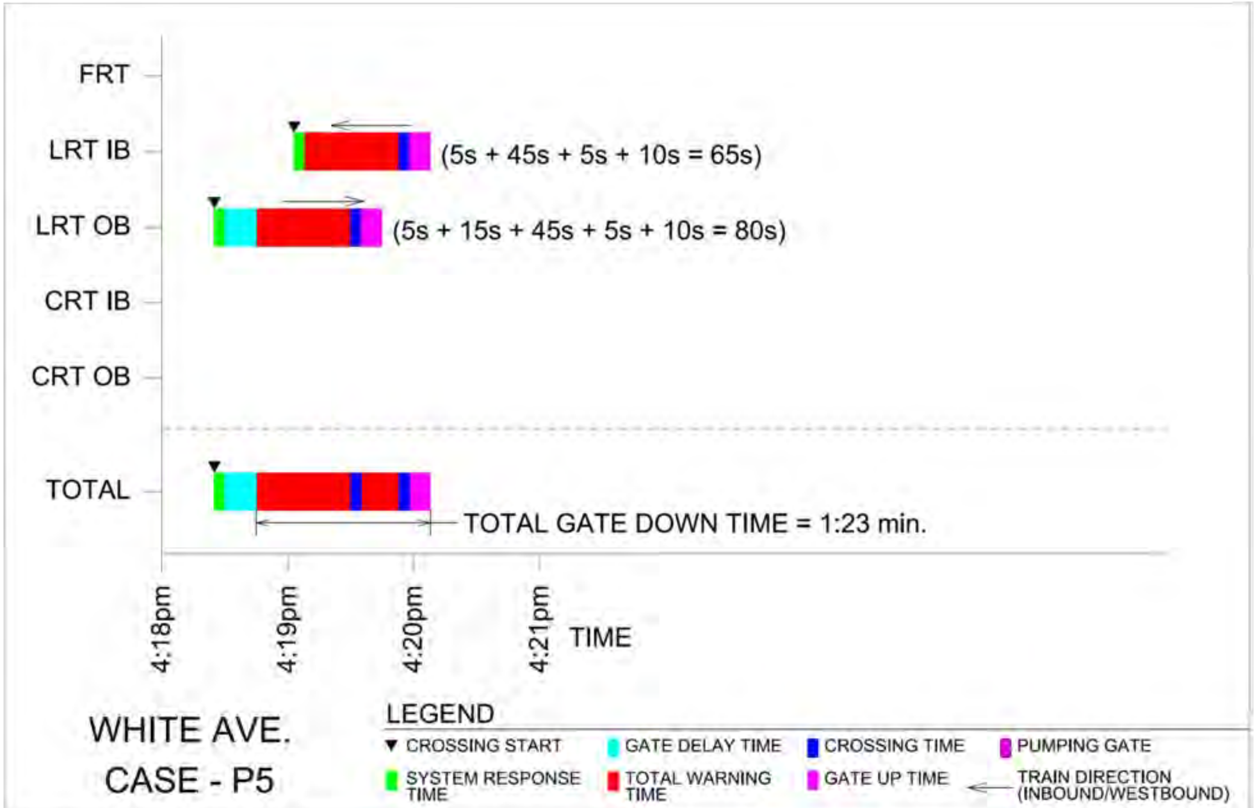


Figure 3-13 White Ave Gate Down Time Case P5

Case P9

The resulting gate down time for Case P9 is 219 seconds (3:39 min.) out of 267 seconds (4:27 min.), compared to the 60 seconds needed for a single LRT and 68 seconds for a single CRT.

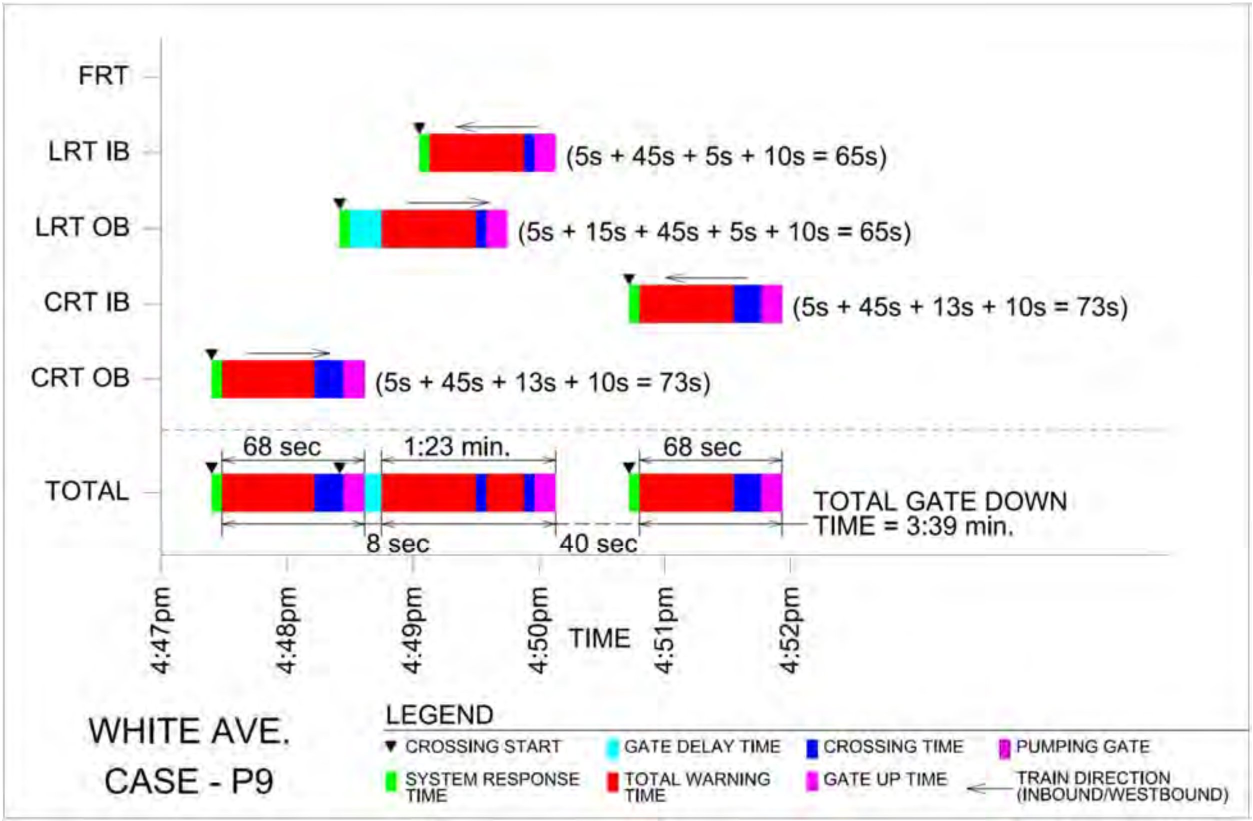


Figure 3-14 Cambridge Ave Gate Down Time Case P9

Case P13

The resulting gate down time for Case P13 is 151 seconds (2:31 min) out of 172 seconds (2:52 min) compared to the 60 seconds needed for a single LRT and 68 seconds needed for a single CRT.

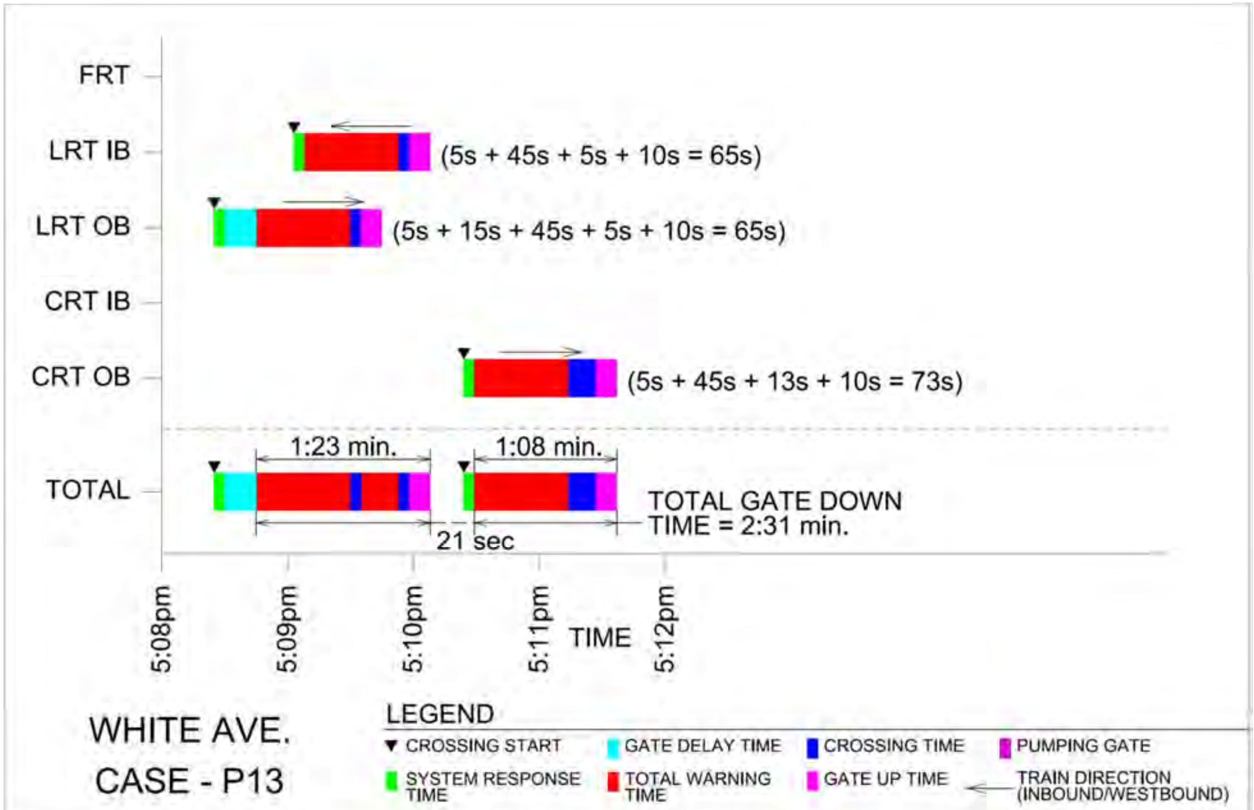


Figure 3-15 White Ave. Gate Down Time Case P13

3.2.4.4 Multiple Activation Discussion

The peak hour multiple train activations are a concern due to their potential effect on the traffic. Long gate down times often leads to driver and pedestrian stress, which leads to undesired behaviors. The use of four quadrant gates, pedestrian gates and other measures limit the type and number of undesirable behaviors.

For White Ave., the gate down times in the PM rush are somewhat manageable with the maximum of 3:39 minutes.

3.2.4.5 Total Peak Hour Gate Down Time

For the existing conditions, the greatest number of activations (five) occur in the PM peak hour due to the assumed freight train schedule. The activations are spaced out such that they behave as individual trains at White Ave. The gates are down a total of 5:46 minutes out of 60:00 minutes, or 10% of the hour.

Table 3-6 White Ave. PM Peak Hour Activations (Existing)

Activation Time	Train ID	Gate Down Time
4:00 PM	CRT (314)	1:08 mins.
4:05 PM	FRT	1:14 mins.
4:30 PM	CRT (316)	1:08 mins.
4:42 PM	CRT (331)	1:08 mins.
4:52 PM	CRT (318)	1:08 mins.
Total PM Peak Hour Gate Down Time =		5:46 mins

For the LRT No-Build future conditions, we have assumed that the increased service described in the SCRRA 2025 service plan will be instituted. The 2025 plan adds trains to increase the length of the peak service, however due to the existing density between 4:00 PM and 5:00 PM, there are no additional trains introduced into the peak hour based on our presumptive schedule.

Table 3-7 White Ave. PM Peak Hour Activations (LRT No-Build, SCRRA 2025)

Activation Time	Train Type	Gate Down Time
3:54 PM	CRT (310)	1:08 mins.
4:07 PM	FRT	1:14 mins.
4:11 PM	CRT (374)	1:08 mins.
4:31 PM	CRT (376)	1:08 mins.
4:48 PM	CRT (318)	1:08 mins.
Total PM Peak Hour Gate Down Time =		5:46 mins

For the 2035 full build scenario, AM peak hour between 6:00 AM and 7:00 AM at White Ave., the gates are down a total of 18:44 minutes out of 120:00 minutes, or approximately 31% of the time. This should not present significant issues.

Table 3-8 White Ave. AM Peak Hour Activations (2035)

Activation Time	Case	Gate Down Time
6:04 AM	P5[1]	1:23 mins.
6:09 AM	A1	1:23 mins.
6:14 AM	P5	1:23 mins.
6:19 AM	P5	1:23 mins.
6:24 AM	P5	1:23 mins.
6:29 AM	A1	1:23 mins.
6:34 AM	P5	1:23 mins.
6:39 AM	P5	1:23 mins.
6:47 AM	P5	1:23 mins.
6:51 AM	A4	3:28 mins.
6:54 AM	P5	1:23 mins.
6:59 AM	P5	1:23 mins.
Total AM Peak Hour Gate Down Time =		18:44 mins

[1] Case P5 is representative of a crossing scenario that occurs in both the AM and PM peak hours.

For the 2035 full build scenario, PM peak hour between 4:00 PM and 5:00 PM at White Ave., the gates are down a total of 21:40 minutes out of 60:00 minutes, or approximately 36% of the time. The primary reason for the difference in the AM and PM down time seems to be that in the PM there are more multiple crossings with three trains or more; however, in this case the trains have more overlap than in the AM cases.

Table 3-9 White Ave. PM Peak Hour Activations (2035)

Activation Time	Case	Gate Down Time
4:02 PM	P1	1:53 mins
4:09 PM	P13	2:31 mins
4:14 PM	P5	1:23 mins
4:19 PM	P5	1:23 mins
4:24 PM	P5	1:23 mins
4:29 PM	P13	2:31 mins
4:34 PM	P5	1:23 mins
4:39 PM	P5	1:23 mins
4:44 PM	P5	1:23 mins
4:48 PM	P9	3:47 mins
4:54 PM	P5	1:23 mins
4:59 PM	P5	1:23 mins
Total PM Peak Hour Gate Down Time =		21:48 mins

3.3 Traffic Data

The speed limit on White Ave. is 35 mph. Per the FRA grade crossing inventory data, this crossing is not regularly used by school buses. It is unknown if hazardous material transporters use the crossing regularly, however there are no signs prohibiting those uses.

There are no bus routes serving White Ave. in the area of the crossing.

3.3.1 Traffic Volume/ Truck Percentages/Queues

The existing and proposed traffic data for the White Ave. road crossing is presented in tables 3-10 and 3-11. The traffic data and projections came from multiple sources, including the FRA Grade Crossing Inventory. The analysis team has included the FRA values because they are the data used by the FRA to predict collisions at the crossing.

The industrial facility driveway on the west side of White Ave. currently allows only right in/right out vehicular traffic between the two crossings. Likewise, the access roadway on the east side allows only right in/right out vehicular traffic between the two crossings.

Table 3-10 White Ave. Traffic Counts

	FRA Crossing Inventory	FEIR	FEIR Forecasted
Year	1988	2010	2035
AADT	12,000	16,466	18,712
Trucks %	20	n/a	n/a

Table 3-11 White Ave. Forecasted Crossings Peak Hour

2035 (from FEIR)	AM NB	AM SB	PM NB	PM SB
White Ave.	583	770	998	639

3.3.2 Traffic Queues

The traffic queues were calculated using the data contained in the October 24, 2016 Metro Gold Line Foothill Extension – Grade Crossing Sensitivity Analysis technical memo. The new train schedules and gate down times developed for this analysis were used in the calculation.

Table 3-12 Grade Crossing Traffic Data

Crossing	Direction of Travel	# of Lanes	Total Number of Lanes	Future (2035) Volumes Crossing the LRT Tracks		Future (2035) Lane Volumes Crossing the LRT Tracks		Maximum Peak Hour Volume per Lane	Trains per Hour per Direction
				AM	PM	AM	PM		
White Ave	NB	2	4	583	998	292	499	499	16
	SB	2		770	639	385	320	385	
Fulton Rd	NB	1	2	76	57	76	57	76	16
	SB	1		62	74	62	74	74	
Cambridge Ave	NB	1	2	386	301	386	301	386	16
	SB	1		343	321	343	321	343	
Indian Hill Blvd	NB	2	4	739	886	370	443	443	16
	SB	2		735	869	368	435	435	
College Ave	NB	1	2	388	266	388	266	388	16
	SB	1		230	385	230	385	385	
Claremont Blvd.	NB	2	4	500	374	250	187	250	16
	SB	2		364	494	182	247	247	

Table 3-13 presents the results of the analysis performed at White Ave.

The peak design crossing spillback queues were calculated using the Webster formula from the FHWA Grade Crossing Handbook that was also used in the Grade Crossing Sensitivity Analysis technical memo:

$$N = q*R$$

N = Number of vehicles in queue (peak design queue)
q = Peak hour vehicle arrival rate (vehicles/minute)
R = Gate down time in minutes

The Estimated Influence Zone is the queue extending towards the crossing from the adjacent intersection. It was calculated using the formula in the MTA Grade Crossing Policy. The following formula adds the Peaking Factor (PF) as noted in the guidance MTA Policy:

$$N = PF * (q*(R/2 +d)$$

$$25*N = \text{length}$$

N = Number of vehicles in queue
PF = Peaking Factor (a factor of 2 was used)
q = Peak hour vehicle arrival rate (vehicles/minute)
R = Red Time (minutes)
d = Average Delay (minutes)
25 = The Average Queue Length per Vehicle as used in the Grade Crossing Sensitivity Analysis technical memo

The Red Time was calculated by using Webster's Formula for the Optimum Cycle Length as detailed on the FHWA website at https://ops.fhwa.dot.gov/publications/signal_timing/03.htm to determine the assumed cycle length and by using Table 2-4 in the Caltrans' Traffic Signal Operations Manual to determine the Maximum Green Time for the cross street which equates to the Red Time on the street with the queue.

The Average Delay was determined using the intersection Level of Service and taking the average value in the corresponding range from Table A-1 of the MTA Grade Crossing Policy.

Table 3-13 White Ave. Projected 2035 queues

Crossing	Direction of Travel	# of Lanes	Total Number of Lanes	Calculated Queues			Available Storage Length (ft)	Min Gate up After Max Gate Down (min.)	Queue Clears prior to next Gate Down
				Max Crossing Queue (ft)	Estimated Influence Zone (ft)	Maximum Expected Down-stream Queue (ft)			
White Ave	NB	2[1]	4	775	650	1425	490	1.5	No[2]
	SB	2		525	300	825	1240[3]	3.25	Yes
Note: see Appendix G for additional calculation information.									

[1] Two lanes at the crossing reduces to 1 lane north of the crossing
[2] Twenty-seven (22) vehicles remain in queue at next gate down for worst case scenario (P9)
[3] Storage length includes "Do Not Block" intersection locations.

As shown in Table 3-13 above, the worst case P9 scenario gate down time of 3:47 minutes results in 1,425 ft of vehicle queuing for northbound traffic. At approximately 4:52pm the train movements are completed, gates raise and traffic resumes across the crossing for approximately 1.5 minutes. During this 1.5-minute period, 875-ft of the 1,425-ft vehicle queue will clear the crossing. At 4:54pm, the next gate down activation occurs from the outbound LRT and the gates are down for 1:23 minutes. After this activation, there is a longer gate up time (approximately 3.5 minutes), during this time all remaining vehicles in queue should clear the crossing. While it is undesirable for vehicles to remain in queue for another gate activation, the following gate down activation is minimal (1:23 minutes) and the Analysis Team believes that with appropriate crossing treatments (queue cutters, presignals, etc.), crossing safety is not compromised. .

The southbound storage distance for White Avenue should be sufficient to contain and clear the vehicle queue.

The screening analysis for White Ave. indicates that there are changes to the original determination of the acceptability of an at-grade crossing due to the longer gate down times. The analyses focused on the effects to the north side of the crossing. There are other areas of concern to the Analysis Team.

1. The Analysis Team is concerned that the expected northbound 1,425-foot queue with an available storage length of 490 feet is a problem in that the traffic may queue past Arrow Hwy. The Analysis Team observed several long queues under existing conditions and with the projected growth in traffic and train crossings, the queues are expected to lengthen. As discussed, the gate up after the longest gate down is not sufficient to clear the full queue that accumulates during the P9 scenario. However, the sequential gate down and then gate up should be able to clear the queue. We feel that further traffic analysis is required to address the Arrow Hwy and White Ave intersection. Modifications may help store the longer queues with minimal impact to the intersection through traffic.
2. The Analysis Team is also concerned about the interaction of the SCRRA crossing on Arrow Hwy with the White Avenue crossing. The concerns are greater for an outbound train. The Arrow Hwy. crossing would activate first, shutting off the exit for the right hand turning queue from southbound White Ave. The queue on White would grow longer, and sooner than the available green time would indicate because the crossing to the west on Arrow Hwy is occupied. This increases the length of the influence queue on White Ave., leading to the filling of the southbound queue sooner and potentially having vehicles on the crossing when the gates activate with no area to exit. The Analysis Team recommends that a signal timing/pre-emption study with traffic queue analysis be performed on both crossings acting together to ascertain if advanced preemption is required to manage queue growth at both crossings.

3.3.3 Traffic Delays and LOS at Crossings

The FEIR provided both the Volume to Capacity Ratios (V/c) and the LOS values for the existing conditions and includes the crossings in the study area. Table 3-14 summarizes the information for the crossings.

Table 3-14 Existing Volume Ratios and LOS at Crossings

Crossing Name	V/c	LOS (2010)
White Ave.	1.03	F

Although LOS is an industry standard for intersection operations, calculating LOS specific to crossings is not a common measurement. LOS at the crossing was calculated to help demonstrate safe flow through the crossing. To determine the LOS of the proposed crossing at White Ave., we have used the delay formulas for signalized intersections (from the ITE Highway Capacity Manual) and adjusted the crossing gate down parameters to fit within the methodology. The delay calculations consist of three distinct calculations, d_1 through d_3, representing the delay calculated assuming uniform arrivals (d_1), delay due to random arrivals (d_2), and delay due to initial queue at start of analysis time period (d_3).

The equation for determining the delay calculated assuming uniform arrivals (d_1) is shown below:

$$d_1 = \frac{0.5C\left(1-\frac{g}{C}\right)^2}{1-\left[\min(1, X)\frac{g}{C}\right]}$$

d_1 = delay due to uniform arrivals (s/veh)

C = cycle length (seconds)

g = effective green time for lane group (seconds)

X = v/c ratio for lane group

The analysis is designed around traffic signal controllers that typically have a constant set of timings that are progressed through in response to certain actuations to control the intersection. Railroad grade crossings are different in that the timings vary and are only displayed in response to an activation and deactivation. Because we are interested in the average delay per vehicle, we have taken the total gate down time in the peak hour as equivalent to the red interval and subtracted that from the hour to get to the green interval. We then took the number of activations and subtracted a set period (four seconds) from the green interval for each activation to account for motorist response time, producing an equivalent effective green time for the full hour. The formula uses the factor (g/C) as a ratio of the effective green time to the cycle length. Because this is a ratio, we were able to calculate the equivalent ratio by using the effective green for the entire hour divided by the number of seconds in the hour. Because the formula also uses C as a variable by itself, we have assigned it to the headway, which is also representative of the average cycle time for the activations.

The equation for determining the delay due to random arrivals (d_2) is shown below:

$$d_2 = 900T\left[(X-1)+\sqrt{(X-1)^2+\frac{8kIX}{cT}}\right]$$

d2 = delay due to random arrivals (s/veh)

T = duration of analysis period (hours). If the analysis is based on the peak 15-min. flow then T = 0.25 hrs.

k = delay adjustment factor that is dependent on signal controller mode. For pretimed intersections k = 0.5. For more efficient intersections k < 0.5.

I = upstream filtering/metering adjustment factor. Adjusts for the effect of an upstream signal on the randomness of the arrival pattern. I = 1.0 for completely random. I < 1.0 for reduced variance.

c = lane group capacity (veh/hr)

X = v/c ratio for lane group

There were no adjustments required for this equation; the values were used in standard ways. The value of T was set to 1.0, k was set to 0.5, c was set to 1800, and l was set to 1.0.

For White Ave. d_3 is assumed to be 0 seconds because the queues clear between activations for all except one scenario.

To confirm our methodology, the tabulated v/c for existing conditions in the FEIR were utilized in the above described equations. The resulting LOS matched that which was provided in the FEIR for existing conditions. This validated the methodology. The equations were then used to calculate the LOS for the 2035 condition with the calculated gate down times. Table 3-15 lists the results.

Table 3-15 Vehicle Delay and LOS for the 2035 Crossing Conditions – Peak Hour

Crossing Name	**Average Delay secs. per Vehicle (2035)**	**LOS (2035)**	**Existing LOS (FEIR 2010)**
White Ave.	26.1	C	F
Note: see Appendix G for additional calculation information.			

At White Ave, the LOS calculated in the future condition is an improvement over the existing condition; this is a result of differing evaluation styles. The FEIR used a full traffic model analysis including the crossing and adjacent intersections. This includes the lane reduction that occurs north of the crossing. The analysis laid out in this report looks at the configuration, crossings and queues as they relate to the crossing only. Due to this difference, the result of the LOS analysis at White Ave. indicates an improved LOS in the future condition.

The delay results indicate that the increased gate down times do have a negative impact on traffic at White Ave., but the resulting average delay after improvements being a LOS of C is above the design criteria for local roads where the design LOS is often considered to be LOS D.

The average delay calculations for the peak hour do not fully describe the delays that will be experienced during the longest gate down times, and neither do they show the time when the gates are not down. To capture the issues with the longest gate down times, the operation of the queues are being used as the indicator as discussed throughout this report.

3.3.4 Proximity to Key Associated Facilities

The White Ave. crossing is located at the edge of an industrial area. There are industrial sites in all of the quadrants except for the northwest quadrant, which is commercial closer to the crossing, and residential a block away from the crossing.

The industrial nature of the area is reflected in the truck percentage listed in the FRA grade crossing inventory.

3.4 Pedestrians/Bicycle

3.4.1 Pedestrian and Bicyclist Volume

At the White Ave crossing, pedestrian and bicycle activity is low, with 116 pedestrians and 65 bicyclists crossing during the hours covered by the table below.

Table 3-16 White Ave. Pedestrian and Bicycle Counts

	7 AM-11 AM				**11 AM-3 PM**				**3 PM-6 PM**			
Weekday (09/21/2016)	**East Leg**		**West Leg**		**East Leg**		**West Leg**		**East Leg**		**West Leg**	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
Pedestrians	9	13	6	9	5	16	7	14	10	3	8	16
Bikes	9	1	2	11	9	5	1	11	3	2	1	10

3.4.2 Pedestrian Improvements

Consistent with Metro and SCRRA design criteria, the proposed pedestrian treatments will include automatic pedestrian gates, flashers, fencing, signs, pavement markings and channelization. The Advanced Concept Engineering Plans propose pedestrian gates and barriers for this crossing. The existing sidewalks are expanded to lead pedestrians to the pedestrian gates and barriers. The increased crossing protection for pedestrians is an industry best practice and consistent with the existing Gold Line crossing equipment.

Figure 3-16 shows the typical Gold Line pedestrian treatment installed in Phase 2 at the North Azusa Avenue crossing. The crossing has a station entrance to the left, two LRT tracks and a single freight track.

The Pedestrian Clearance time calculated in the Analysis section is short enough to allow pedestrians to clear into the refuge area from either part of the crossing after the flashing lights and gates are activated.

3.4.3 Bicycle Improvements

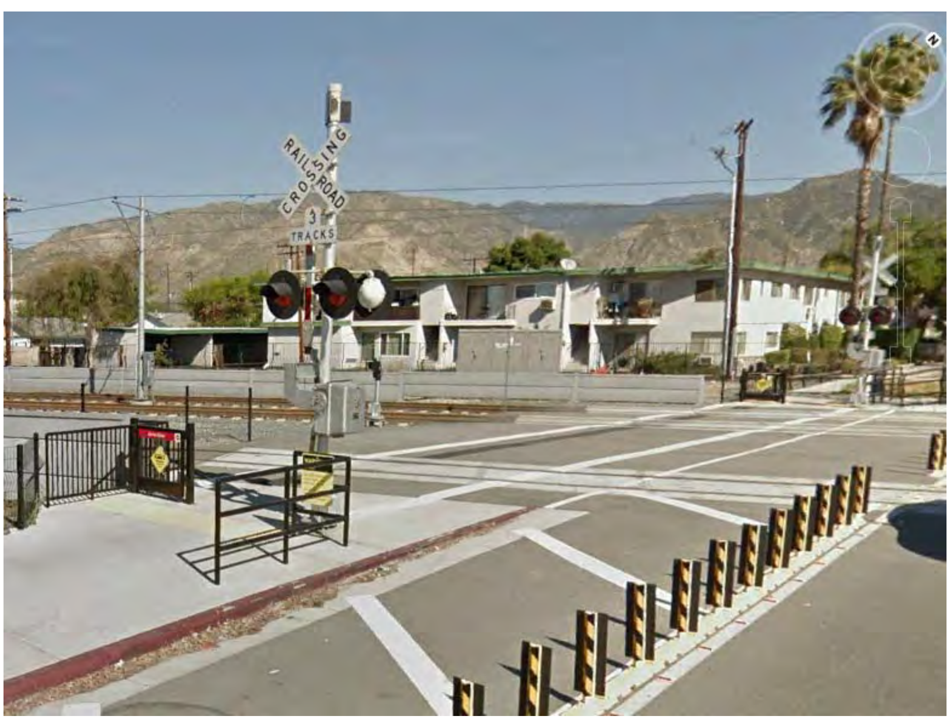
Based on the lack of signage and pavement markings, White Ave. is not a designated bicycle route. The roadway crosses the tracks at approximately right angles and includes flangeway gap filler. Typical signage warning about flangeway gap will be evaluated for the crossing, but no other bicycle specific improvements are required.

3.5 Hazard Analysis

WBAPS is a standard tool that implements the USDOT Accident Prediction Model. When the USDOT Accident Prediction Model was developed, the number of grade crossing accidents were significantly higher. As safety improvements have been implemented, the number of grade crossing accidents at crossings have generally been reduced to a point where the variability of the data exceeds the values

Figure 3-16 Typical Gold Line Phase 2 Pedestrian Treatment (Google Earth)

being predicted. The Indian Hill Blvd. crossing is a good example of this since it has had only one accident in the past five years and because of that it rates nearly twice as high as its nearest ranked counterpart.



3.5.1 FRA Grade Crossing Accident History

Railroads are required to report grade crossings accidents to the FRA. The FRA maintains a data base of the accidents as part of their Grade Crossing Inventory system

The Analysis Team has downloaded and reviewed the accident data records for the crossings in the study area. The FRA grade crossing accident reports are included in Appendix C.

One Suicide has occurred at the White Ave. grade crossing according to the FRA grade crossing database. The FRA accident report is provided in Appendix C of this document.

3.5.2 Hazard Index Calculations

3.5.2.1 FRA Web Based Accident Prediction Systems (WBAPS)

The FRA's WBAPS analysis was performed for the study area and the report is included in Appendix C. Table 3-17 summarizes the results of the WBAPS analysis for all of the crossings in the study area. WBAPS can only predict collisions based on the existing conditions and historic data.

The historic data used comes directly from the FRA Grade Crossing Inventory data set. Reviewing the data shows that some of the AADT numbers are markedly different from the AADT numbers used in the FEIR. The higher AADT increases the risk and drives up the projected number of collisions.

The predicted collisions reflect the percent chance of an accident per year. For White Ave., there is a 2.7% chance that an accident will occur in any year. The rank is produced from the WBAPS data for all the crossings within the model corridor. The lower the rank number the more likely for an accident to occur.

Table 3-17 WBAPS Predicted Collisions – Existing Conditions

Crossing	DOT #	MP	Sub-Division	Rank	Predicted Collisions
White Ave.	026187X	107.51	Pasadena	18	0.015869
	747331D	30.33	San Gabriel	11	0.027440
Fulton Ave.	026186R	107.05	Pasadena	23	0.007757
	747331D	30.80	San Gabriel	10	0.027785
Cambridge Ave.	026730Y	32.44	San Gabriel	12	0.027394
Indian Hill Blvd.	026180A	32.91	San Gabriel	1	0.112067
College Ave.	026179F	33.16	San Gabriel	7	0.036295
Claremont Blvd.	026178Y	33.68	San Gabriel	4	0.050953

3.5.2.2 US DOT Accident Prediction Model (APM) – Proposed Conditions

The APM model is used in the WBAPS system to predict the collision rate for the existing conditions.

The APM is also used by CPUC in determining where grade crossing safety funding is applied, therefore it is useful in this study as a California methodology.

The FHWA guidance on the APM provides two different methods for determining the inputs to the model, a tabular and a mathematical method. The tabular method is limited to high train and vehicle volumes. The mathematical method, as presented in the FHWA Handbook, contains several typesetting errors, specifically there are missing parenthesis that would raise the entire value calculated to a power instead of just one of the variables. This was corrected in the team's implementation of the spreadsheet APM model. The calculations for the existing conditions at the four eastern crossings include the tabular inputs for verification.

By using the APM directly, the Analysis Team was able to develop accident prediction numbers for the proposed conditions. This allows the direct comparison of the existing condition prediction and the proposed condition prediction. The APM utilizes a factor to adjust the projections to reflect recent data. The last published adjustment factor of 0.4614 was from 2010.

The APM was run for the existing conditions to determine the current adjustment factor in use. For the four easternmost crossings, the current adjustment factor varied, but an average value of 0.4251 brought the output in line with the WBAPS predictions.

Using the APM for the proposed conditions does have an additional issue. In the APM, four-quadrant gates are calculated to have the same effect as simple flashing lights and gates, so the only data that affects the projection is the 2035 number of trains and the number of vehicles. The FHWA Grade Crossing Handbook identifies several sources that show that four-quadrant gates by themselves reduce accidents at crossings by over 80% at crossings with normal flashing lights and gates. It also identified that adding median barriers also reduces the accident rates at crossings with both four-quadrant and normal flashing lights and gate equipped crossings.

To more accurately reflect the proposed conditions, the Analysis Team selected a conservative value for the overall accident reduction possible at the proposed crossings based on the warning device improvements. The team selected the 82% reduction reported by the Canadian Study 'A Human Factors Analysis of Highway-Railway Grade Crossing Accidents in Canada' cited in the FHWA Grade Crossing Manual for just adding four-quadrant gates to the crossings as the factor that would be applied to the APM output for the proposed conditions. The US data indicated reductions of over 90% in all cases. A link to the Canadian study is provided in Appendix B of this report. Recent conversations with the FRA grade crossing safety team has indicated that their future update of the APM will include a similar factor for the addition of Four Quadrant Gates.

One further data adjustment was made; White Ave., and Fulton Ave. are each currently treated as two separate crossings, one for the Pasadena Sub and one for the San Gabriel Sub at each crossing. WBAPS reports projections for each crossing. In the proposed condition, they will function as a single crossing. To address this, the team added the two projections for each of the existing crossings to create the existing baseline projections.

The APM model projections included in Table 3-18 present the existing, proposed 2035, and proposed adjusted for four quadrant gates projections for the six crossings in the study.

The predicted collisions reflect the percent chance of an accident per year. For White Ave., there is a 4.3% chance that an accident will occur in any year. In 2035, the chance increases to 13.7% but with the addition of quadrant gates it is then reduced to 2.5%.

Table 3-18 APM Predicted Collisions – Proposed Conditions

Crossing	MP	Total WBAPS Predicted Collisions	APM 2035 Predicted Collisions	APM 2035 Predicted Collisions w/ 4 Quad Gates
White Ave.	30.33	0.043309	0.137675135	0.024781524

Fulton Ave.	30.80	0.043309	0.13474019	0.024253234
Cambridge Ave.	32.44	0.027394	0.058903933	0.010602708
Indian Hill Blvd.	32.91	0.112067	0.136854103	0.024633739
College Ave.	33.16	0.036295	0.059471971	0.010704955
Claremont Blvd.	33.68	0.050953	0.064996925	0.0116994

The predicted collision rate from the APM model for White Ave. in 2035 with the increased number of trains and growth in AADT is lower than the WBAPS rate for the existing crossing.

3.5.3 Traffic Studies

The existing traffic studies included in the FEIR and CPUC supporting data were based in a simplistic way on the headways of the new LRT extension. These simplifying assumptions understated the gate down times leading to a less conservative analysis.

A series of additional traffic studies performed by AECOM were reviewed. The studies include the CPUC support memos for the grade crossings in this study, analysis of lane configurations, queues, and intersection modifications. The studies generally indicate a set of significant mitigations to the adjacent intersections along the corridor, typically moving them from LOS D, E and F to LOS A and B.

For White Ave., the results of the more rigorous gate down time methodology and the simplified queue analysis produced a difference that would require different treatments of the crossing. The proposed warning devices and pedestrian improvements are acceptable, however there could be a need to integrate White Ave. with both the Arrow Hwy. traffic signal and the Arrow Hwy. grade crossing. The effects of the queues and their operation are similar across all of the studies.

SECTION 4

Other Considerations

4.1 PTC, Railroad Signal, and Communications

The Analysis Team was charged with addressing several other concerns related to the proposed crossings. Each of the concerns are discussed individually in the following sections.

4.1.1 Ability to safely and effectively operate PTC

There are concerns in the rail industry about the new PTC systems, a major one being the operation and integration of grade crossings into the PTC system. PTC systems require that the grade crossing circuitry provide a health condition report from the crossing devices to the PTC control systems, adding additional points of failure to the system.

4.1.1.1 Crossing Interconnection

The design of the new crossings relies on the crossing circuitry already in place on the SCRRA tracks. The new circuitry on the proposed Gold Line tracks is expected to be similar to the systems installed in Phase 2A of the Gold Line. The circuitry and devices have operated effectively and were proven through the CPUC acceptance process.

Because the different trains operate on dedicated tracks, there is no reason to suspect that the circuitry and devices will not operate as they have in revenue service to this point in time. This arrangement only leaves the interconnection of the two systems to operate as a single crossing. The interconnections (less the PTC component) have been proven on the Gold Line Phase 2A crossings where the MTA and SCRRA devices have been functioning in an integrated single crossing system.

4.1.1.2 Four Quadrant Gates

The use of Four Quadrant Gates (quad gates) adds the requirement that crossings include vehicle detection within the crossing. If a vehicle is detected, the exit gates remain up and allow the vehicle to clear the crossing. The Analysis Team is not aware of any SCRRA quad gate crossings in the study area. The addition of quad gates to crossings has been applied at numerous crossings similar to the SCRRA crossings, and the Analysis Team foresees no impediment to fully implementing the vehicle detection on the existing SCRRA crossings or future PTC system if applicable.

MTA has implemented Quad Gates on Phase 2A of the Gold Line. Figure 4-1 shows the quad gate system installed on the Gold Line in Azusa, CA at N. Dalton Ave.This implementation by MTA was accepted by CPUC, therefore the Analysis Team foresees no impediment to fully implementing the vehicle detection requirements on the new crossings in the study area.

Figure 4-1 Google Street View N. Dalton Ave. Azusa, CA

4.1.1.3 On board train control systems

The Gold Line has established train to wayside systems for the operator of the LRT to interact with the crossing gates at crossings adjacent to stations. The Gold Line crossings are set on timers that accommodate the normal station dwells. The operator can also activate the crossing warning devices through a train-to-wayside link at each station.

LRT dwelling at Claremont Station will affect the Indian Hill Blvd. crossing gate operations due to the distance between the station and the crossing (if Indian Hill remains at-grade). At other crossings adjacent to LRT stations, the Gold Line has established train to wayside control loops and communication that provides for gate activation and allows the train operator to manually raise the gates for dwells longer than the dwells set by the timers.

SCRRA generally designs grade crossing warning devices adjacent to stations to remain down during station stops without timing out in all cases, except for unique crossings such as Gary Ave. This reduces and likely eliminates the need for any interaction beyond the PTC related functions.

4.1.1.4 Possibility of applying grade crossing near-side signal stop/PTC technology

On the surface, having a near-side signal that could be activated from the control cab of the train would seem to be just a modern update of the crossing start (for gates down) that the train activates after the station dwell, but it quickly gets more complicated, depending on the operating plan and PTC. The existing conditions at the Claremont Station and the adjacent College Ave. crossing, highlight some of the key issues.

Some issues must be addressed in the implementation of an outbound near-side signal at the east end of the station platform.

1. The first issue to consider is whether the near-side signal would be an absolute signal. Making it an absolute signal would prevent a train from proceeding past the signal and would provide the PTC system with a defined target. To get past the signal it would need to be cleared by either a request from the control cab of the train, or from a Control Operator. Item 3 below discusses how the crossing could be handled. Regardless of the signal's indication, the entire route would need to be locked to the next interlocking to prevent routing an opposing move into the block in advance of the near-side signal.

2. The next issue is how to set the routes in the PTC system so that the freight train or a commuter express train could run outbound unimpeded. The freight/express route request would set the nearside signal to a more permissive aspect. If the train is a local, then the system would have to set a route that sets the nearside signal to STOP. In Denver, this is apparently beyond the capabilities of the PTC implementation; we are unsure if the SCRRA implementation could handle this.

3. Another issue is how to handle the crossing. This is less complex to implement, but needs to be considered. Under PTC operation, the near-side signal is a target point and the PTC system enforces the stop.

   - The first case is for a through train when the near-side signal is cleared without intervention. The gates would operate as they would normally under the PTC system.
   - Another method, when the nearside signal is set to STOP, would be to simply hold the gates down as they currently are, but this eliminates the need for the near-side signal.
   - With the near-side signal setup as an Absolute signal, PTC would enforce the stop, and any subsequent request to clear the signal would start a timer that in turn would activate the crossing warning devices. After the appropriate interval on the timer, the signal would upgrade from STOP and the train could proceed at the indicated speed. This method uses the nearside signal to minimize the gate down time.

4. Another approach to the near-side signal would be to make the nearside signal an absolute signal at the crossing rather than the end of the station. The signal could be cleared by the dispatcher for an express or freight train or auto routed by platform occupancy and timers. The timers would be set to allow for the train to pull into the station, stop, dwell to load and unload, then start the crossing. The downside is if a train is delayed in the station, the WTs would be longer. Therefore, a better approach may be to install a detection circuit at the end of the platform (AFO, Axle counter, etc.) As the train pulls out of the platform and occupies this detection circuit the crossing would activate clearing the signal once the entrance gates have reached the horizontal position. This approach would be more indicative to a "Positive Start" already used on the SCRRA system simply modified to accommodate a nearside absolute signal. There have been preliminary discussions between MTA and SCRRA on this implementation, and discussions are expected to continue.

5. The last method we'll discuss is outside the box, but is based on older techniques adapted to work within PTC controls. In this case, the near-side signal is an automatic signal, where a STOP aspect is displayed and would be enforced by PTC. Under a through-PTC route it could be set to display any permissive aspect. Under a PTC route with a station stop, the nearside signal would display a STOP aspect. If the PTC implementation allowed, the train could then creep towards the near-side signal, since the most restrictive indication is a STOP and PROCEED. The near-side signal would be placed farther east of the head-end stopping location, and the island circuit would be extended to just east of the stopping location in the rear of the nearside signal. In effect, the train would creep onto the island circuit without passing the signal. The action of entering the island circuit would start a timer that would automatically request a signal upgrade, allowing the train to proceed without having to call for the signal. Timetable Special Instructions would detail this operation to the operator. Thus, under the rules, with the cab signal upgraded and the train in advance of the signal, the train could then proceed at the maximum indicated speed instead of at restricted speed.

4.2 Grade Crossing Geometry

The Analysis Team has reviewed the crossing geometry, and has determined that there are no significant opportunities or need to improve the geometric conditions at the White Ave. crossing.

During construction, tree trimming may be required to maximize the sight lines and sight triangles.

4.2.1 Driveway within the Crossing

The industrial driveway is a unique aspect of this crossing. The Advanced Concept Engineering Plans do not show any driveway at its existing location, and the Analysis Team was told that the industry is being purchased and the driveway will be eliminated.

4.3 Operation of Warning Devices

4.3.1 Vehicle Devices

For interconnected adjacent crossings configured as shown in AREMA Figure 3111-1 like White Ave., Part 3.1.11 of the AREMA Manual states that the operation should flash all lights and lower both gates with activation on either track.

The proposed White Ave. crossing has exit gates in a four-quadrant arrangement. CPUC GO 75-D Paragraph 6.6 c) requires that the exit gates be controlled by a presence detection device, referred to as Dynamic Exit Gate Operating Mode (Dynamic EGOM) in the AREMA and CAMUTCD documents.

GO 75-D Paragraph 6.6 b) specifies the gate sequencing and referenced CAMUTCD for additional requirements.

Section 8C.06 of the CAMUTCD details the design and operation of Four Quadrant crossing gates.

The Vehicle Warning Devices at White Ave. are expected to operate in accordance with these standards.

4.3.2 Pedestrian Devices

AREMA and CPUC provide no specific guidance for the operation of pedestrian warning devices. The SCRRA Grade Crossing Manual describes the selection methodology, and type of devices and the SCRRA ES-4000 Standard Drawings present details for the physical configuration.

The configuration of the pedestrian devices has been proven to limit the frequency of pedestrians who avoid the warning devices, however, people can still actively circumvent the warning devices by taking extraordinary steps.

The configuration at White Ave. allows for safe pedestrian refuge between the LRT and Metrolink tracks. The Pedestrian gates treat the SCRRA tracks as a separate crossing from the LRT/freight tracks with entrance and exit gates provided at each crossing. This results in warning and a pedestrian refuge between the tracks. The refuge area allows for shorter walking distance compared to pedestrians walking across all tracks during warning activation.

4.4 Active Warning Device Performance and Reliability

At this point in the design, the specific equipment manufacturers cannot be determined, however the type of devices required are similar to those devices already deployed on both Metrolink and the earlier phases of the Gold Line. These are used throughout the rail and transit industry including the Class 1 freight railroads. Performance and reliability of the general equipment type and manufacturers are known and are at acceptable levels for wide spread adoption.

The Illinois High-Speed Rail Four-Quadrant Gate Reliability Assessment study has detailed information on the probability and causes of failures of four-quadrant gated crossings. A link to the study is included in Appendix B. The result of the finding is that for a 10 train a day HSR route, the failures did not appreciably delay the operating schedule.

4.5 Need for Interconnecting Gold Line and SCRRA Warning Devices

The need to interconnect gates presumes that there is a potential configuration where the crossing is comprised of two independent crossings. The AREMA C&S Manual provides guidance in Part 3.1.11. Part 3.1.11 also includes guidance concerning timing if vehicles queue onto an adjacent track. Figure 3111-1 in the AREMA guidance shows that for crossings within 100 feet of each other, a single set of warning devices are used. Part 3.1.11 also describes how the devices are intended to function in response to train activations.

Figure 4-2 presents the Analysis Team's assessment for the minimum possible distance between the tracks where there would be no possibility of a queue on the adjacent track based on the length of the maximum design vehicle. As shown in AREMA Figure 3111-2, crossings between 100' and 200' apart are treated as separate crossings but require interconnection. Based on crossing configurations within the study area, the minimum track spacing to fit a WB-67 design vehicle is 117 feet between two independent crossings.

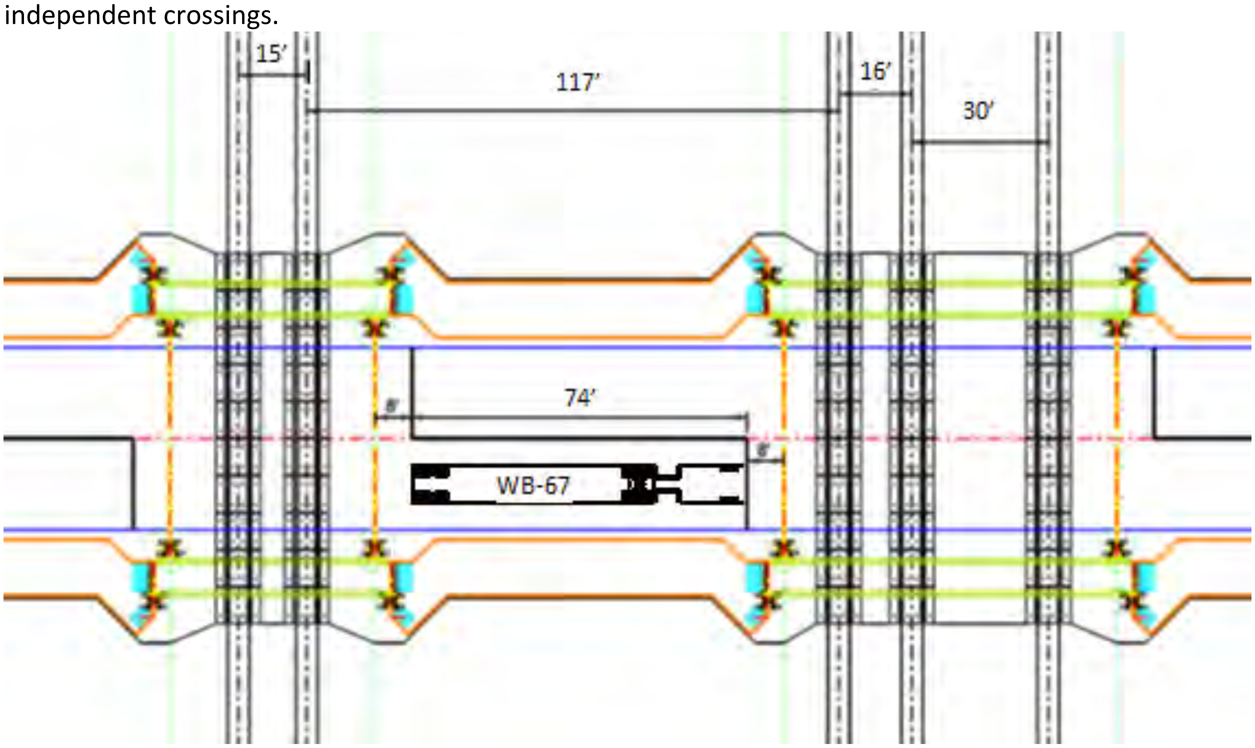


Figure 4-2 Minimum Track Spacing for WB-67 Vehicle Clearance

The proposed track configuration at White Ave. has only 43 feet between the adjacent Gold Line and SCRRA tracks, requiring that the crossings be interconnected to operate as a single joint grade crossing.

The interconnection of the two sets of controllers is not a significant technical issue. The issue is of an administrative nature. Different systems have taken different paths. Utah Transit Authority's Front Runner commuter line shares crossings with the Union Pacific. Their solution was to have each operator maintain the gates adjacent to their tracks and to have joint testing. FRA had an issue with this arrangement, until a single phone number to report crossing issues was instituted for each of the crossings in place of individual UTA and UPRR numbers. In Denver, each crossing has a single party responsible for the crossing. Where two adjacent crossings are interconnected, each operator maintains its own crossing, but joint inspections and troubleshooting are performed.

A maintenance and operations agreement will be implemented between MTA and SCRRA, that further details maintenance of crossing equipment.

4.6 Preliminary Advanced Preemption Calculations

White Ave. is a mid-block crossing. Previous traffic studies performed as part of the FEIR documents have indicated that no advanced pre-emption is required. The Analysis Team believes that queue loop interconnection and/or advanced pre-emption of the White Ave. and Arrow Hwy. crossings could be required for proper queue management at the crossing and the roadway intersection.

4.7 Quiet zones in the Future

The study area for the crossings between White Ave. (MP 30.33) and Claremont Blvd. (MP 33.68) includes two crossings not analysed in this report, N. Garey Ave. (MP 31.23) and N. Towne Ave. (MP 31.91). At these crossings, the Gold Line will be grade-separated with reconfigurations of the existing tracks.

The addition of the Gold Line trains to the six at-grade crossings in the study area is mitigated to some extent by the grade separations at N. Garey Ave. and N. Towne Ave. The upgrades to the existing warning devices that will result in Four Quadrant Gates and/or medians at all of the crossings in the study area are further mitigation for the addition of the Gold Line trains. These mitigations may be adequate to meet the goals of the FRA's Quiet Zone application process and the requirements of the 'Horn Rule' regulations that form the underpinnings of the Quiet Zone process.

For the SCRRA service increases through the study area stated in their 2025 Long Range Plan, the modifications and upgrades to the existing warning devices that will result in Four Quadrant Gates at all crossings in the study area may be sufficient to accommodate the additional Metrolink trains and still meet the FRA's requirements for the Quiet Zone.

SECTION 5

Conclusions and Recommendations

5.1 Conclusions

1. The grade crossing equipment proposed in the Advanced Conceptual Design drawing set is configured similarly to the crossings in Phase 2A of the Gold Line extension in Azusa.
2. The gate down times and the resulting traffic queues provide potentially significant impacts and are much larger in magnitude than those presented in the update to the FEIR analysis.
3. In the 2035 built-out state, the accident rate predicted by the APM is lower than the accident rate calculated in WBAPS for the current conditions.
4. Grade separation may not be required at this location based on the analysis in this document, however further study is required to determine if the traffic impacts of longer gate down times can be managed with the at-grade crossing.

5.2 Recommendations

1. The final design of the grade crossing at White Ave. should include adding lighting to the crossing to meet the requirements of ANSI/IEC RP-8 and the CAMUTCD.
2. Interconnecting the White Ave. crossing to the White Ave. and Arrow Hwy. intersection by queue loop and/or advanced pre-emption should be studied.
3. The queue for northbound White Ave. is longer than the available storage length between the crossing and Arrow Hwy. Additional study of possible intersection modifications is recommended to help manage the longer queue lengths.
4. Cantilever traffic signals should be considered for the north approach (southbound traffic lanes) to act as a pre-signal or queue cutter depending on application.

Exhibit G:

La Verne Multi-Location Traffic Study

Gold Line/Metrolink Impacted Intersections

Traffic Simulation and Modeling Analysis Report

April 18, 2018

Gold Line Foothill Extension Authority

Table of Contents

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List of Figures

List of Tables

List of Appendices

Executive Summary

A traffic simulation and operations analysis was prepared to analyze the impacts to Arrow Highway, D Street, E Street/Fairplex Drive and White Avenue with both the Gold Line Phase 2B Extension Project and Southern California Regional Rail Authority's (SCRRA) Metrolink Lone Hill to CP White Double-Track projects in operation. The study area for the proposed SCRRA Metrolink Lone Hill to CP White Double-Track and Gold Line Phase 2B Extension projects is in the City of La Verne, CA. The Gold Line Authority is also proposing to implement a passenger station that includes a parking garage with access to Arrow Highway between E Street/Fairplex Drive and the SCRRA Metrolink crossing on Arrow Highway.

The study corridor includes five signalized intersections and five at-grade crossings along Arrow Highway, E Street/Fairplex Drive and White Avenue (Introduction Section). There are four scenarios that were studied as listed in **Table 1** below:

Table 1: Scenario Comparison

Features	Scenario			
	Existing Conditions	2035 No-Build Conditions	2035 No-Build Conditions with Improvements	2035 Build Conditions
Background Traffic Growth (0.6%/year)		X	X	X
La Verne Old Town Specific Plan		X	X	X
Freight	X	X	X	X
SCRRA Lone Hill to CP White Double-Track Project		X	X	X
Gold Line and Parking Garage				X

Based on the analysis of the scenarios described above, the traffic operations under the 2035 Build Conditions are better than the 2035 No-Build Conditions and are comparable to the 2035 No-Build with Improvements, providing an acceptable Level of Service (LOS D or better) at each study intersection.

Table 2 below shows the list of recommended improvements recommended for the 2035 No-Build and Build Conditions. These recommendations are proposed to address the increase in overall traffic/SCRRA Metrolink operations (2035 No-Build) and Gold Line operations (2035 Build) in the study area:

Table 2: List of Proposed Improvements

Proposed Recommendations		
Improvement	Recommended for No-Build Condition	Recommended for Build Condition
D Street and Arrow Highway • Provide westbound right turn lane (100' minimum)		X
E Street/Fairplex Dr and Arrow Highway • Provide northbound dual left turn lanes (185' minimum) by restriping or constructing an additional lane	X	*
E Street/Fairplex Dr and Arrow Highway • Provide an additional northbound through lane; • Provide 2 receiving lanes on north leg of intersection (as a minimum up to 1st alley way); and • Provide westbound right turn lane (180' minimum)		X
White Avenue and Arrow Highway • Provide northbound dual left turn lanes (225' minimum) by restriping or constructing an additional lane; and • Provide a right turn lane on eastbound approach (230' minimum)	X	*
Bonita Avenue and White Avenue • Provide a right turn lane on eastbound and westbound approaches (235' and 220' minimum) • Provide a left-turn lane, one through lane, and one shared through/right turn lane on northbound and southbound approaches	X	*
Arrow Highway between White Avenue and D Street • Maintain three westbound through lanes, as this existing through capacity (2600 vehicles per hour) is needed to address the heavy westbound movements (2250 vehicles per hour) • Consider an off-street bike path or a parallel facility (in lieu of removing a through traffic lane) in this area	X	*
White Avenue between 1st Street and 6th Street • Provide a 4-lane roadway to increase queue capacity at rail road crossing	X	*
Construct pre-signal at 4 locations • Eastbound approach on Arrow Highway at SCRRA Metrolink crossing; • Northbound approach on Fairplex Drive at SCRRA Metrolink crossing; • Westbound approach on Arrow Highway at SCRRA Metrolink crossing; and • Southbound approach on White Avenue at Pasadena Subdivision/San Gabriel Subdivision/SCRRA Metrolink/Proposed Gold Line	X	*

*Required for No-Build Condition

With the proposed improvements at these intersections/roadway segments, the existing and proposed rail crossings along White Avenue can operate as at-grade crossings.

1. Introduction

1.1 Overview and Study Goals

The Metro Gold Line Foothill Extension Construction Authority (Authority) proposes to extend the Metro Gold Line alignment from the Azusa-Citrus Station eastward approximately 12.3 miles to the City of Montclair Transportation Center (also known as "the Gold Line Phase 2B Extension Project. The Southern California Regional Rail Authority (SCRRA) proposes to double-track their existing Metrolink commuter rail line through the La Verne, CA area, through their Lone Hill to CP White Double-Track project. Concerns have been raised regarding the La Verne area, where the Gold Line Phase 2B Extension project and the SCRRA Metrolink Lone Hill to CP White Double-Track project are in close proximity to each other. The study area, shown in **Figure 1**, also includes freight lines running Union Pacific and BNSF trains on the Pasadena Subdivision and San Gabriel Subdivision tracks. In order to determine whether the proposed Gold Line Phase 2B Extension project requires improvements at any of the existing at-grade intersections, a traffic simulation and traffic operations analysis was prepared to analyze the impacts to Arrow Highway, D Street, E Street/Fairplex Drive and White Avenue with both the Gold Line Foothill Extension and SCRRA Metrolink Lone Hill to CP White Double-Track projects in operation. In conjunction with the Foothills Extension project, the Authority is also proposing to implement a passenger station that includes a parking garage with access to Arrow Highway between E Street/Fairplex Drive and the SCRRA Metrolink tracks.

1.2 Study Limits

The limits of the study area are in the City of La Verne along Arrow Highway from D Street to White Avenue, Fairplex Drive from Puddingstone Drive to Arrow Highway and White Avenue south of from Arrow Highway to Bonita Avenue. The study area includes the analysis of five signalized intersections and five at-grade crossings as listed below (shown in **Figure 1)**:

Signalized Intersections:

- Arrow Highway and D Street
- Arrow Highway and E Street/Fairplex Drive
- Arrow Highway and White Avenue
- Fairplex Drive and Puddingstone Drive
- White Avenue and Bonita Avenue

At-Grade Crossings:

- D Street and Pasadena Subdivision/Proposed Gold Line
- E Street and Pasadena Subdivision/Proposed Gold Line
- Fairplex Drive and SCRRA Metrolink/San Gabriel Subdivision
- Arrow Highway and SCRRA Metrolink/San Gabriel Subdivision
- White Avenue and Pasadena Subdivision/San Gabriel Subdivision/SCRRA Metrolink/Proposed Gold Line

1.3 Other Related Projects

The City of La Verne is proposing a bike path on north side of Arrow Highway, which will reduce the westbound through lanes from 3 lanes to 2 lanes between White Avenue and Wheeler Avenue.

Through the Old Town La Verne Specific Plan, the City of La Verne is encouraging significant redevelopment of the Old Town La Verne area, encompassing the study area and areas to the north and west of the study area.

The impact of these projects has been considered in the analyses associated with this project.

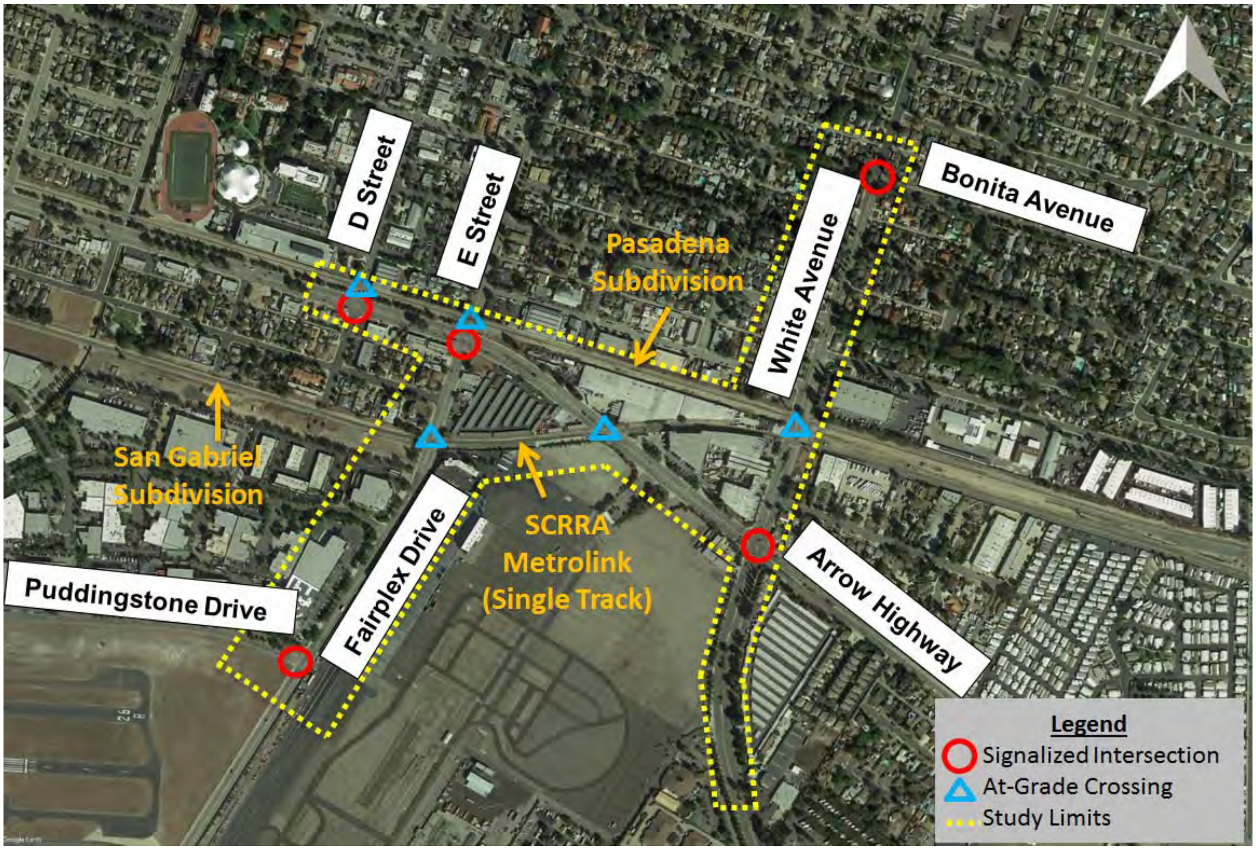

Figure 1: Study Area

2. Study Assumptions and Scenarios

2.1 Scenarios

In order to determine the impact of the proposed Gold Line Phase 2B Extension project on the intersections and at-grade crossings in the study area, the following scenarios were analyzed.

2.1.1 Existing Conditions

The Existing Conditions scenario represents current (or recent) conditions in the study area, incorporating recent traffic counts (2010, 2016 and 2017), existing roadway geometry, existing traffic signal timings, and existing SCRRA Metrolink commuter rail line and Pasadena Subdivision rail operations. The purpose of this scenario is to calibrate the traffic simulation model, making sure the model outputs match, as closely as possible, current conditions in the study area.

2.1.2 2035 No-Build Conditions

The 2035 No-Build Conditions scenario includes the items in the Existing Conditions scenario, but also incorporates regional growth in traffic volumes (0.6% per year) to the analysis year of 2035. This scenario also includes the projected redevelopment of the Old Town La Verne area, as envisioned in the Old Town La Verne Specific Plan, the proposed double-tracking of the SCRRA Metrolink commuter rail line through the Lone Hill to CP White Double-Track project, and the City of La Verne's proposal to replace one westbound lane on Arrow Highway (between White Avenue and Wheeler Avenue) with a bike path. The purpose of this scenario is to isolate the improvements needed to address conditions ***other than*** the proposed Gold Line Phase 2B Extension project.

2.1.3 2035 No-Build Conditions with Improvements

The 2035 No-Build Conditions with Improvements scenario includes all of the elements of the 2035 No-Build Conditions scenario, but incorporates improvements needed to address the anticipated congestion associated with regional growth and the proposed double-tracking of the SCRRA Metrolink commuter rail line. The purpose of this scenario is to create a new baseline against which the impacts of the proposed Gold Line Phase 2B Extension project can be measured.

2.1.4 2035 Build Conditions

The 2035 Build Conditions scenario includes the elements of the above scenarios, but also includes the proposed Gold Line Foot Hills Extension project. The purpose of this scenario is to identify what improvements are needed to address the impacts of just the Gold Line Phase 2B Extension project.

A summary of these scenarios is shown in **Table 1** (Executive Summary).

2.2 Traffic Model Methodology and Measures of Effectiveness

2.2.1 Traffic Model Methodology

The traffic operations analysis for all of the aforementioned scenarios was performed using VISSIM microscopic simulation software version 8.00-06. VISSIM is a microscopic, time-step and behavior-based simulation software developed to model urban traffic, transit, rail and pedestrian operations. The software analyzes traffic, transit, rail and pedestrian operations under a series of constraints, such as lane configuration, traffic composition, traffic control types, and transit stops, among others.

When analyzing each scenario, in order to ensure that the build-up and dissipation of the congestion occurs during the peak hour, the simulations were run for 75 minutes. This includes the actual peak hour (60 minutes) and pre-load period of 15 minutes, also called a “shoulder period,” which is a standard practice in microscopic simulation and recommended by Federal Highway Administration (FHWA).

2.2.2 Measures of Effectiveness

VISSIM provides a large number of options for outputs. For this project, the node evaluation output file was used to determine traffic operations at the intersections and at-grade crossings. From the node evaluation output, the Measures of Effectiveness (MOEs) of throughput and delay were selected, both of which help to determine the Level of Service (LOS) of an intersection.

LOS is a qualitative measure of the operational efficiency or effectiveness of a roadway. Six LOS categories are defined and are designated by letters ranging from “A” through “F”, with LOS “A” representing the best range of operating conditions and LOS “F” representing the worst. The criteria for Level of Service at unsignalized and signalized intersections are shown in **Table 3**.

Table 3: Signalized Intersection Level of Service Criteria

Level of Service	Signalized Intersection (Average Control Delay (seconds/vehicle))
A	≤ 10
B	10 - 20
C	20 - 35
D	35 - 55
E	55 - 80
F	≥ 80

Source: Highway Capacity Manual 6th Edition

From the node evaluation output, VISSIM also reports average and maximum queue lengths for each of the movements at an intersection. Average queues are measured for every time interval and an arithmetical average of the average queue is computed for the entire peak hour. The maximum queues are measured for every time interval and the maximum queue length is computed for the entire peak hour. Average queues are likely to occur each signal cycle, whereas maximum queues will occur rarely.

3. Existing Conditions

3.1 Geometry

Existing number of lanes for the roadway network in the study corridor as described below:

- Arrow Highway is a six-lane divided arterial from D Street to White Avenue.
- Fairplex Drive is a four-lane undivided arterial from Puddingstone Drive to Arrow Highway and E Street is a two-lane undivided roadway north of Arrow Highway.
- White Avenue is a four-lane divided arterial from south of Arrow Highway to 1st Street, and three-lane undivided arterial from 1st Street to Bonita Avenue.

3.2 Traffic Volumes

Existing morning and afternoon peak hour turning movement counts were gathered from the February 2013 Metro Gold Line Foothill Extension Azusa to Montclair Final Environmental Impact Report (FEIR), Lone Hill to CP White Double-Track Project (Traffic Analysis Report by LIN Consulting from September 28, 2016), and current counts (collected by LIN Consulting on January 18, 2017). From all of the above information, the morning peak hour is defined from 7:15 to 8:15 AM and the afternoon peak hour is defined from 5:00 to 6:00 PM. The following is a list of study intersections that were collected from each source:

- D Street and Arrow Highway (FEIR)
- 1st Street and E Street (FEIR)
- E Street/Fairplex Drive and Arrow Highway (Lone Hill to CP White Double-Track)
- Walnut Street and Fairplex Drive (Lone Hill to CP White Double-Track)
- Puddingstone Drive and Fairplex Drive (Lone Hill to CP White Double-Track)
- Bonita Avenue and White Avenue (Lone Hill to CP White Double-Track)
- 1st Street and White Avenue (FEIR)
- Arrow Highway and White Avenue (Lone Hill to CP White Double-Track)
- Sierra Way and White Avenue (counts collected on January 18, 2017)

The traffic volumes obtained from the 2013 FEIR were based on the year 2010, and a growth rate of 0.6% (obtained from 2013 FEIR for the City of La Verne) was used to project the traffic from 2010 to the 2016 analysis year.

All of the traffic counts went through a comprehensive screening process to identify potential irregularities. For the 2016 AM peak hour and PM peak hour, the volumes look comparable between all sources. Except the PM peak hour counts from White Double-Track project shows higher traffic along eastbound Arrow Highway (at E Street/Fairplex Drive and White Avenue) compared to the 2013 FEIR study. It has been discussed with the Authority staff and determined that the Lone Hill to CP White Double-Track project counts (September 2016) are more recent and more conservative to assume in this study. After the screening process, all intersection counts were adjusted and balanced accordingly. The peak hour volumes for both the AM Peak Hour and the PM Peak Hour are provided in **Appendix A.**

Observations from our review of traffic volumes and anecdotal information provided by others include:

- The roadways in the study area are heavily directional, with the heavy directions being westbound on Arrow Highway and southbound on White Avenue in the AM Peak period; and eastbound on Arrow Highway and northbound on White Avenue in the PM Peak period.
- Based on recent counts, directionalities are 68%/32% for westbound/eastbound on Arrow Highway, and 55%/45% for southbound/northbound on White Avenue.
- The heaviest areas of congestion (and the longest queues) exist along White Avenue between Arrow Highway and Bonita Avenue; and along Arrow Highway between White Avenue and D Street.
- The PM Peak Hour represents the worst congestion on a daily basis.

3.3 Traffic Signal Timings

For each of the signalized intersections, traffic signal timings plans were requested and provided by the city of La Verne. A Synchro model was developed and coded with the signal timings received from the city. These signal timings were then imported directly from Synchro to VISSIM. The signal timings received are provided in **Appendix B.**

3.4 Travel Time Runs

As part of the existing conditions VISSIM microsimulation calibration, travel time runs were collected (January 18, 2017) during the morning (7:00-9:00 AM) and afternoon peak period (4:00 to 6:00 PM). A total of 8 runs were collected in each direction.

- Arrow Highway from D Street to Miramonte Drive/Lordsburg Court
- White Avenue from south of Arrow Highway to Bonita Avenue
- E Street/Fairplex Drive from Puddingstone Drive to 1st Street

These travel time runs were then used in the model calibration process, with the goal of making sure the traffic simulation model is properly representing field conditions.

3.5 Train Information

For the existing conditions two railroad subdivisions within the project area were considered. One is the Pasadena Subdivision with one daily BNSF freight train operating on this segment. The other is the San Gabriel Subdivision which has SCRRA Metrolink passenger trains and Union Pacific Railroad (UPRR) freight trains operating on it (See Figure 1).

The Pasadena Subdivision at-grade crossings within the study area include D Street, E Street and White Avenue. The San Gabriel Subdivision at-grade crossings within the study area include Fairplex Drive, Arrow Highway and White Avenue. All existing grade crossings are equipped with active warning devices as described in the most recent FRA crossing inventory forms.

The following train assumptions are based on the coordination with SCRRA and Gold Line Authority:

SCRRA Metrolink:

- Total Length: ~ 575’
- Speed: 40 MPH in the Vicinity of this study on San Gabriel Subdivision
- Frequency: Two in the AM Peak Hour and two in the PM Peak Hour
- Warning Time for White Avenue = 48 to 52 seconds (westbound and eastbound)
- Warning Time for Arrow Highway = 42 - 46 seconds (westbound and eastbound)
- Warning Time for Fairplex Drive = 38 - 42 seconds (eastbound and westbound)
- Total Train operations (at Fairplex Drive/ Arrow Highway and White Avenue) =55-69 seconds

BNSF:

- Total Length: ~ 945’
- Speed: 40 MPH in the Vicinity of this study on Pasadena Subdivision
- Frequency: None during the AM Peak Hour and one train during the PM Peak Hour
- Warning Time for White Avenue = 39 seconds
- Warning Time for D Street/ E Street =30 seconds
- Total Train operations (at White Avenue, E Street and D Street) =55-59 seconds
- Advance Preemption for E Street/ D Street = 39 seconds

3.6 Traffic Model Development and Calibration

Applying the following steps, the AM Peak Hour and PM Peak Hour VISSIM models were developed and calibrated to existing field conditions:

- Scale and import background aerial image of the corridor
- Develop network geometry (number of lanes, lane widths, acceleration/deceleration lane lengths)
- Code Desired Speed Decisions
- Code Reduced Speed Areas where appropriate
- Code Priority Rules/Conflict Areas
- Code Signal Controllers and Signal Heads (signal timings)
- Code Volume Inputs and Routing Decisions (15 minutes of preload (also called shoulder time period) and 60 min of actual peak hour)
- Run the model to extract results
- Calibrate model

During calibration, the following output files were generated, post-processed, and the corresponding MOEs results were compared with the field data.

- Node Evaluation (used to extract delay and throughput for all the approaches at each signalized intersection)
- Travel Time (used to extract travel time from point to point for each direction)

For each peak period ten (10) simulation runs were executed and their results averaged before being compared with field data, thus minimizing the chance of outliers yielded by the stochastic component of the software.

Furthermore, the shoulder period of 15 minutes is used to prevent bias caused by an initially empty network. MOEs were only collected after the simulation had run 15 minutes of pre-load traffic. MOEs were then aggregated during the peak hour. Whenever the comparison between the model results and the field data fell outside the acceptable ranges set by the guidelines included in FHWA's *Traffic Analysis Toolbox Volume III*[1], adjustments to the model parameters were made and the simulation was run again ten (10) times to determine if the new results fell within the acceptable ranges.

To ensure satisfactory calibration of the model is achieved, standards were used to establish targets regarding traffic flows and travel times.

The targets of this calibration effort were set at the values included in *Traffic Analysis Toolbox Volume III* – Guidelines for Applying Traffic Microsimulation Modeling Software published by the Federal Highway Administration (FHWA) shown in **Figure 2** below.

[1] FHWA-HRT-04-040 Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software (July 2004)

Criteria and Measures	Calibration Acceptance Targets
Hourly Flows, Model Versus Observed	
Individual Link Flows	
Within 15%, for 700 veh/h < Flow < 2700 veh/h	> 85% of cases
Within 100 veh/h, for Flow < 700 veh/h	> 85% of cases
Within 400 veh/h, for Flow > 2700 veh/h	> 85% of cases
Sum of All Link Flows	Within 5% of sum of all link counts
GEH Statistic < 5 for Individual Link Flows*	> 85% of cases
GEH Statistic for Sum of All Link Flows	GEH < 4 for sum of all link counts
Travel Times, Model Versus Observed	
Journey Times, Network	
Within 15% (or 1 min, if higher)	> 85% of cases
Visual Audits	
Individual Link Speeds	
Visually Acceptable Speed-Flow Relationship	To analyst's satisfaction
Bottlenecks	
Visually Acceptable Queuing	To analyst's satisfaction

Figure 2: Calibration Targets - FHWA: Traffic Analysis Toolbox Volume III

During the calibration process, all of the default parameters within the model remained the same except the safety distance reduction factor. This parameter helps the vehicles perform a lane change. The default value of this parameter is “0.6” and was changed to “0.2” during the calibration process. As the study intersections are closely spaced together, this parameter helps vehicles to position in the correct lane ahead of time in order to complete the appropriate turn or through movement.

The results from both the AM Peak Hour and PM Peak Hour models show that the volume and travel time calibration thresholds are satisfied and appear to reasonably reproduce existing field traffic conditions. Tables in **Appendix C** show the detailed calibration results for volume throughput and travel time.

3.7 Existing Conditions Analysis

The analysis includes a detailed evaluation of the traffic operations at all intersections in the study area, and incorporates the SCRRA Metrolink commuter rail line and Pasadena Subdivision rail operations, along with the traffic signal timings imported from Synchro to VISSIM. **Figure 3** shows the VISSIM roadway geometry of the existing conditions within the study area.

For train operations, we modelled the SCRRA Metrolink and freight lines with the following assumptions: the SCRRA Metrolink line crosses midblock at White Avenue, Arrow Highway and E Street/Fairplex Drive, and the freight line crosses midblock at White Avenue and near the signalized intersections at E Street/Fairplex Drive/Arrow Highway and D Street/Arrow Highway. These crossing locations are illustrated in **Figure 3**. Please note the traffic volumes for intersection of Arrow Highway and D street were obtained from the 2013 FEIR which were based on the year 2010 with the growth factor.

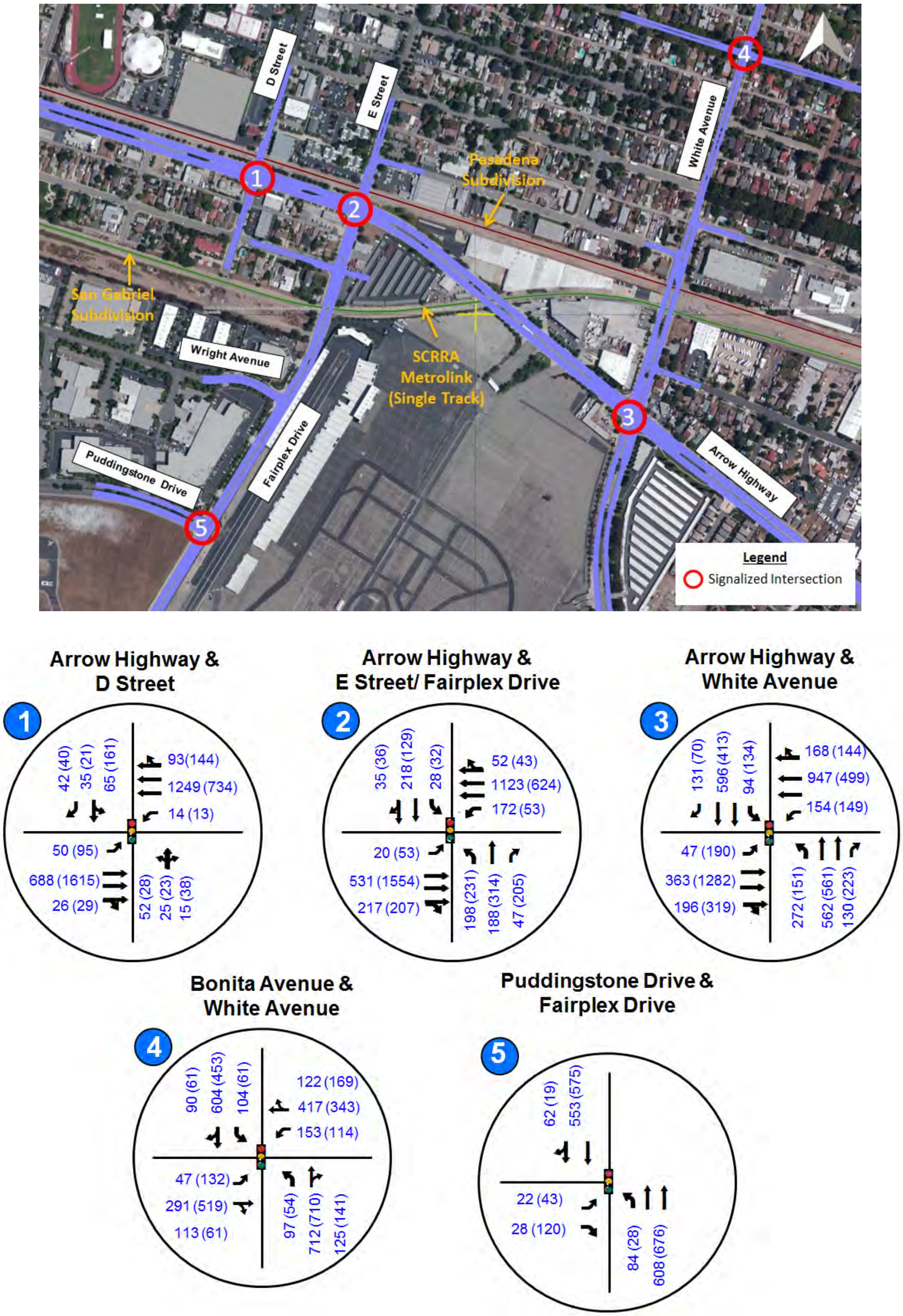

Figure 3: 2016 Existing Conditions VISSIM Network and Peak Hour Volumes – AM (PM)

Using the above information and assumptions, node evaluation output results were extracted from VISSIM simulation and compared to the input data to evaluate the operational performance of major intersections. This includes throughput and average total delay per approach at all 4 signalized intersections during the peak hour.

The overall average total delay at each signalized intersection was then calculated using a weighted average of the approach delay (seconds/vehicle), and is shown in **Table 4**.

The detailed volume processing spreadsheet, travel time processing spreadsheet and intersection evaluation spreadsheet is provided in **Appendix C.**

Table 4: 2016 Existing Conditions - AM and PM Peak Hour Intersection Delay

2016 Existing Condition (Intersection Delay/ LOS)				
Intersection	AM Peak Hour		PM Peak Hour	
	Delay (seconds/vehicle)	LOS	Delay (seconds/vehicle)	LOS
Arrow Highway & D Street	7	A	9	A
Arrow Highway & E Street / Fairplex Drive	27	C	29	C
Arrow Highway & White Avenue	41	D	40	D
Fairplex Drive & Puddingstone Drive	4	A	4	A
Bonita Avenue & White Avenue	33	C	38	D

The existing conditions analysis results show that all of the intersections in the study area are operating at LOS “D” or better during both the AM and PM peak hours. However, the eastbound approach at Bonita Avenue and White Avenue is operating close to LOS “E”.

3.7.1 Queuing Analysis

In order to determine the impact of intersection congestion on adjacent intersections and at-grade rail crossings, VISSIM model results related to lengths of average and maximum queues were extracted. The following describes the results of this process.

AM Peak hour:

While running the AM 2016 Existing Conditions model, traffic queueing/backups were observed in the following locations:

- Arrow Highway/E Street/Fairplex Drive:
    - Northbound: Due to the heavy approach volume, the maximum queue (449') backs up close to the SCRRA Metrolink tracks at-grade crossing.
- Arrow Highway/White Avenue intersection:
    - Southbound: Due to the heavy approach volume and lack of capacity in the southbound approach, the maximum queue (484') backs up close to the San Gabriel Subdivision/SCRRA Metrolink at-grade crossings.
    - Northbound: Due to the heavy approach volume, the average (251') and the maximum (676') queues at this approach extend beyond the driveway.
- Bonita Avenue/White Avenue intersection:
    - Southbound: Due to the heavy approach volumes and lack of capacity, the maximum queue (528') at this approach extends to 5th Street
    - Westbound: Due to the heavy approach volumes and lack of capacity, the maximum queue (782') extends beyond I Street.
    - Northbound: Due to the heavy approach volumes and lack of capacity, the average (257') and maximum (1106') queues at this approach backup close to the Pasadena Subdivision at-grade crossing to Arrow Highway.
    - Eastbound: Due to the heavy approach volumes and lack of capacity, the maximum queue (501') extends beyond G Street.

Figure 4 summarizes the average (in red) and maximum (in yellow) approach queues at each of the intersections during the AM Peak Hour for 2016 Existing Conditions:

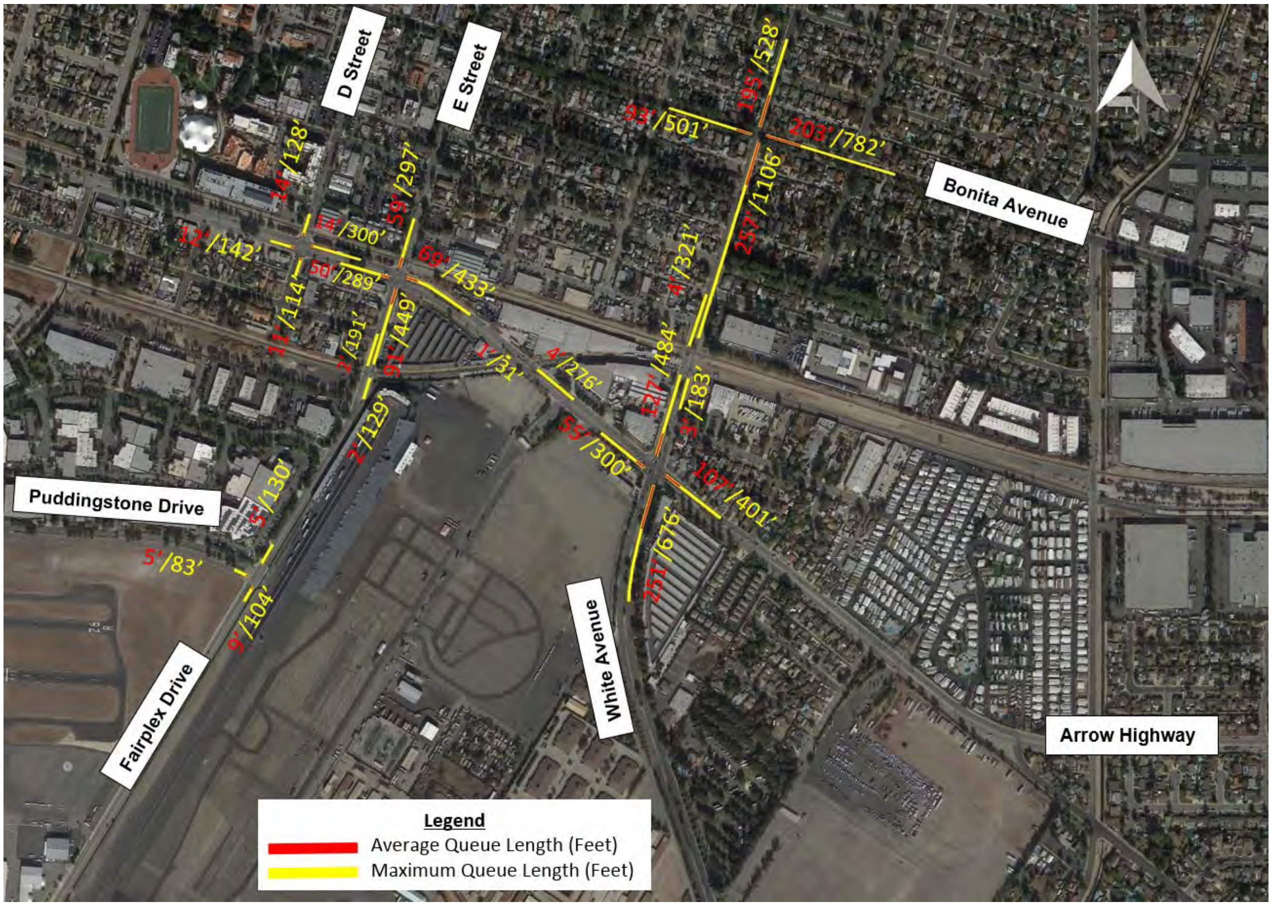

Figure 4: Average and Maximum Queue Length for 2016 Existing Condition (AM Peak Hour)

PM Peak hour:

While running the PM 2016 Existing Conditions model, the traffic queueing/backups were observed in the following locations:

- Arrow Highway/E Street/Fairplex Drive:
  - Northbound: Due to the heavy approach volume, the maximum queue (566') extends beyond the SCRRA Metrolink tracks at-grade crossing.
  - Eastbound: Due to the heavy through volume, the maximum queue (562') at this approach extends to D Street.
- Arrow Highway/White Avenue intersection:
  - Southbound: Due to the heavy approach volume and lack of capacity on the southbound approach, the maximum queue (388') extends to Sierra Way
  - Northbound: Due to the heavy approach volume the maximum (483') queue at this approach extends beyond the driveway.

   - Eastbound: Due to the heavy approach volumes, the average (218') and the maximum (886') queues at this approach back up close to the SCRRA Metrolink at-grade crossing.

- Bonita Avenue/White Avenue intersection:

   - Southbound: Due to the heavy approach volumes and lack of capacity, the maximum queue (490') at this approach extends to 5th Street

   - Westbound: Due to the heavy approach volumes and lack of capacity, the maximum queue (766') extends beyond I Street.

   - Northbound: Due to the heavy approach volumes and lack of capacity, the average (998') and maximum (2043') queues at this approach extend beyond the Pasadena Subdivision/San Gabriel Subdivision/SCRRA Metrolink at-grade crossing to Arrow Highway.

   - Eastbound: Due to the heavy approach volumes and lack of capacity, the average (432') and maximum (719') queues extend beyond G Street.

Figure 5 summarizes the average (in red) and maximum (in yellow) approach queues at each of the intersections during the PM Peak Hour for 2016 Existing Conditions:

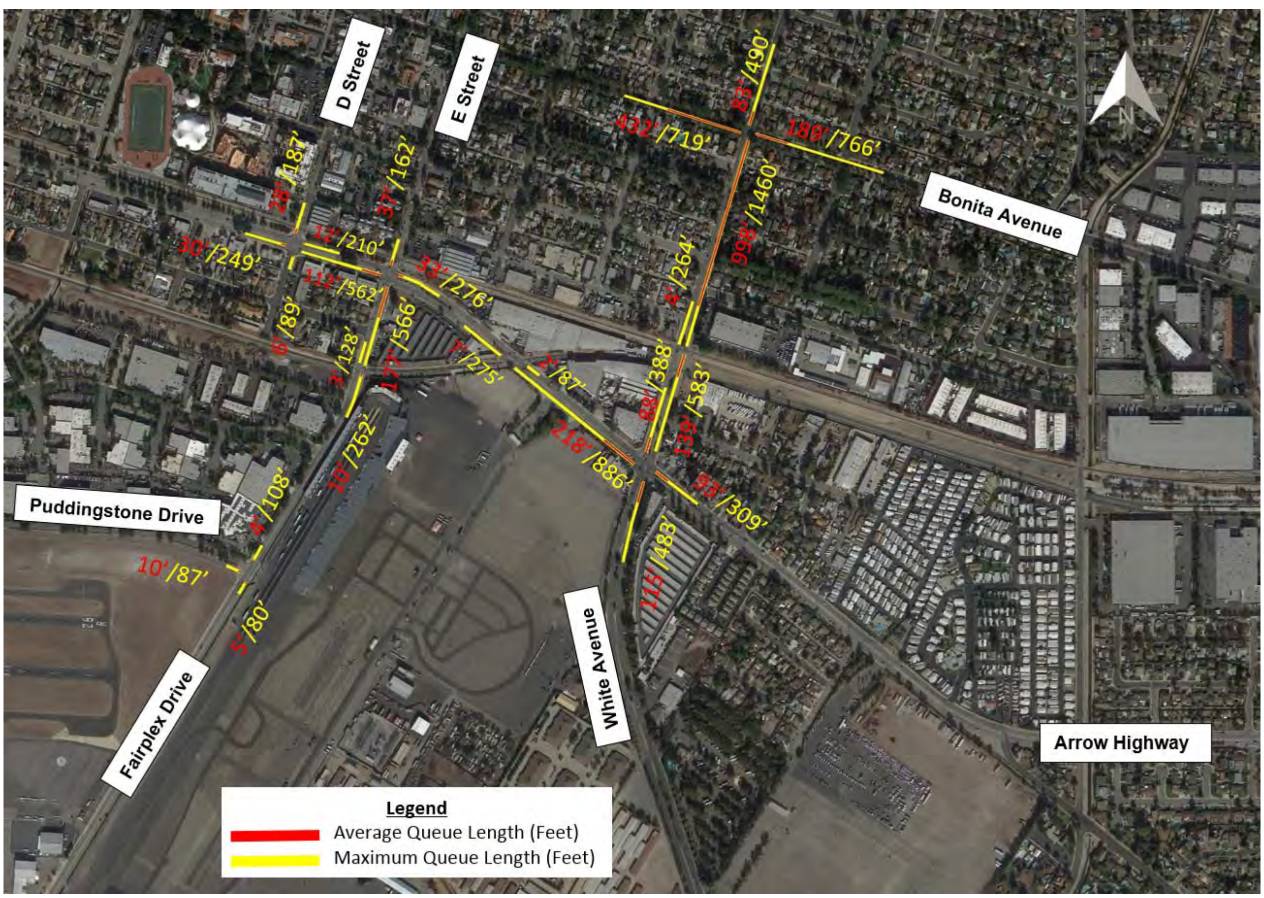

Figure 5: Average and Maximum Queue Length for 2016 Existing Condition (PM Peak Hour)

The AM and PM Peak Hour queuing analysis results indicate that there are two locations where the maximum queues spill back onto at-grade crossings as listed below:

- Queues on the northbound approach at the Fairplex Drive/ E Street/Arrow Highway intersection extend beyond the SCRRA Metrolink crossing; and
- Queues on the northbound approach at the White Avenue/Bonita Avenue intersection extend beyond the Freight/Gold Line/SCRRA Metrolink crossing

4. 2035 No-Build Conditions

The following improvements are planned by the City and SCRRA in the study area, and are incorporated into the 2035 No-Build Conditions analysis:

1. In order to provide a bike path on north side of Arrow Highway between White Avenue and Wheeler Avenue, the City of La Verne proposes to reduce the number of westbound through lanes from 3 lanes to 2 lanes.

2. SCRRA proposes to construct a second Metrolink track as part of the Lone Hill to CP White Double-Track project. According to SCRRA, the CP White Double Track project does not anticipate a change in headways, and will therefore have minimal impact on traffic operations.

4.1 2035 No-Build Traffic Volumes

The following data sources were used to develop the No-Build scenario traffic projections:

- Metro Gold Line Foothill Extension – Azusa to Montclair Environmental Impact Report (FEIR), February 2013;
- The Parking Structure and Gold Line Traffic Analysis report by LSA (ULV); and
- Traffic Counts collected by LIN Consulting, Inc. on September 28, 2016 and January 18, 2017

4.1.1 Methodology

The following steps were used in developing the traffic projections for Year 2035:

Step 1: Balance 2016 Traffic Volumes:

Based on recent traffic data collected by LIN Consulting, traffic volumes at all the study intersections were developed and balanced throughout the study area for Year 2016, AM and PM Peak Hours. In some locations that lacked data, Year 2010 traffic volumes were extracted from the 2013 FEIR and grown to Year 2016 (Section 3.2).

Step 2: Apply Growth Calculation:

The 2013 FEIR was used to determine the annual growth rate in the City of La Verne which is shown to be 0.6%. This growth rate was applied to Year 2016 volumes to develop Year 2035 volumes.

Step 3: Old Town Specific Plan and Development

The City of La Verne has developed an Old Town La Verne Specific Plan, which envisions significant redevelopment in the Old Town La Verne area. This plan envisions higher densities of residential and commercial uses within and adjacent to the study area. Based on the summary of existing land use and proposed land use within the study area from Table 2-1 and Table 2-2 of the *Old Town La Verne Specific Plan – Environmental Impact Report* (provided by the City of La Verne), the additional land uses proposed within the study area were identified and the number of additional trips (traffic volumes) generated by the new land uses were estimated using the Institute of Transportation Engineers' *Trip Generation Manual*.

The total inbound and outbound additional trips for the AM and PM peak hours due to the redevelopment of Old Town La Verne were determined and routed through the appropriate intersections within the study area.

These trips then were added to the 2035 volumes in Step 2 in order to estimate the 2035 No-Build Conditions traffic.

The traffic development process diagram and resulting No-Build peak hour volumes for both the AM and the PM peak hour are shown in **Figure 6**. Table 2-1 and Table 2-2 from the Old Town La Verne Specific Plan are provided in **Appendix D**.

Please note that based on the previous report (Lone Hill to CP White Double-Track Project), the site traffic due to the Pharmaceutical development is minimal and should be accounted by the growth assumed in the study area.

4.2 2035 No-Build Model Development

For this scenario, the VISSIM models were created using the calibrated existing conditions models. The roadway geometry was updated based on the geometric improvements listed above (Section 4). Traffic volumes were updated based on the detailed traffic projections, and the optimized signal timings from Synchro were used. **Figure 6** shows the VISSIM roadway geometry and volumes of the No-Build conditions within the study area.

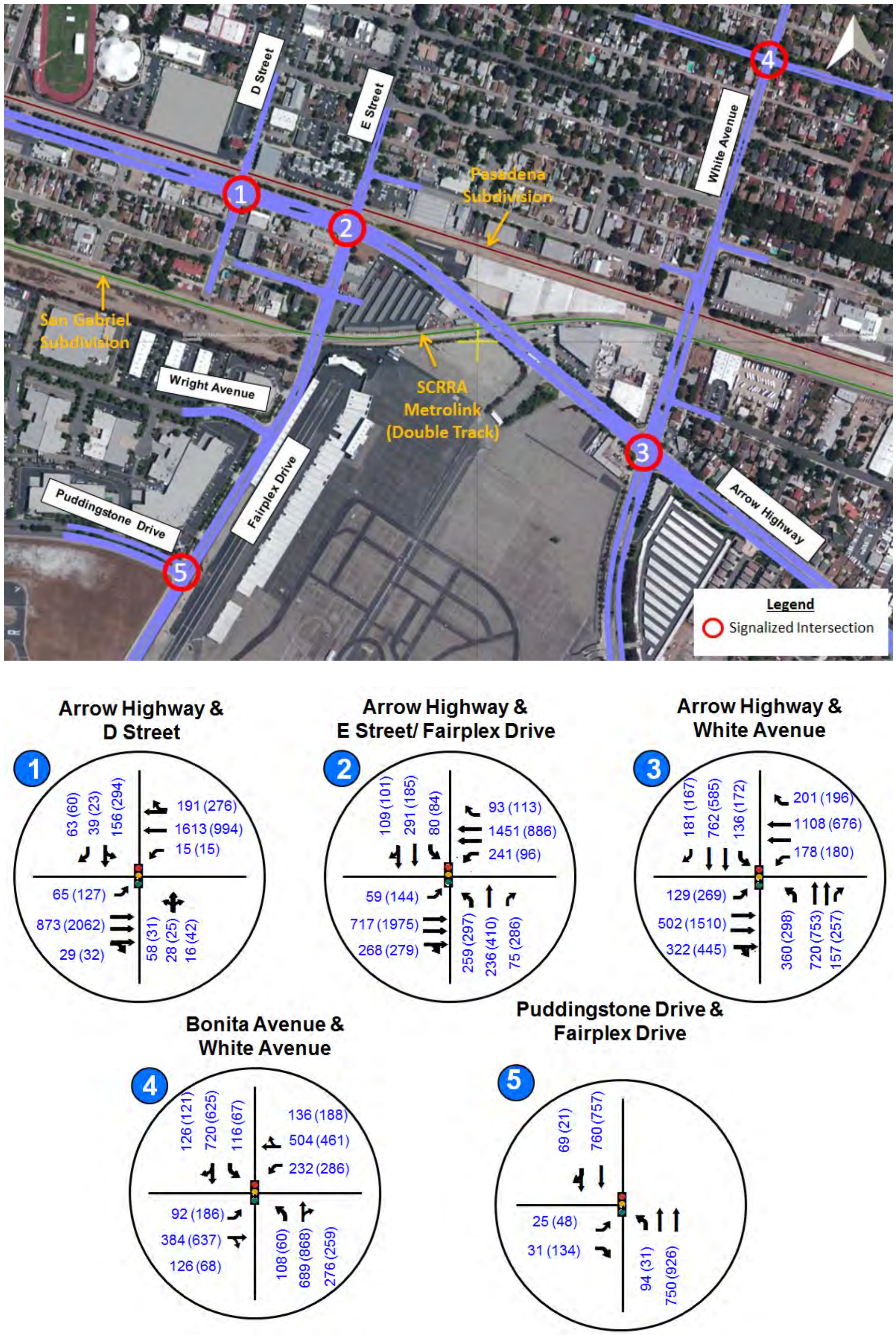

Figure 6: 2035 No-Build Conditions VISSIM Network and Peak Hour Volumes – AM (PM)

4.3 2035 No-Build Conditions Analysis

After updating the No-Build conditions VISSIM models, the models were run to extract the results. Throughput and average total delay were reported at each of the study intersections during the peak hours.

Table 5 summarizes the intersection delay (seconds/vehicle) for each intersection during both the AM and PM peak hours.

Table 5: 2035 No-Build Conditions – AM and PM Peak Hour

2035 No-Build Condition (Intersection Delay/ LOS)				
Intersection	AM Peak Hour		PM Peak Hour	
	Delay (seconds/vehicle)	LOS	Delay (seconds/vehicle)	LOS
Arrow Highway & D Street	11	B	41	D
Arrow Highway & E Street / Fairplex Drive	45	D	50	D
Arrow Highway & White Avenue	55	E	62	E
Fairplex Drive & Puddingstone Drive	4	A	4	A
Bonita Avenue & White Avenue	51	D	46	D

The AM and PM Peak Hour analysis results show that all of the intersections in the study area operate at an acceptable LOS "D" or better, with the exception of the Arrow Highway/White Avenue intersection which operates at LOS "E" during AM and PM Peak Hours.

4.3.1 Queuing Analysis

In order to determine the impact of intersection congestion on adjacent intersections and at-grade rail crossings, VISSIM model results related to lengths of average and maximum queues were extracted. The following describes the results of this process.

AM Peak hour:

While running the AM 2035 No-Build Conditions model, significant traffic queueing/backups were observed in the following locations:

- Arrow Highway/D Street:

- Southbound approach: Due to the heavy left-turn volume, the maximum queue (368’) extends to 1st Street.

- Arrow Highway/E Street/Fairplex Drive:
  - Westbound: Due to the heavy through volume and the proposed (by the City of La Verne) elimination of the westbound through lane, the average (1124’) and maximum (1685’) queues on this approach extend beyond the SCRRA Metrolink tracks at-grade crossing and to the White Avenue intersection.
  - Northbound: Due to the heavy approach volume, the maximum queue (938’) extends beyond the SCRRA Metrolink tracks at-grade crossing.

- Arrow Highway/White Avenue intersection:
  - Southbound: Due to the heavy approach volume, the proposed (by the City of La Verne) elimination of the westbound through lane on Arrow Highway (west of White Avenue), and lack of capacity in the southbound approach, the average (358’) and maximum (1821’) queues on this approach extend to the Pasadena Subdivision/San Gabriel Subdivision/SCRRA Metrolink at-grade crossings. The average queue extends to 1st Street and the maximum queue extends to Bonita Avenue intersection.
  - Westbound: Due to the heavy approach volume and the proposed (by the City of La Verne) elimination of the westbound through lane on Arrow Highway (west of White Avenue), the maximum (618’) queues extend beyond Miramonte Drive.
  - Northbound: Due to the heavy approach volume, the proposed (by the City of La Verne) elimination of the westbound through lane on Arrow Highway (west of White Avenue), and lack of capacity on White Avenue, the average (1090’) and maximum (2161’) queues on this approach extend to Fairplex Gate 9.
  - Eastbound: Due to the heavy approach volumes and lack of capacity along northbound White Avenue, the average queue (497’) on this approach extends to the Los Angeles County Fair Gate 13, and the maximum queue (1248’) extends beyond the SCRRA Metrolink at-grade crossing.

- Bonita Avenue/White Avenue intersection:
  - Southbound: Due to the heavy approach volumes and lack of capacity, the average queue (295’) on this approach extends to 5th Street and the maximum queue (522’) extends to 6th St.
  - Westbound: Due to the heavy approach volumes and lack of capacity, the average (579’) and maximum (801’) queues extend beyond I Street.
  - Northbound: Due to the heavy approach volumes and lack of capacity, the average (1634’) and maximum (1936’) queues on this approach extend beyond the Pasadena Subdivision/San Gabriel Subdivision/SCRRA Metrolink at-grade crossing and to the Arrow Highway intersection.
  - Eastbound: Due to the heavy approach volumes and lack of capacity, the average (505’) and maximum (701’) queues extend beyond G Street.

Figure 7 summarizes the average (in red) and maximum (in yellow) approach queues at each of the intersections during the AM Peak Hour for 2035 No-Build Conditions:

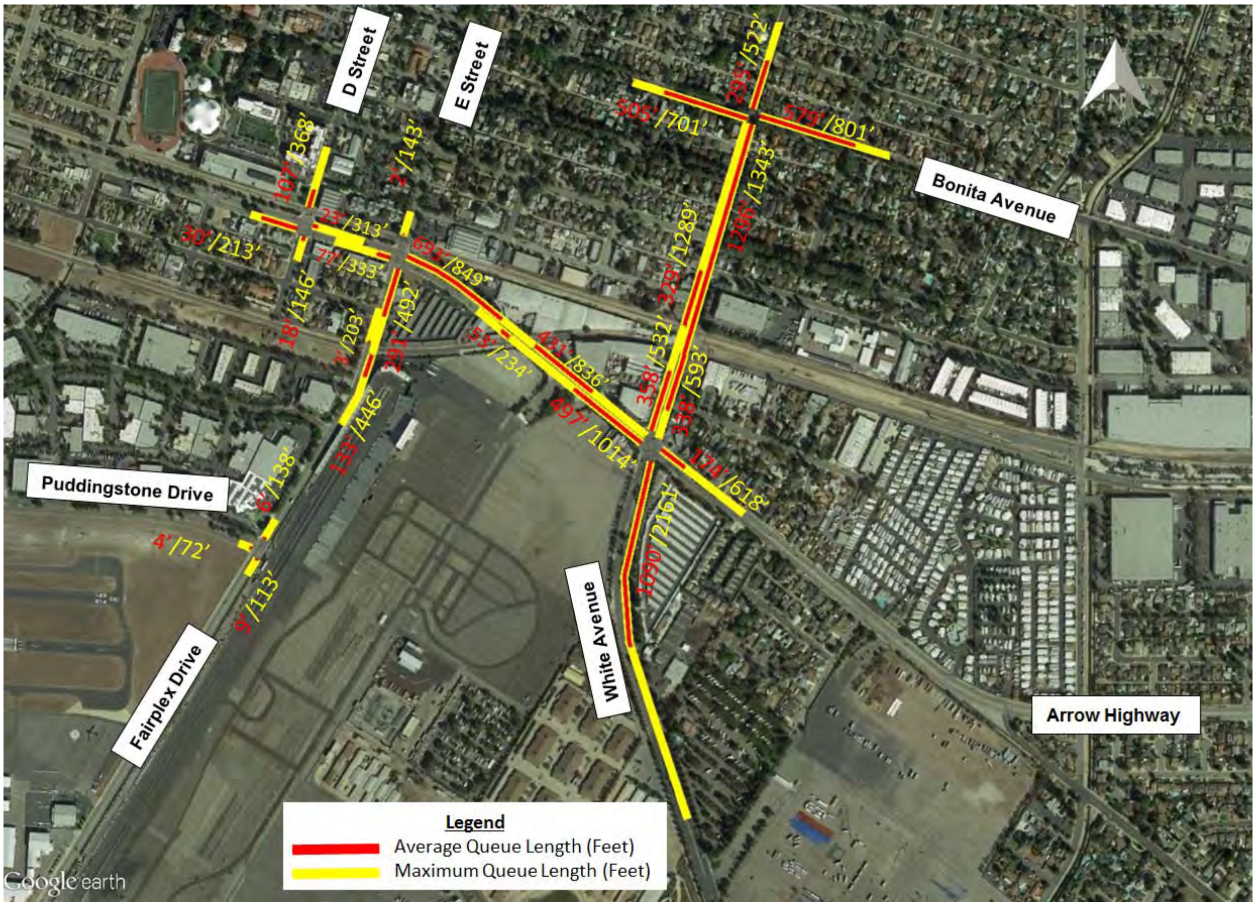

Figure 7: Average and Maximum Queue Length for 2035 No-Build Condition (AM Peak Hour)

PM Peak hour:

While running the PM 2035 No-Build Conditions model, significant traffic queueing/backups were observed in the following locations:

- Arrow Highway/D Street:
    - Southbound approach: Due to the heavy through volume, the average queue (176’) on this approach extends to the driveway from the University Garage, and the maximum queue (560’) extends to 2nd Street.
    - Eastbound approach: Due to the heavy through volumes, the average queue (754’) extends to C Street and the maximum queue (1289’) extends to B Street.

- Arrow Highway/E Street/Fairplex Drive:
  - Northbound: Due to the heavy approach volume, the average queue (293') on this approach extends to Walnut Street and the maximum queue (1235') extends beyond the SCRRA Metrolink tracks at-grade crossing.
  - Eastbound: Due to the heavy through volume, the average (298') and maximum queues (562') on this approach extend to D Street.
- Arrow Highway/White Avenue intersection:
  - Southbound: Due to the heavy approach volume, proposed (by the City of La Verne) elimination of the westbound through lane on Arrow Highway (west of White Avenue), and lack of capacity on the southbound approach, the average queue (259') extends to Sierra Way and the maximum queue (1672') extends beyond the Pasadena Subdivision/San Gabriel Subdivision/SCRRA Metrolink at-grade crossing to the 3rd Street alley.
  - Northbound: Due to the heavy approach volume, the proposed (by the City of La Verne) elimination of the westbound through lane on Arrow Highway (west of White Avenue), and lack of capacity on White Avenue, the average (1730') and maximum (2515') queues on this approach extend to Fairplex Gate 9.
  - Eastbound: Due to the heavy approach volumes and lack of capacity along northbound White Avenue, the average (1318') and maximum (1942') queues extend beyond the SCRRA Metrolink at-grade crossing.
- Bonita Avenue/White Avenue intersection:
  - Southbound: Due to the heavy approach volumes and lack of capacity, the average queue (205') on this approach extends to 5th Street and the maximum queue (520') extends to 6th St.
  - Westbound: Due to the heavy approach volumes and lack of capacity, the average (552') and maximum (796') queues extend beyond I Street.
  - Northbound: Due to the heavy approach volumes and lack of capacity, the average (1676') and maximum (1958') queues on this approach extend beyond the Pasadena Subdivision/San Gabriel Subdivision/SCRRA Metrolink at-grade crossing to Arrow Highway.
  - Eastbound: Due to the heavy approach volumes and lack of capacity, the average (493') and maximum (701') queues extend beyond G Street.

Figure 8 summarizes the average (in red) and maximum (in yellow) approach queues at each of the intersections during the PM Peak Hour for 2035 No-Build Conditions:

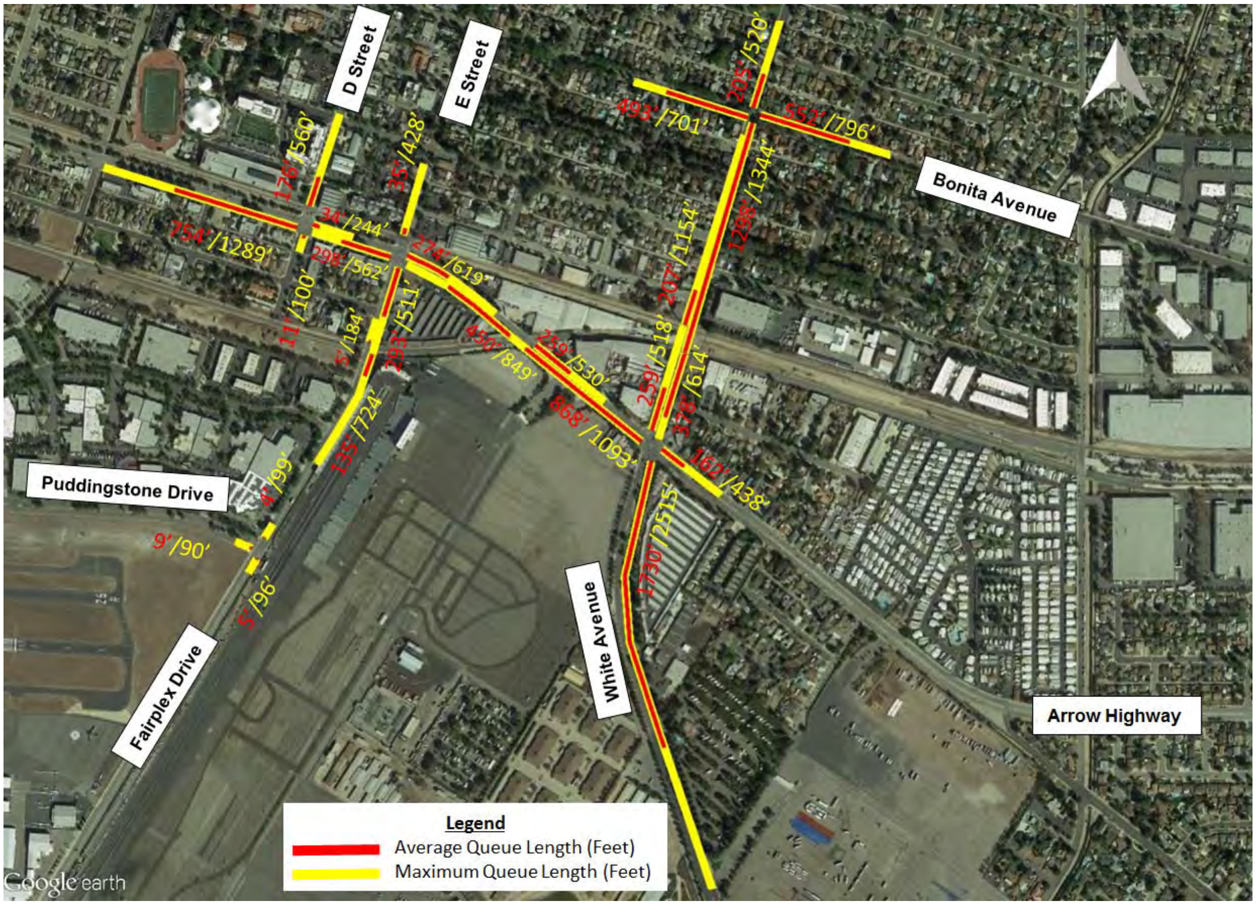

Figure 8: Average and Maximum Queue Length for 2035 No-Build Condition (PM Peak Hour)

The AM and PM Peak Hour queuing analysis results indicate that there are 5 locations where the maximum queues spill back onto at-grade crossings as listed below:

- Queues on the northbound approach at the Fairplex Drive/ E Street/Arrow Highway intersection extend beyond the SCRRA Metrolink crossing;
- Queues on the westbound approach at the Arrow Highway/ Fairplex Drive/ E Street intersection extend beyond the SCRRA Metrolink crossing;
- Queues on the eastbound approach at the Arrow Highway/White Avenue intersection extend beyond the SCRRA Metrolink crossing;
- Queues on the southbound approach at the White Avenue/Arrow Highway intersection extend beyond the Freight/Gold Line/SCRRA Metrolink crossing; and
- Queues on the northbound approach at the White Avenue/Bonita Avenue intersection extend beyond the Freight/Gold Line/SCRRA Metrolink crossing

It is proposed that a pre-signal (or “queue cutter’ signal) be implemented at the crossings to prevent cars stopping on the tracks. The detailed intersection evaluation and queue lengths are provided in **Appendix E.**

5. 2035 No-Build Conditions with Improvements

Based on the No-Build condition analysis results, operational improvements are needed throughout the study area. The following is a list of recommended geometric improvements that are recommended to address the needs of the study area, regardless of whether the proposed Gold Line Phase 2B Extension project is implemented. These improvements were incorporated into the “2035 No-Build Conditions with Improvements” model to improve the traffic operations, and set a new baseline, against which the impact of the proposed Gold Line Phase 2B Extension project could be assessed:

Proposed Improvements for No-Build Conditions
E Street/Fairplex Drive/Arrow Highway (**Figure 9**) • Provide northbound dual left-turn lanes by restriping or constructing an additional lane
White Avenue/Arrow Highway (**Figure 10**) • Provide northbound dual left-turn lanes by restriping or constructing an additional lane; and • Provide a right-turn lane on the eastbound approach
White Avenue between 1St Street and 6th Street (**Figure 11**) • Restripe or widen White Avenue between 1st Street and 6th Street to a 4-lane undivided roadway to provide additional capacity and reduce the queue lengths
Bonita Avenue/White Avenue (**Figure 12**) • Restripe the northbound and southbound approaches to include a left-turn lane, a through lane, and shared through/right-turn lane • Restripe the eastbound and westbound approaches to include a left-turn lane, a through lane, and a right-turn lane
Arrow Highway within study area: • Maintain three westbound through lanes, as this existing through capacity (2600 vehicles per hour) is needed to address the heavy westbound movements (2250 vehicles per hour) • Consider an off-street bike path or a parallel facility (in lieu of removing a through traffic lane) in this area
Construct pre-signal at 4 locations • Eastbound approach on Arrow Highway at SCRRA Metrolink crossing • Northbound approach on Fairplex Drive at SCRRA Metrolink crossing • Westbound approach on Arrow Highway at SCRRA Metrolink crossing • Southbound approach on White Avenue at Pasadena Subdivision/San Gabriel Subdivision/SCRRA Metrolink/Proposed Gold Line

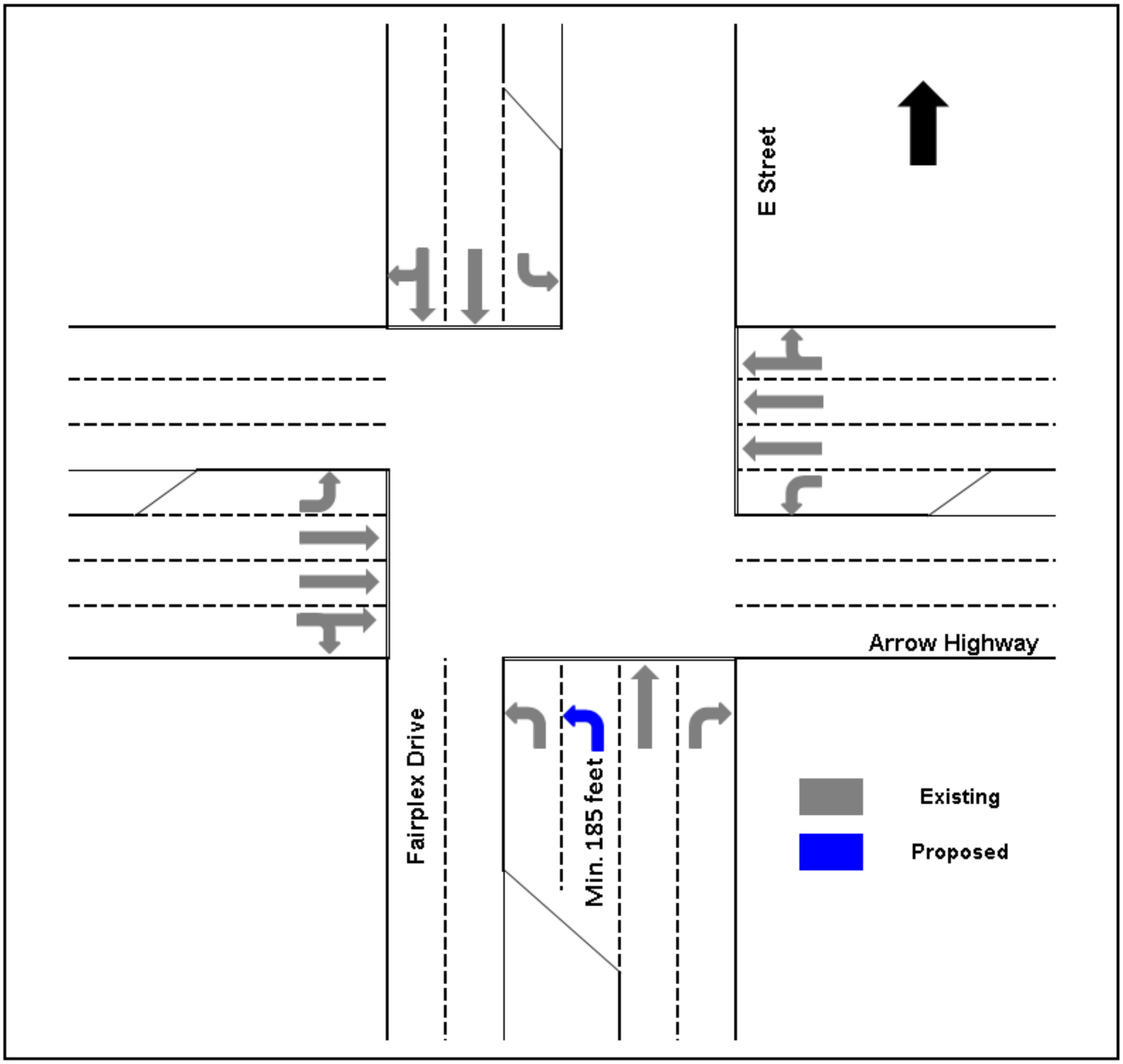

Figure 9: Arrow Highway and E Street/Fairplex Drive Improvements

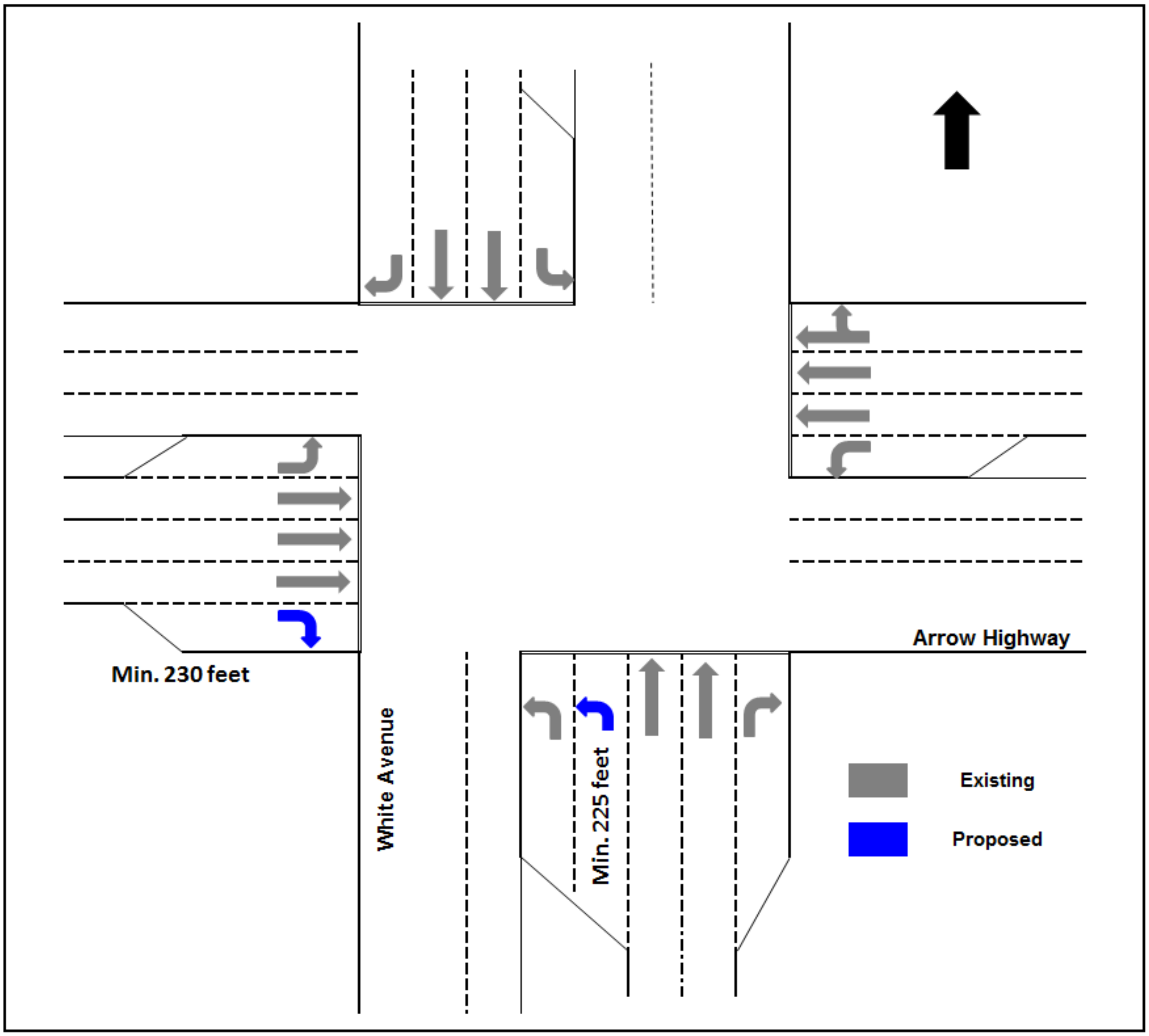

Figure 10: Arrow Highway and White Avenue Improvements

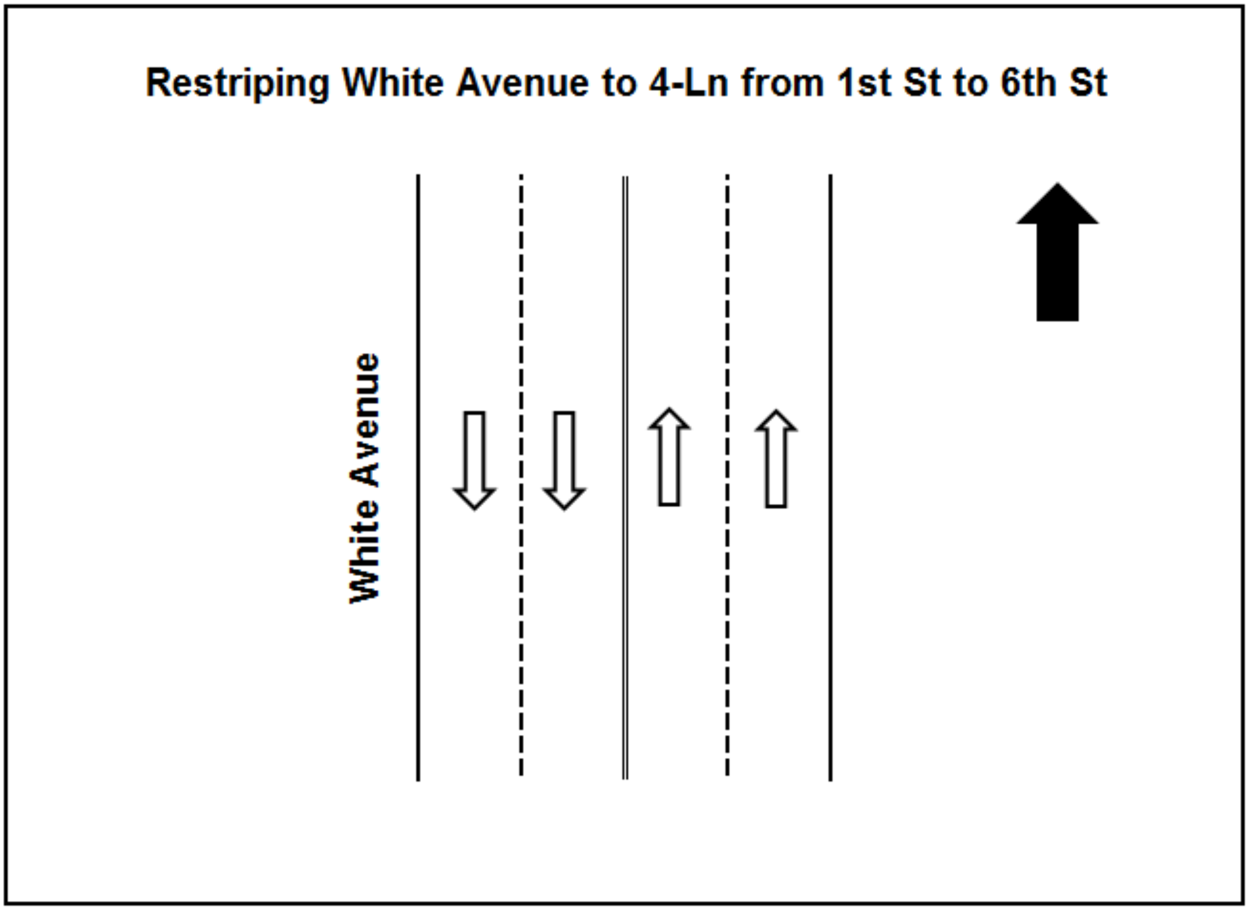

Figure 11: Restripe/Widen White Avenue to 4-Lane

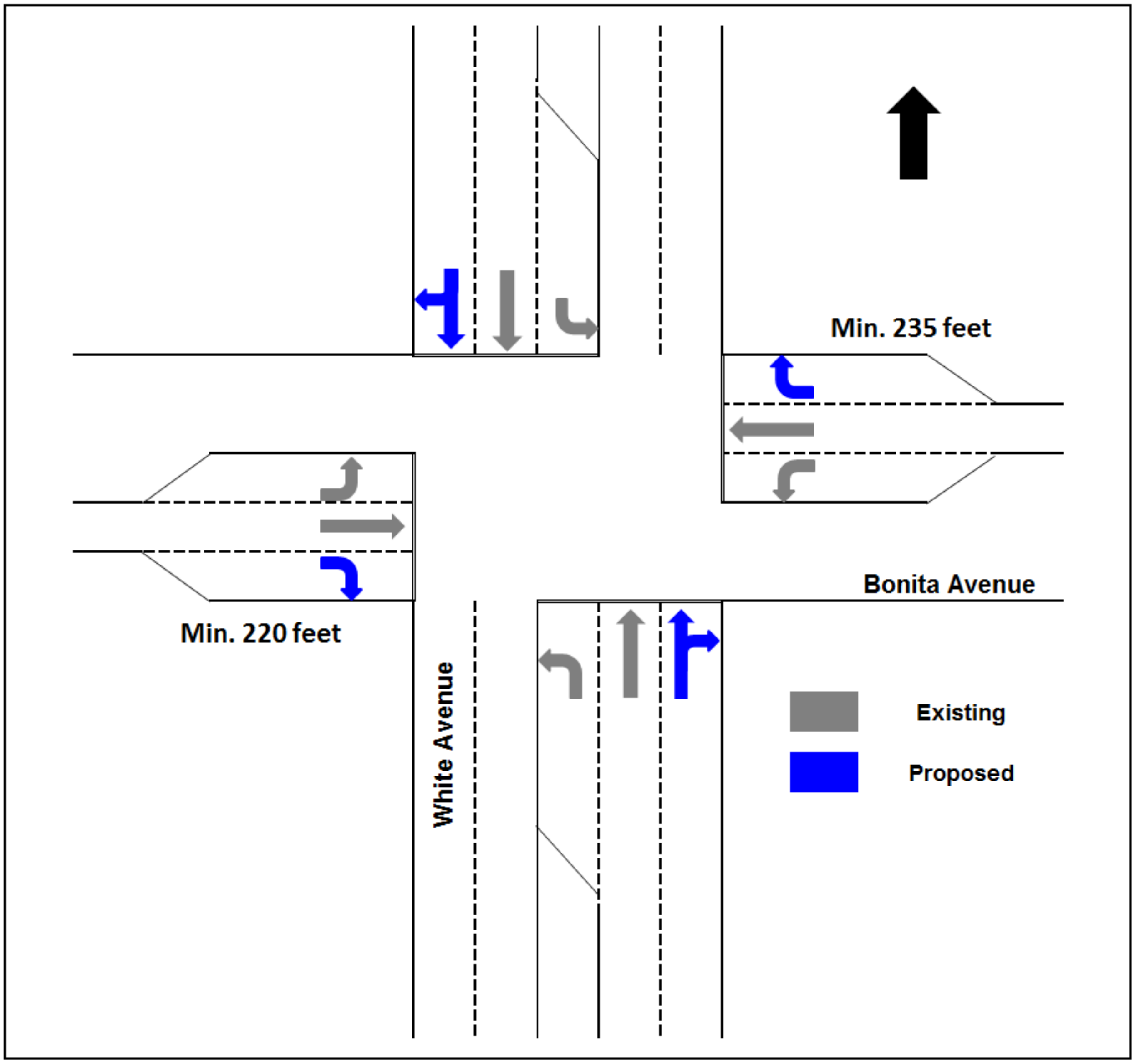

Figure 12: White Avenue and Bonita Avenue Improvements

5.1 2035 No-Build Conditions with Improvements Model Development

For this scenario, the VISSIM models were created by updating the geometry in No-Build Conditions models to include the geometric improvements listed above. Traffic volumes remained the same as the No-Build conditions, and the optimized signal timings from Synchro were used. **Figure 13** shows the VISSIM roadway geometry and volumes of the No-Build conditions with improvements within the study area.

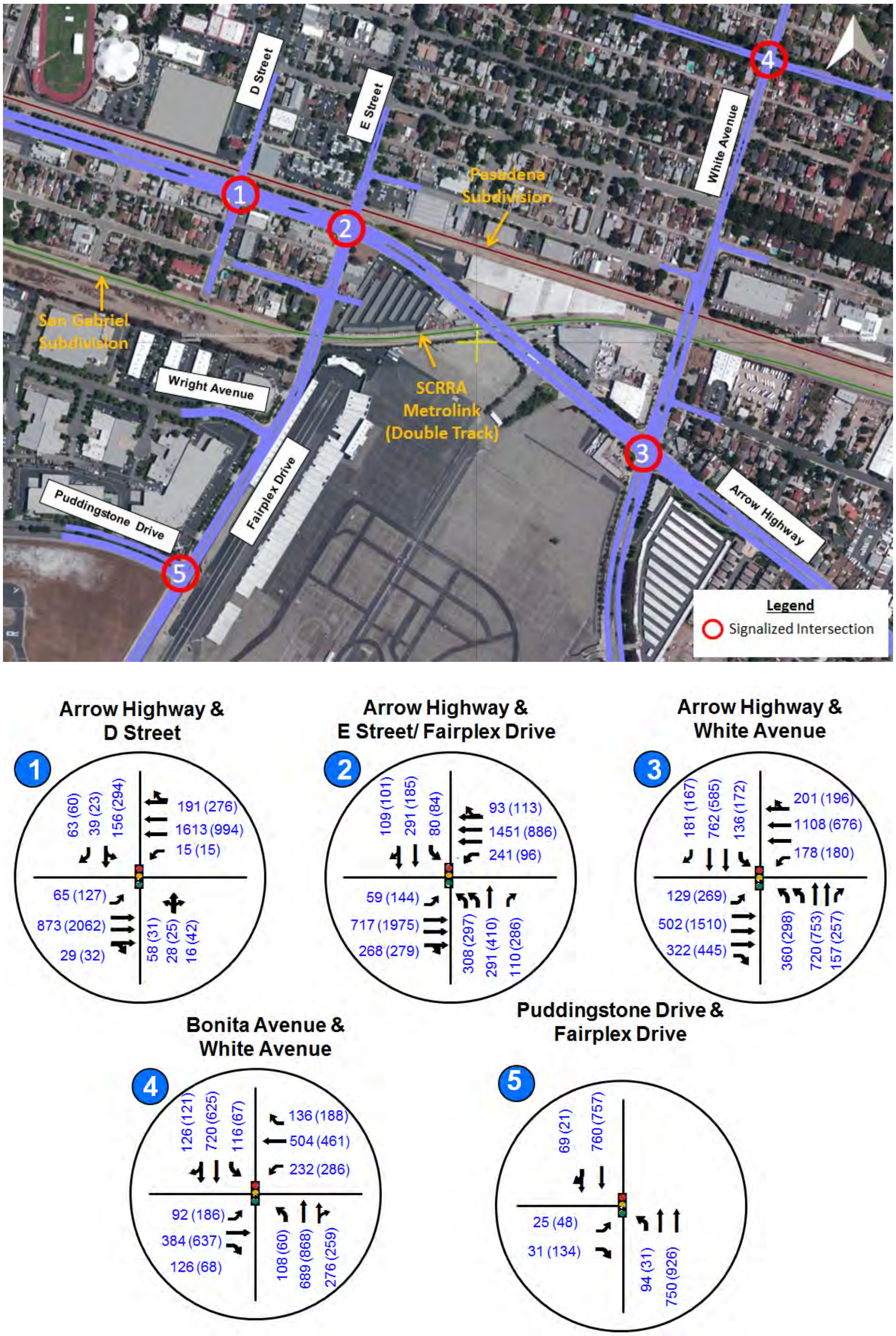

Figure 13: 2035 No-Build Conditions w/Improvements and Peak Hour Volumes – AM (PM)

5.2 2035 No-Build Conditions with Improvements Analysis

After updating the VISSIM models, the models were run to extract the results. Throughput and average total delay were reported at each of the study intersections during the peak hours.

Table 6 summarizes the intersection delay (seconds/vehicle) obtained from VISSIM for each intersection during both the AM and PM peak hours.

Table 6: 2035 No-Build Conditions with improvements – AM and PM Peak Hour

2035 No-Build Condition with Improvements (Intersection Delay/ LOS)				
Intersection	AM Peak Hour		PM Peak Hour	
	Delay (seconds/vehicle)	LOS	Delay (seconds/vehicle)	LOS
Arrow Highway & D Street	12	B	19	B
Arrow Highway & E Street / Fairplex Drive	35	D	31	C
Arrow Highway & White Avenue	34	C	39	D
Fairplex Drive & Puddingstone Drive	4	A	4	A
Bonita Avenue & White Avenue	29	C	38	D

The AM and PM Peak Hour analysis results show that with the proposed improvements, all of the intersections in the study area operate at an acceptable LOS D or better.

5.2.1 Queuing Analysis

AM Peak Hour:

Traffic queueing/backups in the AM 2035 No-Build Conditions with Improvements model were significantly improved from the AM 2035 No-Build Conditions. However, some traffic queueing/backups were still observed at the following intersection approaches:

- Arrow Highway/D Street:
  - Southbound approach: Due to the heavy left turn volume, the maximum queue (347') extends to 1st Street.
- Arrow Highway and White Avenue intersection:
  - Southbound: Due to the heavy approach volume, the maximum (880') queues on this approach extend to the Pasadena Subdivision/San Gabriel Subdivision/SCRRA Metrolink at-grade crossing and extends (maximum queue) to 1st Street.
- Bonita Avenue and White Avenue intersection:
  - Southbound: Due to the heavy approach volumes and lack of capacity, the maximum queue (477') extends to 6th Street.
  - Westbound: Due to the heavy approach volumes and lack of capacity, the maximum (737') queues extend beyond I Street.
  - Northbound: Due to the heavy approach volumes, the maximum queues (557') on this approach extend to 2nd Street alley.
  - Eastbound: Due to the heavy approach volumes and lack of capacity, the maximum queue (505') extends beyond G Street.

Figure 14 summarizes the average (in red) and maximum (in yellow) approach queues at each of the intersections during the AM Peak Hour for 2035 No-Build Conditions with Improvements:

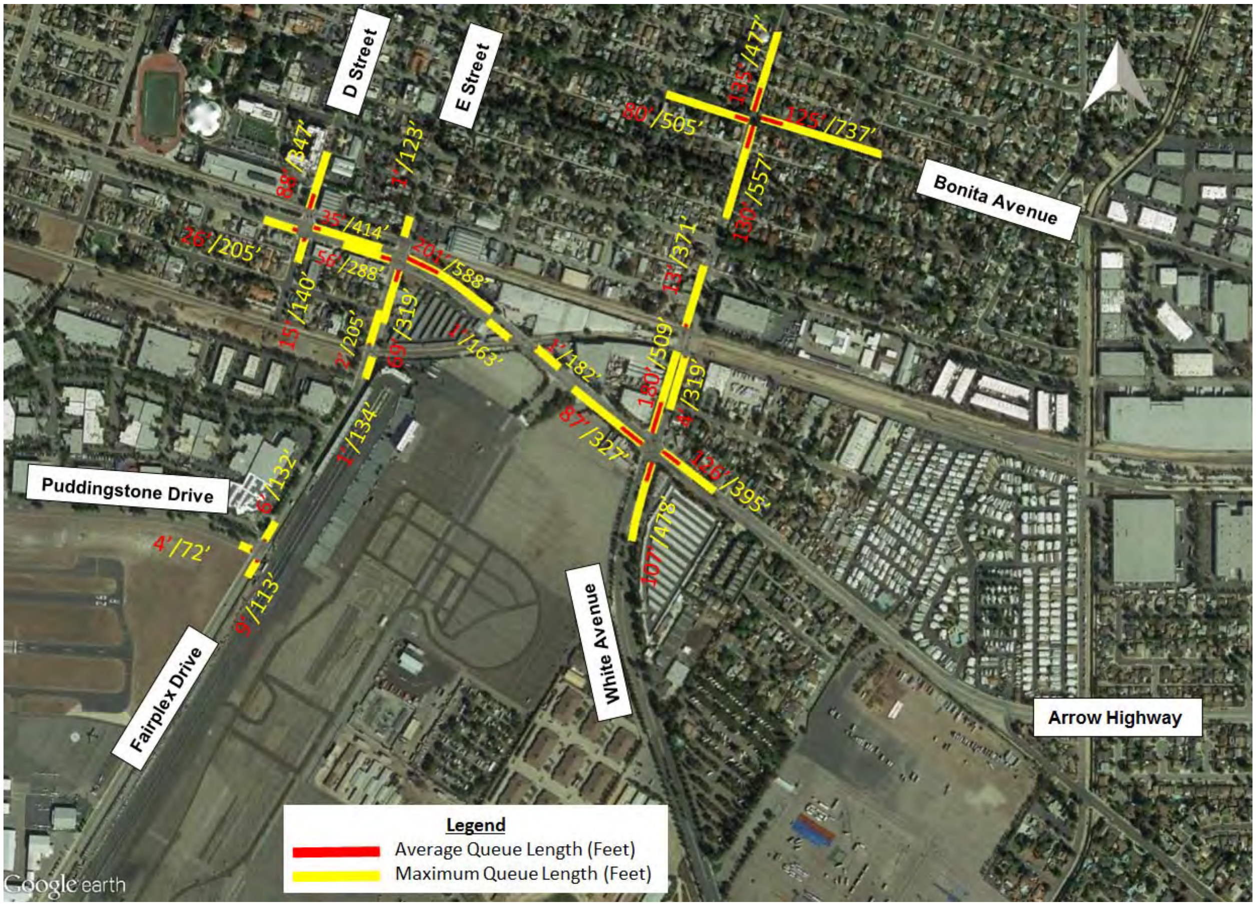

Figure 14: Average and Maximum Queue Length for 2035 No-Build with Improvements (AM Peak Hour)

PM Peak Hour:

Traffic queueing/backups in the PM 2035 No-Build Conditions with Improvements model were significantly improved from the PM 2035 No-Build Conditions. However, some traffic queueing/backups were still observed at the following intersection approaches:

- Arrow Highway/E Street/Fairplex Drive:
  - Northbound: Due to the heavy approach volume, the maximum queue (1024') extends beyond the SCRRA Metrolink tracks at-grade crossing.
- Arrow Highway/White Avenue intersection:
  - Southbound: Due to the heavy approach volume, the average queue (234') extends to Sierra Way and the maximum queue (925') on this approach extends beyond the Pasadena Subdivision/San Gabriel Subdivision/SCRRA Metrolink at-grade crossing to 1st Street.
- Bonita Avenue/White Avenue intersection:
  - Southbound: Due to the heavy approach volumes, the maximum queue (406') extends to 5th Street.
  - Westbound: Due to the heavy approach volumes and lack of capacity, the maximum queue (775') extends beyond I Street.

- Northbound: Due to the heavy approach volumes, the average queue (523') extends to the 2nd Street alley and the maximum queue (1095') on this approach extends beyond the Pasadena Subdivision/San Gabriel Subdivision/SCRRA Metrolink at-grade crossing to Arrow Highway.
- Eastbound: Due to the heavy approach volumes and lack of capacity, the maximum queue (708') extends beyond G Street.

Figure 15 summarizes the average (in red) and maximum (in yellow) approach queues at each of the intersections during the PM Peak Hour for 2035 No-Build Conditions:

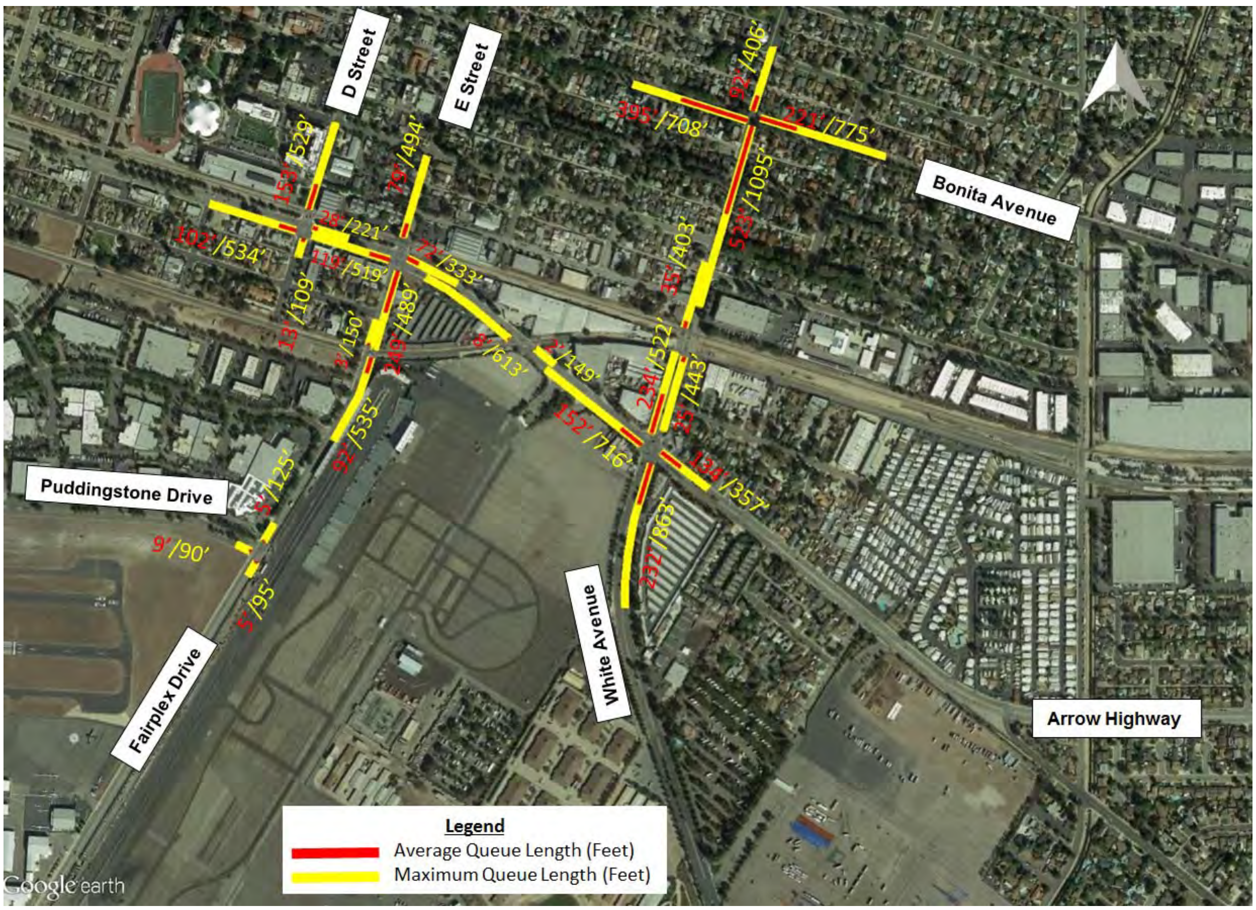

Figure 15: Average and Maximum Queue Length for 2035 No-Build with Improvements (PM Peak Hour)

The PM Peak Hour queue analysis indicates that there are two locations where the maximum queues spill back onto at-grade crossings as listed below:

- Queues on the northbound approach on E Street/Fairplex Drive/Arrow Highway intersection extend beyond the SCRRA Metrolink crossing; and
- Queues on the southbound approach at the White Avenue/Arrow Highway intersection extend beyond the Freight/Gold Line/SCRRA Metrolink crossing.

It is proposed that a pre-signal (or "queue cutter' signal) be implemented at the crossings to prevent cars stopping on the tracks. The detailed intersection evaluation and queue lengths are provided in **Appendix F.**

6. 2035 Build Conditions

The Gold Line Authority is proposing to construct the Foothills Extension through La Verne, including a passenger station (La Verne Station) and a parking garage. The parking garage will be accessed from Arrow Highway between E Street/Fairplex Drive and the SCRRA Metrolink tracks. The following Freight at-grade crossings will be modified as part of the Gold Line Phase 2B Extension project:

- D Street crossing;
- E Street crossing; and
- White Avenue crossing

6.1 2035 Build Conditions Traffic Volumes

The following data source, supplementing those listed in Section 4.1, was used to develop traffic projections for the 2035 Build Conditions scenario:

- Metro Gold Line Phase 2B – La Verne Station Parking Garage Report (dated December 5, 2016)

6.1.1 Methodology

In addition to No-Build Traffic volumes described in Section 4.1.1, the proposed Gold Line Garage trips were included when developing the traffic projections for the 2035 Build Conditions:

Garage Traffic Additional Trips:
Based on the Metro Gold Line Phase 2B – The La Verne Station Parking Garage Report, it was determined that the proposed development of an intermodal parking facility at the proposed Gold Line La Verne Station would generate additional traffic movements. This parking facility will be located east of E Street/Fairplex Drive, just north of Arrow Highway in the City of La Verne. Estimated trips generated at the parking facility were added to 2035 No-Build traffic volumes. The distribution of the trips was determined based on the Parking Structure and Gold Line Traffic Analysis report (ULV). The total traffic volumes from that report were used to analyze traffic operations for the 2035 Build Conditions scenario.

Transit Volume Reduction:
Based on the FEIR report, the 2035 No-Build Alternative and the Build Alternative model data were compared to determine the effects of the Build Alternative on traffic flow and circulation patterns. The results showed a decrease of -0.579% change in traffic volumes within the City of La Verne. To be conservative, this study excluded the traffic volume decrease of 0.579%.

The traffic development process diagram and the Build Scenario peak hour volumes for both the AM and the PM peak hour are provided in **Appendix G**.

6.2 2035 Build Conditions Gold Line Light Rail Information

The following describes the Gold Line LRT information used for the 2035 Build Conditions operational analysis:

- Total Length: 270’
- Speed: 55 MPH
- Frequency: 5-minute headway in each direction (12 trains inbound and 12 outbound)
- Station Dwell Time: westbound = 30 seconds, eastbound = 26 seconds
- Warning Time for White Avenue = 34 seconds (eastbound and westbound)
- Warning Time for D Street/E Street = 30 seconds (eastbound and westbound)
- Total Train operation (at White Avenue, E Street and D Street) = 55-59 seconds
- Advance Preemption for E Street/D Street = 39 seconds

Preemption timings for Gold Line were received from Authority and were used to code into the VISSIM models. The advanced preemption calculations for Arrow Highway/E Street/Fairplex Drive are provided in **Appendix H**. For Arrow Highway/D Street, the advanced preemption timings are assumed to be the same as Arrow Highway/E Street/Fairplex Drive.

6.3 2035 Build VISSIM Model Development

For this scenario, the VISSIM models from the 2035 No-Build with Improvements were used to develop the 2035 2035 Build Conditions models. Traffic volumes were updated based on the detailed traffic projections, and the optimized signal timings from Synchro were used. **Figure 16** shows the VISSIM roadway geometry of the 2035 2035 Build Conditions within the study area, which includes the Gold Line and associated La Verne station and garage (north of Arrow Highway and east of E Street/Fairplex Drive).

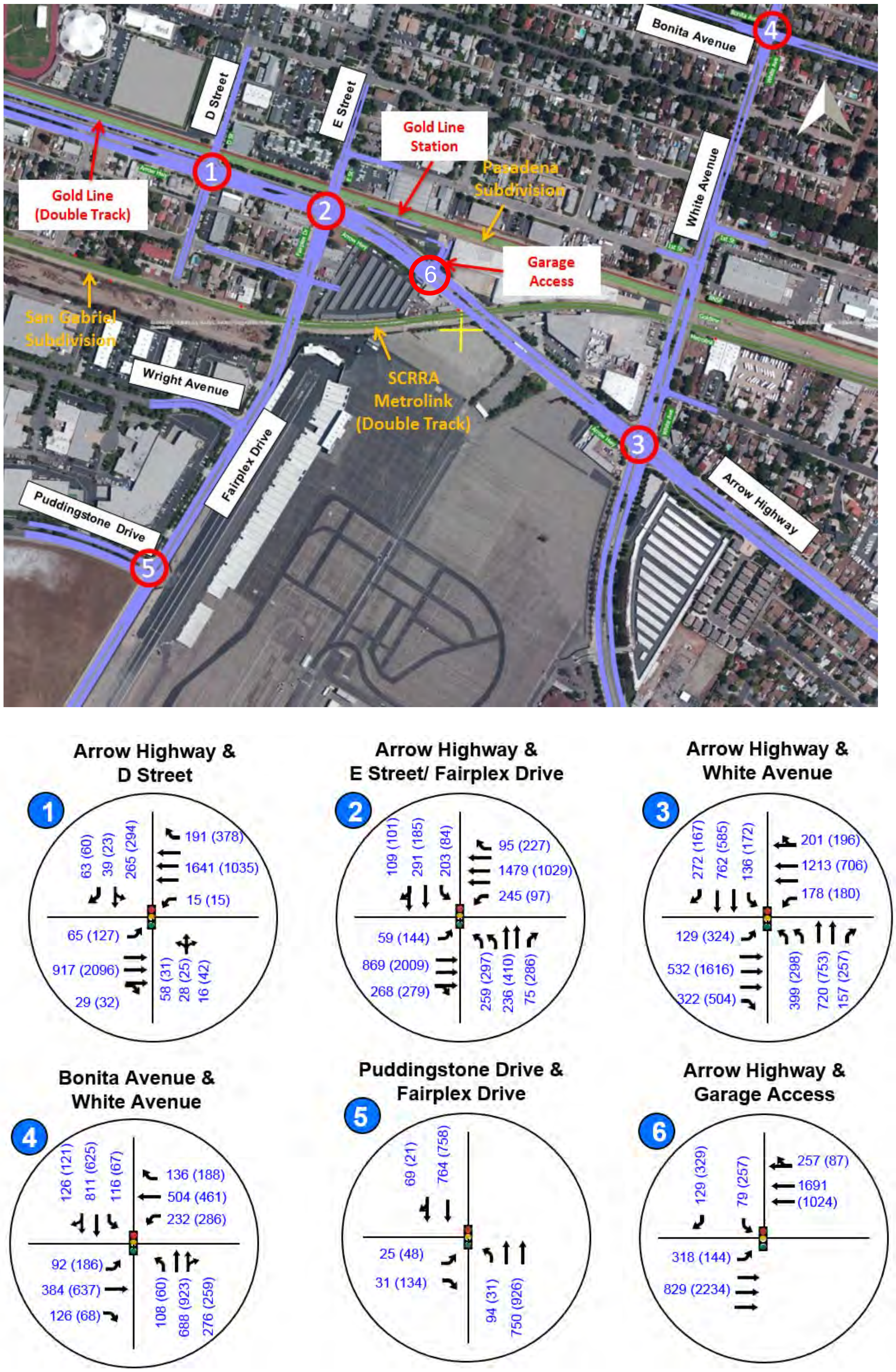

Figure 16: 2035 Build Conditions VISSIM Network and Peak Hour Volumes – AM (PM)

6.4 2035 Build Conditions Analysis

After updating the Build Conditions VISSIM models, the models were run to extract the results. Throughput and average total delay were reported at all the study intersection during the peak hours.

Table 7 summarizes the intersection delay (seconds/vehicle) obtained from VISSIM for each intersection during both the AM and PM peak hours.

Table 7: 2035 Build Conditions – AM and PM Peak Hour

2035 Build Condition with Gold Line (Intersection Delay/ LOS)				
Intersection	AM Peak Hour		PM Peak Hour	
	Delay (seconds/vehicle)	LOS	Delay (seconds/vehicle)	LOS
Arrow Highway & D Street	23	C	54	D
Arrow Highway & E Street / Fairplex Drive	40	D	53	D
Arrow Highway & White Avenue	35	C	47	D
Fairplex Drive & Puddingstone Drive	4	A	6	A
Arrow Highway & La Verne Garage	10	A	17	B
Bonita Avenue & White Avenue	32	C	38	D

The AM and PM Peak Hour analysis results show that all of the intersections in the study area operate at an acceptable LOS D or better.

6.4.1 Queuing Analysis

AM Peak Hour:

While running the AM 2035 Build Conditions, traffic queueing/backups were slightly worse compared to the AM 2035 Build with Improvements conditions. Some traffic queueing/backups occur at the following intersection approaches:

- Arrow Highway/D Street:
  - Southbound approach: Due to the heavy left-turn volume and Gold Line operations, the average queue (326') and maximum queues (597') extend to 2nd Street.
- Arrow Highway/White Avenue intersection:
  - Southbound: Due to the heavy approach volume, the maximum (1672') queues on this approach extend to the Pasadena Subdivision/San Gabriel Subdivision/SCRRA Metrolink at-grade crossing. The maximum queue extends almost to the 3rd Street alley.
- Bonita Avenue/White Avenue intersection:
  - Southbound: Due to the heavy approach volumes and lack of capacity
  - , the maximum queue (525') extends to 6th St.
  - Westbound: Due to the heavy approach volumes and lack of capacity, the maximum queues (771') extend beyond I Street.
  - Northbound: Due to the heavy approach volumes, the maximum (885') queues on this approach extend to 2nd Street.
  - Eastbound: Due to the heavy approach volumes and lack of capacity, the maximum queue (583') extends beyond G Street.
- Arrow Highway/Garage Access:
  - Westbound: Due to the heavy approach volumes and lack of capacity, the maximum queue (676') extends beyond the SCRRA Metrolink tracks at-grade crossing.

Figure 17 summarizes the average (in red) and maximum (in yellow) approach queues at each of the intersections during the AM Peak Hour for 2035 Build Conditions with Improvements.

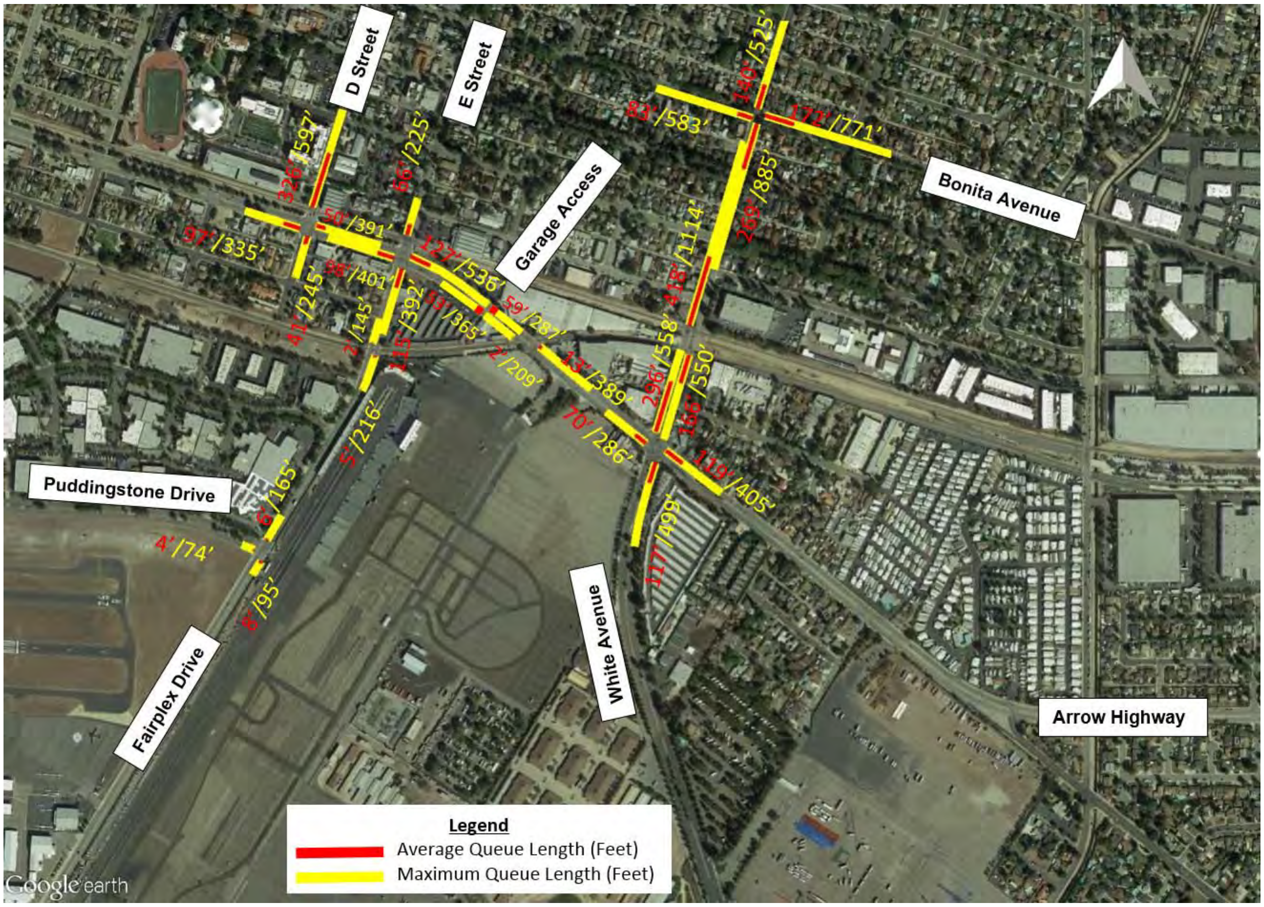

Figure 17: Average and Maximum Queue Length for 2035 Build Condition (AM Peak Hour)

PM Peak Hour:

Traffic queueing/backups in the PM 2035 Build Conditions with Improvements model were comparable to the PM 2035 No-Build with Improvements Conditions. However, some traffic queueing/backups were still occurring at the following intersection approaches:

- Arrow Highway/D Street:
  - Southbound: Due to the heavy left-turn volume and Gold Line operations, the average (354') and maximum (593') queues extend to 2nd Street.
  - Eastbound: Due to Gold Line operations, the average (1078') and maximum (1280') queues extend to B Street.
- Arrow Highway/E Street/Fairplex Drive:
  - Northbound: Due to the heavy approach volume and Gold Line operations, the maximum queue (1217') extends beyond the SCRRA Metrolink tracks at-grade crossing.
  - Eastbound: Due to Gold Line operations, the average (345') and maximum (586') queues extend to D Street.

- Arrow Highway/White Avenue intersection:
  - Southbound: Due to the heavy approach volume and Gold Line operations, the average queue (345') extends beyond Sierra Way and the maximum queue (1698') on this approach extends beyond the Pasadena Subdivision/San Gabriel Subdivision/SCRRA Metrolink at-grade crossing to 1st Street.
  - Northbound: Due to Gold Line operations, the maximum queue (1321') extends beyond the driveway to the Finish Line Sports Grill.
  - Eastbound: Due to Gold Line operations, the maximum queue (874') on this approach extends beyond the SCRRA Metrolink at-grade crossing.
- Bonita Avenue/White Avenue intersection:
  - Southbound: Due to the heavy approach volumes, the maximum queue (359') extends to 5th St.
  - Westbound: Due to the heavy approach volumes and lack of capacity, the maximum queue (786') extends beyond I Street.
  - Northbound: Due to the heavy approach volumes, the average queue (529') extends to the 2nd Street alley and the maximum queue (1818') on this approach extends beyond the Pasadena Subdivision/San Gabriel Subdivision/SCRRA Metrolink at-grade crossing to Arrow Highway.
  - Eastbound: Due to the heavy approach volumes and lack of capacity, the maximum queue (704') extends beyond G Street.
- Arrow Highway/Garage Access:
  - Westbound: Due to the heavy approach volumes and lack of capacity, the maximum queue (676') extends beyond the SCRRA Metrolink tracks at-grade crossing.

Figure 18 summarizes the average (in red) and maximum (in yellow) approach queues at each of the intersections during the PM Peak Hour for 2035 Build Conditions:

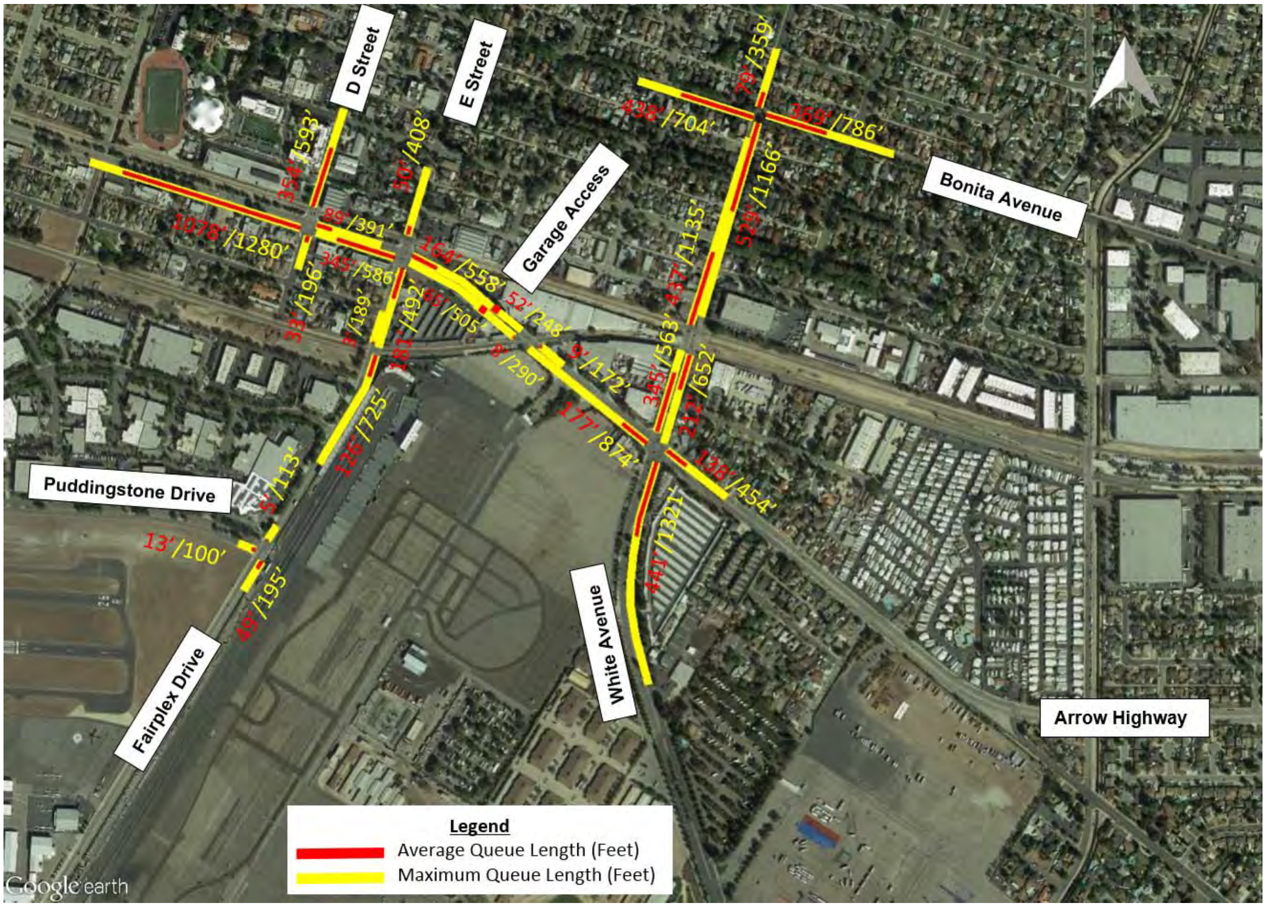

Figure 18: Average and Maximum Queue Length for 2035 Build Condition (PM Peak Hour)

The AM and PM Peak Hour queue analysis results indicate that there are 4 locations where the maximum queues spill back onto at-grade crossings as listed below:

- Queues on the northbound approach at the Fairplex Drive/ E Street/Arrow Highway intersection extend beyond the SCRRA Metrolink crossing;
- Queues on the westbound approach at the Arrow Highway/La Verne Garage intersection extend beyond the SCRRA Metrolink crossing;
- Queues on the eastbound approach at the Arrow Highway/White Avenue intersection extend beyond the SCRRA Metrolink crossing; and
- Queues on the southbound approach at the White Avenue/Arrow Highway intersection extend beyond the Freight/Gold Line/SCRRA Metrolink crossing.

It is proposed that a pre-signal – designed in accordance with the California MUTCD – be implemented on the above crossing approaches to prevent cars from stopping on the tracks. The example of the pre-signal is shown in **Figure 19 (Pima Mine Road, Sahuarita, AZ)**. A traffic pre-signal design was prepared for this three-leg intersection which includes a Union Pacific Railroad spur track that crosses within 100 feet of the intersection. The proposed pre-signal locations are shown in **Figure 20.** The detailed intersection evaluation and maximum queue lengths with available storage are provided in **Appendix I.**

Figure 19: Pre-Signal Example

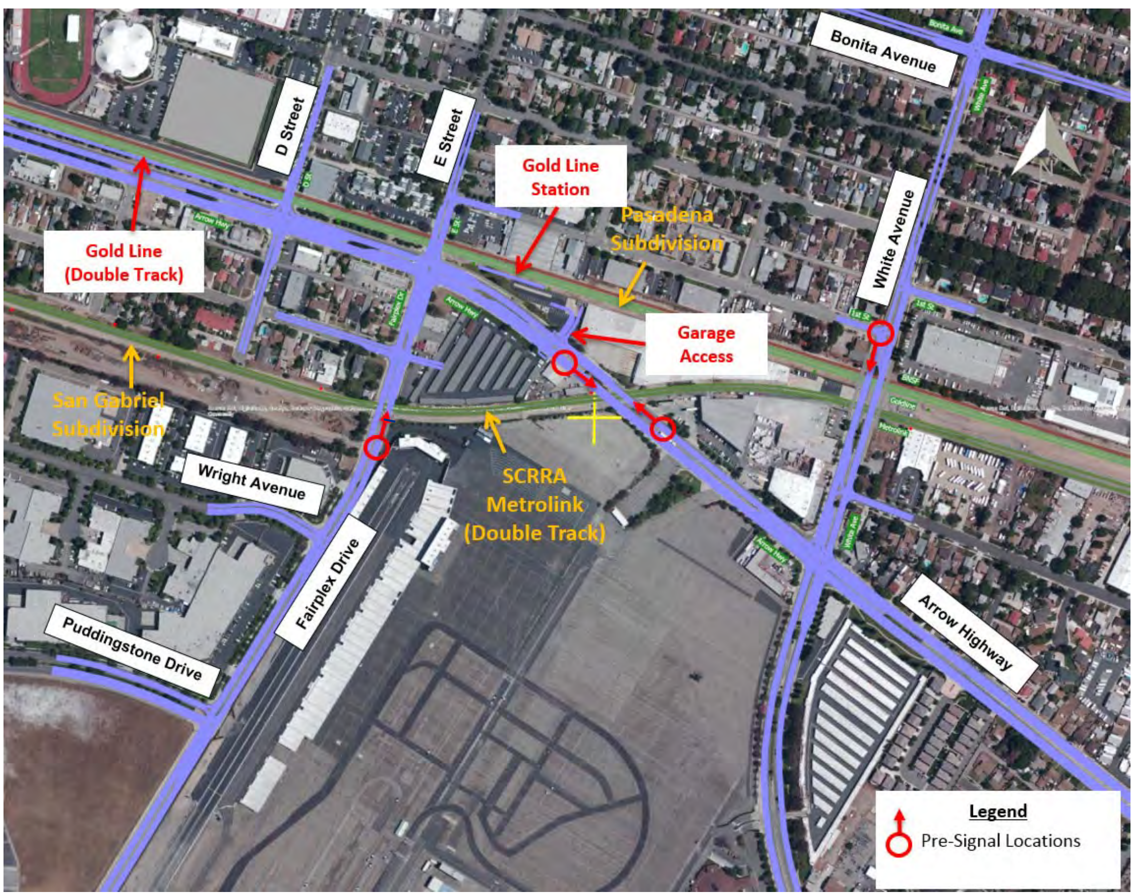

Figure 20: Proposed Pre-Signal Locations

7. Scenario Results Comparison

Table 8 and Table 9 summarize the intersection delay and Level of Service results for all the conditions during both AM and PM peak hours. Based on overall comparison, 2035 Build condition with Gold Line LRT operates better than the 2035 No-Build condition and is comparable to the 2035 No-Build condition with Improvements during both the AM and PM peak hours.

Table 8: 2035 Build AM Peak Hour Intersection Delay (All Scenarios)

Intersection Delay/ LOS Comparision - AM Peak Hour						
Intersection	2035 No-Build Condition		2035 No-Build Condition (with improvements)		2035 Build Condition (with Gold Line LRT)	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Arrow Highway & D Street	11	B	12	B	23	C
Arrow Highway & E Street / Fairplex Drive	45	D	35	D	40	D
Arrow Highway & White Avenue	55	E	34	C	35	C
Fairplex Drive & Puddingstone Drive	4	A	4	A	4	A
Arrow Highway & La Verne Garage	N/A	N/A	N/A	N/A	10	A
Bonita Avenue & White Avenue	51	D	29	C	32	C

Table 9: 2035 Build PM Peak Hour Intersection Delay (All Scenarios)

Intersection Delay/ LOS Comparision - PM Peak Hour						
Intersection	2035 No-Build Condition		2035 No-Build Condition (with improvements)		2035 Build Condition (with Gold Line LRT)	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Arrow Highway & D Street	41	D	19	B	54	D
Arrow Highway & E Street / Fairplex Drive	50	D	31	C	53	D
Arrow Highway & White Avenue	62	E	39	D	47	D
Fairplex Drive & Puddingstone Drive	4	A	4	A	6	A
Arrow Highway & La Verne Garage	N/A	N/A	N/A	N/A	17	B
Bonita Avenue & White Avenue	46	D	38	D	38	D

8. Conclusions and Recommendations

Based on the analysis of the scenarios described above, the traffic operation under 2035 Build Condition operates better than the 2035 No-Build Condition and is comparable to the 2035 No-Build with Improvements, providing an acceptable Level of Service (LOS D or better) at each study intersection.

Table 10 shows the list of recommended improvements that are proposed due to the increase in overall traffic/Gold Line operations in the study area which should be implemented by others or the Gold Line Authority.

With the proposed improvements at these intersections/roadway segments, the existing and proposed rail crossings along White Avenue can operate as at-grade crossings.

Table 10: List of Improvements

2035 Proposed Recommendations		
Improvement	Recommended for No-Build Condition	Recommended for Build Condition
D Street and Arrow Highway • Provide westbound right turn lane (100’ minimum)		X
E Street/Fairplex Dr and Arrow Highway • Provide northbound dual left turn lanes (185’ minimum) by restriping or constructing an additional lane	X	*
E Street/Fairplex Dr and Arrow Highway • Provide an additional northbound through lane; • Provide 2 receiving lanes on north leg of intersection (as a minimum up to 1st alley way); and • Provide westbound right turn lane (180’ minimum)		X
White Avenue and Arrow Highway • Provide northbound dual left turn lanes (225’ minimum) by restriping or constructing an additional lane; and • Provide a right turn lane on eastbound approach (230’ minimum)	X	*
Bonita Avenue and White Avenue • Provide a right turn lane on eastbound and westbound approaches (235’ and 220’ minimum) • Provide a left-turn lane, one through lane, and one shared through/right turn lane on northbound and southbound approaches	X	*
Arrow Highway between White Avenue and D Street • Maintain three westbound through lanes, as this existing through capacity (2600 vehicles per hour) is needed to address the heavy westbound movements (2250 vehicles per hour) • Consider an off-street bike path or a parallel facility (in lieu of removing a through traffic lane) in this area	X	*
White Avenue between 1st Street and 6th Street • Provide a 4-lane roadway to increase queue capacity at rail road crossing	X	*
Construct pre-signal at 4 locations • Eastbound approach on Arrow Highway at SCRRA Metrolink crossing; • Northbound approach on Fairplex Drive at SCRRA Metrolink crossing; • Westbound approach on Arrow Highway at SCRRA Metrolink crossing; and • Southbound approach on White Avenue at Pasadena Subdivision/San Gabriel Subdivision/SCRRA Metrolink/Proposed Gold Line	X	*

*Required for No-Build Condition

9. References

[1] Traffic Analysis Toolbox Volume III – Guidelines for Applying Traffic Microsimulation Modeling Software; FHWA; Publication No. FHWA-HRT-04-040, July 2004;

[2] VISSIM 8 User Manual © Planung Transport Verkehr (PTV) AG 2015;

[3] Ring Barrier Controller 1.70 PTV America August, 2014;

[4] VAP 2.16 User Manual © PTV AG 2014;

[5] Metro Gold Line Foothill Extension – Azusa to Montclair Environmental Impact Report (FEIR), February 2013;

[6] Metro Gold Line Phase 2B – La Verne Station Parking Garage Report (dated December 5, 2016);

[7] Traffic Counts collected by LIN Consulting, Inc. in September 28, 2016 and January 18, 2017;

[8] The Parking Structure and Gold Line Traffic Analysis report by LSA (ULV); and

[9] California Manual on Uniform Traffic Control Device (Part 8 – Traffic Control for Railroad and Light Rail Transit Grad Crossing)

[10] Lone Hill to CP White Double-Track Project (Traffic Analysis Report by LIN Consulting from September 28, 2016)

Exhibit H:

Memo: La Verne Traffic Signal Network and Design Parameters

Memo

To: **City of La Verne Crossing Stakeholders**

From: **Metro Gold Line Construction Foothill Authority**

Date: **5/17/2018**

Subject: **La Verne Traffic Signal Network and Design Parameters**

Background

The Metro Gold Line Foothill Construction Authority (Authority) has conducted several traffic studies in the City of La Verne to demonstrate safe operations for the at-grade crossings. Specifically, the *La Verne Multi-location Traffic Study* conducted by Jacobs Engineering dated April 2018, recommends upgrades of several signals near the Metro Gold Line Foothill Extension Phase 2B Glendora to Montclair Project (Project). During the crossing diagnostics and traffic study review meetings, the Project stakeholders including Southern California Regional Rail Authority (SCRRA), California Public Utilities Commission (CPUC), Los Angeles County Metropolitan Transportation Authority (LACMTA), BNSF Railway and City of La Verne, requested clarification of the "network" traffic signal interconnection for the five (5) crossings at A Street, D Street, E Street, White Avenue, Fairplex Drive, and Arrow Highway.

This Memo has been developed to further clarify traffic signal parameter and interconnection in support of the CPUC crossing application.

The Authority will award a design-build contract to advance the design, construct the crossings and support the Authority with coordination among crossing stakeholders and CPUC as necessary. The design-build contractor will determine the final locations of the backup prevention queue loops accounting for traffic flow, loop detection delay and traffic signal cycle time, in efforts to prevent motorists from queuing on the tracks. The locations for queue loops QC1b and QC2b will allow sufficient room for potential southbound motorists stopped on tracks to complete the left turn onto eastbound Arrow Hwy. No later than 60-days prior to commencing crossing construction, the design-build contractor is responsible for providing 100% design level drawings for compliance submission of the traffic parameters.

Reference Figure 1 for nomenclature and traffic signal locations.

Traffic Signal Configurations

Table 1 summarizes the traffic signal configuration, including signals that will be modified or installed.

Table 1. Traffic Signal Configurations

	Traffic Signal	Location	Details
1	TS1	D Street & Arrow Hwy	Install new presignal for SB traffic prior to the Tracks Existing traffic signal at Arrow Hwy to be modified
2	TS2	E Street & Arrow Hwy	Install new presignal for SB traffic prior to the Tracks Existing traffic signal at Arrow Hwy to be modified
3	TS3	Driveway at Arrow Hwy	Install new traffic signal (for Parking Lot)
4	TS4	Arrow Hwy at SCRRA Tracks	Install new queue cutter signal east and west of the SCRRA tracks (Presignal not necessary)
5	TS5	White Ave & Arrow Hwy	Existing traffic signal
6	TS6	White Ave & Tracks	Install new queue cutter signal for southbound traffic
7	TS7	Fairplex Dr. & SCRRA Track	Install new queue cutter signal near SCRRA track for northbound traffic

Crossing Preemption

Table 3 summarizes crossing preemption and requirements that prevent motoristses from stopping on the crossing during activation.

Table 2. Preemption at Crossing

	Crossing Preemption	Directional "Red" Light at Traffic Signal(s)	Additional Requirements to Prevent Queuing onto Crossing and/or into Intersection
1	C1	SB Red @ TS1 Presignal	QC1b and Controller Programmable Logic with TS1
2	C2	SB Red @ TS2 Presignal	QC2a and Controller Programmable Logic with TS2
3	C3	SB Red @ TS6 Queue Cutter	QC6a and Controller Programmable Logic with TS5/TS6
4	C4	WB Red @ TS4 EB Red @ TS4	QC4a/QC4b and Controller Programmable Logic with TS2/TS3/TS4/TS5
5	C5	NB Red @ TS7	QC7a and Controller Programmable Logic with TS2/TS7

Queuing Prevention

Table 3 summarizes potential queue scenarios and requirements that prevent queuing onto the intersection or crossing.

Table 3. Queuing Prevention Measures

Scenario	Potential Motorist Queue	Directional "Red" Light at Traffic Signal(s)	Additional Requirements to Prevent Queuing onto Crossing and/or Intersection
1	EB traffic into TS1	EB Red @ TS1	QC1b and Controller Programmable Logic with TS1/TS2 QC1b location will allow room for potential southbound motorists stopped on tracks making left turn onto eastbound Arrow
2	WB traffic into TS2	WB Red @ TS2	QC2a and Controller Programmable Logic with TS1/TS2
3	EB traffic into TS2	EB Red @ TS2	QC2b and Controller Programmable Logic with TS2/TS3 QC2b location will allow room for potential southbound motorists stopped on tracks making left turn onto eastbound Arrow
4	WB traffic into TS3	WB Red @ TS3	QC3a and Controller Programmable Logic with TS2/TS3/TS4
5	EB traffic into TS3	EB Red @ TS3	QC3b and Controller Programmable Logic with TS2/TS3/TS4
6*	WB traffic into TS4/C4	WB Red @ TS4	QC4a and Controller Programmable Logic with TS2/TS3/TS4
7*	EB traffic into TS4/C4	EB Red @ TS4	QC4b and Controller Programmable Logic with TS4/TS5
8	WB traffic into TS5	WB Red @ TS5	QC5a and Controller Programmable Logic with TS3/TS4/TS5
9	NB traffic into C3	NB Red @ TS5	QC5b and Controller Programmable Logic with TS5
10*	SB traffic into TS6/C3	SB Red @ TS6	QC6a and Controller Programmable Logic with TS5/TS6
11*	NB traffic into TS7/C5	NB Red @ TS7	QC7a and Controller Programmable Logic with TS2/TS7

**Scenarios 6,7,10, and 11 are crossing safety related and are further described in "Description of Queuing Prevention" below*

Description of Queuing Prevention

The scenarios summarized in Table 3 are not all inclusive, and are further detailed in the description below:

1. The two LRT/FRT joint crossings at D and E Streets (C1 and C2), the LRT/FRT/SCRRA crossing on White Avenue (C3) and two (2) SCRRA Metrolink crossings on Fairplex and Arrow Highway (C4 and C5) will require additional consideration due to the close proximity and potential simultaneous crossing activations. Each of the five (5) crossings will include signals with QC loop activation and/or a pre-signal to prevent motorists from queuing onto the tracks. The design-builder contractor's traffic signal design will account for the network of multiple crossing activations for the described crossings and traffic signals.

2. ***At D and E Streets crossings (C1 and C2)***, the design includes advance preemption and presignal to stop motorists from stopping on the crossings.
    a. **Scenario #1** – If EB QC loops (QC1b) west of the downstream traffic signal (TS1) are activated, then traffic signal (TS1) will activate to stop EB traffic before the D Street intersection. Eastbound (EB) Arrow Highway traffic includes No Left Turn Blankout signs that activate upon train approach to the crossing to prevent right turns onto tracks.
        - WB Arrow Highway traffic also includes No Right Turn Blankout signs that activate upon train approach to the crossing to prevent right turns onto D Street crossing.
    b. **Scenario #2** - If EB QC loops (QC2b) west of the downstream traffic signal (TS2) are activated, then traffic signal (TS2) will activate to stop EB traffic before the E Street intersection. Eastbound (EB) Arrow Highway traffic includes No Left Turn Blankout signs that activate upon train approach to the crossing to prevent right turns onto tracks.
        - If WB QC loops (QC2a) east of the downstream traffic signal (TS2) are activated, then traffic signal (TS2) will activate to stop WB traffic before the E Street intersection. WB Arrow Highway traffic also includes No Right Turn Blankout signs that activate upon train approach to the crossing to prevent right turns onto E Street crossing.
3. ***At the Arrow Highway SCRRA Metrolink crossing (C4)***, both eastbound and westbound approaches, a installation of queue cutter (QC) signals at the MetroLink crossing and QC loops at all traffic signals along Arrow Highway from D Street to White Avenue:
    a. The QC signal and loops at the SCRRA crossing is used to prevent motorists from queuing onto the tracks.
    b. A fiber optic hardwire interconnect will be installed between QC signals and traffic signals along Arrow Highway to allow the seven (7) traffic signals to communicate with each other.

c. Scenarios to be considered in traffic signal design for peak traffic periods as follows:

- **Scenario #6** - If WB QC loops (QC3a) east of the downstream traffic signal (TS3) are activated and the westbound (WB) through at the downstream traffic signal(s) are red, then activate the upstream queue cutter traffic signal (TS4) to stop WB traffic before the tracks (C4) or at the upstream traffic signal.
- **Scenario #7** - If eastbound (EB) QC loops (QC4b) west of the downstream traffic signal (TS5) are activated and the EB through at the downstream traffic signal(s) are red, and then activate the upstream queue cutter traffic signal (TS4) to stop EB traffic before the tracks (C4) or at the upstream traffic signal.

4. ***At the White Ave LRT/FRT/SCRRA Metrolink crossing (C3)***, southbound approach, QC signal and QC loops for the traffic signals with interconnection to Arrow Highway (TS5):

a. The QC traffic signal (TS6) recommended at White Avenue crossing isused to prevent southbound motorists from queuing onto the tracks.

b. A fiber optic hardwire interconnect will be required between the traffic signals along White Avenue to allow the seven (7) traffic signals to communicate with each other.

c. Scenarios to be considered in traffic signal design for peak traffic periods as follows:

- **Scenario #10 -** If SB QC loops (QC6a) north of the downstream traffic signal (TS5) are activated and the SB through at the downstream traffic signal is red, and then activate the upstream QC traffic signal (TS6) to stop SB traffic before the tracks or upstream traffic signal.

5. ***At the Fairplex Drive SCRRA Metrolink crossing (C5)***, northbound approach, provide a design supporting installation of a QC signal at the SCRRA crossing and QC loops for the traffic signals along Fairplex Drive from Puddingstone Drive to Arrow Highway:

a. The northbound QC signal (TS7) recommended at the SCRRA crossing (C5) is used to prevent motorists from queuing onto the tracks.

b. A fiber optic hardwire interconnect will be required between QC signal and traffic signals along Fairplex Drive/E Street to allow the seven (7) traffic signals to communicate with each other.

c. Scenarios to be considered in traffic signal (TS) design for peak traffic periods as follows:

   - **Scenario #11** - If NB QC loops (QC7a) south of the downstream traffic signal (TS2) are activated and the NB through at the downstream traffic signal(s) is red, and then activate the upstream QC traffic signal (TS7) to stop NB traffic before the tracks.

Figure 1 – La Verne Traffic Signals and Crossings

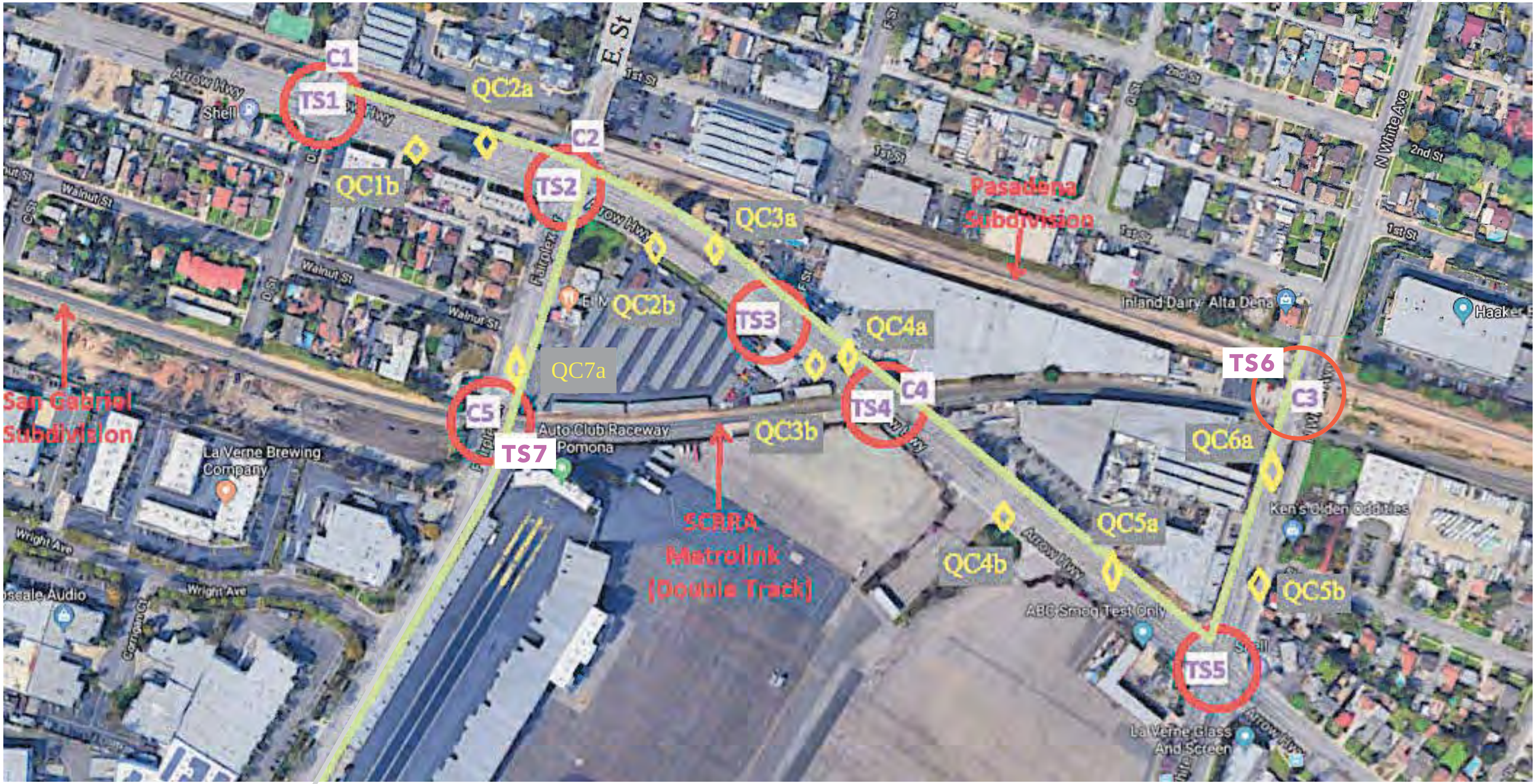

Exhibit I:

Crossing Working Group Meeting Minutes

(Agreement of Interested Parties)

Gold Line Foothill Extension
Crossing Diagnostic
Meeting Minutes

Meeting Subject: City of La Verne Diagnostic Evaluations

Meeting Date:
- February 21, 2018

Meeting Location: White Avenue and Fulton Road

Item	Description / Discussion	Diagnostic Action / Comments
1	Safety Briefing.	
2	Introductions / Sign-in See attachment A for sign in sheet. Note that Pomona stakeholders did not participate in Fulton Diagnostic as the crossing is not within Pomona boundaries.	
3	Drawings provided in advance of the Diagnostic, and at diagnostic include: *Grade crossing equipment, guidance & flasher details, street improvements, signing/striping, traffic signal, vehicle turning movements.*	
	General Section	
4	Pedestrian Treatments: Pedestrian treatments are generally upgraded for each tracks, and include: Automatic Ped gates, flashers, bells/shrouds, channelization railing, ADA features.	
5	The City informed that overhead utilities will likely be relocated underground.	
	The traffic studies and at-grade safety of White Ave. was discussed, including impacts of LRT at-grade vs. grade separation. *Response: The Authority summarized the traffic studies and noted that current queuing is a concern without LRT tracks. The mitigations proposed in the study, including street widening and queue cutters will significantly improve queuing.*	
	White Avenue	
6	**At-grade LRT/FRT/SCRRA Crossing Discussion:** **Configuration – Crossing Equipment** Currently one FRT track is north of the one SCRRA tracks. There are not continuous sidewalks or pedestrian crossing treatments. The proposed crossing configuration includes 1 FRT track with adjacent 2 new LRT tracks, then 1 existing SCRRA tracks	The exit gate near SCRRA tracks will be subject to further Metro

<table>
<tr><th>Item</th><th>Description / Discussion</th><th>Diagnostic Action / Comments</th></tr>
<tr><td></td><td>approximately 100-ft south. Provisions are included for the 2nd SCRRA track including location of pedestrian crossing equipment and panels.
The drawings reviewed show grade crossing equipment of:
• Std. 9 Entry and Exit gates on the outside of FRT and SCRRA tracks.
o SCRRA objected to the exit gate near the SCRRA tracks (to reduce maintenance). Authority to further discuss with Metro.
• Pedestrian crossing treatments and sidewalks are proposed for both sides of the crossing.
o The east side of the crossing contains existing wash/drainage that will need construction of structure to support sidewalk (and acquiring additional property).</td><td>review, as this sealed single crossing subject to Metro criteria.</td></tr>
<tr><td>7</td><td>Traffic Study Discussion:
Two (2) traffic studies were recently conducted:
1. To evaluate White Ave safety at the worst-case queuing
2. To evaluate traffic flow through several crossings in the City of La Verne
The La Verne traffic study recommended improvements for White Avenue to support better traffic flow and reducing queuing including:
• Provide pre-signal/queue cutter at Crossing
• Provide 4 lane roadway on White between 1st and 6th
• Northbound Left, Through and Through/right turn lanes at Bonita
Response: The Authority explained that in coordination with the City, the report recommendations will be incorporated and are generally shown on the provided drawings.
The City noted that their Council has requested that 5 lanes for White Ave. be reviewed.</td><td>Traffic Studies were distributed to the stakeholders and to be part of the CPUC application.</td></tr>
<tr><td>8</td><td>At-grade LRT/FRT/SCRRA Crossing Discussion:
Configuration
Currently one FRT track is north of the one SCRRA track. There are not continuous sidewalks or pedestrian crossing treatments.
The proposed crossing configuration includes 1 FRT track with adjacent 2 new LRT tracks, then 1 existing SCRRA track approximately 100-ft south. The drawings reviewed include provisions for the 2nd SCRRA track including location of pedestrian crossing equipment and panels.</td><td></td></tr>
</table>

<table>
<tr><th>Item</th><th>Description / Discussion</th><th>Diagnostic Action / Comments</th></tr>
<tr><td></td><td>The drawings reviewed show grade crossing equipment of:
• Std. 9 Entry and Exit gates on the outside of FRT and SCRRA tracks.
o SCRRA objected to the exit gate near the SCRRA tracks (to reduce maintenance). Authority to further discuss with Metro.</td><td></td></tr>
<tr><td>9</td><td>At-grade LRT/FRT/SCRRA Crossing Discussion:
Function
Currently the crossing operates on separate activation for FRT and SCRRA, such that northbound motorists may clear the SCRRA tracks to stop for FRT train, and southbound motorist clear the FRT track to stop for SCRRA trains.
• The group confirmed that a single sealed crossing was preferred, as a there is not room between the tracks for the design vehicle (WB-65 truck).
• The sealed crossing will have an Standard #9 entrance gates, median gate and/or flashers, raised medians and pedestrian treatments
• Interior crossing gates will be removed</td><td></td></tr>
<tr><td>10</td><td>Queue Cutter Discussion:
The drawings reviewed (TF-330) shows a queue cutter for southbound motorists that stops the vehicles prior to crossing the tracks if a queue exists between Arrow Hwy and the tracks.
• Backup prevention queue loops are located just south of the tracks that signal the red signal north of the tracks.
• Queue cutter intention is to stop vehicles prior to queuing onto the tracks.
The original design does not include interconnection between the crossing queue cutter and Arrow Hwy traffic signal.
• SCRRA asked to study if the queue cutter can be interconnected with the Arrow Hwy traffic signal, to allow for improved southbound traffic flow.
o SCRRA also mentioned that if interconnection occurs between White crossing and Arrow Hwy, that priority “flush” may conflict with the flush phase of adjacent intersections and the Arrow Hwy Metrolink Grade Crossing.
o Authority to evaluate the network advance preemption/interconnection concern
• CPUC asked if measures could be reviewed for the queue cutter and 1st St. north of the crossing such as:
o Keep Clear pavement markings to prevent cars queuing</td><td>Authority noted that Advance Preemption is not planned for White Ave Crossing, but queue cutter is preferred measure.

The Authority to consider interconnection the Queue cutter with Arrow Hwy.

The CPUC application will include description of DB contractor responsibilities to ensure the crossing signal preemption/interconnection upgrades are also considered as network flow.
Although outside of White Avenue crossing, the Authority will evaluate signal treatments for the Fairplex and Arrow Hwy SCRRA crossings.

The Authority to evaluate measures to prevent motorists from</td></tr>
</table>

Item	Description / Discussion	Diagnostic Action / Comments
	through the 1st St. intersection o Locate the queue cutter north such that 1st St. intersection becomes signalized	queuing north of the tracks through the 1st St. intersection.
11	**Pedestrian Discussion:** Currently sidewalks and pedestrian crossing treatments are not consistent along the White Ave. crossing • The drawings reviewed show pedestrian crossing treatments and sidewalks across both sides of the crossing. • The pedestrians will have refuge area between the LRT and SCRRA tracks. • The adjacent wash present challenges for sidewalk on the east.	
Fulton Road (EXTRACTED FROM POMONA DIAGNOSTIC CROSSING MEEITNG MINUTES)		
20	**At-grade LRT/FRT/SCRRA Crossing Discussion:** **Configuration** Currently one FRT track is north of the two SCRRA tracks. There are not sidewalks or pedestrian crossing treatments The proposed crossing configuration includes 1 FRT track with adjacent 2 new LRT tracks, then 2 existing SCRRA tracks approximately 100-ft south. The LRT tracks and LRT station will remove approx. 100 of the existing parking lot spaces (on the north of the parking lot). Parking to be relocated in the new proposed parking structure. The drawings reviewed show grade crossing equipment of: • Std. 9 Entry and Exit gates on the outside of FRT and SCRRA tracks. o SCRRA objected to the exit gate near the SCRRA tracks (to reduce maintenance). Authority to further discuss with Metro. • Pedestrian crossing treatments and sidewalks are proposed for the west side of the crossing. o The east side of the crossing contains existing wash/drainage that will need construction of structure to support sidewalk (and acquiring additional property).	The exit gate near SCRRA tracks will be subject to further Metro review, as this sealed single crossing subject to Metro criteria.
21	**At-grade LRT/FRT/SCRRA Crossing Discussion:** **Function** Currently the crossing operates on separate activation for FRT and SCRRA, such that northbound motorists may clear the SCRRA tracks to stop for FRT train, and southbound motorist clear the FRT track to stop for SCRRA trains.	

Item	Description / Discussion	Diagnostic Action / Comments
	• The group confirmed that a single sealed crossing was preferred, as a there is not room between the tracks for the design vehicle (WB-65 truck). • The sealed crossing will have an Standard #9 entrance gates, median gate and/or flashers, raised medians and pedestrian treatments • There will not be (interior) gates located between the tracks – except for the current station parking driveway located on the west between the tracks (if applicable)	
22	**Driveway (Pomona Station) Discussion:** Currently a driveway exists between the FRT and SCRRA tracks on the west of the crossing – to allow for existing parking lot access. • The drawings reviewed show the driveway to include entrance Std. 9 gate and median to restrict motorists from exiting the driveway between the tracks during train activation. • The drawings also show a median between the tracks to prevent left turns in/out of the driveway. Such that driveway is right in/out. The group presented concerns that if motorist drive around the driveway median there is risk of the motorist getting onto active track. • The CPUC recommended that **driveway is closed** to prevent motorists driving around the median or other unfavorable access around live tracks. SCRRA also initially agrees with Driveway closure but will further confirm. o The City is against driveway closure, and was concerned that motorists would park along Fulton, Supply Street may not be sufficient to access the parking lot, • The CPUC noted that if driveway was to remain open, design to be revised to prevent motorist driving around median, such as: o Lengthen the driveway median or redesign of parking lot circulation. o Provide “exit gate” on the driveway, so driveway is sealed. o Evaluate traffic signal of driveway and crossing.	The Authority will coordinate with the City to advance driveway designs for: • Driveway Closure or • Driveway median lengthen, or exit gate, or traffic signal
23	**Pedestrian Discussion:** Currently no sidewalks are located along the Fulton Rd. crossing • The drawings reviewed show pedestrian crossing treatments and sidewalks for the west side of the crossing.	The Authority will coordinate with the City to advance sidewalk designs for: • Approved measures to protect driveway

Item	Description / Discussion	Diagnostic Action / Comments
	• The group was concerned that if the driveway was closed, motorist may park along Fulton Rd. and result in additional pedestrian activity to the west side. o CPUC asked the authority to coordinate with the City to finalize driveway designs or closure. • If driveway is closed, consider additional pedestrians parking on the street. Mitigations may include: o Study of motorists parking/pedestrian circulation to determine if risk exists for Fulton Rd. pedestrian activity o Sidewalks and pedestrian treatments on the east side of the crossing (challenge with existing wash) o Signalized midblock crosswalk for pedestrians between the tracks	Or • Driveway Closure with consideration of ped activity, eastside sidewalk/Ped crossing treatments, signalized midblock crosswalk
24	**Fulton Road closure** was discussed with the group, and the City argued the need Fulton Road was necessary for circulation and further City development including a development planned to the south in 5-10 years.	

Exhibit J: The Final Environmental Impact Report (FEIR) legal description (FEIR SCH# 200361157)

Due to the size of this report, the FEIR is submitted in the format of plastic discs.

The format of the original FEIR report on disc is an Archival-Grade DVD.

The format of FEIR copies thereof are included in six (6) CD-ROMs.

The FEIR discs are separately presented for filing in individual manila envelopes along with reference to the application.

Exhibit K

Scoping Memo Information for Applications

A. Category (Check the category that is most appropriate)

☐ **Adjudicatory -** "Adjudicatory" proceedings are: (1) enforcement investigations into possible violations of any provision of statutory law or order or rule of the Commission; and (2) complaints against regulated entities, including those complaints that challenge the accuracy of a bill, but excluding those complaints that challenge the reasonableness of rates or charges, past, present, or future, such as **formal rough crossing complaints** (maximum 12 month process if hearings are required).

☒ **Ratesetting -** "Ratesetting" proceedings are proceedings in which the Commission sets or investigates rates for a specifically named utility (or utilities), or establishes a mechanism that in turn sets the rates for a specifically named utility (or utilities). "Ratesetting" proceedings include complaints that challenge the reasonableness of rates or charges, past, present, or future. Other proceedings may also be categorized as ratesetting when they do not clearly fit into one category, such as **railroad crossing applications** (maximum 18 month process if hearings are required).

Quasi-legislative - "Quasi-legislative" proceedings are proceedings that establish policy or rules (including generic ratemaking policy or rules) affecting a class of regulated entities, including those proceedings in which the Commission investigates rates or practices for an entire regulated industry or class of entities within the industry.

B. Are hearings necessary? **Yes** ☒ **No**

If yes, identify the material disputed factual issues on which hearings should be held, and the general nature of the evidence to be introduced. Railroad crossing applications which are not controversial usually do not require hearings.

Are public witness hearings necessary?

Yes ☒ **No**

Public witness hearings are set up for the purpose of getting input from the general public and any entity that will not be a party to the proceeding. Such input usually involves presenting written or oral statements to the presiding officer, not sworn testimony. Public witness statements are not subject to cross-examination.

C. Issues - List here the specific issues that need to be addressed in the proceeding.

None

D. Schedule (Even if you checked "No" in B above) Should the Commission decide to hold hearings, indicate here the proposed schedule for completing the proceeding within 12 months (if categorized as adjudicatory) or 18 months (if categorized as ratesetting or quasi-legislative).

The schedule should include proposed dates for the following events as needed:

30-days Protest Period – May 20, 2018 through June 20, 2018

4-months Proposed Decision – September 20, 2018

6-months Final Decision – November 20, 2018

If an unexpected hearing becomes necessary:

6-months Prehearing conference – November 20, 2018

9-months Hearings – February 20, 2019

12-months Briefs due – May 20, 2019

13-months Submission – June 20, 2019

16-months Proposed decision (90 days after submission) –September 20, 2019

18-months Final decision (60 days after proposed decision) – November 20, 2019

Task Q: Metro Gold Line Foothill Extension – CPUC Application Support Lone Hill Avenue (City of Glendora)

AECOM
300 S Grand Ave
Los Angeles, CA 90071
www.aecom.com

213 330 7200 tel
213 330 7201 fax

Memorandum

Date:	December 27, 2016
To:	Denis Cournoyer, Metro Gold Line Foothill Extension Construction Authority
From:	Robert Hertz, David Madera, AECOM
Cc:	Ray Sosa, AECOM
Subject:	Task Q: Metro Gold Line Foothill Extension – CPUC Application Support Lone Hill Avenue (City of Glendora)

1.0 Introduction

This technical memorandum presents an evaluation of the freight at-grade crossing at Lone Hill Avenue in the City of Glendora using existing traffic volumes for the peak shopping season between Thanksgiving and Christmas, and year 2035 volumes for weekday PM peak hour and Saturday Mid-Day peak hour. Traffic counts were collected on November 18, 2015 (Wednesday) for the weekday PM peak period and on December 12, 2015 for the Saturday mid-day peak period for the three study intersections: Lone Hill Avenue at Auto Centre Drive, Glendora Marketplace, and East Gladstone Street. Traffic counts are attached at the end of this memorandum.

Currently a single track, used by freight trains, crosses Lone Hill Avenue at the south side of its intersection with Auto Centre Drive. The intersection is currently signalized. The existing freight track runs at a northwest skew of approximately 30 degrees to Lone Hill Avenue at this location. The proposed project will add two new grade separated LRT tracks. The existing freight track will be realigned, transitioning from the south side to the north side of the LRT tracks as it traverses the crossing. Freight trains will continue to operate on the single dedicated track at the realigned at-grade crossing after the initiation of LRT operations.

The signalized intersection of Lone Hill Avenue and Auto Centre Drive is currently preempted by the freight trains. A microsimulation analysis was conducted at the study intersections to determine potential impacts to traffic, such as vehicle queuing and vehicular delay that are expected to occur as a result of the project. Results of this analysis are discussed in the sections below.

In the analysis presented in this memorandum, LADOT and TxDOT railroad preemption calculation sheets were used to determine the most appropriate advance pre-emption timing requirements for the at-grade crossing at this location. Conceptual signal phasing and pre-emption sequencing plans were prepared based on our initial analysis of the crossing for the proposed project. Conceptual improvement plans that also incorporate control of pedestrian movements were also prepared.

2.0 Field Review and Observation

Field review and observations were conducted on December 7, 2015, for the at-grade crossing at the Lone Hill Avenue and Auto Centre Drive intersection as well as at the signalized intersections on Lone Hill Avenue at Glendora Marketplace and at East Gladstone Street. Photos and notes were taken to document the existing traffic and pedestrian control features and operations at these intersections, including grade crossing geometry, crossing hardware, pedestrian crossing features, current intersection and crossing signage and pavement markings.

The following are the field comments for existing conditions at this location:

- There are no existing pedestrian treatments or pedestrian gates.
- There are no existing four-quadrant crossing railroad warning devices.
- Signage and pavement markings do not conform to CA MUTCD or ADA requirements.
- There are no existing anti-queuing controls such as signage or pavement markings.
- There is no existing safety lighting at crossings.
- The existing freight crossing is approximately 100 feet south of Auto Centre Drive.
- The visibility of approaching freight trains is obstructed for northbound and southbound approaches due to the existing buildings and mature landscaping on both sides of the existing tracks and the adverse skew angle of the crossing.
- Southbound queuing from the crossing gate blocks the crosswalk across Lone Hill Avenue on the north side of Auto Centre Drive.
- Northbound queuing occurs from the crossing gate to beyond Glendora Marketplace to the south.
- The extent of northbound queuing appears to result from a combination of northbound through traffic from Gladstone Street and eastbound traffic making the dual left turn out of Glendora Marketplace.

3.0 Microsimulation Analysis

A microsimulation analysis was performed for these intersections to determine whether satisfactory traffic operations could be maintained with the relocation of the existing at-grade freight operations and projected 2035 traffic conditions. The simulation model network includes intersections of Lone Hill Avenue and Auto Centre Drive, Lone Hill Avenue and Glendora Marketplace, Lone Hill Avenue and Gladstone Street and the at grade railroad crossing. One railroad track was coded in the model including the existing freight track on the south side.

Table 1 shows delay analysis results for the Lone Hill Avenue and Auto Centre Drive, Lone Hill Avenue and Glendora Marketplace, and Lone Hill Avenue and Gladstone Street intersections with the proposed relocated at-grade freight crossing under the existing Saturday Mid-Day peak hour and weekday PM Peak hour conditions. As shown in Table 1, all intersections are projected to operate at LOS C or better.

Table 1: Existing Intersection Level of Service – Lone Hill Avenue Crossing

Intersection Location	Control	Saturday MD Peak Hour Build Condition		Weekday PM Peak Hour Build Condition	
		Delay (sec)	LOS	Delay (sec)	LOS
Lone Hill Ave & Auto Centre Dr	Signalized	21.6	C	21.9	C
Lone Hill Ave & Glendora Marketplace	Signalized	20.1	C	18.0	B
Lone Hill Ave & Gladstone St	Signalized	32.5	C	34.7	C

Table 2 shows Saturday Mid-Day Peak Hour and weekday PM Peak hour queue analysis results for the Lone Hill Avenue and Auto Centre Drive, Lone Hill Avenue and Glendora Marketplace, and Lone Hill Avenue and Gladstone Street intersections with the proposed relocated freight crossing. Significant queuing and blocking problems are expected at all three intersections, as shown in the table.

Table 2: Existing Queuing Analysis – Lone Hill Avenue Crossing

Intersection Location	Movement	Available Storage (ft)	Saturday MD Peak Hour Build Condition Queue (ft)	Weekday PM Peak Hour Build Condition Queue (ft)
Lone Hill Ave & Auto Centre Dr	NBT	100	380	305
	SBL	950	425	455
	WBL	600	770	570
	WBR	600	695	570
Lone Hill Ave & Glendora Marketplace	NBL	240	145	100
	SBL	85	95	20
	SBT	430	95	20
	SBR	210	95	20
	EBL	300	1150	695
	EBR	175	190	140
Lone Hill Ave & Gladstone St	NBL	150	285	90
	NBR	120	60	65
	SBL	220	365	210
	SBR	190	85	85
	EBL	120	150	180
	WBL	240	125	545

BOLD font represents inadequate storage

Table 3 shows delay analysis results for the Lone Hill Avenue and Auto Centre Drive, Lone Hill Avenue and Glendora Marketplace, and Lone Hill Avenue and Gladstone Street intersections with the proposed relocated at-grade freight crossing under the year 2035 Saturday Mid-Day peak hour and weekday PM Peak hour conditions. As shown in Table 3, all intersections are projected to operate at LOS C or better.

Table 3: 2035 Intersection Level of Service – Lone Hill Avenue Crossing

Intersection Location	Control	Saturday MD Peak Hour Build Condition		Weekday PM Peak Hour Build Condition	
		Delay (sec)	LOS	Delay (sec)	LOS
Lone Hill Ave & Auto Centre Dr	Signalized	37.7	D	25.1	C
Lone Hill Ave & Glendora Marketplace	Signalized	27.3	C	21.3	C
Lone Hill Ave & Gladstone St	Signalized	39.1	D	30.6	C

Table 4 shows Saturday Mid-Day Peak Hour and weekday PM Peak hour queue analysis results for the Lone Hill Avenue and Auto Centre Drive, Lone Hill Avenue and Glendora Marketplace, and Lone Hill Avenue and Gladstone Street intersections with the proposed relocated freight crossing. Significant queuing and blocking problems are expected at all three intersections, as shown in the table.

Table 4: 2035 Queuing Analysis – Lone Hill Avenue Crossing

Intersection Location	Movement	Available Storage (ft)	Saturday MD Peak Hour Build Condition Queue (ft)	Weekday PM Peak Hour Build Condition Queue (ft)
Lone Hill Ave & Auto Centre Dr	NBT	100	390	395
	SBL	950	970	595
	WBL	600	1180	690
	WBR	600	1155	680
Lone Hill Ave & Glendora Marketplace	NBL	240	170	95
	SBL	85	175	170
	SBT	430	175	170
	SBR	210	175	170
	EBL	300	1315	970
	EBR	175	185	110
Lone Hill Ave & Gladstone St	NBL	150	430	255
	NBR	120	65	110
	SBL	220	695	190
	SBR	190	135	175
	EBL	120	160	165
	WBL	240	140	155

BOLD font represents inadequate storage

4.0 LADOT and TxDOT Calculation Sheets

According to the proposed grade crossing plans, the existing freight track will be relocated from the south side west of the crossing to the north side east of the crossing, and rated for a 40 mph train operating speed. Using the forecast traffic volumes, LADOT and TxDOT railroad preemption calculation sheets were used to determine the most appropriate advance preemption requirements for the relocated freight track. The main purpose of the preemption calculation sheets is to determine if additional time or advance preemption is required for the traffic signal to clear stationary vehicles out of the crossing before the arrival of the train. Advance preemption has the following benefits:

- Provides additional track clearance and separation time, which clears the intersection prior to lowering the gates.
- Give vehicles stopped under the gates time to start and clear the gates before they descend.
- Provides adequate queue clearance time.

In addition, advance preemption can also include time for pedestrians to cross the street prior to train arrival. The Lone Hill Avenue northbound (NB) and southbound (SB) approaches and volume information were used in the preemption calculation sheets. The LADOT and TxDOT railroad preemption calculation sheets are attached at the end of this memorandum. Table 5 shows the maximum preemption time using the LADOT and TxDOT methodologies for both of the Lone Hill Avenue NB and SB grade crossing approaches:

Table 5: Maximum Preemption Time (MPT) for At-Grade Crossing

Approach	LADOT MPT (Seconds)	TxDOT MPT (Seconds)	Queue Startup Distance L (ft)
NB Lone Hill Avenue	94	51.1	188
SB Lone Hill Avenue	123	73.0	609

Queue startup distance (L) is defined as the distance (in feet) from the railroad warning device limit line or gate to the adjacent intersection limit line. The table above shows that the LADOT calculation sheets resulted in greater preemption time compared to the TxDOT calculation sheets for Lone Hill Avenue northbound and southbound (84% and 68%, respectively). Therefore, the LADOT preemption times, being more conservative, were used in the evaluation. The LADOT and TxDOT calculation sheets are attached at the end of this memorandum.

5.0 Conceptual Signal Phasing and Pre-emption Sequencing Plans

Based on the forecast traffic volumes from the FEIR, site conditions, and pedestrian and traffic operational concerns, the Conceptual Improvement Plans TS-003 and TS-004 were developed to satisfy the requirements of the CPUC for at-grade crossings. A proposed phase diagram for the traffic signal is also shown along with the expected railroad preemption sequence phasing diagram. The Conceptual Improvement Plans (TS-003 and TS-004) are attached at the end of this memorandum.

6.0 Evaluation of Need for Pre-Signal

Traffic analysis along Lone Hill Avenue was conducted using VISSIM model for existing and 2035 conditions, taking into consideration the existing coordinated signal progression. The model provides a better picture of the overall traffic patterns along the corridor while helping minimize overall queuing and intersection delay along study area. As shown in Table 2 and Table 4, the maximum queue length for the NB approach, which crosses the freight tracks at this location, is 395 feet in the Saturday MD peak hour. The available storage length between the stop bar and track is approximately 100 feet and will not be sufficient for the expected queues. Therefore, a pre-signal would be warranted at Lone Hill Avenue and Auto Center Drive. In addition, southbound queue cutter detection should be installed to prevent queue spillback onto the tracks at Lone Hill Avenue and Glendora Marketplace.

7.0 List of Attachments

- Traffic Counts
- LADOT Preemption Calculation Sheets
- TxDOT Preemption Calculation Sheets
- Conceptual Improvement Plans (TS-003 and TS-004)

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Glendora
N/S: Lone Hill Avenue
E/W: Auto Center Drive
Weather: Clear

File Name : GLDLHACPM
Site Code : 19515635
Start Date : 11/18/2015
Page No : 1

Groups Printed- Total Volume

	Lone Hill Avenue Southbound			Auto Center Drive Westbound			Lone Hill Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
04:00 PM	98	159	257	103	120	223	182	116	298	778
04:15 PM	110	175	285	84	140	224	212	106	318	827
04:30 PM	120	236	356	85	138	223	170	89	259	838
04:45 PM	134	221	355	99	146	245	207	88	295	895
Total	462	791	1253	371	544	915	771	399	1170	3338
05:00 PM	145	227	372	94	147	241	197	97	294	907
05:15 PM	133	265	398	111	134	245	219	115	334	977
05:30 PM	149	220	369	103	121	224	205	101	306	899
05:45 PM	120	158	278	84	108	192	215	96	311	781
Total	547	870	1417	392	510	902	836	409	1245	3564
Grand Total	1009	1661	2670	763	1054	1817	1607	808	2415	6902
Apprch %	37.8	62.2		42	58		66.5	33.5		
Total %	14.6	24.1	38.7	11.1	15.3	26.3	23.3	11.7	35	

	Lone Hill Avenue Southbound			Auto Center Drive Westbound			Lone Hill Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	134	221	355	99	146	**245**	207	88	295	895
05:00 PM	145	227	372	94	**147**	241	197	97	294	907
05:15 PM	133	**265**	**398**	**111**	134	245	**219**	**115**	**334**	**977**
05:30 PM	**149**	220	369	103	121	224	205	101	306	899
Total Volume	561	933	1494	407	548	955	828	401	1229	3678
% App. Total	37.6	62.4		42.6	57.4		67.4	32.6		
PHF	.941	.880	.938	.917	.932	.974	.945	.872	.920	.941

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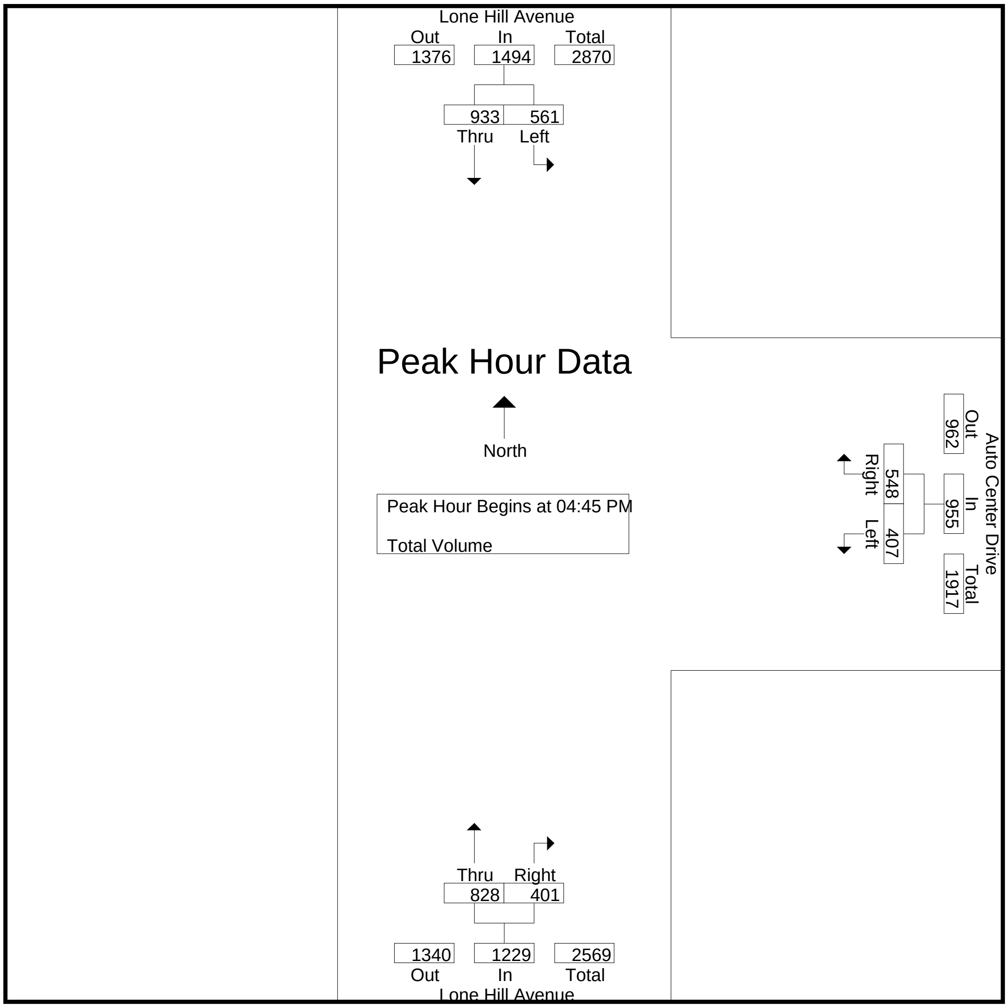
City of Glendora
N/S: Lone Hill Avenue
E/W: Auto Center Drive
Weather: Clear

File Name : GLDLHACPM
Site Code : 19515635
Start Date : 11/18/2015



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM			04:45 PM			05:00 PM		
+0 mins.	134	221	355	99	146	**245**	197	97	294
+15 mins.	145	227	372	94	**147**	241	**219**	**115**	**334**
+30 mins.	133	**265**	**398**	**111**	134	245	205	101	306
+45 mins.	**149**	220	369	103	121	224	215	96	311
Total Volume	561	933	1494	407	548	955	836	409	1245
% App. Total	37.6	62.4		42.6	57.4		67.1	32.9	
PHF	.941	.880	.938	.917	.932	.974	.954	.889	.932

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City of Glendora
N/S: Lone Hill Avenue
E/W: Glendora Marketplace Drive
Weather: Clear

File Name : GLDLHGMPM
Site Code : 19515635
Start Date : 11/18/2015
Page No : 1

Groups Printed- Total Volume

	Lone Hill Avenue Southbound				Glendora Marketplace Drive Westbound				Lone Hill Avenue Northbound				Glendora Marketplace Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	144	115	259	5	1	15	21	20	182	1	203	116	0	35	151	634
04:15 PM	0	152	118	270	1	0	10	11	13	170	0	183	117	0	45	162	626
04:30 PM	1	156	155	312	2	0	5	7	19	151	0	170	110	0	47	157	646
04:45 PM	1	181	136	318	0	0	3	3	28	164	0	192	136	0	48	184	697
Total	2	633	524	1159	8	1	33	42	80	667	1	748	479	0	175	654	2603
05:00 PM	0	172	136	308	1	0	4	5	28	162	0	190	133	0	52	185	688
05:15 PM	1	211	169	381	1	0	4	5	44	210	0	254	132	0	49	181	821
05:30 PM	0	210	138	348	1	1	3	5	27	206	0	233	127	0	52	179	765
05:45 PM	0	70	146	216	0	0	2	2	31	176	0	207	144	0	41	185	610
Total	1	663	589	1253	3	1	13	17	130	754	0	884	536	0	194	730	2884
Grand Total	3	1296	1113	2412	11	2	46	59	210	1421	1	1632	1015	0	369	1384	5487
Apprch %	0.1	53.7	46.1		18.6	3.4	78		12.9	87.1	0.1		73.3	0	26.7		
Total %	0.1	23.6	20.3	44	0.2	0	0.8	1.1	3.8	25.9	0	29.7	18.5	0	6.7	25.2	

	Lone Hill Avenue Southbound				Glendora Marketplace Drive Westbound				Lone Hill Avenue Northbound				Glendora Marketplace Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	**1**	181	136	318	0	0	3	3	28	164	0	192	**136**	0	48	184	697
05:00 PM	0	172	136	308	**1**	0	**4**	**5**	28	162	0	190	133	0	**52**	**185**	688
05:15 PM	1	**211**	**169**	**381**	1	0	4	5	**44**	**210**	0	**254**	132	0	49	181	**821**
05:30 PM	0	210	138	348	1	**1**	3	5	27	206	0	233	127	0	52	179	765
Total Volume	2	774	579	1355	3	1	14	18	127	742	0	869	528	0	201	729	2971
% App. Total	0.1	57.1	42.7		16.7	5.6	77.8		14.6	85.4	0		72.4	0	27.6		
PHF	.500	.917	.857	.889	.750	.250	.875	.900	.722	.883	.000	.855	.971	.000	.966	.985	.905

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City of Glendora
N/S: Lone Hill Avenue
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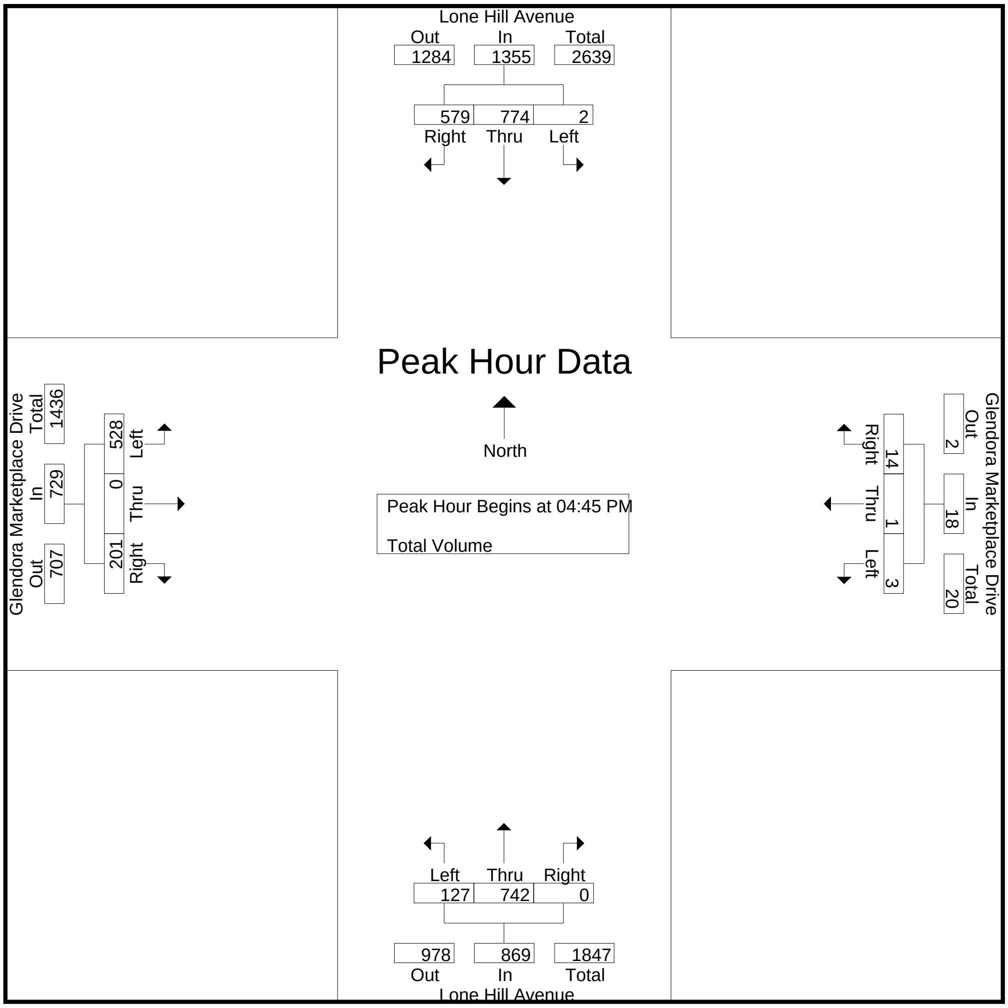
Weather: Clear

File Name : GLDLHGMPM
Site Code : 19515635
Start Date : 11/18/2015
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:00 PM				05:00 PM				05:00 PM			
+0 mins.	**1**	181	136	318	**5**	**1**	**15**	**21**	28	162	0	190	133	0	**52**	**185**
+15 mins.	0	172	136	308	1	0	10	11	**44**	**210**	0	**254**	132	0	49	181
+30 mins.	1	**211**	**169**	**381**	2	0	5	7	27	206	0	233	127	0	52	179
+45 mins.	0	210	138	348	0	0	3	3	31	176	0	207	**144**	0	41	185
Total Volume	2	774	579	1355	8	1	33	42	130	754	0	884	536	0	194	730
% App. Total	0.1	57.1	42.7		19	2.4	78.6		14.7	85.3	0		73.4	0	26.6	
PHF	.500	.917	.857	.889	.400	.250	.550	.500	.739	.898	.000	.870	.931	.000	.933	.986

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City of Glendora
N/S: Lone Hill Avenue
E/W: Gladstone Street
Weather: Clear

File Name : GLDLHGLPM
Site Code : 19515635
Start Date : 11/18/2015
Page No : 1

Groups Printed- Total Volume

	Lone Hill Avenue Southbound				Gladstone Street Westbound				Lone Hill Avenue Northbound				Gladstone Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	61	147	50	258	77	91	46	214	27	72	36	135	68	119	31	218	825
04:15 PM	47	134	33	214	70	88	26	184	15	61	23	99	40	108	34	182	679
04:30 PM	43	134	36	213	77	81	52	210	22	68	22	112	58	92	48	198	733
04:45 PM	51	160	28	239	97	115	49	261	25	62	18	105	56	125	34	215	820
Total	202	575	147	924	321	375	173	869	89	263	99	451	222	444	147	813	3057
05:00 PM	39	157	36	232	86	101	41	228	29	83	33	145	64	153	47	264	869
05:15 PM	52	184	40	276	83	122	48	253	28	74	41	143	69	140	35	244	916
05:30 PM	55	199	53	307	87	145	45	277	17	73	35	125	65	143	62	270	979
05:45 PM	49	131	45	225	74	108	49	231	18	64	23	105	63	131	43	237	798
Total	195	671	174	1040	330	476	183	989	92	294	132	518	261	567	187	1015	3562
Grand Total	397	1246	321	1964	651	851	356	1858	181	557	231	969	483	1011	334	1828	6619
Apprch %	20.2	63.4	16.3		35	45.8	19.2		18.7	57.5	23.8		26.4	55.3	18.3		
Total %	6	18.8	4.8	29.7	9.8	12.9	5.4	28.1	2.7	8.4	3.5	14.6	7.3	15.3	5	27.6	

	Lone Hill Avenue Southbound				Gladstone Street Westbound				Lone Hill Avenue Northbound				Gladstone Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	51	160	28	239	**97**	115	**49**	261	25	62	18	105	56	125	34	215	820
05:00 PM	39	157	36	232	86	101	41	228	**29**	**83**	33	**145**	64	**153**	47	264	869
05:15 PM	52	184	40	276	83	122	48	253	28	74	**41**	143	**69**	140	35	244	916
05:30 PM	**55**	**199**	**53**	**307**	87	**145**	45	**277**	17	73	35	125	65	143	**62**	**270**	**979**
Total Volume	197	700	157	1054	353	483	183	1019	99	292	127	518	254	561	178	993	3584
% App. Total	18.7	66.4	14.9		34.6	47.4	18		19.1	56.4	24.5		25.6	56.5	17.9		
PHF	.895	.879	.741	.858	.910	.833	.934	.920	.853	.880	.774	.893	.920	.917	.718	.919	.915

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City of Glendora
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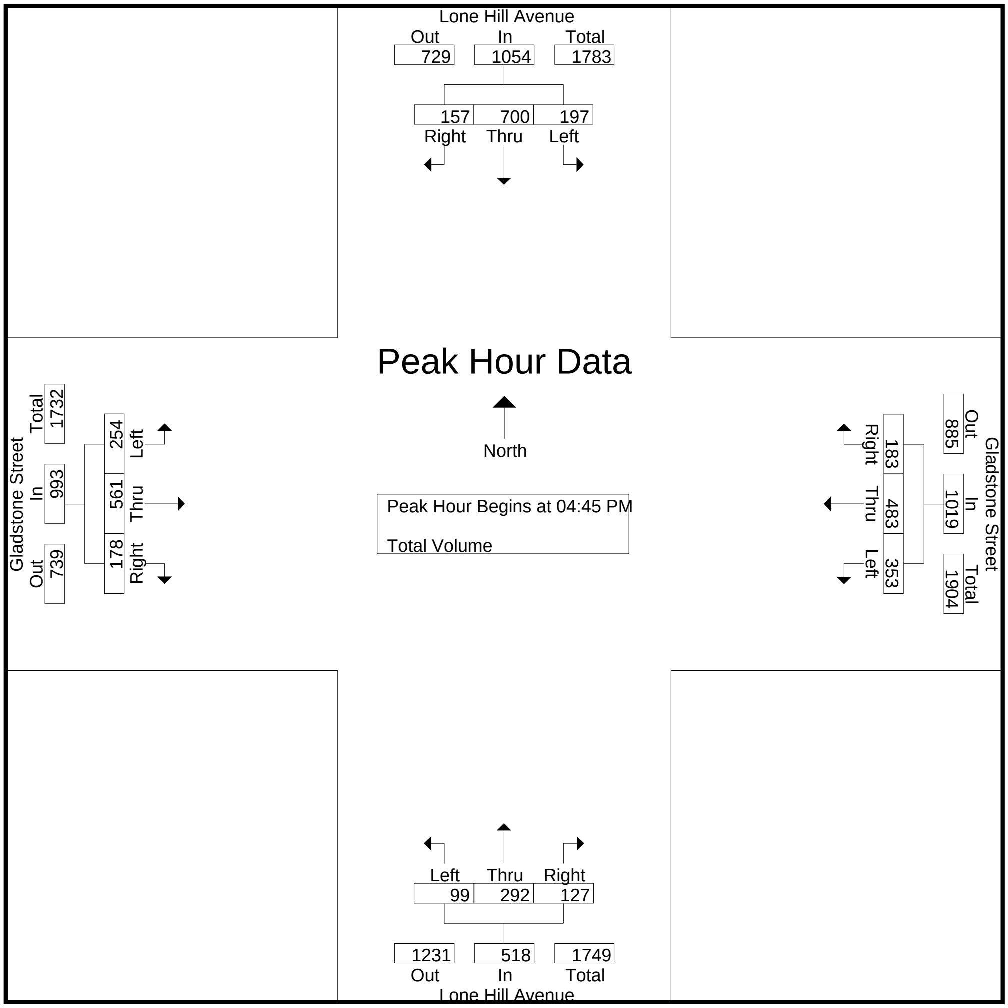
Weather: Clear

File Name : GLDLHGLPM
Site Code : 19515635
Start Date : 11/18/2015
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				04:45 PM				05:00 PM			
+0 mins.	51	160	28	239	**97**	115	**49**	261	25	62	18	105	64	**153**	47	264
+15 mins.	39	157	36	232	86	101	41	228	**29**	**83**	33	**145**	**69**	140	35	244
+30 mins.	52	184	40	276	83	122	48	253	28	74	**41**	143	65	143	**62**	**270**
+45 mins.	**55**	**199**	**53**	**307**	87	**145**	45	**277**	17	73	35	125	63	131	43	237
Total Volume	197	700	157	1054	353	483	183	1019	99	292	127	518	261	567	187	1015
% App. Total	18.7	66.4	14.9		34.6	47.4	18		19.1	56.4	24.5		25.7	55.9	18.4	
PHF	.895	.879	.741	.858	.910	.833	.934	.920	.853	.880	.774	.893	.946	.926	.754	.940

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City of Glendora
N/S: Lone Hill Avenue
E/W: Auto Center Drive
Weather: Clear

File Name : GLDLHACPM
Site Code : 19515635
Start Date : 12/12/2015

Groups Printed- Total Volume

	Lone Hill Avenue Southbound			Auto Center Drive Westbound			Lone Hill Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
12:00 PM	129	300	429	157	93	250	261	126	387	1066
12:15 PM	153	317	470	111	105	216	260	126	386	1072
12:30 PM	109	306	415	122	105	227	252	120	372	1014
12:45 PM	132	318	450	145	102	247	248	120	368	1065
Total	523	1241	1764	535	405	940	1021	492	1513	4217
01:00 PM	136	286	422	145	114	259	257	121	378	1059
01:15 PM	112	283	395	115	91	206	284	112	396	997
01:30 PM	118	241	359	117	118	235	268	130	398	992
01:45 PM	134	290	424	121	97	218	294	132	426	1068
Total	500	1100	1600	498	420	918	1103	495	1598	4116
Grand Total	1023	2341	3364	1033	825	1858	2124	987	3111	8333
Apprch %	30.4	69.6		55.6	44.4		68.3	31.7		
Total %	12.3	28.1	40.4	12.4	9.9	22.3	25.5	11.8	37.3	

	Lone Hill Avenue Southbound			Auto Center Drive Westbound			Lone Hill Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 12:00 PM										
12:00 PM	129	300	429	**157**	93	**250**	**261**	**126**	**387**	1066
12:15 PM	**153**	317	**470**	111	**105**	216	260	126	386	**1072**
12:30 PM	109	306	415	122	105	227	252	120	372	1014
12:45 PM	132	**318**	450	145	102	247	248	120	368	1065
Total Volume	523	1241	1764	535	405	940	1021	492	1513	4217
% App. Total	29.6	70.4		56.9	43.1		67.5	32.5		
PHF	.855	.976	.938	.852	.964	.940	.978	.976	.977	.983

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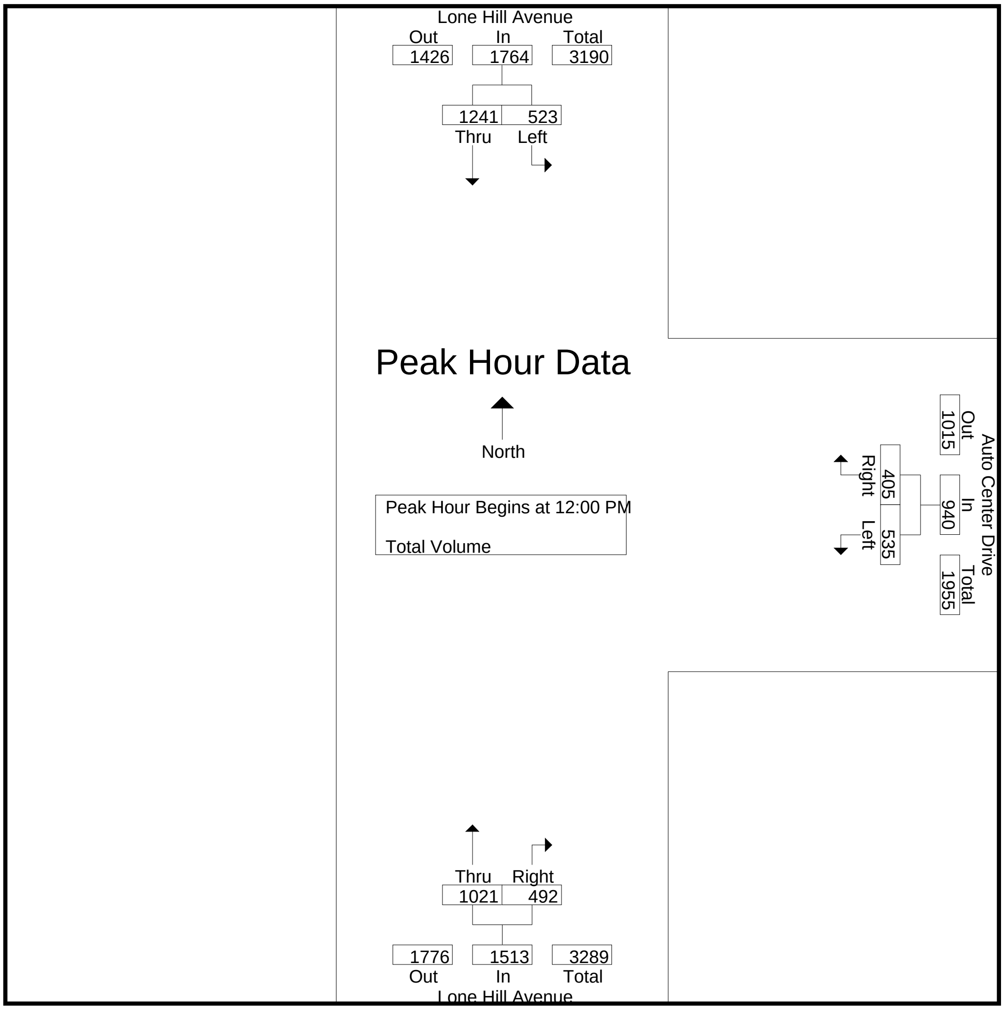
City of Glendora
N/S: Lone Hill Avenue
E/W: Auto Center Drive
Weather: Clear

File Name : GLDLHACPM
Site Code : 19515635
Start Date : 12/12/2015
Page No : 2



Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	12:00 PM			12:15 PM			01:00 PM		
+0 mins.	129	300	429	111	105	216	257	121	378
+15 mins.	**153**	317	**470**	122	105	227	284	112	396
+30 mins.	109	306	415	**145**	102	247	268	130	398
+45 mins.	132	**318**	450	145	**114**	**259**	**294**	**132**	**426**
Total Volume	523	1241	1764	523	426	949	1103	495	1598
% App. Total	29.6	70.4		55.1	44.9		69	31	
PHF	.855	.976	.938	.902	.934	.916	.938	.938	.938

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City of Glendora
N/S: Lone Hill Avenue
E/W: Glendora Marketplace Drive
Weather: Clear

File Name : GLDLHGMPM
Site Code : 19515635
Start Date : 12/12/2015
Page No : 1

Groups Printed- Total Volume

	Lone Hill Avenue Southbound				Glendora Marketplace Drive Westbound				Lone Hill Avenue Northbound				Glendora Marketplace Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:00 PM	1	201	241	443	0	1	0	1	48	191	1	240	202	0	74	276	960
12:15 PM	5	187	236	428	0	0	0	0	58	215	0	273	184	0	83	267	968
12:30 PM	2	203	212	417	0	0	0	0	49	173	0	222	178	0	79	257	896
12:45 PM	5	228	216	449	0	1	0	1	54	175	0	229	180	1	85	266	945
Total	13	819	905	1737	0	2	0	2	209	754	1	964	744	1	321	1066	3769
01:00 PM	5	203	217	425	1	0	5	6	54	207	0	261	178	0	102	280	972
01:15 PM	6	201	205	412	0	0	0	0	53	182	0	235	186	0	92	278	925
01:30 PM	0	145	203	348	0	0	0	0	35	191	0	226	230	0	105	335	909
01:45 PM	4	181	224	409	0	0	0	0	67	216	0	283	181	0	60	241	933
Total	15	730	849	1594	1	0	5	6	209	796	0	1005	775	0	359	1134	3739
Grand Total	28	1549	1754	3331	1	2	5	8	418	1550	1	1969	1519	1	680	2200	7508
Apprch %	0.8	46.5	52.7		12.5	25	62.5		21.2	78.7	0.1		69	0	30.9		
Total %	0.4	20.6	23.4	44.4	0	0	0.1	0.1	5.6	20.6	0	26.2	20.2	0	9.1	29.3	

	Lone Hill Avenue Southbound				Glendora Marketplace Drive Westbound				Lone Hill Avenue Northbound				Glendora Marketplace Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:15 PM																	
12:15 PM	**5**	187	**236**	428	0	0	0	0	**58**	**215**	0	**273**	**184**	0	83	267	968
12:30 PM	2	203	212	417	0	0	0	0	49	173	0	222	178	0	79	257	896
12:45 PM	5	**228**	216	**449**	0	**1**	0	1	54	175	0	229	180	**1**	85	266	945
01:00 PM	5	203	217	425	**1**	0	**5**	**6**	54	207	0	261	178	0	**102**	**280**	**972**
Total Volume	17	821	881	1719	1	1	5	7	215	770	0	985	720	1	349	1070	3781
% App. Total	1	47.8	51.3		14.3	14.3	71.4		21.8	78.2	0		67.3	0.1	32.6		
PHF	.850	.900	.933	.957	.250	.250	.250	.292	.927	.895	.000	.902	.978	.250	.855	.955	.972

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City of Glendora
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File Name : GLDLHGMPM
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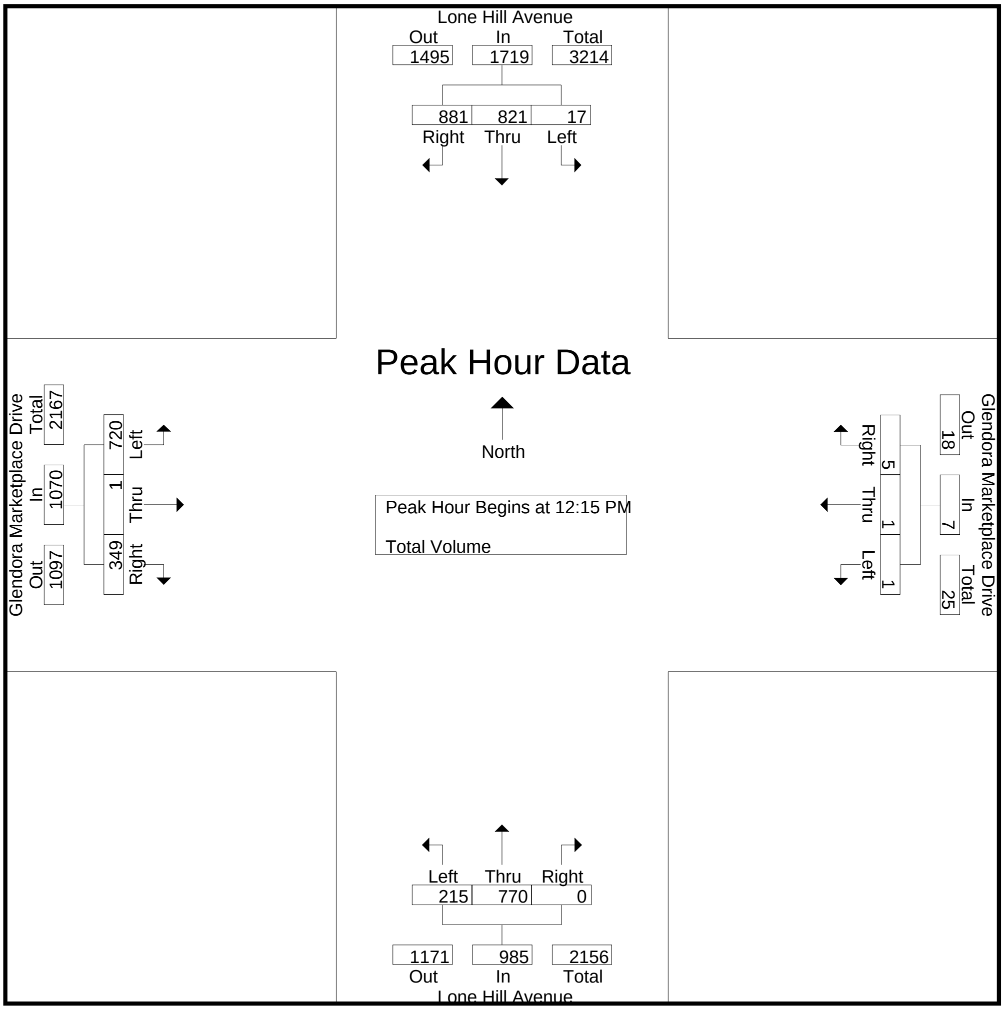

Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	12:00 PM				12:15 PM				01:00 PM				12:45 PM			
+0 mins.	1	201	**241**	443	0	0	0	0	54	207	0	261	180	**1**	85	266
+15 mins.	**5**	187	236	428	0	0	0	0	53	182	0	235	178	0	102	280
+30 mins.	2	203	212	417	0	**1**	0	1	35	191	0	226	186	0	92	278
+45 mins.	5	**228**	216	**449**	**1**	0	**5**	**6**	**67**	**216**	0	**283**	**230**	0	**105**	**335**
Total Volume	13	819	905	1737	1	1	5	7	209	796	0	1005	774	1	384	1159
% App. Total	0.7	47.2	52.1		14.3	14.3	71.4		20.8	79.2	0		66.8	0.1	33.1	
PHF	.650	.898	.939	.967	.250	.250	.250	.292	.780	.921	.000	.888	.841	.250	.914	.865

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File Name : GLDLHGLPM
Site Code : 19515635
Start Date : 12/12/2015
Page No : 1

Groups Printed- Total Volume

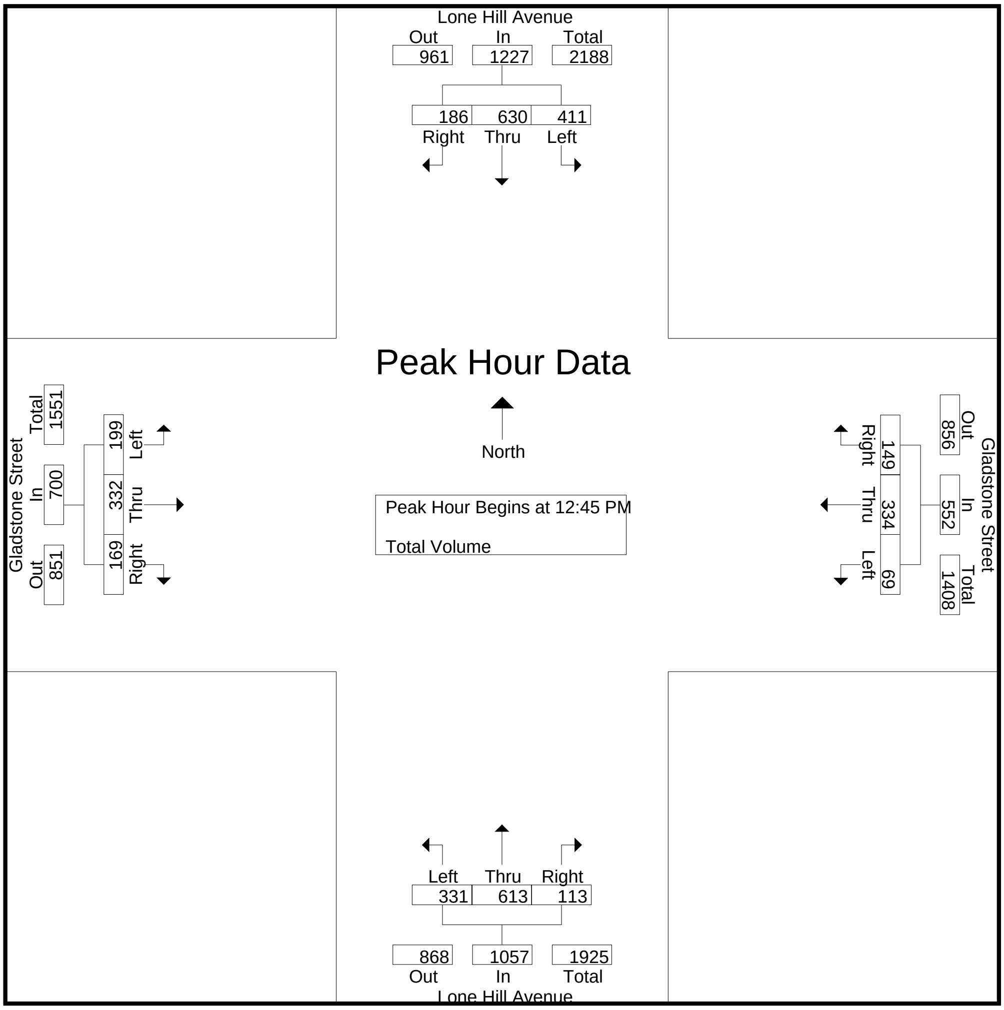
	Lone Hill Avenue Southbound				Gladstone Street Westbound				Lone Hill Avenue Northbound				Gladstone Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:00 PM	86	162	37	285	21	83	33	137	93	155	23	271	56	78	40	174	867
12:15 PM	77	118	52	247	20	77	44	141	78	154	24	256	51	86	50	187	831
12:30 PM	109	145	44	298	22	79	42	143	101	132	32	265	45	84	42	171	877
12:45 PM	104	166	56	326	12	73	42	127	86	143	36	265	49	74	29	152	870
Total	376	591	189	1156	75	312	161	548	358	584	115	1057	201	322	161	684	3445
01:00 PM	102	145	51	298	20	75	47	142	73	155	28	256	63	94	53	210	906
01:15 PM	111	169	52	332	19	76	29	124	88	163	17	268	32	76	42	150	874
01:30 PM	94	150	27	271	18	110	31	159	84	152	32	268	55	88	45	188	886
01:45 PM	87	109	36	232	24	88	38	150	85	175	26	286	60	76	38	174	842
Total	394	573	166	1133	81	349	145	575	330	645	103	1078	210	334	178	722	3508
Grand Total	770	1164	355	2289	156	661	306	1123	688	1229	218	2135	411	656	339	1406	6953
Apprch %	33.6	50.9	15.5		13.9	58.9	27.2		32.2	57.6	10.2		29.2	46.7	24.1		
Total %	11.1	16.7	5.1	32.9	2.2	9.5	4.4	16.2	9.9	17.7	3.1	30.7	5.9	9.4	4.9	20.2	

	Lone Hill Avenue Southbound				Gladstone Street Westbound				Lone Hill Avenue Northbound				Gladstone Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:45 PM																	
12:45 PM	104	166	**56**	326	12	73	42	127	86	143	**36**	265	49	74	29	152	870
01:00 PM	102	145	51	298	**20**	75	**47**	142	73	155	28	256	**63**	**94**	**53**	**210**	**906**
01:15 PM	**111**	**169**	52	**332**	19	76	29	124	**88**	**163**	17	**268**	32	76	42	150	874
01:30 PM	94	150	27	271	18	**110**	31	**159**	84	152	32	268	55	88	45	188	886
Total Volume	411	630	186	1227	69	334	149	552	331	613	113	1057	199	332	169	700	3536
% App. Total	33.5	51.3	15.2		12.5	60.5	27		31.3	58	10.7		28.4	47.4	24.1		
PHF	.926	.932	.830	.924	.863	.759	.793	.868	.940	.940	.785	.986	.790	.883	.797	.833	.976

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Glendora
N/S: Lone Hill Avenue
E/W: Gladstone Street
Weather: Clear

File Name : GLDLHGLPM
Site Code : 19515635
Start Date : 12/12/2015
Page No : 2



Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	12:30 PM				01:00 PM				01:00 PM				01:00 PM			
+0 mins.	109	145	44	298	20	75	**47**	142	73	155	28	256	**63**	**94**	**53**	**210**
+15 mins.	104	166	**56**	326	19	76	29	124	**88**	163	17	268	32	76	42	150
+30 mins.	102	145	51	298	18	**110**	31	**159**	84	152	**32**	268	55	88	45	188
+45 mins.	**111**	**169**	52	**332**	**24**	88	38	150	85	**175**	26	**286**	60	76	38	174
Total Volume	426	625	203	1254	81	349	145	575	330	645	103	1078	210	334	178	722
% App. Total	34	49.8	16.2		14.1	60.7	25.2		30.6	59.8	9.6		29.1	46.3	24.7	
PHF	.959	.925	.906	.944	.844	.793	.771	.904	.938	.921	.805	.942	.833	.888	.840	.860

LADOT Railroad Preemption Form

Revised 6/23/2008

Street Name:	Lone Hill Ave NB	Crossing No:	026200J

Section 1: Highway and Traffic Information

Part 1:

Maximum Approach Move Distance	178	ft	Grade	0.0	%
Maximum Conflicting Move Distance	122	ft	Grade	0.0	%
Minimum Track Clearance Dist, MTCD	132	ft	Grade	0.0	%
Clear Storage Distance, CSD	56	ft			
Length, L	**188**	ft			

Part 2:

	Car	Truck	Bus	Semi	
Vehicle Length (ft)	15	30	40	65	
Vehicle Height (ft)	5	14	11	14	
Queue Space (ft/veh)	21	36	46	71	
Vehicles within L (veh)	8	5	4	2	
Start moving last vehicle in L (sec)	**14.1**	**9.8**	**9.7**	**10.0**	**14**
Move front of vehicle thru L (sec)	9.6	10.6	8.8	19.0	19
Move entire vehicle past gate (sec)	2.4	3.9	3.8	11.0	11
Move entire vehicle thru MTCD (sec)	**8.4**	**9.8**	**8.4**	**19.5**	**19**
Non-interaction gate descent time (sec)	10.7	4.1	5.4	4.1	4
Approach vehicle clearance time (sec)	11.8	12.8	11.2	22.5	22
Conflicting vehicle clearance time (sec)	10.5	11.9	10.8	22.9	23
Include as Design Vehicle?	**Yes**	**Yes**	**Yes**	**Yes**	Use

Part 3:

Green Track Clearance Time	**33**	sec	
MTCD Queue Clearance Time	**33**	sec	
Minimum Walk	7	sec	
Maximum Ped Clearance	26	sec	
Minimum Green	6	sec	
Maximum Yellow + All Red	5.5	sec	
Maximum RWTT	**39**	sec	
Separation Time, ST	7	sec	*See Preemption Timeline*
Maximum Preemption Time, MPT	**94**	sec	*for actual Separation Time*

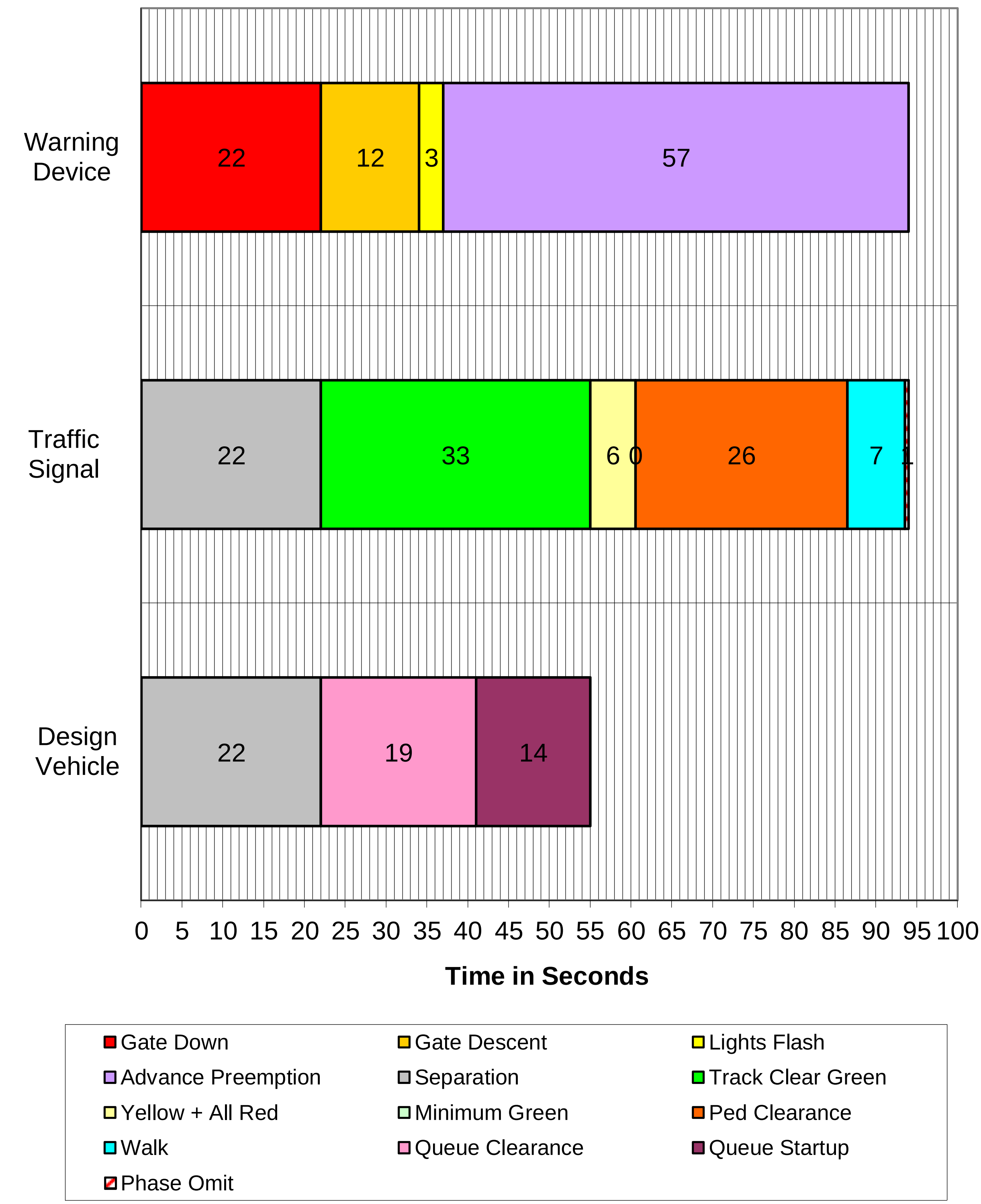
Section 2: Railroad Information

Lights Flash	3	sec	
Gate Descent	12	sec	
Minimum Time, MT	30	sec	
Clearance Time, CT	7	sec	10 sec minimum
Minimum Warning Time, MWT	**37**	sec	
Buffer Time, BT	5	sec	
Total Warning Time, TWT	**42**	sec	
Include vehicle-gate interaction check?	**Yes**		
Distance from gate to vehicle	6	ft	
Advance Preemption Time, APT	**57**	sec	
Equipment Response Time, ERT	5	sec	
Total Approach Time, TAT	**104**	sec	
Maximum Authorized Speed, MAS	40	mph	
Total Approach Distance, TAD	**6101**	ft	

LADOT Railroad Preemption Form Revised 6/23/2008

Street Name:	Lone Hill Ave NB	Crossing No:	026200J

Preemption Timeline



Preemption Timeline Displays Minimum RWTT? **No**

LADOT Railroad Preemption Form

Revised 6/23/2008

Street Name:	Lone Hill Ave SB	Crossing No:	026200J

Section 1: Highway and Traffic Information

Part 1:

Maximum Approach Move Distance	536	ft	Grade	0.0	%
Maximum Conflicting Move Distance	106	ft	Grade	0.0	%
Minimum Track Clearance Dist, MTCD	179	ft	Grade	0.0	%
Clear Storage Distance, CSD	430	ft			
Length, L	**609**	ft			

Part 2:

	Car	Truck	Bus	Semi	
Vehicle Length (ft)	15	30	40	65	
Vehicle Height (ft)	5	14	11	14	
Queue Space (ft/veh)	21	36	46	71	
Vehicles within L (veh)	29	16	13	8	
Start moving last vehicle in L (sec)	**44.8**	**25.8**	**25.5**	**27.9**	**45**
Move front of vehicle thru L (sec)	18.2	20.2	16.5	35.0	35
Move entire vehicle past gate (sec)	2.4	3.9	3.8	11.0	11
Move entire vehicle thru MTCD (sec)	**9.7**	**11.2**	**9.5**	**21.8**	**22**
Non-interaction gate descent time (sec)	10.7	4.1	5.4	4.1	4
Approach vehicle clearance time (sec)	19.4	21.3	18.1	36.7	37
Conflicting vehicle clearance time (sec)	10.0	11.4	10.4	22.1	22
Include as Design Vehicle?	**Yes**	**Yes**	**Yes**	**Yes**	Use

Part 3:

Green Track Clearance Time	**80**	sec	
MTCD Queue Clearance Time	**67**	sec	
Minimum Walk	7	sec	
Maximum Ped Clearance	26	sec	
Minimum Green	6	sec	
Maximum Yellow + All Red	5.5	sec	
Maximum RWTT	**39**	sec	
Separation Time, ST	7	sec	*See Preemption Timeline*
Maximum Preemption Time, MPT	**123**	sec	*for actual Separation Time*

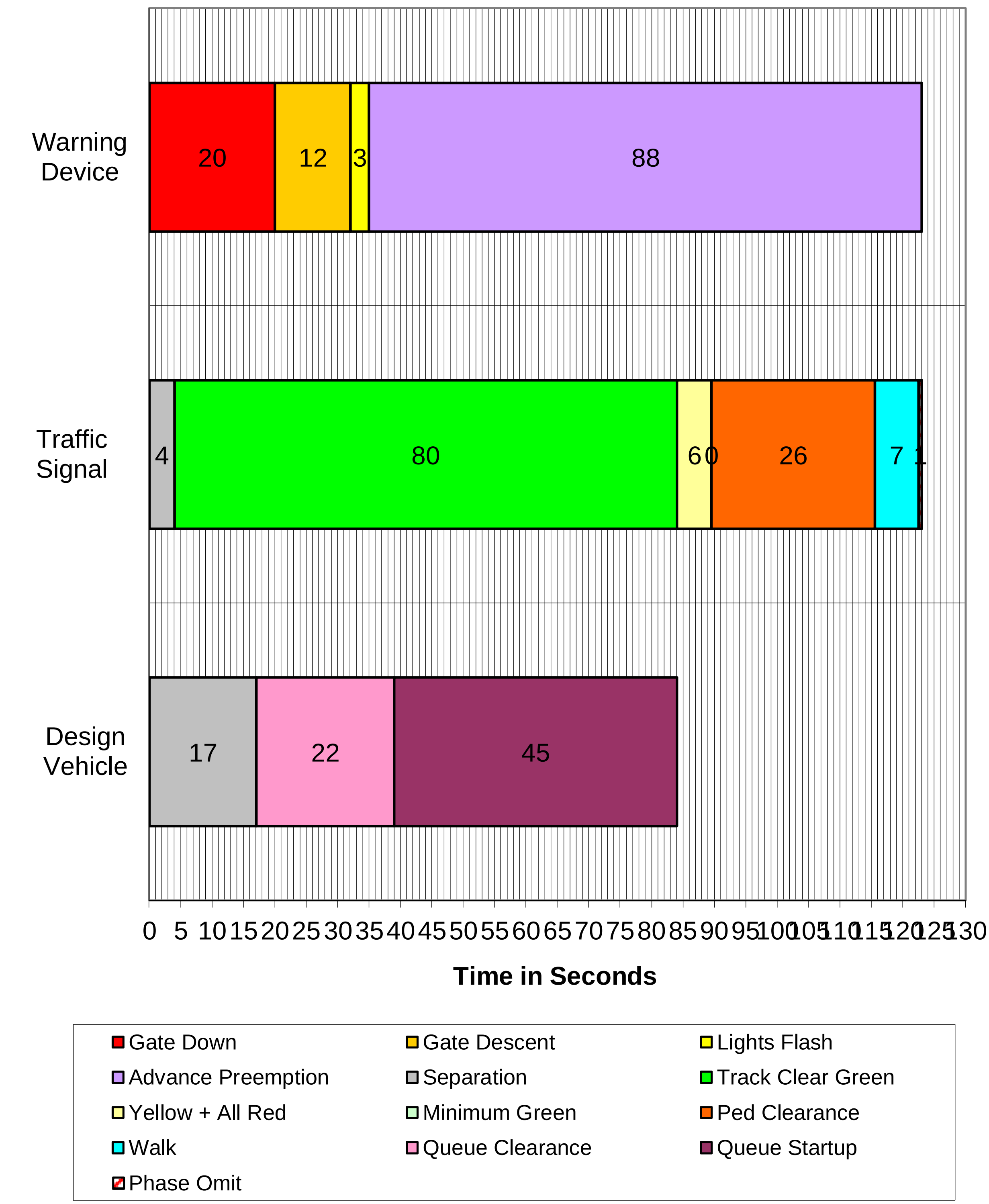
Section 2: Railroad Information

Lights Flash	3	sec	
Gate Descent	12	sec	
Minimum Time, MT	20	sec	
Clearance Time, CT	15	sec	15 sec minimum
Minimum Warning Time, MWT	**35**	sec	
Buffer Time, BT	5	sec	
Total Warning Time, TWT	**40**	sec	
Include vehicle-gate interaction check?	**Yes**		
Distance from gate to vehicle	6	ft	
Advance Preemption Time, APT	**88**	sec	
Equipment Response Time, ERT	5	sec	
Total Approach Time, TAT	**133**	sec	
Maximum Authorized Speed, MAS	40	mph	
Total Approach Distance, TAD	**7803**	ft	

LADOT Railroad Preemption Form Revised 6/23/2008

Street Name:	Lone Hill Ave SB	Crossing No:	026200J

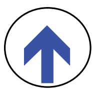
Preemption Timeline



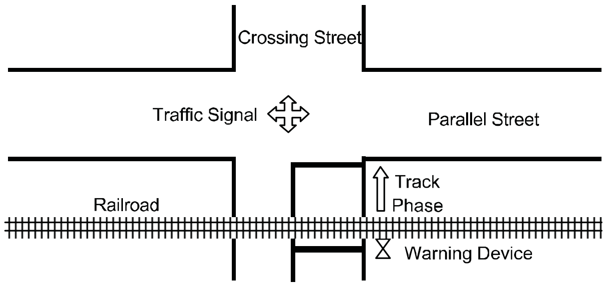
Preemption Timeline Displays Minimum RWTT? **No**

GUIDE FOR DETERMINING TIME REQUIREMENTS FOR TRAFFIC SIGNAL PREEMPTION AT HIGHWAY RAIL GRADE CROSSINGS

City: GLENDORA
Date: 02/22/16
County: LOS ANGELES
Completed by: AECOM
District:
District Approval:



Show North Arrow



Parallel Street Name: Auto Centre Dr
Crossing Street Name: Lone Hill Ave NB

Railroad: SCAX
Railroad Contact: SCAX
Crossing DOT#: 026200J
Phone: (415) 703-3722

SECTION 1: RIGHT-OF-WAY TRANSFER TIME CALCULATION

Preempt verification and response time

Remarks

1. Preempt delay time (seconds) **1.** 0.0

2. Controller response time to preempt (seconds) ....**2.** 0.0 — Controller type:

3. Preempt verification and response time (seconds): add lines 1 and 2 ....**3.** 0.0

Worst-case conflicting vehicle time

4. Worst-case conflicting vehicle phase number **4.** 2

Remarks

5. Minimum green time during right-of-way transfer (seconds) **5.** 6.00

6. Other green time during right-of-way transfer (seconds) ....**6.**

7. Yellow change time (seconds) **7.** 4.50

8. Red clearance time (seconds) **8.** 1.00

9. Worst-case conflicting vehicle time (seconds): add lines 5 through 8 ....**9.** 11.5

Worst-case conflicting pedestrian time

10. Worst-case conflicting pedestrian phase number..........................**10.** 8

Remarks

11. Minimum walk time during right-of-way transfer (seconds) **11.** 0.0

12. Pedestrian clearance time during right-of-way transfer (seconds) **12.** 0.0

13. Vehicle yellow change time, if not included on line 12 (seconds) **13.** 4.5

14. Vehicle red clearance time, if not included on line 12 (seconds) **14.** 1.0

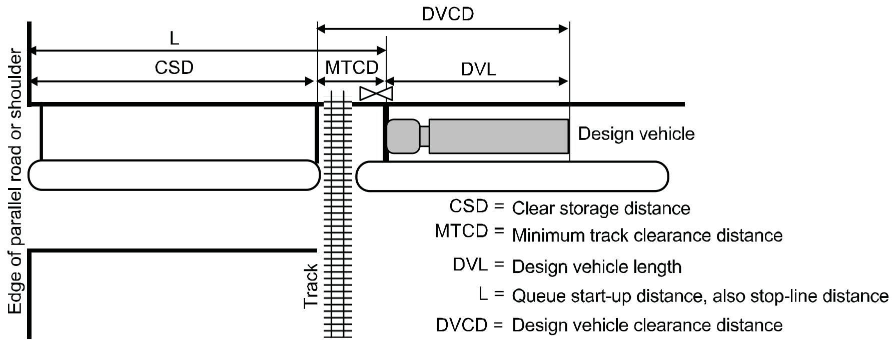
15. Worst-case conflicting pedestrian time (seconds): add lines 11 through 14 ....**15.** 5.5

Worst-case conflicting vehicle or pedestrian time

16. Worst-case conflicting vehicle or pedestrian time (seconds): maximum of lines 9 and 15................**16.** 11.5

17. Right-of-way transfer time (seconds): add lines 3 and 16 ....**17.** 11.5

SECTION 2: QUEUE CLEARANCE TIME CALCULATION



Line	Description	Value	Remarks
18.	Clear storage distance (CSD, feet) ....18.	85	
19.	Minimum track clearance distance (MTCD, feet) ....19.	132	
20.	Design vehicle length (DVL, feet) ....20.	75	Design vehicle type:
21.	Queue start-up distance, L (feet): add lines 18 and 19 .... 21.	217	
22.	Time required for design vehicle to start moving (seconds): calculate as 2+(L÷20) ....22.	12.9	
23.	Design vehicle clearance distance, DVCD (feet): add lines 19 and 20 ....23.	207	
24.	Time for design vehicle to accelerate through the DVCD (seconds) .... 24.	19.8	Read from Figure 2 in Instructions.
25.	**Queue clearance time (seconds): add lines 22 and 24 .... 25.**	32.6	

SECTION 3: MAXIMUM PREEMPTION TIME CALCULATION

Line	Description	Value	Remarks
26.	Right-of-way transfer time (seconds): line 17 .... 26.	11.5	
27.	Queue clearance time (seconds): line 25 .... 27.	32.6	
28.	Desired minimum separation time (seconds) .... 28.	7.0	
29.	**Maximum preemption time (seconds): add lines 26 through 28 .... 29.**	51.1	

SECTION 4: SUFFICIENT WARNING TIME CHECK

Line	Description	Value	Remarks
30.	Required minimum time, MT (seconds): per regulations ....30.	20.0	
31.	Clearance time, CT (seconds): get from railroad ....31.	7.0	
32.	Minimum warning time, MWT (seconds): add lines ....32.	27.0	Excludes buffer time (BT)
33.	Advance preemption time, APT, if provided (seconds): get from railroad .... 33.		
34.	Warning time provided by the railroad (seconds): add lines 32 and 33 ....34.	27.0	
35.	**Additional warning time required from railroad (seconds): subtract line 34 from line 29, round up to nearest full second, enter 0 if less than 0 .... 35.**	25	

If the additional warning time required (line 35) is greater than zero, additional warning time has to be requested from the railroad. Alternatively, the maximum preemption time (line 29) may be decreased after performing an engineering study to investigate the possibility of reducing the values on lines 1, 5, 6, 7, 8, 11, 12, 13 and 14.

Remarks: ______________________________

SECTION 5: TRACK CLEARANCE GREEN TIME CALCULATION (OPTIONAL)

Preempt Trap Check

Line	Description	No.	Value	Notes
36.	Advance preemption time (APT) provided (seconds):	**36.**	0.0	Line 33 only valid if line 35 is zero.
37.	Multiplier for maximum APT due to train handling	**37.**		See Instructions for details.
38.	Maximum APT (seconds): multiply line 36 and 37	**38.**	0.0	**Remarks**
39.	Minimum duration for the track clearance green interval (seconds)	**39.**	15.0	For zero advance preemption time
40.	Gates down after start of preemption (seconds): add lines 38 and 39	**40.**	15.0	
41.	Preempt verification and response time (seconds): line 3	**41.**	0.0	**Remarks**
42.	Best-case conflicting vehicle or pedestrian time (seconds): usually 0	**42.**	0.0	
43.	Minimum right-of-way transfer time (seconds): add lines 41 and 42	**43.**	0.0	
44.	Minimum track clearance green time (seconds): subtract line 43 from line 40	**44.**	15.0	

Clearing of Clear Storage Distance

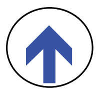
Line	Description	No.	Value	Notes
45.	Time required for design vehicle to start moving (seconds), line 22	**45.**	12.9	
46.	Design vehicle clearance distance (DVCD, feet), line 23	**46.**	207	**Remarks**
47.	Portion of CSD to clear during track clearance phase (feet)	**47.**	85	CSD* in Figure 3 in Instructions.
48.	Design vehicle relocation distance (DVRD, feet): add lines 46 and 47	**48.**	292	
49.	Time required for design vehicle to accelerate through DVRD (seconds)	**49.**	23.8	Read from Figure 2 in Instructions.
50.	Time to clear portion of clear storage distance (seconds): add lines 45 and 49	**50.**	36.7	
51.	**Track clearance green interval (seconds): maximum of lines 44 and 50, round up to nearest full second**	**51.**	37	

SECTION 6: VEHICLE-GATE INTERACTION CHECK (OPTIONAL)

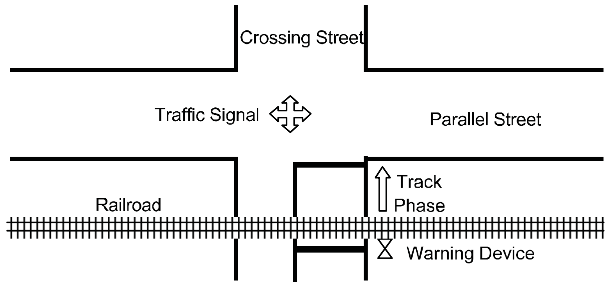
Line	Description	No.	Value	Notes
52.	Right-of-way transfer time (seconds): line 17	**52.**	11.5	
53.	Time required for design vehicle to start moving (seconds), line 22	**53.**	12.9	
54.	Time required for design vehicle to accelerate through DVL (on line 20, seconds)	**54.**	11.5	Read from Table 3 in Instructions.
55.	Time required for design vehicle to clear descending gate (seconds): add lines 52 though 54	**55.**	35.9	**Remarks**
56.	Duration of flashing lights before gate descent start (seconds): get from railroad	**56.**	3.0	**Remarks**
57.	Full gate descent time (seconds): get from railroad	**57.**	12.0	
58.	Proportion of non-interaction gate descent time	**58.**	0.23	Read from Figure 5 in Instructions.
59.	Non-interaction gate descent time (seconds): multiply lines 57 and 58	**59.**	2.8	
60.	Time available for design vehicle to clear descending gate (seconds): add lines 56 and 59	**60.**	5.8	
61.	**Advance preemption time (APT) required to avoid design vehicle-gate interaction (seconds): subtract line 60 from line 55, round up to nearest full second, enter 0 if less than 0**	**61.**	31	

GUIDE FOR DETERMINING TIME REQUIREMENTS FOR TRAFFIC SIGNAL PREEMPTION AT HIGHWAY RAIL GRADE CROSSINGS

City: GLENDORA
Date: 02/22/16
County: LOS ANGELES
Completed by: AECOM
District:
District Approval:



Show North Arrow



Parallel Street Name: Auto Centre Dr

Crossing Street Name: Lone Hill Ave SB

Railroad: SCAX
Railroad Contact: SCAX
Crossing DOT#: 026200J
Phone: (415) 703-3722

SECTION 1: RIGHT-OF-WAY TRANSFER TIME CALCULATION

Preempt verification and response time

Line	Description	Value	Remarks
1.	Preempt delay time (seconds)	0.0	
2.	Controller response time to preempt (seconds)	0.0	Controller type:
3.	Preempt verification and response time (seconds): add lines 1 and 2	0.0	

Worst-case conflicting vehicle time

Line	Description	Value	Remarks
4.	Worst-case conflicting vehicle phase number	2	
5.	Minimum green time during right-of-way transfer (seconds)	6.00	
6.	Other green time during right-of-way transfer (seconds)		
7.	Yellow change time (seconds)	4.50	
8.	Red clearance time (seconds)	1.00	
9.	Worst-case conflicting vehicle time (seconds): add lines 5 through 8	11.5	

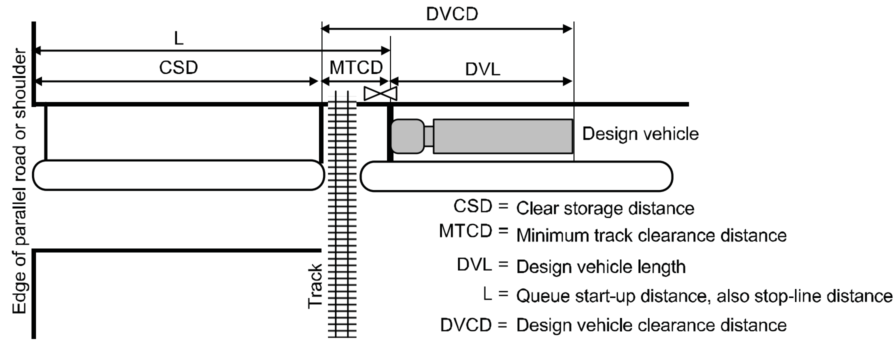
Worst-case conflicting pedestrian time

Line	Description	Value	Remarks
10.	Worst-case conflicting pedestrian phase number	8	
11.	Minimum walk time during right-of-way transfer (seconds)	0.0	
12.	Pedestrian clearance time during right-of-way transfer (seconds)	0.0	
13.	Vehicle yellow change time, if not included on line 12 (seconds)	4.5	
14.	Vehicle red clearance time, if not included on line 12 (seconds)	1.0	
15.	Worst-case conflicting pedestrian time (seconds): add lines 11 through 14	5.5	

Worst-case conflicting vehicle or pedestrian time

Line	Description	Value
16.	Worst-case conflicting vehicle or pedestrian time (seconds): maximum of lines 9 and 15	11.5
17.	**Right-of-way transfer time (seconds): add lines 3 and 16**	11.5

SECTION 2: QUEUE CLEARANCE TIME CALCULATION



Remarks

18. Clear storage distance (CSD, feet) ……………………………**18.** 430

19. Minimum track clearance distance (MTCD, feet) ………………**19.** 179

20. Design vehicle length (DVL, feet) ……………………………**20.** 75 Design vehicle type: ______

21. Queue start-up distance, L (feet): add lines 18 and 19 ……………………… **21.** 609

Remarks

22. Time required for design vehicle to start moving (seconds): calculate as 2+(L÷20) ……**22.** 32.5

23. Design vehicle clearance distance, DVCD (feet): add lines 19 and 20 ……**23.** 254

24. Time for design vehicle to accelerate through the DVCD (seconds) ……………………. **24.** 22.1 Read from Figure 2 in Instructions.

25. Queue clearance time (seconds): add lines 22 and 24 ………………………………………… 25. 54.5

SECTION 3: MAXIMUM PREEMPTION TIME CALCULATION **Remarks**

26. Right-of-way transfer time (seconds): line 17 ……………………………… **26.** 11.5

27. Queue clearance time (seconds): line 25 ………………………………… **27.** 54.5

28. Desired minimum separation time (seconds) ……………………………… **28.** 7.0

29. Maximum preemption time (seconds): add lines 26 through 28 ……………………………… 29. 73.0

SECTION 4: SUFFICIENT WARNING TIME CHECK **Remarks**

30. Required minimum time, MT (seconds): per regulations ……….**30.** 20.0

31. Clearance time, CT (seconds): get from railroad ……………**31.** 15.0

32. Minimum warning time, MWT (seconds): add lines ……………………**32.** 35.0 Excludes buffer time (BT)

33. Advance preemption time, APT, if provided (seconds): get from railroad ….. **33.**

34. Warning time provided by the railroad (seconds): add lines 32 and 33 ……………………**34.** 35.0

35. Additional warning time required from railroad (seconds): subtract line 34 from line 29, round up to nearest full second, enter 0 if less than 0 ……………………………………………… 35. 39

If the additional warning time required (line 35) is greater than zero, additional warning time has to be requested from the railroad. Alternatively, the maximum preemption time (line 29) may be decreased after performing an engineering study to investigate the possibility of reducing the values on lines 1, 5, 6, 7, 8, 11, 12, 13 and 14.

Remarks: ______

SECTION 5: TRACK CLEARANCE GREEN TIME CALCULATION (OPTIONAL)

Preempt Trap Check

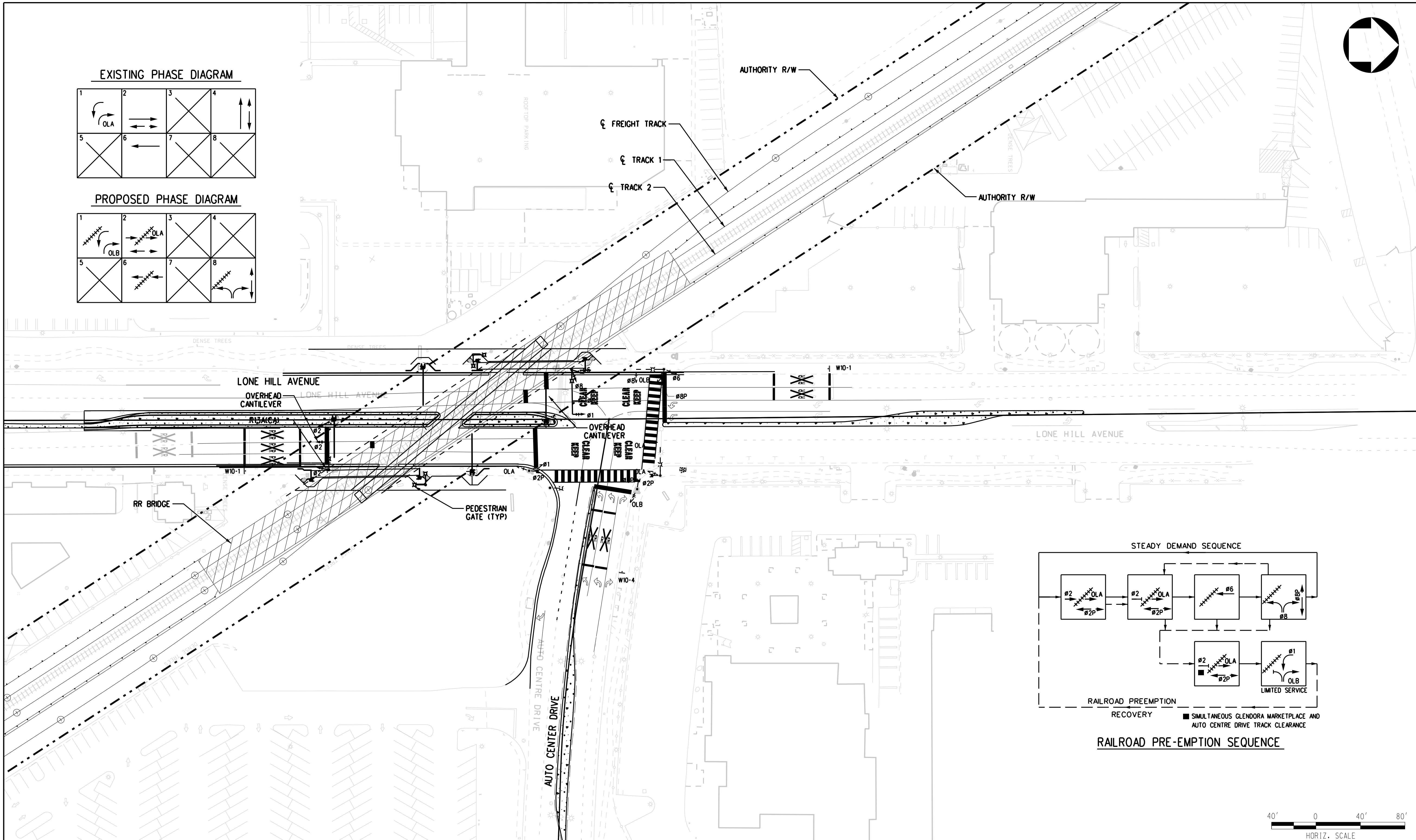
Line	Description	Value	Notes
36.	Advance preemption time (APT) provided (seconds)	0.0	Line 33 only valid if line 35 is zero.
37.	Multiplier for maximum APT due to train handling		See Instructions for details.
38.	Maximum APT (seconds): multiply line 36 and 37	0.0	**Remarks**
39.	Minimum duration for the track clearance green interval (seconds)	15.0	For zero advance preemption time
40.	Gates down after start of preemption (seconds): add lines 38 and 39	15.0	
41.	Preempt verification and response time (seconds): line 3	0.0	**Remarks**
42.	Best-case conflicting vehicle or pedestrian time (seconds): usually 0	0.0	
43.	Minimum right-of-way transfer time (seconds): add lines 41 and 42	0.0	
44.	Minimum track clearance green time (seconds): subtract line 43 from line 40	15.0	

Clearing of Clear Storage Distance

Line	Description	Value	Notes
45.	Time required for design vehicle to start moving (seconds), line 22	32.5	
46.	Design vehicle clearance distance (DVCD, feet), line 23	254	**Remarks**
47.	Portion of CSD to clear during track clearance phase (feet)	430	CSD* in Figure 3 in Instructions.
48.	Design vehicle relocation distance (DVRD, feet): add lines 46 and 47	684	
49.	Time required for design vehicle to accelerate through DVRD (seconds)	38.3	Read from Figure 2 in Instructions.
50.	Time to clear portion of clear storage distance (seconds): add lines 45 and 49	70.7	
51.	**Track clearance green interval (seconds): maximum of lines 44 and 50, round up to nearest full second**	71	

SECTION 6: VEHICLE-GATE INTERACTION CHECK (OPTIONAL)

Line	Description	Value	Notes
52.	Right-of-way transfer time (seconds): line 17	11.5	
53.	Time required for design vehicle to start moving (seconds), line 22	32.5	
54.	Time required for design vehicle to accelerate through DVL (on line 20, seconds)	11.5	Read from Table 3 in Instructions.
55.	Time required for design vehicle to clear descending gate (seconds): add lines 52 though 54	55.5	
56.	Duration of flashing lights before gate descent start (seconds): get from railroad	3.0	**Remarks**
57.	Full gate descent time (seconds): get from railroad	12.0	**Remarks**
58.	Proportion of non-interaction gate descent time	0.23	Read from Figure 5 in Instructions.
59.	Non-interaction gate descent time (seconds): multiply lines 57 and 58	2.8	
60.	Time available for design vehicle to clear descending gate (seconds): add lines 56 and 59	5.8	
61.	**Advance preemption time (APT) required to avoid design vehicle-gate interaction (seconds): subtract line 60 from line 55, round up to nearest full second, enter 0 if less than 0**	50	



REVISIONS				
REV.	DATE	DESCRIPTION	DES.	ENG.

METRO GOLD LINE FOOTHILL EXTENSION CONSTRUCTION AUTHORITY
GOLD LINE FOOTHILL EXTENSION PHASE 2B
AZUSA (CITRUS) TO MONTCLAIR
JANUARY 2016

GOLD LINE FOOTHILL EXTENSION
PRELIMINARY CONCEPT
PHASE 2B ALIGNMENT
GRADE CROSSING
LONE HILL AVE & AUTO CTR DR

DRAWING NO TS-003
REV A
SHEET NO

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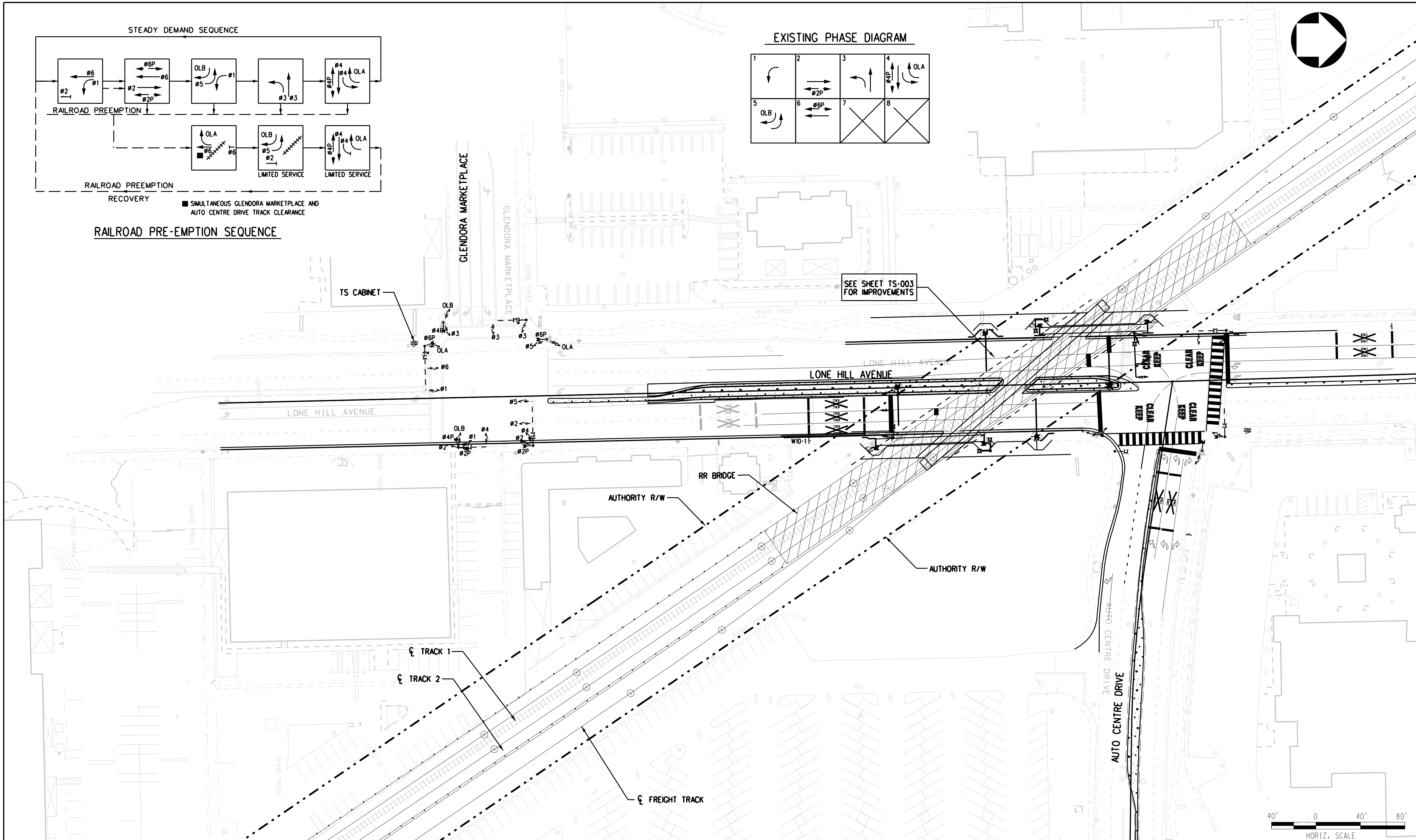
UserName: elizabeth.diaz 12/27/2016



REVISIONS				
REV.	DATE	DESCRIPTION	DES.	ENG.

METRO GOLD LINE FOOTHILL EXTENSION CONSTRUCTION AUTHORITY
GOLD LINE FOOTHILL EXTENSION PHASE 2B
AZUSA (CITRUS) TO MONTCLAIR
JANUARY 2016

GOLD LINE FOOTHILL EXTENSION
PRELIMINARY CONCEPT
PHASE 2B ALIGNMENT
GRADE CROSSING
LONE HILL AVE & GLENDORA MARKETPLACE

DRAWING NO: TS–004
REV: A
SHEET NO

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UserName: elizabeth.diaz 12/27/2016

Final Report

Metro Gold Line Extension – Pomona Station (South) Traffic Feasibility Study

Prepared for

Metro Gold Line Foothill Extension Construction Authority

May 2018

Prepared by

JACOBS ch2m

Contents

Appendixes

Tables

Figures

SECTION 1
Introduction

A Final Environmental Impact Report (EIR) for the Metro Gold Line Foothill Extension – Azusa to Montclair Project was completed in February 2013 by the Metro Gold Line Foothill Extension Construction Authority (Authority) in accordance with the requirements of the California Environmental Quality Act (CEQA). The Final EIR (FEIR) was certified, and a preferred alternative was selected by the Authority Board of Directors in March 2013. Addendum #1 to the 2013 FEIR addressing project refinements associated with grade separation of Garey Avenue in Pomona was adopted by the Authority Board in May 2014. Addendum #2 to the 2013 FEIR, which would allow phased construction of the project if deemed necessary was adopted by the Authority Board in December 2014. Addendum #3, addressing minor technical changes to the engineering design of the Metro Gold Line Foothill Extension was approved in March 2016. Addendum #4, which addressed modifications to the grade separation at Towne Avenue (Modification #7), was approved September 2017. The 2013 FEIR, the 2014 Addendum #1 and #2, the 2016 Addendum #3, and the 2017 Addendum #4 can be viewed at the Authority's website at http://foothillgoldline.org. On January 10, 2018 the Authority Board of Directors passed a Resolution deleting Modification # 7 from Addendum #4.

The 2013 FEIR preferred alternative identifies stations at Glendora, San Dimas, La Verne, Pomona, Claremont, and Montclair. The FEIR also proposed a parking structure north of the proposed station at Pomona with access via Bonita Avenue. The existing Metrolink station parking would remain in place but the number of parking spaces would need to be reduced to accommodate the Metro Gold Line tracks. The Authority and City have decided to study an alternative location for the parking structure located south of the proposed station. This report summarizes the results of a traffic analysis for the Pomona Station Parking Structure located near the existing Santa Fe Street Metrolink parking driveway with an access driveway at Supply Street.

In addition to the parking structure, a new transit-oriented housing development north of the Pomona station has been approved. The Waterford Group is proposing an 8.44-acre development that will include 648 dwelling units, two parking structures, amenities, and some retail space. The Waterford Group housing development's current site plan proposed two access points. One access point (future Street A) is a proposed intersection on Bonita Avenue, immediately east of Jacaranda Street, and the other access point (future Street B) is a proposed intersection on Garey Avenue, north of the relocated freight tracks. It is assumed that the Waterford Group Housing Development will be completed prior to the construction of the Pomona Station Parking Structure.

Figure 1-1 is an illustration of the proposed locations for the Pomona Station Parking Structure and the Waterford Group Housing Development along with the proposed access points. Figure 1-2 is a more detailed proposed site plan for the Waterford Group Housing Development. Figure 1-3 illustrates the location of the existing Pomona Metrolink Station parking lot and access points at Fulton Road and Santa Fe Street.

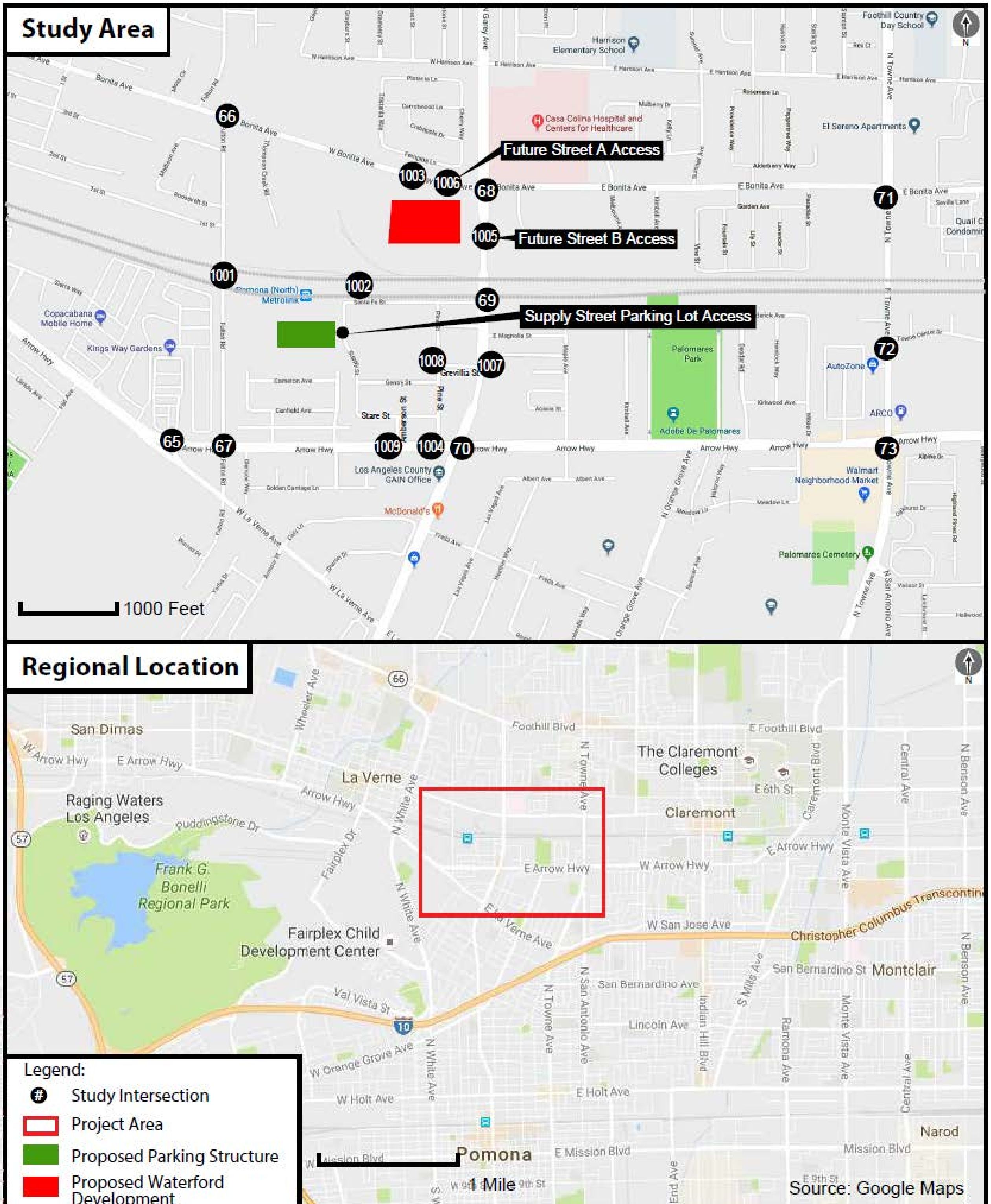
The traffic analysis study area was selected to be consistent with the FEIR study area for the Pomona Station. The study area is generally bounded by Arrow Highway (to the south), Bonita Avenue (to the north), Towne Avenue (to the east), and Fulton Road/La Verne Avenue (to the west). The study area includes 19 study intersections[1] that were selected to capture the effects of the traffic pattern changes due to the proposed projects. Ten of the study intersections were analyzed as part of the FEIR traffic

[1] Additional intersections were evaluated for roadway geometrics as part of a companion document ("Metro Gold Line Foothill Extension – Pomona South Parking Circulation Analysis")

analysis. Other intersections were selected at existing and future access points to the Pomona parking structure and Waterford Group development. The study intersections are as follows:

- 65: La Verne Avenue and Arrow Highway (*FEIR Study Intersection*)
- 66A: North Fulton Road and Bonita Avenue *(FEIR Study Intersection) **
- 66B: South Fulton Road and Bonita Avenue *(FEIR Study Intersection) **
- 67: Fulton Road and Arrow Highway *(FEIR Study Intersection) ****
- 68: Garey Avenue and Bonita Avenue *(FEIR Study Intersection)*
- 69: Garey Avenue and Santa Fe Street *(FEIR Study Intersection)*
- 70: Garey Avenue and Arrow Highway (*FEIR Study Intersection*)
- 71: Towne Avenue and Bonita Avenue (*FEIR Study Intersection*)
- 72: Towne Avenue and Towne Centre Drive (*FEIR Study Intersection*)
- 73: Towne Avenue and Arrow Highway (*FEIR Study Intersection*) ***
- 1001: West Metrolink Parking Entrance and Fulton Road
- 1002: South Metrolink Parking Entrance and Santa Fe Street
- 1003: Jacaranda Way and Bonita Avenue
- 1004: Pine Street and Arrow Highway
- 1005: Future Street B and Garey Avenue
- 1006: Future Street A and Bonita Avenue**
- 1007: Grevillia Street and Garey Avenue
- 1008: Pine Street and Grevillia Street
- 1009: Amberson Street and Arrow Highway ***

** 66A and 66B were analyzed as two different intersection instead of one intersection, as analyzed in the FEIR, due to the offset distance between both legs of Fulton Road*
*** For intersection evaluations of the existing configuration, the existing driveway was analyzed as a two-way driveway at a single point as a conservative approach*
**** Also evaluated in the Palomares Station Traffic Impact Study (TIS) (Linscott, Law & Greenspan, November 2017)*

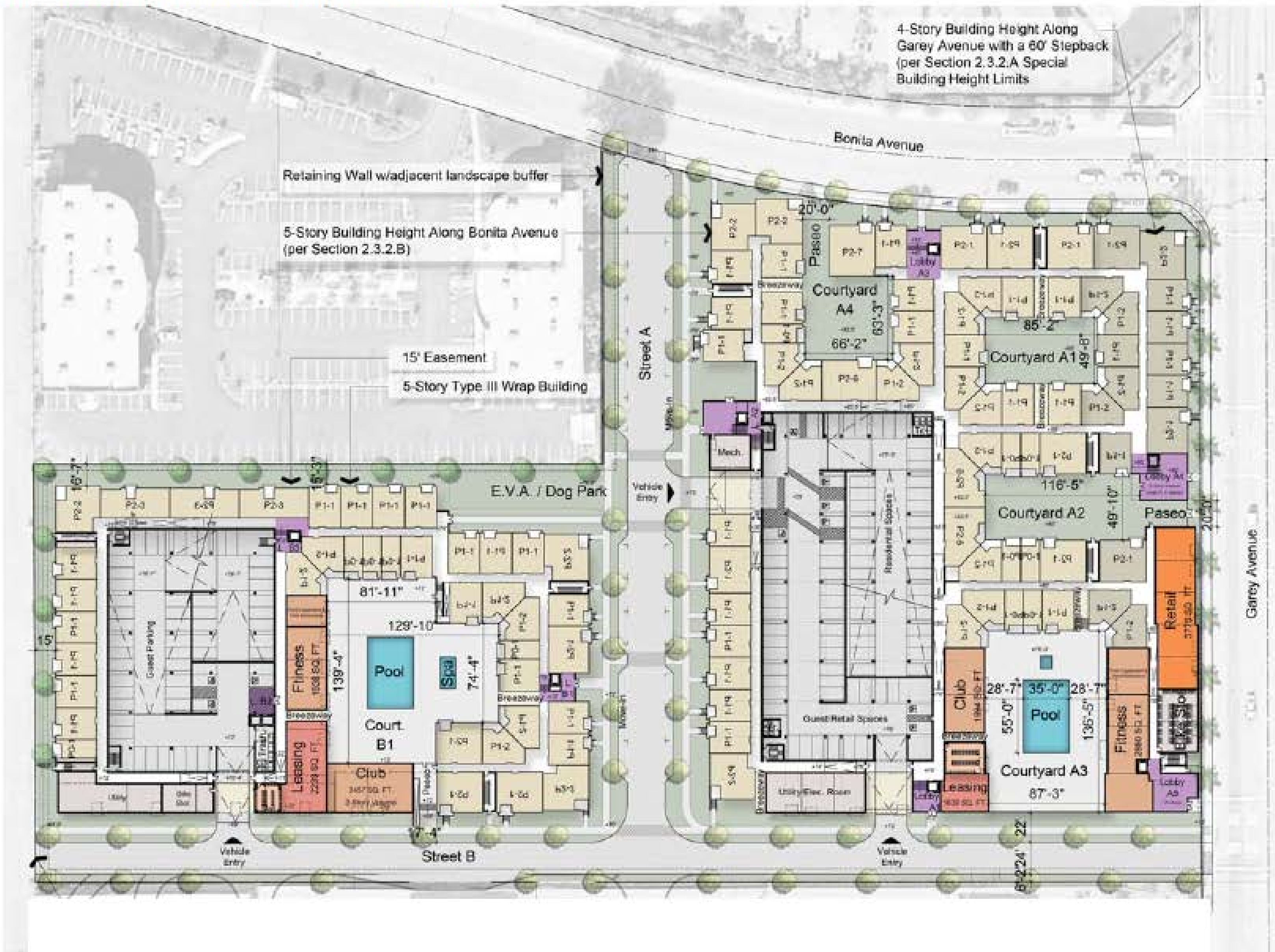


Metro Gold Line Extension - Pomona Station (South) Traffic Feasibility Study Report

Figure 1-1: Project Location and Study Intersections

FIGURE 1-2

Waterford Housing Development Proposed Site Plan



Project Data

Project Address

2771 North Garey, Pomona, CA

Site Area Information

Gross Site Area	± 8.44 AC
Dwelling Units	± 648 DU
Density	76.8 DU / AC

Unit SF Summary

Building A

Unit Plan	Unit Type	SF	Total	Percent
Plan 0-1	0bd/1ba	379 sf	35	8.6%
Plan 1-1	1bd/1ba	695 sf	156	38.4%
Plan 1-2	1bd/1ba	720 sf	84	20.7%
Plan 2-1	2bd/2ba	1,017 sf	78	19.2%
Plan 2-2	2bd/2ba	1,038 sf	21	5.2%
Plan 2-2 Alt	2bd/2ba	979 sf	7	1.7%
Plan 2-4	2bd/2ba	1,223 sf	2	0.5%
Plan 2-5	2bd/2ba	1,099 sf	10	2.5%
Plan 2-6	2bd/2ba	1,184 sf	5	1.2%
Plan 2-7	2bd/2ba	1,259 sf	5	1.2%
Plan 2-8	2bd/2ba	1,011 sf	3	0.7%
Totals			406	100%

Building B

Unit Plan	Unit Type	SF	Total	Percent
Plan 0-1	0bd/1ba	379 sf	29	12.0%
Plan 1-1	1bd/1ba	695 sf	102	42.1%
Plan 1-2	1bd/1ba	720 sf	30	12.4%
Plan 2-1	2bd/2ba	1,017 sf	35	14.5%
Plan 2-2	2bd/2ba	1,038 sf	15	6.2%
Plan 2-3	2bd/2ba	1,060 sf	31	12.8%
Totals			242	100%

Parking Summary

	Building A (7-stories+Partial Submerged Level)	Building B (7-stories+Partial Submerged Level)
Required	654 spaces	383 spaces
Provided	687 spaces	438 spaces

Uncovered spaces provided:	24 spaces
Total Parking Provided:	1,149 spaces (1.8 sp/unit)
Total Parking Required:	1,037 spaces (1.6 sp/unit)

Project Totals

Total NRSF	**±466,000 sf**
Total GRSF	**±506,000 sf**
Average Unit Size	**±720 sf (net)** **±780 sf (gross)**
Amenities & Leasing	**±6,700 sf (Bldg A)** **±5,600 sf (Bldg B)**
Retail	**±3,700 gsf (Bldg A)**

ktgy Architecture + Planning 888.456.5849 ktgy.com

The Waterford Group 18301 Von Karman, Suite 560 Irvine, CA 92612

Garey & Bonita POMONA, CA # 2015-0999

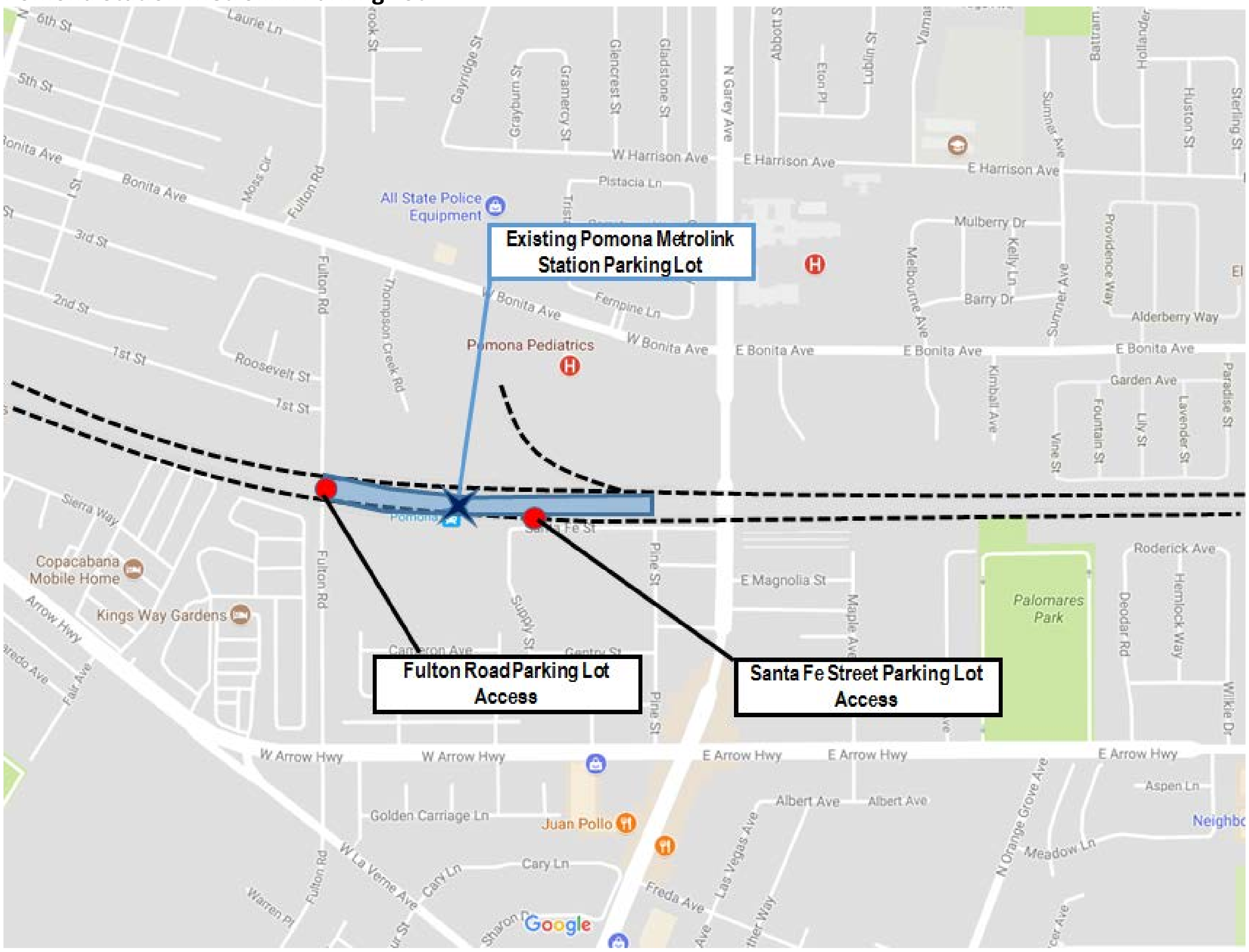
SCHEMATIC DESIGN AUGUST 18, 2016

SITE PLAN STUDY

A1.0

FIGURE 1-3

Pomona Station Metrolink Parking Lot



SECTION 2

Analysis Scenarios

Two basic scenarios were assessed for this traffic study; they are described below. Year 2035 was used for the analysis horizon year to be consistent with the FEIR modeling and assumptions.

2.1 2035 No Build

The baseline for the 2035 No Build scenario is the FEIR No Build Alternative, but adds the Waterford Housing Development. It assumes that the Metro Gold Line Foothill Extension Phase 2B (Azusa to Montclair) will not be built and that there will be no new station in Pomona. This scenario includes the median improvements at Garey Avenue between Arrow Highway and Harrison Avenue. The median improvements restrict some movements that were identified as the future baseline configuration in the FEIR No Build Alternative.

The 2035 No Build scenario also includes the constructed Waterford development with the two future streets that would serve access to the development: Future Street A at Bonita Avenue, and Future Street B on Garey Avenue. Both intersections were assumed to be stop-controlled, and Future Street B would be right-in/right-out access only at Garey Avenue.

2.2 2035 Build

The 2035 Build scenario includes the construction of the Gold Line Extension with the Pomona Station Parking Structure located south of the station. The parking structure would be located near the Santa Fe Street parking entrance to the existing Metrolink parking to the southwest.

In addition, the following other geometric changes were assumed:

- The Garey Avenue and Grevillia Street intersection would be signalized to serve as the main access roadway to the proposed parking structure.
- Santa Fe Street will operate as a one-way street (eastbound) between Pine Street and Garey Avenue with a right-out at the Garey Avenue intersection.[2]
- The La Verne Avenue and Arrow Highway intersection would be signalized as part of the project improvements.
- Left turns will be eliminated at the existing Fulton Road Metrolink parking access point, and it will be operated as right-in/right-out only.
- There are currently two sets of railroad tracks that cross Garey Avenue at grade. Freight tracks are located to the north and Metrolink tracks to the south. The new LRT tracks will be grade separated under the Build scenario.

Since the 2035 Build scenario differs from the FEIR Build scenario, some mitigation measures identified and project modifications in the FEIR and addendums may have to change and be addressed in an appropriate environmental document. Details are provided in Section 5.

[2] The change to a one-way configuration for Santa Fe is addressed in a separate circulation study report. Truck circulation with full access will remain within the development, although some routes will change.

SECTION 3
Traffic Volume Development

3.1 Data Sourcing and Collection

Existing morning (7 to 9 AM) and afternoon (4 to 6 PM) intersection turning movement counts were synthesized from multiple sources. The FEIR included year 2010 existing counts for intersections 65 to 73. Those counts were performed on weekdays (Tuesday, Wednesday, and Thursday) in May 2010. Additional data were also collected as listed below:

- Intersections 1003 and 1005 were counted in July 2016
- Intersections 1007, 1002, and 1004 were counted in March 2017
- Intersections 1007, 1008, and 1009 were counted in May 2017
- Intersections 1003, 68, 69, and 70 were counted in October 2017

The updated intersection counts (beyond those in the FEIR) are summarized in Appendix A.

3.2 Background Traffic Volumes

The baseline 2035 No Build volumes were developed by applying the annual growth rate area factor used in the FEIR. The majority of the study intersections are in the City of Pomona, so the 0.7% annual growth rate identified in Table 2-12 of the FEIR was used to grow the study intersection volumes from the year of data collection to year 2035. These volumes do not include the effects of the new Gold Line service.

For the Build volumes, an additional reduction factor was applied to include the effects shifts from driving to transit once the Gold Line extension is constructed. Reduction factors used in the FEIR were applied, corresponding to the travel demand model differences between the Build and No Build traffic patterns. For the City of Pomona, a reduction factor of -1.38% (as summarized in Table 2-24 of the FEIR) was applied to the established 2035 volumes.

3.3 Trip Generation

3.3.1 Waterford

The trip generation for the proposed Waterford Housing Development was based on the Institute of Transportation Engineers (ITE) Trip Generation Manual, Land Use: 220 Apartment. The AM and PM fitted curve for 648 dwelling units was used to determine the number of peak hour trips on the adjacent streets. The ITE study results in 20% inbound and 80% outbound trips in the AM peak hour; and 65% inbound and 35% outbound trips in the PM peak hour. Using the total number of dwelling units, the fitted curves yielded a total of 322 trips (64 inbound and 258 outbound) during the AM peak hour and 375 trips (244 inbound and 131 outbound) during the PM peak hour.

Since the Waterford Housing Development is near the proposed Pomona Station[3], it categorizes the development as a transit-oriented development (TOD). TODs have proven to generate less trips compared to a non-TOD. Several tenants are projected to use the Metrolink San Bernardino Line or the proposed Metro Gold line for their peak hour work trips. A research effort was conducted to determine the expected reduction of expected trips based on similar TOD studies in other metropolitan areas. The

[3] The TOD reductions were applied (conservatively) to both the No-Build and Build scenarios.

studies reviewed in the research effort suggested an average trip reduction of 40.2%[4] from similar TODs in metropolitan areas (as compared to the trips generated using the ITE Trip Generation Manual). Given the proximity of the Waterford development to the station access, a high percentage of transit usage is expected, but to be conservative, less than half (15%) of the reduction was applied. This value is lower than the comparable value for the north side station access (20%), reflecting the additional walk time that would be needed. Applying this reduction to the Waterford Housing Development yielded a total of 274 trips (54 inbound and 219 outbound) during the AM peak hour and 319 trips (207 inbound and 111 outbound) during the PM peak hour.

The City of Pomona conducted a separate analysis of the traffic impacts of the proposed Waterford development. The final report for that study (Palomares Station TIS) was completed in November 2017. The Palomares TIS assumed the Pomona Station parking structure would be located north of the tracks, and only evaluated seven intersections (three common to this study). Therefore, the overall findings are not directly comparable. However, the trip generation and related factors for the Palomares TIS can be compared to the analysis described in this report.

There are several differences in the methodologies and assumptions. The first two indicate that the Palomares TIS has higher traffic estimates, and the last two indicate that the Palomares TIS traffic estimates are lower:

- The Palomares TIS used the Los Angeles County Congestion Management Program (CMP) factor, with an annual rate of 1.6 percent (versus 0.7 percent in this report). For the 2035 forecasts, using 2017 baseline data, the difference is approximately 18 percent.

- The Palomares TIS included cumulative trips from proposed and constructed projects in the Cities of Pomona and La Verne. The volumes vary by intersection, but at the Garey Avenue/Bonita Avenue intersection, PM peak volumes are 14 percent higher with the cumulative traffic.

- The Palomares TIS included a more aggressive assumption (25 percent vs. 15 percent in this analysis) for reductions in trip generation associated with transit-oriented development. The difference is about 6 percent in project-oriented trips, averaged between the two peak periods.

- The Palomares TIS took a “credit” for eliminating trips at the UTC Aerospace offices. The assumption was that 92 AM and 97 PM trips would be eliminated, effectively reducing the net trip generation from the Waterford site. That reduction is substantial – approximately 26 percent of the total trip generation.

There are two positive differences (18 and 14 percent higher in the Palomares TIS) and two negative differences (6 and 26 percent). Coincidentally, those percentages net to zero. While each of the four

[4] The TOD research was focused on studies that calculated reduction rates in higher-density housing developments (mostly apartment buildings) near train stations in urbanized areas. The three studies were selected because they analyzed locations in the metropolitan areas (not in the urban core): Philadelphia/Northeast New Jersey, Portland, the San Francisco Bay Area, and the greater Washington D.C. area. An average of 40.2% was calculated from the reported results from the studies listed below; they ranged from 34% to 44%. The referenced reports are:

Cervero, R., Murphy, S., Ferrell C., and others. “Transit-oriented Development in the United States: Experiences, Challenges, and Prospects.” Transit Cooperative Research Program (TCRP) Report 102. Transportation Research Board. Page 74. 2004.

Cervero, R., Arrington, G.B. “Vehicle Trip Reduction Impacts of Transit-Oriented Housing” Journal of Public Transportation, Vol. 11, No. 3, 2008. Page 1. 2008.

Lapham, Michael. “Transit Oriented Development: Trip Generation & Mode Split in the Portland Metropolitan Region.” Center for Urban Studies Publications and Reports. Portland State University. Pages 22-40. 2001.

factors have somewhat different effects, because they largely counteract each other, the conclusion is that this study is consistent with the Palomares TIS and the input assumptions are valid.

3.3.2 Parking Structure

The trip generation for the proposed parking structure was based on the station access analysis. Using ridership from the FEIR as the starting point, the projected total number of parking spaces (980) was based on the original baseline estimate for LRT ridership demand (750 spaces), those lost from the existing Metrolink surface lot (114 spaces), and squaring off the roof level of the garage (116 spaces). This estimate may be somewhat conservative, as the additional roof spaces are not included in the current design (875 spaces), although additional modifications may be needed for station elements (e.g., restrooms, security kiosk). However, the higher, more conservative value (980 spaces) was used for the traffic analysis to ensure that the full range of potential traffic operations effects were captured.

From there, additional calculations were needed to conduct the traffic analysis. The FEIR assumed that 70% of the trips are AM peak hour one-way inbound trips and 65% of the trips are PM one-way outbound trips. From those calculated trips, 10% are AM peak hour outbound trips (kiss-and-ride) and 10% are PM peak hour inbound trips. The applied assumptions to the total number of parking spaces available yielded a total of 718 trips in the AM peak hour (652 inbound and 66 outbound) and 667 trips in the PM peak hour (61 inbound and 606 outbound).

A trip reduction effort was conducted to account for the loss of existing parking spaces with the construction of the Metro Gold Line Foothill Extension. Per Metrolink[5], there are 385 parking spaces (14 handicapped) at the Pomona North Metrolink parking lot. The estimated number of parking spaces that would be removed due to the proposed Gold Line track alignment is 114; resulting in a total of 271 remaining spaces once the project is complete. While there will be fewer surface spaces, the proposed parking structure will more than compensate for these lost parking spaces.

Similar assumptions to the FEIR were used to determine the peak hour trips reduction. As mentioned previously, the FEIR assumed that 70% of the trips are AM peak hour one-way inbound trips and 65% of the trips are PM one-way outbound trips. A review of the existing turning movement counts at the driveways revealed that 26% of the inbound trips are outbound trips in the AM peak and 30% of the outbound trips are inbound trips in the PM peak. The intersection peak hour and the driveway peaks are different, so an adjustment was necessary to reflect the correct trips during the peak hours. Further review of the existing turning movement counts revealed that the driveway volumes are lower (28% in the AM and 18% in the PM) during the intersection peak hours. The applied assumptions to the total number of parking spaces lost yielded a total of 65 trips in the AM peak hour (51 inbound and 14 outbound) and 71 trips in the PM peak hour (17 inbound and 54 outbound).

Table 3-1 is a summary of the trip generations and reductions for the proposed parking structure, the Waterford Housing Development, and the alignment of the Metro Gold Line Foothill Extension. Details of the trip generation calculations are provided in Appendix B.

[5] http://www.metrolinktrains.com/stations/detail/station_id/116.html

TABLE 3-1
Daily Trip Generation and Trip Reduction Summary

	AM Peak Hour		PM Peak Hour	
Trip Generator	**In**	**Out**	**In**	**Out**
Pomona Parking Structure	652	66	61	606
Waterford Housing [6]	54	219	207	111
Removed Parking Spaces*	-51	-14	-17	-54

**Reduced parking spaces are from the existing Metrolink Pomona station parking lot located south of the proposed Gold Line alignment and north of Santa Fe Street*

3.4 Trip Distribution

The trip distribution analysis was conducted using the trip distribution methods applied in the FEIR for the proposed parking structure. The differences between the FEIR No Build and FEIR Build intersection volumes were calculated to determine the trip distributions throughout the study intersections. Since the FEIR proposed a parking structure north of the proposed station with access via Bonita Avenue, the trip distributions were manually adjusted to reflect the proposed location south of station with access via Supply Street. Further manual adjustments were made to account for the proposed restricted movements that were not part of the FEIR assumptions.

A separate trip distribution effort was performed for the Waterford Housing Development. The inbound and outbound trips were distributed along projected origin-destination routes generally based on freeway accessibility, shopping center locations, a nearby hospital, and local schools.

The distribution of the trip reductions for the removed parking spaces generally followed the same approach as the trip distribution for the proposed parking structure. The only difference is that the assumed routes changed and the trips were subtracted rather than added.

Details of the trip distribution maps and worksheets for the three efforts are provided in Appendix C. Additional post-processing adjustments were made to properly distribute the Waterford traffic between the intersections on Bonita Avenue (future Street A) and Garey Avenue (future Street B).

3.5 Volume Adjustments

Minor volume adjustments were performed to remove the restricted turning movements with the implementation of the build scenario. These volumes were reassigned to other intersection movements based on the expected new routes to reach the original destinations. The adjusted turning movements were the following:

- Northbound left, southbound right, and eastbound left[7] at the Garey Avenue/Santa Fe Street intersection

[6] The added trips from the Waterford Housing Development do not include a “credit” for trips eliminated from the UTC Aerospace Offices. Doing so would further reduce the projected traffic impacts, because these trips are included in the FEIR forecasts. However, since reliable estimates of the number of trips are not available, a more conservative approach was used, without taking a credit, so the total traffic volumes are higher.

[7] The eastbound left-turn movement is prohibited in the existing and future scenarios. Existing counts revealed that drivers are still making the illegal turn and therefore required an adjustment to remove the turning movement.

- Southbound left and westbound left at the West Parking Metrolink Entrance and Fulton Road

One final set of volume adjustments was performed in each scenario. The adjustments were made at locations where conservation of flow was expected. The changes were made by adjusting the departing volumes at an upstream intersection and/or the entering volumes at a downstream intersection.

Section 4

Traffic Analysis

This section is a summary of the analysis methodology used to evaluate the operational conditions at the study intersections and analysis results.

4.1 Analysis Methodology

The study intersections were evaluated using three intersection operational measures. These measures are overall intersection Level of Service (LOS), intersection movement LOS, and intersection queueing.

4.1.1 Overall Intersection LOS Operational Analysis

The Highway Capacity Manual (HCM 2010) delay was used to determine LOS, ranging from LOS A to LOS F using delay ranges summarized in Table 4-1. At two-way stop-controlled (TWSC) and one-way stop-controlled (OWSC) intersections, the average delay of the worst approach was used to determine the worst approach LOS using the ranges listed in Table 4-1. The implementation of the HCM 2010 has analysis limitation based on lane geometry, number of approaches, and non-standard phasing.

The HCM 2010 techniques were applied by using Synchro software (version 9). For signalized intersections, the HCM 2010 “Signalized Summary” report function in Synchro was used to determine the overall intersection LOS and delay. For unsignalized intersections, the TWSC function in HCM 2010 was used to determine the worst approach LOS and delay.

TABLE 4-1
HCM 2010 LOS Criteria for Intersections

Signalized Intersections	Unsignalized Intersection	LOS
< 10.0	< 10.0	A
> 10.0 to < 20.0	> 10.0 to < 15.0	B
> 20.0 to < 35.0	> 15.0 to < 25.0	C
> 35.0 to < 55.0	> 25.0 to < 35.0	D
> 55.0 to < 80.0	> 35.0 to < 50.0	E
> 80.0	> 50.0	F

Source: HCM 2010

The No Build and Build scenario overall intersection LOS measures were compared to identify project-related operational effects. Since the majority of the study intersections are in City of Pomona’s jurisdiction, these guidelines for traffic impact analysis were used. Per the Traffic Impact Study Guidelines (February, 2012), the criteria for project impacts are as follows:

- Signalized Intersections: Impact if an intersection is projected to operate at LOS D or better in the No Build scenario and degrades to LOS E or worse in the Build scenario
    - OR, intersection operating at LOS E or F in the No Build conditions has an increase in delay in the Build scenario

- Unsignalized Intersections: Impact if an intersection is projected to operate at LOS D or better in the No Build and degrades to LOS E or worse in the Build Scenario
    - OR, the project contributes additional traffic to an intersection operating at LOS E or F in the No Build scenario
        - AND, one or both of the following are met:
            - The project adds ten or more trips to any approach
            - The intersection meets peak hour traffic signal warrants after the project added trips

Section 4.2 is a summary of the project operational effects. Note that these are not defined as significant impacts, and mitigation measures are not identified. This type of analysis would be addressed in a subsequent environmental document. The identification of operational effects and potential project refinements are to inform that future document.

4.1.2 Movement LOS Operational Analysis

The HCM methodology also includes movement LOS, which is based on a delay calculation of each isolated movement in an intersection. The delay ranges are the same as the ones listed in Table 4-1. These delay summaries were also evaluated to determine if the proposed project degrade a specific movement with the increased traffic.

Synchro Software also lists the movement LOS within the HCM 2010 function.

4.1.3 Intersection Queueing Analysis

Intersection queueing analysis was performed for each lane group at all intersections. The lane group queues were calculated by determining the maximum 95th percentile queue length for the movements that comprise the specific lane group. Per the Federal Highway Administration (FHWA) Intersection-Level Performance Measures and Analysis Techniques, 95th percentile queues are "commonly estimated for the time period for which a signal is red[8]." This measure is also reported by Synchro 9.

4.2 Analysis Results and Operational Effects

This section is a summary of the intersection geometry, volumes, and operational results for the 2035 No Build and 2035 Build scenarios.

4.2.1 2035 No Build

Figure 4-1 is an illustration of the 2035 No Build lane configurations. Figure 4-2 is an illustration of the 2035 No Build AM and PM peak hour traffic volumes. Table 4-2 is a summary of the 2035 No Build intersection LOS operational analysis for the study intersections. Synchro 9 output spreadsheets with details on intersection LOS and movement LOS are provided in Appendix D.

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8 FHWA Traffic Signal Timing Manual, Section 3.4.1 <https://ops.fhwa.dot.gov/publications/fhwahop08024/chapter3.htm#3.4>

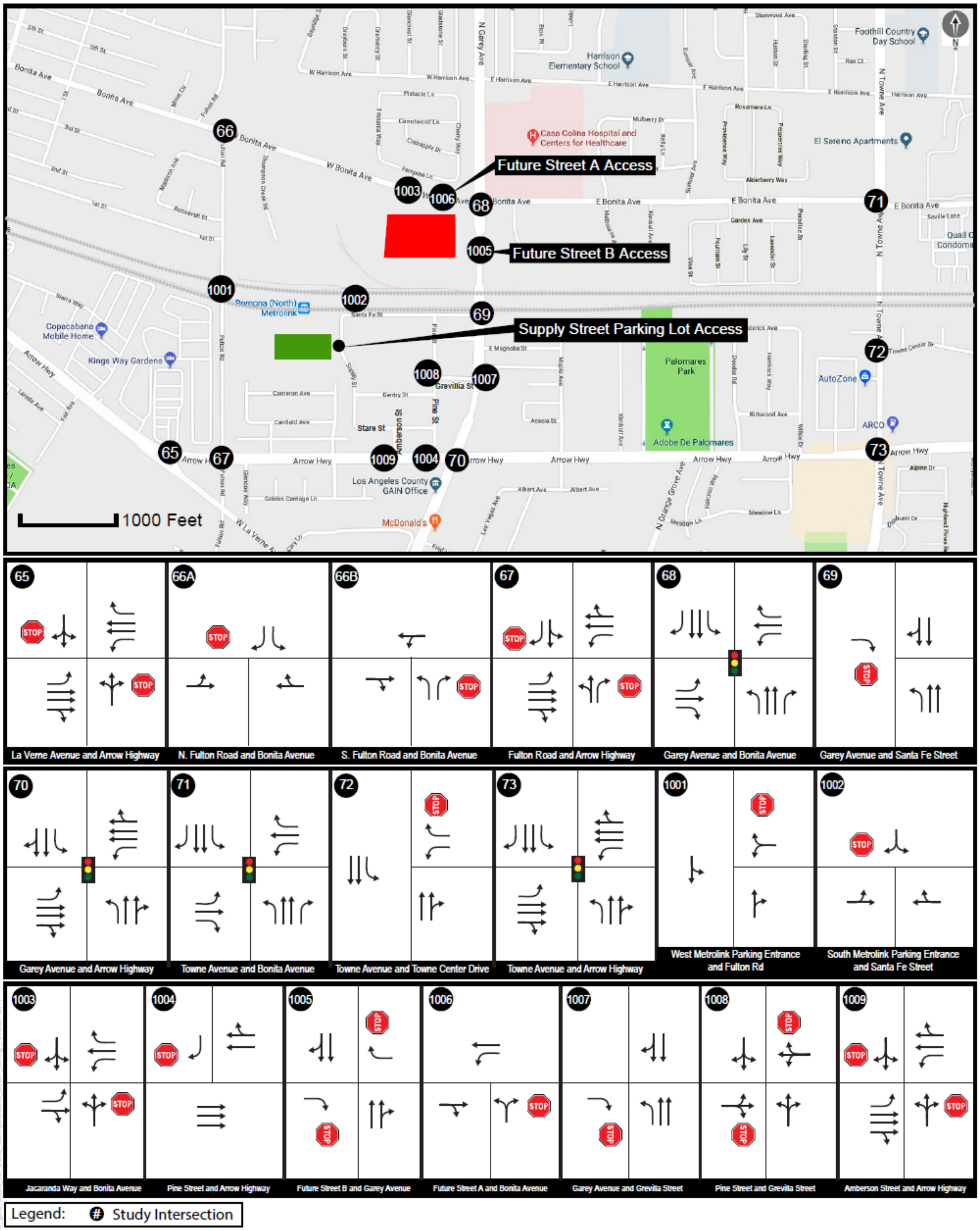
Under the 2035 No Build scenario, all study intersections in both AM and PM peak hours are projected to operate at LOS D or better, except for:

- La Verne Avenue/Arrow Highway (LOS F in the PM peak hour)
- Jacaranda Way/Bonita Avenue (LOS E in the AM and PM peak hours)
- Amberson Street/Arrow Highway (LOS F in the PM peak hour)

TABLE 4-2
2035 No Build AM and PM Peak Hour Intersection LOS Operational Summary

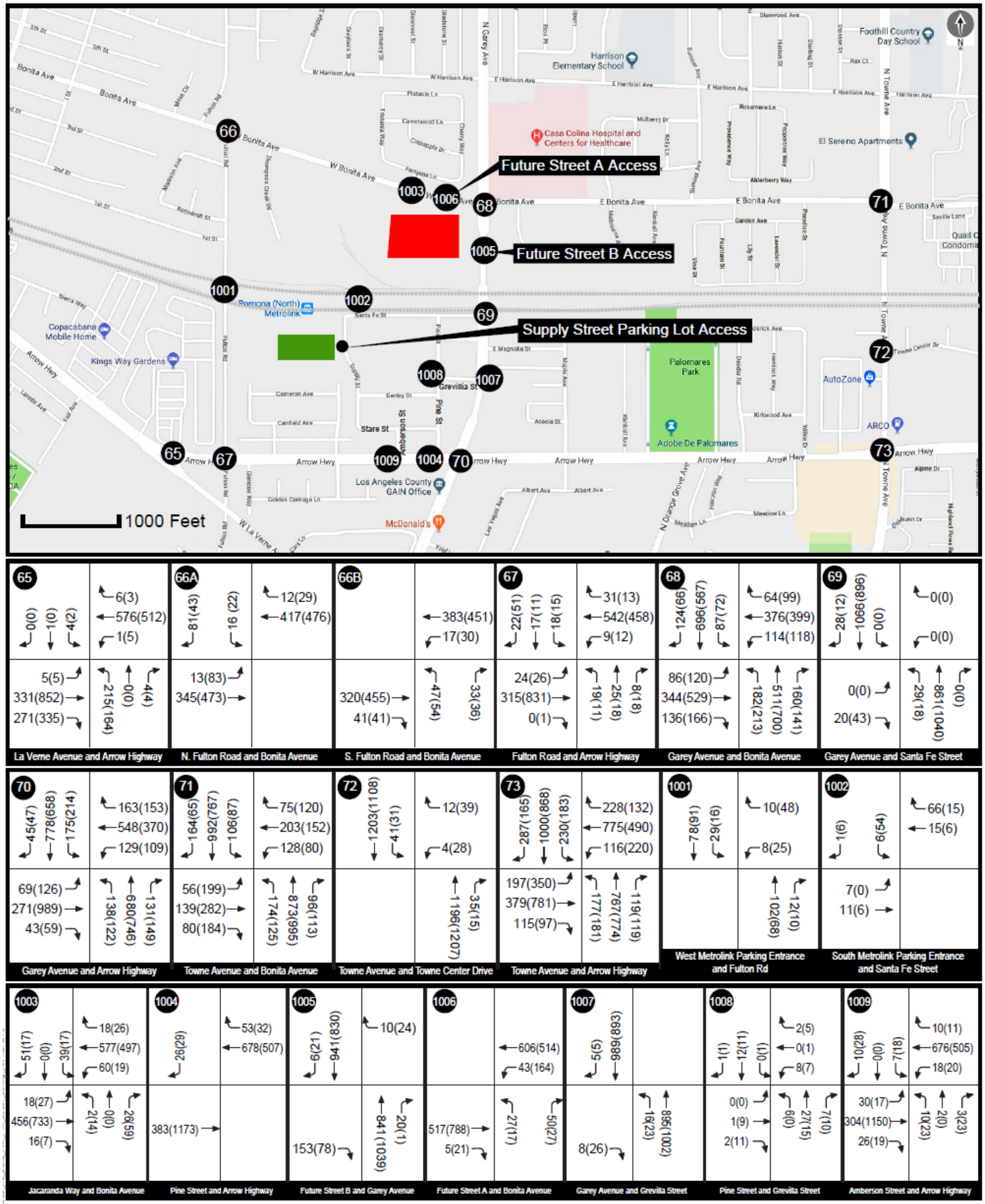
			AM Peak Hour		PM Peak Hour	
#	**Intersection**	**Control**	**Delay**	**LOS**	**Delay**	**LOS**
65	La Verne Avenue and Arrow Highway	TWSC	32.7	D	171.4	**F**
66A	N. Fulton Road and Bonita Avenue	OWSC	12.8	B	17.9	C
66B	S. Fulton Road and Bonita Avenue	OWSC	14.7	B	20.1	C
67	Fulton Road and Arrow Highway	TWSC	20.8	C	33.5	D
68	Garey Avenue and Bonita Avenue	Signal	19.0	B	23.9	C
69	Garey Avenue and Santa Fe Street	OWSC	13.5	B	12.6	B
70	Garey Avenue and Arrow Highway	Signal	25.5	C	37.9	D
71	Towne Avenue and Bonita Avenue	Signal	10.4	B	12.4	B
72	Towne Avenue and Towne Centre Drive	OWSC	18.4	C	23.3	C
73	Towne Avenue and Arrow Highway	Signal	49.9	D	46.8	D
1001	West Metrolink Parking Entrance and Fulton Road	OWSC	9.5	A	9.4	A
1002	South Metrolink Parking Entrance and Santa Fe Street	OWSC	8.9	A	8.8	A
1003	Jacaranda Way and Bonita Avenue	TWSC	36.5	**E**	37.0	**E**
1004	Pine Street and Arrow Highway	OWSC	12.4	B	11.3	B
1005	Future Street B and Garey Avenue	TWSC	15.6	C	13.1	B
1006	Future Street A and Bonita Avenue	OWSC	16.0	C	21.6	C
1007	Grevillia Street and Garey Avenue	OWSC	12.5	B	12.2	B
1008	Pine Street and Grevillia Street	TWSC	8.8	A	8.9	A
1009	Amberson Street and Arrow Highway	TWSC	18.2	C	50.7	**F**

Red and bold text *indicates an LOS E or worse*



ch2m: Metro Gold Line Extension - Pomona Station (South) Traffic Feasibility Study Report

Figure 4-1: 2035 No Build Lane Configurations



Legend: # Study Intersection XX (YY) AM/PM Peak Hour Volume

ch2m: Metro Gold Line Extension - Pomona Station (South) Traffic Feasibility Study Report

Figure 4-2: 2035 No Build AM and PM Peak Hour Volumes

Table 4-3 is a summary of the study intersections with a movement at LOS E or LOS F with the 2035 No Build scenario.

TABLE 4-3
2035 No Build AM and PM Peak Hour Movement LOS Operational Summary

		Movements at LOS E or F	
#	**Intersection**	**AM Peak Hour**	**PM Peak Hour**
65	La Verne Avenue and Arrow Highway	-	NBL
67	Fulton Road and Arrow Highway	-	NBT
70	Garey Avenue and Arrow Highway	-	EBL, WBL, SBL
73	Towne Avenue and Arrow Highway	EBL, WBT, WBR, NBL, SBL	EBL, WBL, NBL, SBL
1003	Jacaranda Way and Bonita Avenue	-	SBL
1009	Amberson Street and Arrow Highway	-	NBL

Note: Northbound (NB), southbound (SB), eastbound (EB), westbound (WB), left (L), through (T), and right (R)

Table 4-4 is a summary of the study intersections that have 95th percentile queues that are projected to exceed the storage with the 2035 No Build scenario. Synchro 9 outputs with details on Queueing Analysis are provided in Appendix E.

TABLE 4-4
2035 No Build AM and PM Peak Hour Queueing Analysis Summary

		Movements with 95th Percentile Queues Exceeding Storage	
#	**Intersection**	**AM Peak Hour**	**PM Peak Hour**
71	Towne Avenue and Bonita Avenue	NBL (150/130)	EBL (135/100)
73	Towne Avenue and Arrow Highway	EBL (250/170)	EBL (390/170)
		-	WBL (240/200)
		NBL (230/100)	NBL (240/100)
		SBL (280/170)	SBL (240/170)

Note: Numbers in parentheses (95th percentile queue length/available storage) in feet.
Northbound (NB), southbound (SB), eastbound (EB), westbound (WB), left (L), through (T), and right (R)

The analysis for intersections that could potentially cause queueing operational issues for the existing grade crossing at Garey Avenue is summarized in Table 4-5. The analysis concluded that the projected queue lengths are well within the available storage and are not expected to reach the railroad tracks.

TABLE 4-5
2035 No Build AM and PM Peak Hour Queueing Analysis Summary for Intersections Adjacent to the Garey Avenue Crossing

#	Intersection Approach	Distance to Tracks (ft.)	Mvmt.	Lane Group	Storage (ft.)	AM 95th Percentile Lane Group Queue (ft.)	PM 95th Percentile Lane Group Queue (ft.)
68	Garey Avenue and Bonita Avenue (NB)	695	LT	L	145	135	215*
			TH	T	695	120	195
			RT	R	100	35	35
70	Garey Avenue and Arrow Highway (SB)	1250	LT	L	300	175*	225*
			TH	T/R	640	255*	195
			RT				

** 95th percentile volume exceeds capacity; queue may be longer*
Lane Group= A group of turning movements assigned to the same travel lane. For example, if an intersection approach serves a left, thru, and right movement in one lane, the lane group is shared left/thru/right (L/T/R) where, L is left, T is thru, and R is right. Simulation and operational analysis software generally provide queues generated by the specific movement and the analyst reports the lane group queues for shared movements.

4.2.2 2035 Build

Figure 4-3 is an illustration of the 2035 Build lane configurations. Figure 4-4 is an illustration of the 2035 Build AM and PM peak hour traffic volumes. Table 4-6 is a summary of the 2035 Build intersection LOS operational analysis for the study intersections. Synchro 9 outputs with details on Intersection LOS and Movement LOS are provided in Appendix F.

Under the 2035 Build scenario, all study intersections in both AM and PM peak hours are projected to operate at LOS D or better, except for:

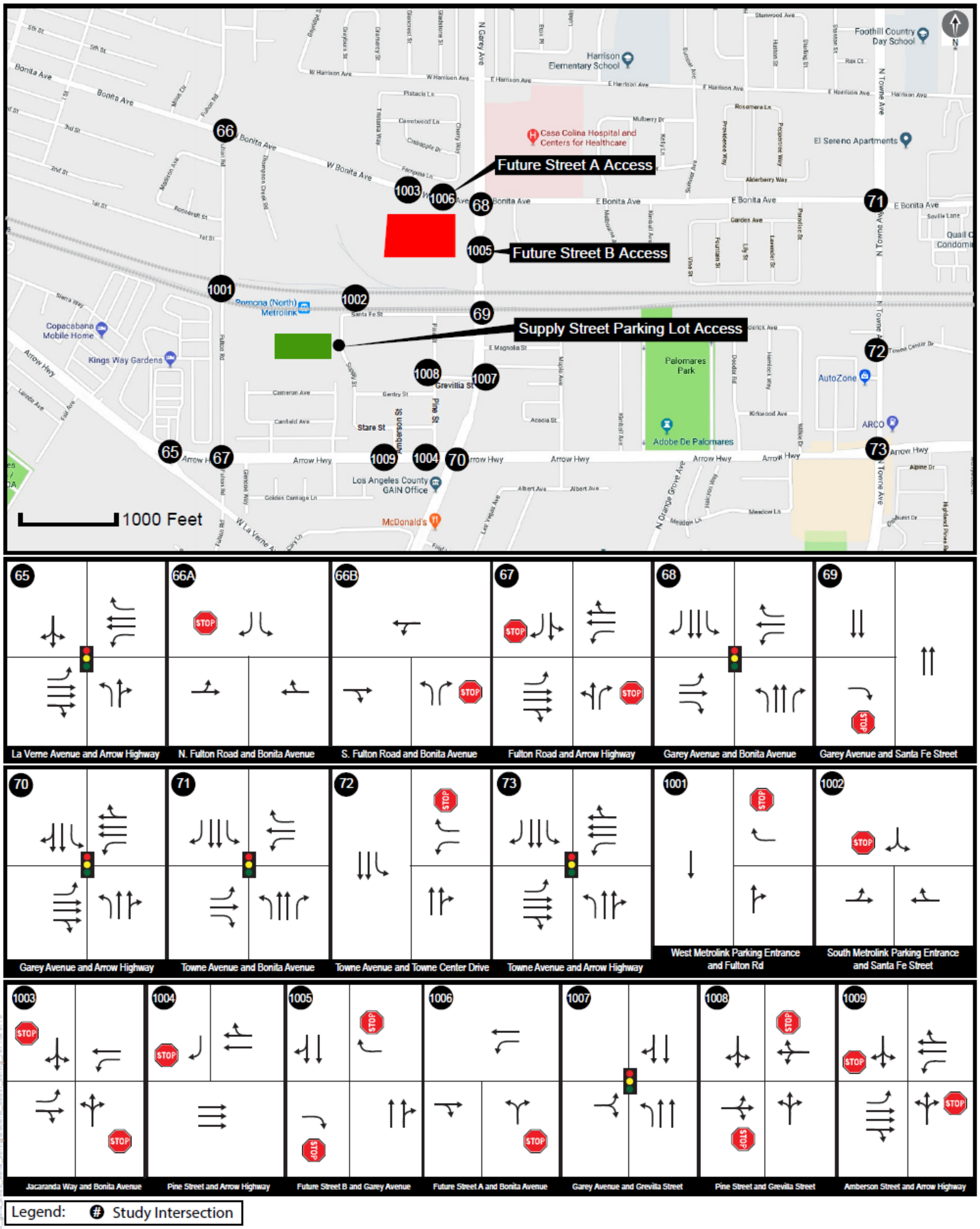
- Fulton Road/Arrow Highway (LOS E in the PM peak hour)
- Towne Avenue/Arrow Highway (LOS E in the AM peak hour)
- Jacaranda Way/Bonita Avenue (LOS E in the AM and PM peak hours)
- Amberson Street/Arrow Highway (LOS F in the PM peak hour)

As summarized in Table 4-6, the highlighted results correspond to the study intersections with an operational effect per the criteria described in Section 4.1.1. The potential strategies for addressing these operational effects are summarized in Section 5.

TABLE 4-6
2035 Build AM and PM Peak Hour Intersection LOS Operational Summary

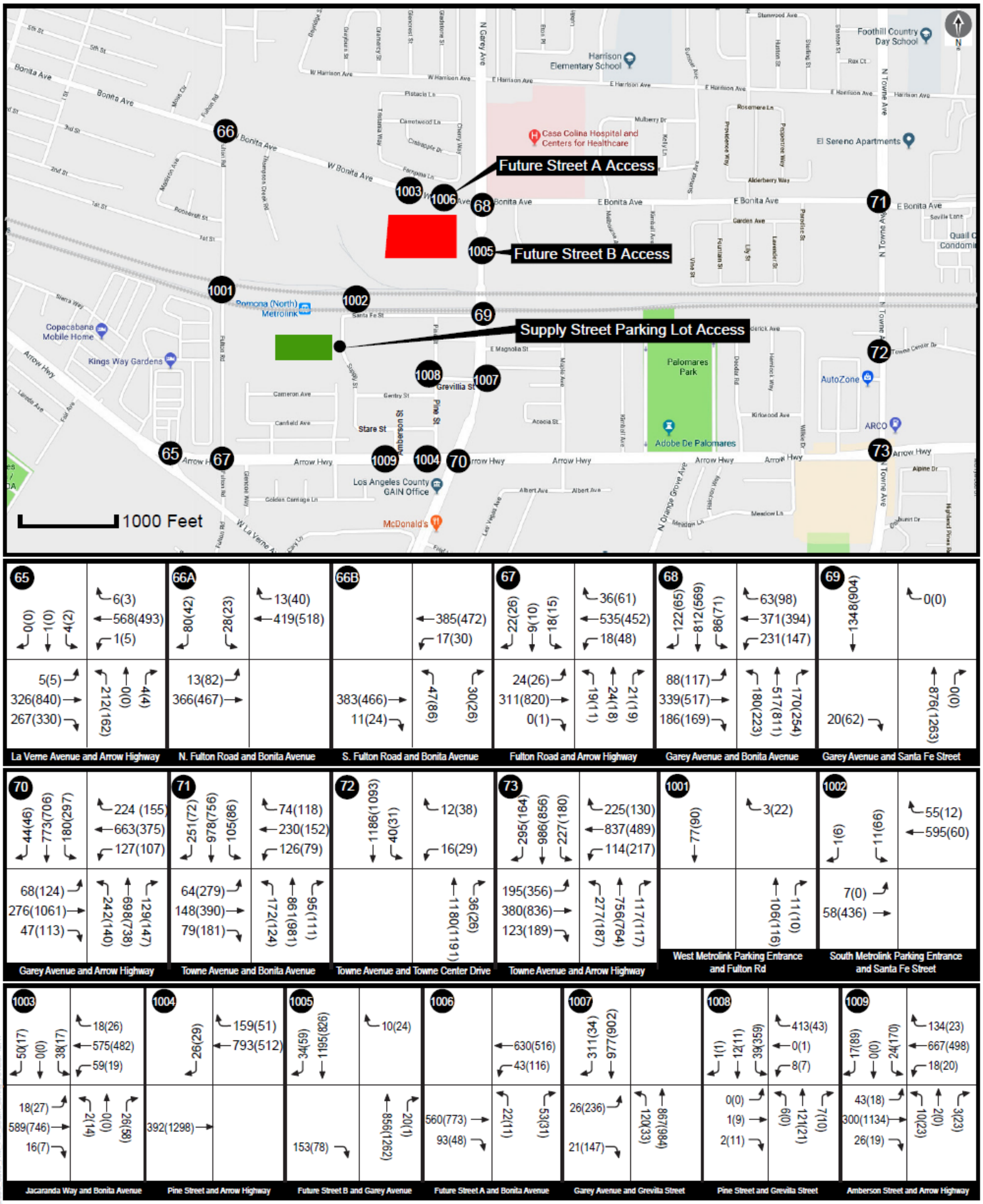
#	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
65	La Verne Avenue and Arrow Highway	Signal	8.2	A	13.4	B
66A	N. Fulton Road and Bonita Avenue	OWSC	13.5	B	19.3	C
66B	S. Fulton Road and Bonita Avenue	OWSC	15.8	C	27.9	D
67	Fulton Road and Arrow Highway	TWSC	18.8	C	41.2	**E**
68	Garey Avenue and Bonita Avenue	Signal	24.1	C	25.1	C
69	Garey Avenue and Santa Fe Street	OWSC	15.5	C	12.9	B
70	Garey Avenue and Arrow Highway	Signal	34.8	C	49.1	D
71	Towne Avenue and Bonita Avenue	Signal	10.7	B	14.2	B
72	Towne Avenue and Towne Centre Drive	OWSC	24.7	C	23.4	C
73	Towne Avenue and Arrow Highway	Signal	56.6	**E**	48.9	D
1001	West Metrolink Parking Entrance and Fulton Road	OWSC	8.9	A	9.0	A
1002	South Metrolink Parking Entrance and Santa Fe Street	OWSC	14.8	B	13.1	B
1003	Jacaranda Way and Bonita Avenue	TWSC	47.9	**E**	37.8	**E**
1004	Pine Street and Arrow Highway	OWSC	13.9	B	11.5	B
1005	Future Street B and Garey Avenue	TWSC	20.2	C	14.9	B
1006	Future Street A and Bonita Avenue	OWSC	16.8	C	20.0	C
1007	Grevillia Street and Garey Avenue	Signal	7.2	A	12.8	B
1008	Pine Street and Grevillia Street	TWSC	12.9	B	14.4	B
1009	Amberson Street and Arrow Highway	TWSC	21.7	C	207.5	**F**

Red and bold text *indicates an operational effect per the City of Pomona guidelines*



Metro Gold Line Extension - Pomona Station (South) Traffic Feasibility Study Report

Figure 4-3: 2035 Build Lane Configurations



Legend: # Study Intersection XX (YY) AM/PM Peak Hour Volume

ch2m: Metro Gold Line Extension - Pomona Station (South) Traffic Feasibility Study Report

Figure 4-4: 2035 Build AM and PM Peak Hour Volumes

Table 4-7 is a summary of the study intersections with an LOS E or LOS F movement for the 2035 Build scenario. The highlighted movements are changes from the No Build scenario, either due to increased traffic from the Pomona station, or reduced green time to accommodate other movements.

TABLE 4-7
2035 Build AM and PM Peak Hour Movement LOS Operational Summary

		Movements at LOS E or F	
#	**Intersection**	**AM Peak Hour**	**PM Peak Hour**
65	La Verne Avenue and Arrow Highway	-	EBL, WBL
67	Fulton Road and Arrow Highway	-	NBT, SBT
68	Garey Avenue and Bonita Avenue	NBL	-
70	Garey Avenue and Arrow Highway	WBL	EBT, EBR, WBL, NBT, NBR, SBL
73	Towne Avenue and Arrow Highway	EBL, WBT, WBR, NBL, SBL	EBL, WBL, NBL, SBL
1003	Jacaranda Way and Bonita Avenue	SBL	SBL
1009	Amberson Street and Arrow Highway	-	NBL, SBL

Red text indicates either a degraded movement in the Build scenario that was LOS D or better in the No Build scenario, or a degraded movement that got substantially worse by 25 percent increase in delay.
Northbound (NB), southbound (SB), eastbound (EB), westbound (WB), left (L), through (T), and right (R)

Table 4-8 is a summary of the study intersections that have 95th percentile queues that are projected to exceed the available storage in the 2035 Build scenario. Synchro 9 outputs with details on queueing analysis are provided in Appendix G.

The analysis for intersections that could potentially cause queueing operational issues for the existing grade crossing at Garey Avenue is summarized in Table 4-9. The analysis concluded that both intersections along Garey Avenue are not projected to have 95th percentile queues spill back to the railroad tracks.

In the Build scenario, the signals at Garey Avenue (at Bonita Avenue and Grevillia Street) will be interconnected with the grade crossing equipment to prevent any vehicles from queuing on the tracks in both directions.

TABLE 4-8

2035 Build AM and PM Peak Hour Queueing Analysis Summary

#	Intersection	Movements with 95th Percentile Queues (feet) Exceeding Storage	
		AM Peak Hour	**PM Peak Hour**
68	Garey Avenue and Bonita Avenue	WBL (215/110/135)	WBL (180/155/135)
		NBL (180/135/145)	NBL (225/215/145)
70	Garey Avenue and Arrow Highway	NBL (235/140/220)	SBL (320/225/300)
71	Towne Avenue and Bonita Avenue	NBL (155/155/130)	EBL (205/135/100)
73	Towne Avenue and Arrow Highway	EBL (260/250/170)	EBL (400/390/170)
		-	WBL (275/240/200)
		NBL (340/230/100)	NBL (250/240/100)
		SBL (265/280/170)	SBL (240/240/170)
		SBR (135/115/120)	-
1007	Garey Avenue and Grevillia Street	NBL (105/5/100)	-
1009	Amberson Street and Arrow Highway	-	NB (60/50/50)
		-	SB (375/15/190)

Red text indicates either a 95th percentile queue that exceeds storage in the Build scenario that was not exceeding in the No Build scenario, or a 95th percentile queue that exceeds storage that got substantially worse by 25 percent increase.
Numbers in Parenthesis (95th percentile Build Queue Length/95th percentile No-Build Queue Length/Available Storage) in feet.
Northbound (NB), southbound (SB), eastbound (EB), westbound (WB), left (L), through (T), and right (R)

TABLE 4-9

2035 Build AM and PM Peak Hour Queueing Analysis Summary for Intersections Adjacent to the Garey Avenue Crossing

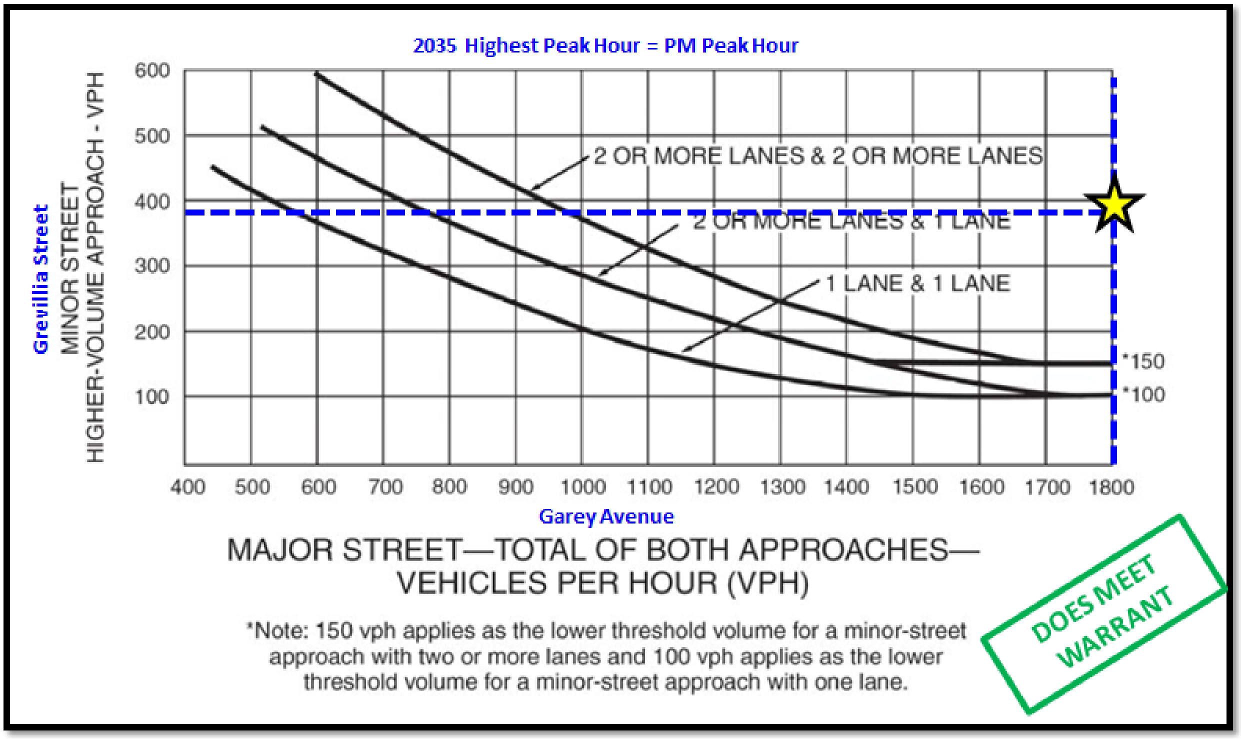
#	Intersection Approach	Distance to Tracks (ft.)	Mvmt.	Lane Group	Storage (ft.)	AM 95th Percentile Lane Group Queue (ft.)	PM 95th Percentile Lane Group Queue (ft.)
68	Garey Avenue and Bonita (NB)	695	LT	L	145	180*	225*
			TH	T	695	125	240
			RT	R	100	35	75
1007	Garey Avenue and Grevillia Street (SB)	550	TH RT	T/R	530	240	210

** 95th percentile volume exceeds capacity; queue may be longer*
Lane Group= A group of turning movements assigned to the same travel lane. For example, if an intersection approach serves a left, thru, and right movement in one lane, the lane group is shared left/thru/right (L/T/R) where, L is left, T is thru, and R is right. Simulation and operational analysis software generally provide queues generated by the specific movement and the analyst reports the lane group queues for shared movements.

A warrant for the signal operations at the Grevillia Street/Garey Avenue intersection is provided in Figure 4-5. The analysis indicates that the intersection peak hour volumes meets the warrant for a signal.

FIGURE 4-5

Garey Avenue and Grevillia Street Peak Hour Signal Warrant Analysis



SECTION 5

Potential Project Refinements

5.1 Potential Project Refinements for the Build Scenario

In looking for potential project refinements, the analysis was focused on the operational effects identified in Section 4. The focus was on determining potential project refinements on the study intersections that met the City of Pomona guidelines for operational effects. The goal was to reduce the operational measure to the level it is projected to operate with the No Build scenario.

Four intersections were identified as operational effects of the Build scenario (with the Pomona Station parking structure) per the City of Pomona guidelines:

- Fulton Road/Arrow Highway (in the PM peak hour)
- Towne Avenue/Arrow Highway (in the AM peak hour)
- Amberson Street/Arrow Highway (in the PM peak hour)
- Jacaranda Way/Bonita Avenue (in the AM and PM peak hours)

Potential project refinements were identified as described below:

<u>*Potential Project Refinement #1 for the Fulton Road/Arrow Highway intersection*</u>*: Restriction of the northbound left-turn and westbound left-turn. Those movements would be re-routed by using the newly-installed signal at the Arrow Highway/La Verne Avenue intersection. The northbound approach will be restriped as a northbound through lane and a right-turn pocket. The westbound left-turn pocket would be closed. "No Left Turn" signage would be installed on the northbound and westbound approaches.*

The traffic volumes rerouted with this potential project refinement are 19/11 vehicles/hour (AM/PM) for the northbound left-turn and 18/48 vehicles/hour (AM/PM) for the westbound left, which are considered minimal on the newly-installed signal with protected left-turn phasing at the La Verne Avenue/Arrow Highway intersection. A vehicle originally making a northbound left would turn left on La Verne Avenue and turn left onto Arrow Highway. A vehicle originally making a westbound left would continue westbound and make a westbound left onto La Verne Avenue and then make a right-turn onto Fulton Road. This potential project refinement eliminates some of the unprotected turn movements that were causing high delays and safety-related conflicts. The results of this potential project refinement are summarized in Table 5-1. An illustration of the potential project refinement is provided in Figure 5-1.

TABLE 5-1
2035 Refined Build LOS Summary for Fulton Road and Arrow Highway

	2035 No Build		2035 Build		2035 Refined Build	
67: Fulton Road and Arrow Highway	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
AM Peak Hour	20.8	C	18.8	C	17.0	C
PM Peak Hour	33.5	D	**41.2**	**E**	**28.8**	**D**
65: La Verne Avenue and Arrow Highway (with rerouted traffic)	**2035 No Build**		**2035 Build**		**2035 Refined Build**	
	Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
AM Peak Hour	32.7	D	8.2	A	15.4	B
PM Peak Hour	**171.4**	**F**	13.4	B	14.4	B

FIGURE 5-1
Potential Project Refinement at Fulton Road and Arrow Highway Intersection

Source: Aerial Image © 2017 Google. Annotation © 2017 CH2M

<u>Potential Project Refinement #2 for the Towne Avenue/Arrow Highway intersection</u>: Addition of one northbound left turn lane and storage length extension from 100 feet to 175 feet.

This potential project refinement provides the additional storage needed to accommodate the added trips from drivers heading from northbound Towne Avenue to westbound Arrow Highway for trips to the Pomona Station or the Waterford Housing Development. Roadway widening near the intersection will be needed to accommodate the improved lane configuration. A detailed engineering assessment is required to determine the feasibility of this potential project refinement. The results of this potential project refinement are summarized in Table 5-2.

TABLE 5-2
2035 Refined Build LOS Summary for Towne Avenue and Arrow Highway

	2035 No Build		2035 Build		2035 Refined Build	
73: Towne Avenue and Arrow Highway	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
AM Peak Hour	49.9	D	**56.6**	**E**	**49.6**	**D**
PM Peak Hour	46.8	D	48.9	D	46.0	D

<u>Potential Project Refinement #3 for the Amberson Street/Arrow Highway intersection:</u> Signalize the intersection and provide permissive left-turn phasing for the all the left-turn movements.

This potential project refinement eliminates some of the unprotected turn movements that were causing high delays and safety-related conflicts. A peak hour signal warrant analysis (See Figure 5-2) was performed to ensure that this potential project refinement was warranted. As illustrated in Figure 5-2, with the projected 2035 Build volumes, the peak hour signal warrant was met. The results of this potential project refinement are summarized in Table 5-3.

FIGURE 5-2
Amberson Street and Arrow Highway Peak Hour Signal Warrant Analysis

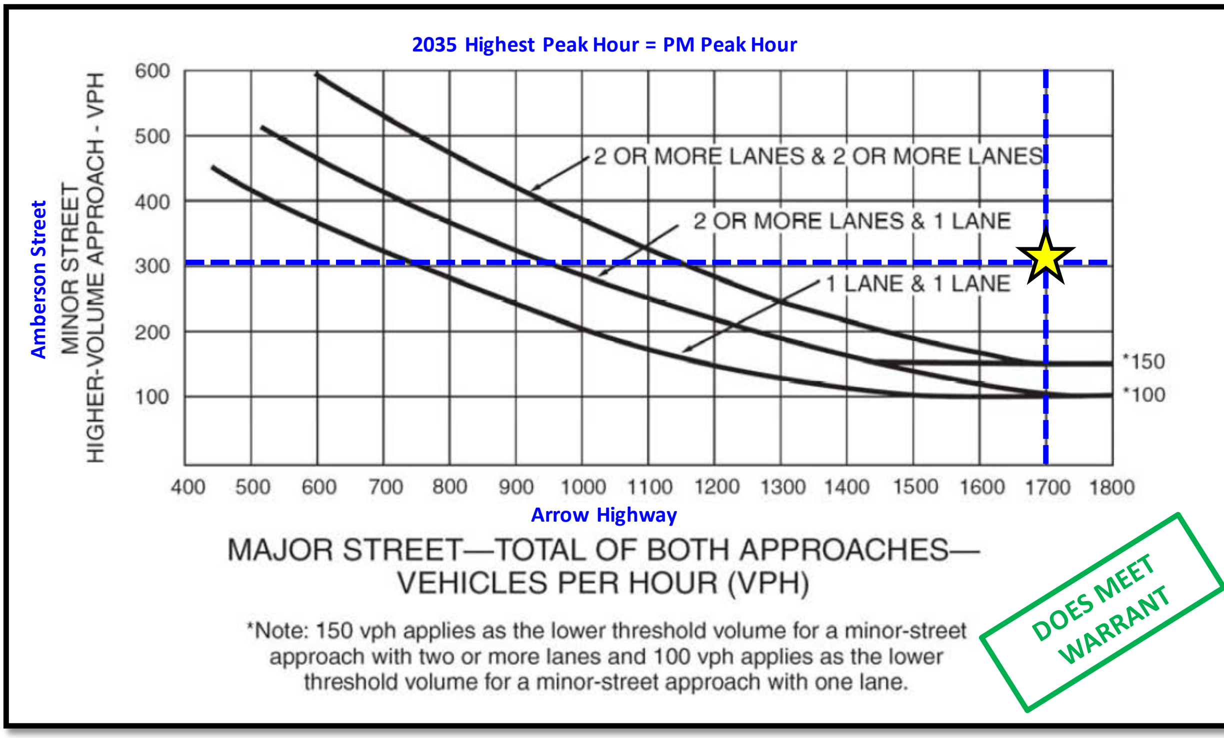


TABLE 5-3
2035 Refined Build LOS Summary for Amberson Street and Arrow Highway

1009: Amberson Street and Arrow Highway	2035 No Build		2035 Build		2035 Refined Build	
	Delay	LOS	Delay	LOS	Delay	LOS
AM Peak Hour	18.2	C	21.7	C	7.4	A
PM Peak Hour	**50.7**	**F**	**207.5**	**F**	**16.4**	**B**

Potential Project Refinement #4 for the Jacaranda Way/Bonita Avenue intersection: Signalize the intersection. The signalization of this intersection will require the signalization of the Future Street A/Bonita Avenue intersection, operating under the same controller.

The Future Street A/Bonita Avenue and Jacaranda Way/Bonita Avenue intersections were assumed to be unsignalized in the 2035 No-Build and Build scenarios. In the Palomares TIS, a signal warrant analysis was performed for the Future Street A/Bonita Avenue driveway. The warrant analysis concluded that based on year 2021 (with project) traffic volume projections, a signal was not warranted. Therefore, intersection operation analysis was not performed for either intersection in that study.

This study uses the 2035 horizon year, 14 years beyond the analysis in the Palomares TIS. Therefore, additional operational analysis was conducted, and the evaluation was completed for both intersections, since they are closely-spaced. Based on the HCM 2010 methodology and the projected 2035 No Build volumes (including the Waterford development trips), the Jacaranda Way/Bonita Avenue intersection is projected to operate at LOS E (more than 36 seconds per vehicle of delay) in the AM and PM peak hours. With the addition of the project traffic from the Pomona Station, the delay increases to 48 seconds in the AM peak and 38 seconds in the PM peak (remaining at LOS E). The projected intersection operations establish the need for a signal at the Jacaranda Way/Bonita Avenue intersection. Since the spacing between the Future Street A/Bonita Avenue and Jacaranda Way/Bonita Avenue intersections is less than 200 feet, a combined signal would be recommended at both locations to improve flow and minimize conflicts. The results of this potential project refinement are summarized in Table 5-4.

Synchro 9 output spreadsheets, with details on intersection and movement LOS for all the potential project refinements, are provided in Appendix H.

TABLE 5-4
2035 Refined Build LOS Summary for Jacaranda Way and Bonita Avenue

	2035 No Build		2035 Build		2035 Refined Build	
1003: Jacaranda Way and Bonita Avenue	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
AM Peak Hour	**36.5**	**E**	**47.9**	**E**	**12.7**	**B***
PM Peak Hour	**37.0**	**E**	**37.8**	**E**	**14.3**	**B***
1006: Future Street A and Bonita Avenue (with shared controller signal)	**2035 No Build**		**2035 Build**		**2035 Refined Build**	
	Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
AM Peak Hour	16.0	C	16.8	C	10.1	B*
PM Peak Hour	21.6	C	20.0	C	13.4	B*

** HCM 2000 methodology was used for consistency with the build scenario, where HCM 2010 has limitations for analyzing the proposed shared signal timing for these two intersections*

5.2 Other Refinements Evaluated but Not Recommended

Garey Avenue/Bonita Avenue and Towne Avenue/Bonita Avenue

Operations for the northbound left turns at the Garey Avenue/Bonita Avenue and Towne Avenue/Bonita Avenue intersections were studied in detail. The proposed parking garage will not result in any operational effects per the City of Pomona guidelines. The addition of a second northbound left-turn lane at either intersection is not supported by this analysis. Table 4-8 indicates that the 95th percentile queue will exceed available storage on the northbound left-turn movement by 10 to 45 feet at Garey Avenue and 25 feet at Towne Avenue. These excess queues (equivalent to one or two vehicles) will occur only one time in every 20 signal cycles. Also, queues will exceed storage for the No Build scenario for these intersections, so no additional modifications are recommended.

Fulton Road/Bonita Avenue

The FEIR identified the signalization of the Fulton Road/Bonita Avenue intersection when warranted. Due to the changes in travel patterns and the added trips from the housing development, a peak hour signal warrant analysis was performed for both unsignalized intersections, as analyzed in this report, to confirm that a signal is not required as part of the Build scenario. Figures 5-4 and 5-5 are summaries of the warrant analysis. The projected peak hour traffic volumes do not meet the warrants. The forecasted traffic volumes for the warrant analysis included the effects of the relocated traffic based on loss of parking spaces at the existing Metrolink parking lot and the restricted turning movements in and out of the parking lot from Fulton Road.

FIGURE 5-3

Fulton Road (North) and Bonita Avenue Peak Hour Signal Warrant Analysis

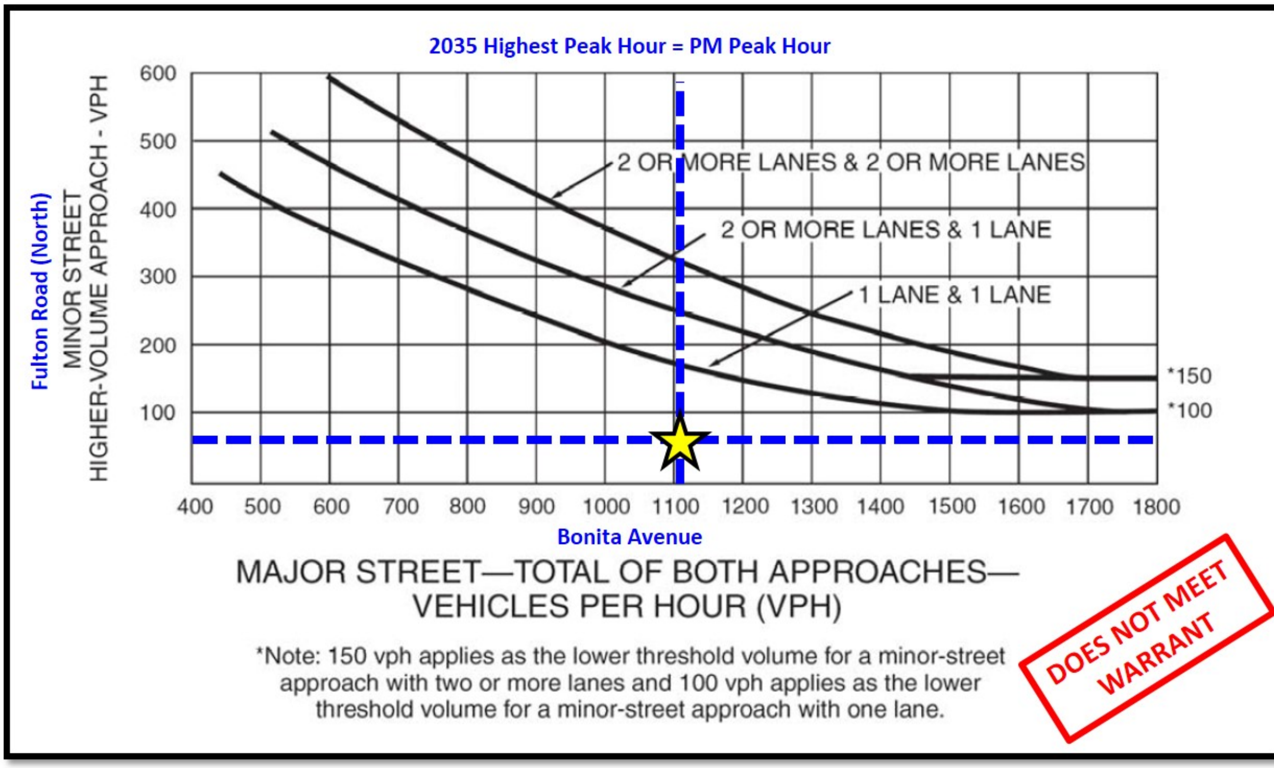
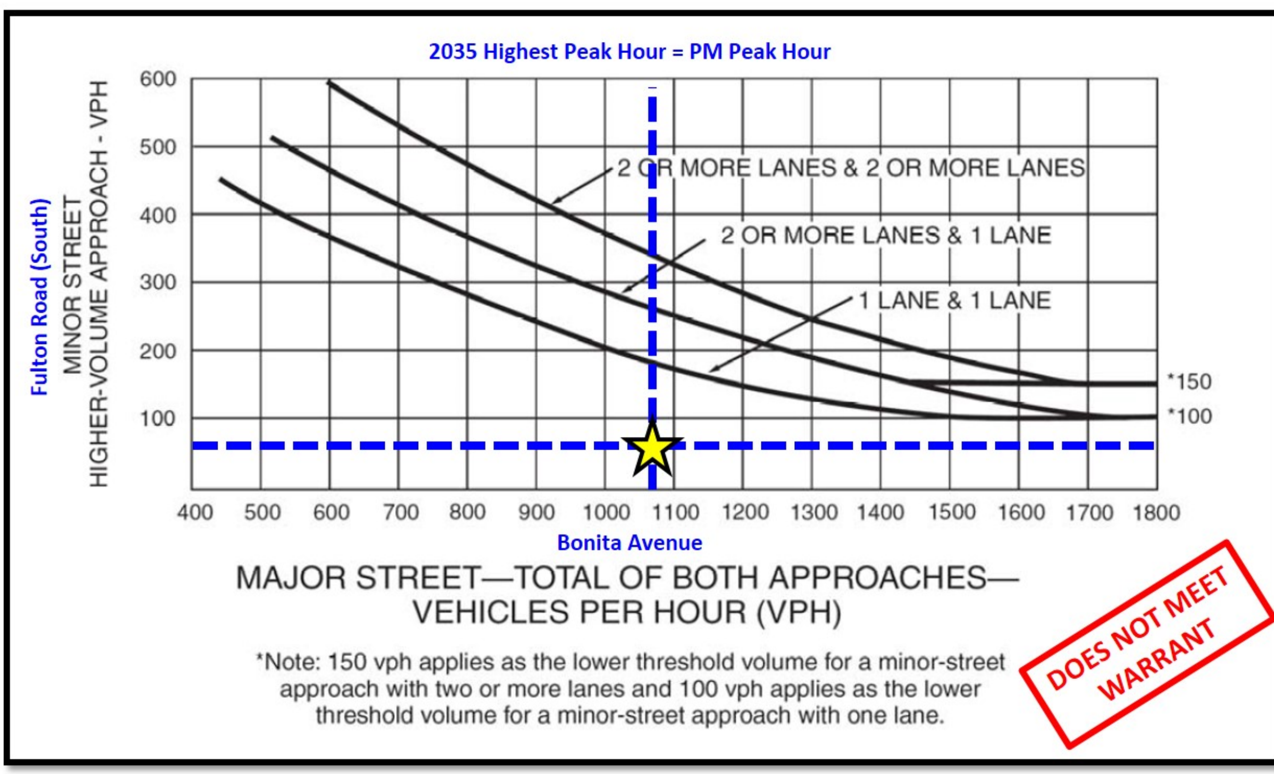


FIGURE 5-4

Fulton Road (South) and Bonita Avenue Peak Hour Signal Warrant Analysis



SECTION 6
Summary and Conclusions

This report is a summary of the traffic analysis performed to assess the operations upon construction of the Metro Gold Line Extension and the Pomona Station Parking Structure. The analysis accounted for planned intersection reconfigurations and trips generated and distributed for the future developments. The Build scenario is described below:

> *The 2035 Build scenario includes the construction of the Gold Line Extension with the Pomona Station Parking Structure located just south of the station. Access to the parking structure would be provided off Supply Street. The 2035 Build scenario also includes the constructed Waterford Housing development with the two future streets that would serve as access to the housing developments. The La Verne Avenue/Arrow Highway and Grevillia Street/Garey Avenue intersections will be signalized as part of the Gold Line Extension. Santa Fe Street will operate as a one-way street (eastbound) and right out at the Garey Avenue intersection. At the existing Fulton Road parking access point, the left-turns will be eliminated and will operate as right-in/right-out. Two sets of railroad tracks cross Garey Avenue at-grade currently. Freight tracks are located to the north and Metrolink tracks to the south. The new LRT tracks will be grade separated under the Build Scenario.*

With the Build scenario in place, the analysis concluded that there would be four traffic operational effects (using the criteria in the City of Pomona guidelines for traffic impacts): the Fulton Road/Arrow Highway, the Towne Avenue/Arrow Highway, and Amberson Street/Arrow Highway, and the Jacaranda Way/Bonita Avenue intersections. The Build intersection operations are projected to be LOS E compared to LOS D in the No Build scenario at the Fulton Road/Arrow Highway intersection in the PM peak hour. The Build intersection operations are projected to be LOS E compared to LOS D in the No Build scenario at the Towne Avenue/Arrow Highway intersection in the AM peak hour. The Build intersection operations are projected to be LOS F in both the No Build and Build scenarios at the Amberson Street/Arrow Highway intersection in the PM peak hour. The Build intersection operations are projected to be LOS E in both the No Build and Build scenarios at the Jacaranda Way/Bonita Avenue intersection in the AM and PM peak hours.

Potential project refinements were identified to address the operational effects in the Build scenario. These potential project refinements are as follows:

<u>Potential Project Refinement #1 for the Fulton Road/Arrow Highway intersection</u>: Restrict the northbound left-turn and westbound left-turn. Those movements would be re-routed by using the newly-installed signal at the Arrow Highway/La Verne Avenue intersection. The northbound approach will be restriped as a northbound through lane and a right-turn pocket. The westbound left-turn pocket would be closed. "No Left Turn" signage would be installed on the northbound and westbound approaches.

<u>Potential Project Refinement #2 for the Towne Avenue/Arrow Highway intersection</u>: Add one northbound left turn lane, and extend the storage length from 100 feet to 175 feet.

<u>Potential Project Refinement #3 for the Amberson Street/Arrow Highway intersection:</u> Signalize the intersection and provide permissive left-turn phasing for the all the left-turn movements.

<u>Potential Project Refinement #4 for the Jacaranda Way/Bonita Avenue intersection:</u> Signalize the intersection. The signalization of this intersection will require the signalization of the Future Street A/Bonita Avenue intersection, operating under the same controller. While both the Waterford development and the Gold Line Extension/Pomona Station Parking Structure would increase delay, the signal improvements at the two intersections will be constructed as part of the Gold Line improvements.

With the implementation of the potential project refinements, all four intersections are projected to operate at LOS D or better with overall intersection delays lower than the No Build scenario.

Appendix A
Intersection Turning Movement Counts

October 2017 Counts

WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969 info@wiltecusa.com

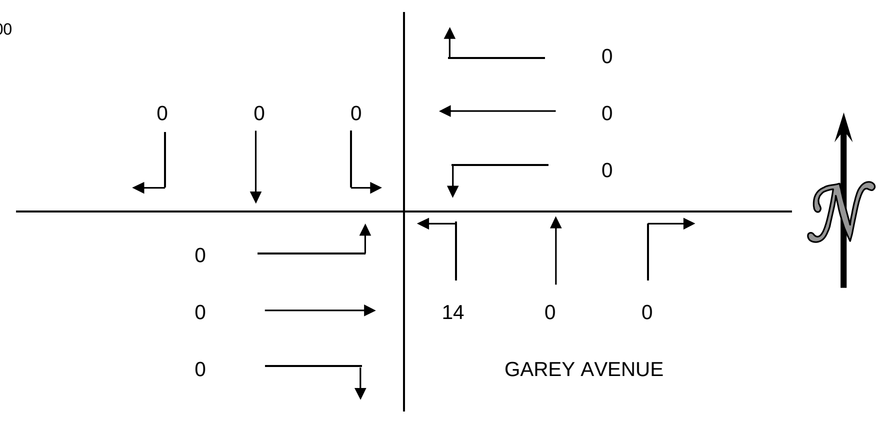
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M HILL, INC.
PROJECT:		FOOTHILL GOLD LINE
DATE:		WEDNESDAY OCTOBER 18, 2017
PERIOD:		6:00 AM TO 9:00 AM
INTERSECTION:	N/S	GAREY AVENUE
	E/W	ARROW HIGHWAY
CITY:		POMONA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-615	0	0	0	0	0	0	0	0	0	0	0	0	0
615-630	0	0	0	0	0	0	0	0	0	0	0	0	0
630-645	0	0	0	0	0	0	0	0	2	0	0	0	2
645-700	0	0	0	0	0	0	0	0	1	0	0	0	1
700-715	0	0	0	0	0	0	0	0	1	0	0	0	1
715-730	0	0	0	0	0	0	0	0	2	0	0	0	2
730-745	0	0	0	0	0	0	0	0	3	0	0	0	3
745-800	0	0	0	0	0	0	0	0	3	0	0	0	3
800-815	0	0	0	0	0	0	0	0	2	0	0	0	2
815-830	0	0	0	0	0	0	0	0	1	0	0	0	1
830-845	0	0	0	0	0	0	0	0	4	0	0	0	4
845-900	0	0	0	0	0	0	0	0	7	0	0	0	7
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-700	0	0	0	0	0	0	0	0	3	0	0	0	3
615-715	0	0	0	0	0	0	0	0	4	0	0	0	4
630-730	0	0	0	0	0	0	0	0	6	0	0	0	6
645-745	0	0	0	0	0	0	0	0	7	0	0	0	7
700-800	0	0	0	0	0	0	0	0	9	0	0	0	9
715-815	0	0	0	0	0	0	0	0	10	0	0	0	10
730-830	0	0	0	0	0	0	0	0	9	0	0	0	9
745-845	0	0	0	0	0	0	0	0	10	0	0	0	10
800-900	0	0	0	0	0	0	0	0	14	0	0	0	14

AM PEAK HOUR: 800-900



ARROW HIGHWAY

WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969 info@wiltecusa.com

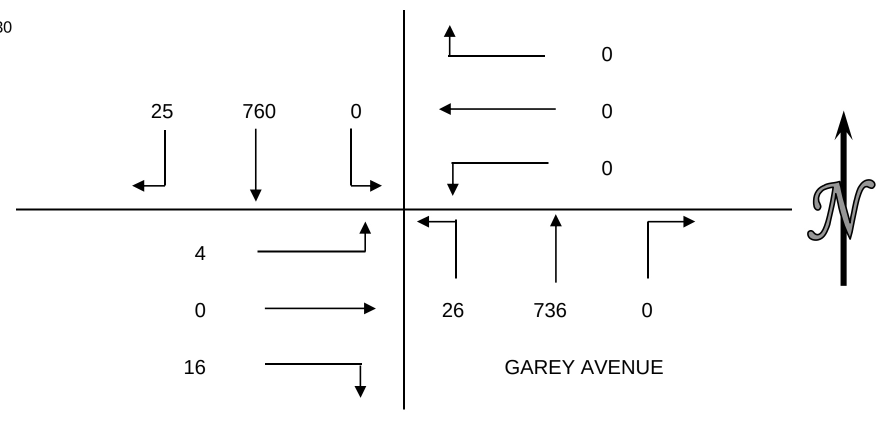
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M HILL, INC.
PROJECT:		FOOTHILL GOLD LINE
DATE:		WEDNESDAY OCTOBER 18, 2017
PERIOD:		6:00 AM TO 9:00 AM
INTERSECTION:	N/S	GAREY AVENUE
	E/W	SANTE FE STREET
CITY:		POMONA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-615	6	55	0	0	0	0	0	43	7	2	0	0	113
615-630	4	82	0	0	0	0	0	55	10	3	0	0	154
630-645	9	102	0	0	0	0	0	62	13	3	0	0	189
645-700	6	122	0	0	0	0	0	76	16	3	0	1	224
700-715	9	134	0	0	0	0	0	97	12	1	0	3	256
715-730	4	162	0	0	0	0	0	128	9	5	0	0	308
730-745	8	195	0	0	0	0	0	154	15	5	0	0	377
745-800	6	211	0	0	0	0	0	214	2	4	0	0	437
800-815	5	198	0	0	0	0	0	191	6	2	0	1	403
815-830	6	156	0	0	0	0	0	177	3	5	0	3	350
830-845	8	138	0	0	0	0	0	118	11	6	0	0	281
845-900	4	162	0	0	0	0	0	146	3	2	0	1	318
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-700	25	361	0	0	0	0	0	236	46	11	0	1	680
615-715	28	440	0	0	0	0	0	290	51	10	0	4	823
630-730	28	520	0	0	0	0	0	363	50	12	0	4	977
645-745	27	613	0	0	0	0	0	455	52	14	0	4	1165
700-800	27	702	0	0	0	0	0	593	38	15	0	3	1378
715-815	23	766	0	0	0	0	0	687	32	16	0	1	1525
730-830	25	760	0	0	0	0	0	736	26	16	0	4	1567
745-845	25	703	0	0	0	0	0	700	22	17	0	4	1471
800-900	23	654	0	0	0	0	0	632	23	15	0	5	1352

AM PEAK HOUR: 730-830



SANTE FE STREET

WILTEC Phone: (626) 564-1944 Fax: (626) 564-0969 info@wiltecusa.com

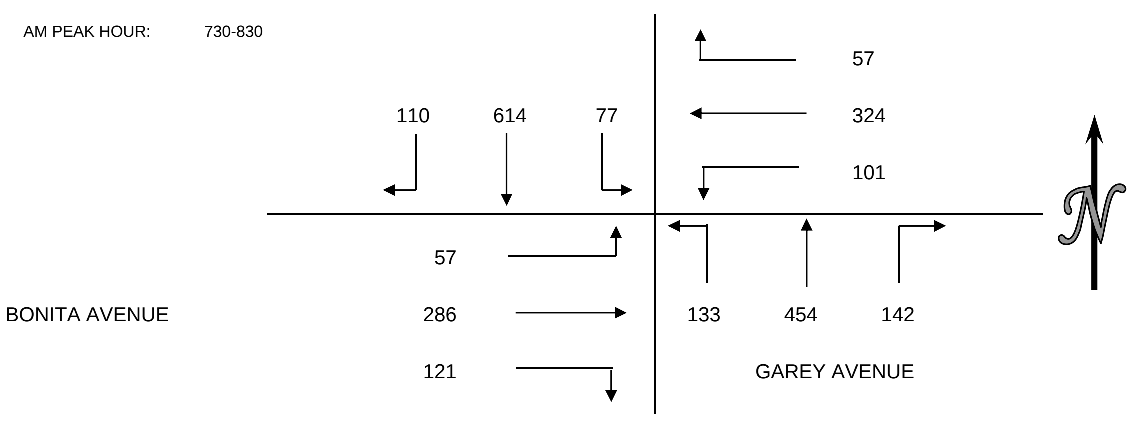
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT: CH2M HILL, INC.
PROJECT: FOOTHILL GOLD LINE
DATE: WEDNESDAY OCTOBER 18, 2017
PERIOD: 6:00 AM TO 9:00 AM
INTERSECTION: N/S GAREY AVENUE
E/W BONITA AVENUE
CITY: POMONA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-615	8	37	4	3	25	18	5	34	6	9	10	3	162
615-630	14	52	10	6	31	15	13	27	21	15	17	4	225
630-645	25	75	6	10	43	23	13	32	11	22	24	5	289
645-700	24	97	8	5	45	28	13	45	21	21	33	9	349
700-715	25	96	6	10	62	30	20	58	25	24	47	8	411
715-730	27	118	12	11	90	21	29	70	33	21	71	7	510
730-745	33	170	19	14	88	27	29	100	25	29	82	15	631
745-800	23	155	27	16	94	25	44	132	31	34	87	16	684
800-815	28	162	20	19	72	26	33	135	37	25	63	15	635
815-830	26	127	11	8	70	23	36	87	40	33	54	11	526
830-845	25	118	14	16	61	24	25	78	26	21	49	13	470
845-900	21	114	12	12	43	16	27	75	19	24	67	11	441
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-700	71	261	28	24	144	84	44	138	59	67	84	21	1025
615-715	88	320	30	31	181	96	59	162	78	82	121	26	1274
630-730	101	386	32	36	240	102	75	205	90	88	175	29	1559
645-745	109	481	45	40	285	106	91	273	104	95	233	39	1901
700-800	108	539	64	51	334	103	122	360	114	108	287	46	2236
715-815	111	605	78	60	344	99	135	437	126	109	303	53	2460
730-830	110	614	77	57	324	101	142	454	133	121	286	57	2476
745-845	102	562	72	59	297	98	138	432	134	113	253	55	2315
800-900	100	521	57	55	246	89	121	375	122	103	233	50	2072

AM PEAK HOUR: 730-830



WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969 info@wiltecusa.com

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M HILL, INC.
PROJECT:		FOOTHILL GOLD LINE
DATE:		WEDNESDAY OCTOBER 18, 2017
PERIOD:		6:00 AM TO 9:00 AM
INTERSECTION:	N/S	JACARANDA WAY
	E/W	BONITA AVENUE
CITY:		POMONA

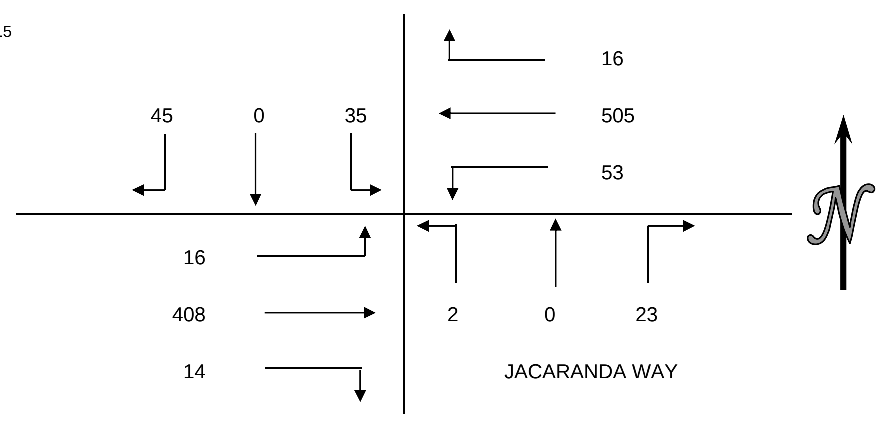
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-615	3	0	2	0	41	0	0	0	1	0	21	0	68
615-630	6	0	2	1	50	0	0	0	0	1	32	1	93
630-645	11	0	4	3	70	6	0	0	0	1	40	2	137
645-700	7	0	7	1	88	8	1	0	1	0	55	2	170
700-715	10	0	3	3	104	5	4	0	0	2	68	2	201
715-730	15	0	11	3	134	8	4	0	0	2	92	6	275
730-745	15	0	12	3	127	10	6	0	1	3	100	3	280
745-800	9	0	8	4	124	19	6	0	0	4	119	3	296
800-815	6	0	4	6	120	16	7	0	1	5	97	4	266
815-830	5	0	3	0	103	22	7	0	0	8	92	7	247
830-845	7	1	4	3	84	21	10	0	3	3	68	8	212
845-900	4	0	2	1	63	20	9	0	3	14	90	1	207

HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-700	27	0	15	5	249	14	1	0	2	2	148	5	468
615-715	34	0	16	8	312	19	5	0	1	4	195	7	601
630-730	43	0	25	10	396	27	9	0	1	5	255	12	783
645-745	47	0	33	10	453	31	15	0	2	7	315	13	926
700-800	49	0	34	13	489	42	20	0	1	11	379	14	1052
715-815	45	0	35	16	505	53	23	0	2	14	408	16	1117
730-830	35	0	27	13	474	67	26	0	2	20	408	17	1089
745-845	27	1	19	13	431	78	30	0	4	20	376	22	1021
800-900	22	1	13	10	370	79	33	0	7	30	347	20	932

AM PEAK HOUR: 715-815

BONITA AVENUE



WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969 info@wiltecusa.com

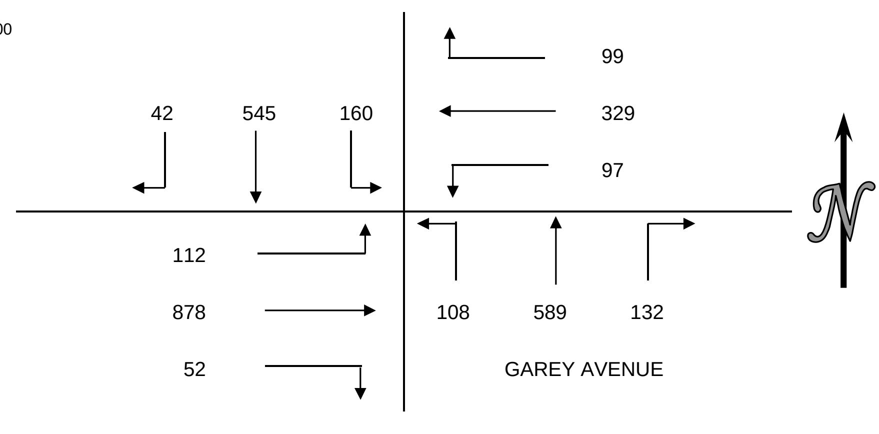
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M HILL, INC.
PROJECT:		FOOTHILL GOLD LINE
DATE:		WEDNESDAY OCTOBER 18, 2017
PERIOD:		4:00 PM TO 7:00 PM
INTERSECTION:	N/S	GAREY AVENUE
	E/W	ARROW HIGHWAY
CITY:		POMOMA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	10	149	25	33	72	23	26	137	25	14	176	35	725
415-430	8	152	33	20	73	27	27	138	24	15	184	24	725
430-445	11	141	34	21	66	23	24	140	25	20	202	37	744
445-500	16	120	25	26	98	16	36	153	31	11	189	38	759
500-515	11	141	50	34	83	28	37	141	21	14	223	24	807
515-530	9	129	37	23	84	23	29	156	32	12	219	38	791
530-545	9	136	37	26	85	21	32	155	25	14	218	27	785
545-600	13	139	36	16	77	25	34	137	30	12	218	23	760
600-615	13	128	26	28	67	29	27	155	22	12	220	27	754
615-630	10	141	23	27	66	19	25	126	24	14	167	18	660
630-645	7	124	38	24	60	20	24	110	20	14	142	20	603
645-700	6	101	16	28	67	26	16	113	24	8	110	17	532
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	45	562	117	100	309	89	113	568	105	60	751	134	2953
415-515	46	554	142	101	320	94	124	572	101	60	798	123	3035
430-530	47	531	146	104	331	90	126	590	109	57	833	137	3101
445-545	45	526	149	109	350	88	134	605	109	51	849	127	3142
500-600	42	545	160	99	329	97	132	589	108	52	878	112	3143
515-615	44	532	136	93	313	98	122	603	109	50	875	115	3090
530-630	45	544	122	97	295	94	118	573	101	52	823	95	2959
545-645	43	532	123	95	270	93	110	528	96	52	747	88	2777
600-700	36	494	103	107	260	94	92	504	90	48	639	82	2549

AM PEAK HOUR: 500-600



ARROW HIGHWAY

WILTEC

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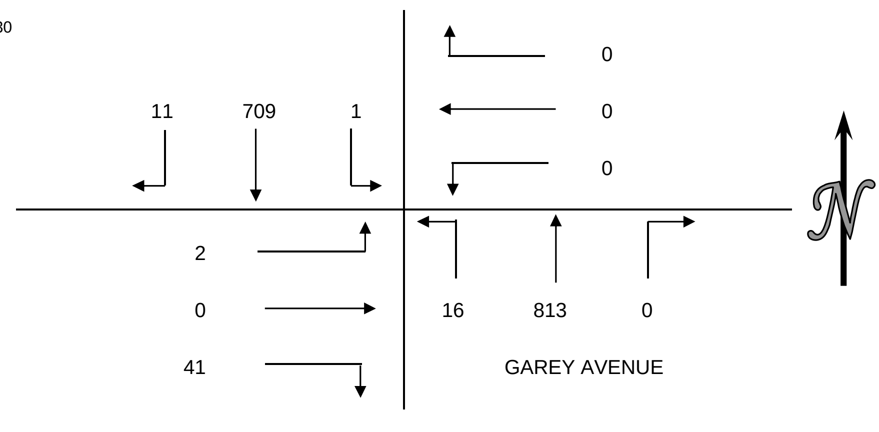
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M HILL, INC.
PROJECT:		FOOTHILL GOLD LINE
DATE:		WEDNESDAY OCTOBER 18, 2017
PERIOD:		4:00 PM TO 7:00 PM
INTERSECTION:	N/S	GAREY AVENUE
	E/W	SANTE FE STREET
CITY:		POMOMA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	4	169	0	0	0	0	0	199	2	13	0	1	388
415-430	3	181	0	0	0	0	0	165	6	4	0	2	361
430-445	3	176	1	0	0	0	0	204	3	8	0	0	395
445-500	1	171	0	0	0	0	0	215	5	7	0	0	399
500-515	2	192	0	0	0	0	0	194	4	4	0	1	397
515-530	5	170	0	0	0	0	0	200	4	22	0	1	402
530-545	0	168	0	0	0	0	0	207	7	7	0	0	389
545-600	2	161	0	0	0	0	0	191	4	24	0	1	383
600-615	6	136	0	0	0	0	0	204	1	8	0	3	358
615-630	1	155	0	0	0	0	0	177	5	16	0	3	357
630-645	2	157	0	0	0	0	0	159	3	17	0	1	339
645-700	1	117	0	0	0	0	0	148	3	1	0	2	272
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	11	697	1	0	0	0	0	783	16	32	0	3	1543
415-515	9	720	1	0	0	0	0	778	18	23	0	3	1552
430-530	11	709	1	0	0	0	0	813	16	41	0	2	1593
445-545	8	701	0	0	0	0	0	816	20	40	0	2	1587
500-600	9	691	0	0	0	0	0	792	19	57	0	3	1571
515-615	13	635	0	0	0	0	0	802	16	61	0	5	1532
530-630	9	620	0	0	0	0	0	779	17	55	0	7	1487
545-645	11	609	0	0	0	0	0	731	13	65	0	8	1437
600-700	10	565	0	0	0	0	0	688	12	42	0	9	1326

AM PEAK HOUR: 430-530



SANTE FE STREET

WILTEC

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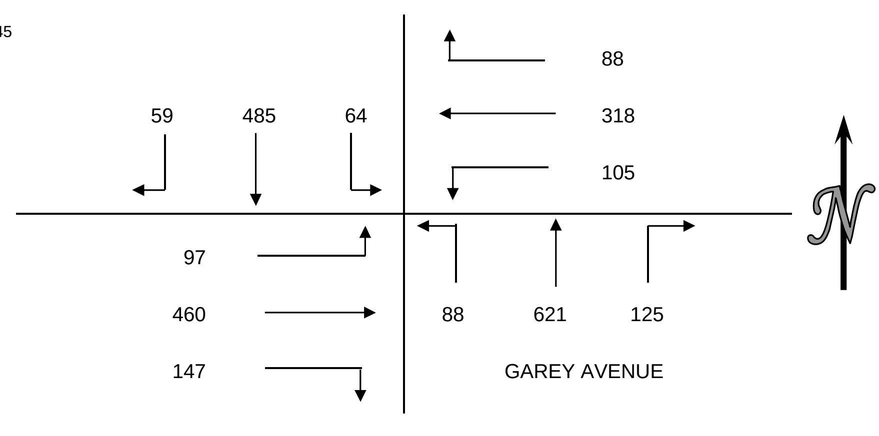
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M HILL, INC.
PROJECT:		FOOTHILL GOLD LINE
DATE:		WEDNESDAY OCTOBER 18, 2017
PERIOD:		4:00 PM TO 7:00 PM
INTERSECTION:	N/S	GAREY AVENUE
	E/W	BONITA AVENUE
CITY:		POMOMA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	10	110	13	23	68	32	29	149	24	31	82	23	594
415-430	18	115	18	30	73	27	36	141	26	32	93	24	633
430-445	18	124	14	27	80	23	25	143	13	20	91	29	607
445-500	19	128	12	18	75	23	34	157	28	31	106	27	658
500-515	10	110	15	30	97	27	25	159	20	54	128	28	703
515-530	16	116	22	12	79	25	30	153	21	31	109	25	639
530-545	14	131	15	28	67	30	36	152	19	31	117	17	657
545-600	10	112	25	17	70	12	26	132	17	22	105	25	573
600-615	26	105	12	20	68	13	28	138	27	25	105	25	592
615-630	20	115	11	14	62	21	23	127	17	16	83	23	532
630-645	17	110	15	16	55	22	27	120	11	18	78	23	512
645-700	8	85	13	12	52	20	18	115	17	10	66	23	439
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	65	477	57	98	296	105	124	590	91	114	372	103	2492
415-515	65	477	59	105	325	100	120	600	87	137	418	108	2601
430-530	63	478	63	87	331	98	114	612	82	136	434	109	2607
445-545	59	485	64	88	318	105	125	621	88	147	460	97	2657
500-600	50	469	77	87	313	94	117	596	77	138	459	95	2572
515-615	66	464	74	77	284	80	120	575	84	109	436	92	2461
530-630	70	463	63	79	267	76	113	549	80	94	410	90	2354
545-645	73	442	63	67	255	68	104	517	72	81	371	96	2209
600-700	71	415	51	62	237	76	96	500	72	69	332	94	2075

AM PEAK HOUR: 445-545



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INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

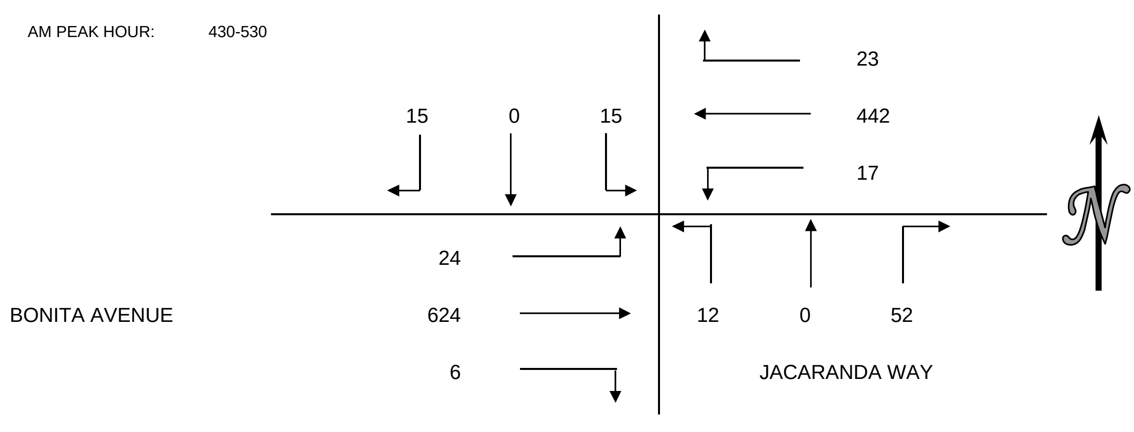
CLIENT: CH2M HILL, INC.
PROJECT: FOOTHILL GOLD LINE
DATE: WEDNESDAY OCTOBER 18, 2017
PERIOD: 4:00 PM TO 7:00 PM
INTERSECTION: N/S JACARANDA WAY
E/W BONITA AVENUE
CITY: POMOMA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	4	0	1	2	91	4	21	1	3	3	110	7	247
415-430	3	0	7	3	101	4	13	0	7	5	113	5	261
430-445	2	0	4	7	107	7	10	0	2	2	142	4	287
445-500	5	0	5	2	112	6	13	0	4	2	146	3	298
500-515	3	0	2	5	119	3	22	0	4	0	178	8	344
515-530	5	0	4	9	104	1	7	0	2	2	158	9	301
530-545	6	1	4	4	93	1	10	0	3	0	150	5	277
545-600	4	0	3	5	85	4	9	0	2	1	142	9	264
600-615	6	0	4	6	107	3	11	0	4	1	133	6	281
615-630	10	0	4	4	99	2	5	0	5	0	112	9	250
630-645	6	0	4	8	82	0	2	0	1	0	108	12	223
645-700	4	0	2	2	63	0	5	0	0	0	98	8	182

HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	14	0	17	14	411	21	57	1	16	12	511	19	1093
415-515	13	0	18	17	439	20	58	0	17	9	579	20	1190
430-530	15	0	15	23	442	17	52	0	12	6	624	24	1230
445-545	19	1	15	20	428	11	52	0	13	4	632	25	1220
500-600	18	1	13	23	401	9	48	0	11	3	628	31	1186
515-615	21	1	15	24	389	9	37	0	11	4	583	29	1123
530-630	26	1	15	19	384	10	35	0	14	2	537	29	1072
545-645	26	0	15	23	373	9	27	0	12	2	495	36	1018
600-700	26	0	14	20	351	5	23	0	10	1	451	35	936

AM PEAK HOUR: 430-530



May 2017 Counts

WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969 info@wiltecusa.com

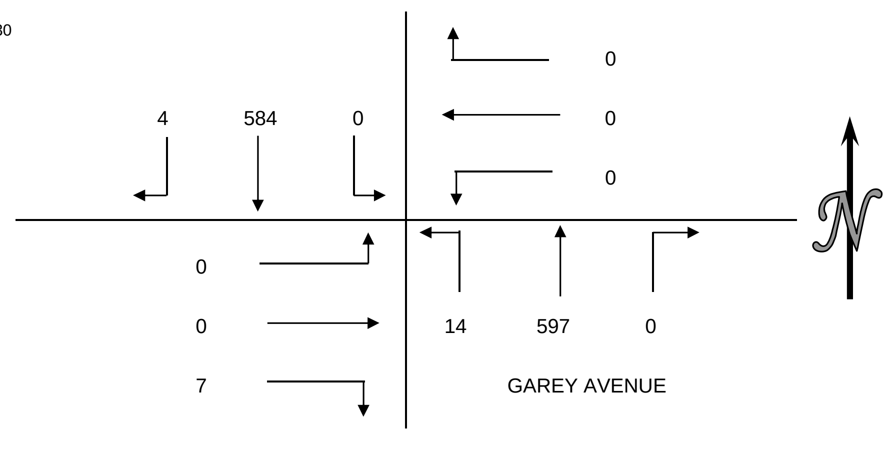
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M HILL, INC.
PROJECT:		FOOTHILL GOLDLINE TRAFFIC OUNTS
DATE:		TUESDAY MAY 9, 2017
PERIOD:		6:00 AM TO 9:00 AM
INTERSECTION:	N/S	GAREY AVENUE
	E/W	GREVILIA STREET
CITY:		POMONA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-615	2	56	0	0	0	0	0	59	3	0	0	0	120
615-630	0	74	0	0	0	0	0	60	3	1	0	0	138
630-645	0	81	0	0	0	0	0	72	0	0	0	0	153
645-700	2	107	0	0	0	0	0	117	3	0	0	0	229
700-715	0	96	0	0	0	0	0	106	2	2	0	0	206
715-730	0	127	0	0	0	0	0	114	2	0	0	0	243
730-745	1	153	0	0	0	0	0	157	4	1	0	0	316
745-800	1	156	0	0	0	0	0	169	3	0	0	0	329
800-815	1	151	0	0	0	0	0	144	1	4	0	0	301
815-830	1	124	0	0	0	0	0	127	6	2	0	0	260
830-845	0	111	0	0	0	0	0	109	5	0	0	0	225
845-900	2	138	0	0	0	0	0	139	3	0	0	0	282
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-700	4	318	0	0	0	0	0	308	9	1	0	0	640
615-715	2	358	0	0	0	0	0	355	8	3	0	0	726
630-730	2	411	0	0	0	0	0	409	7	2	0	0	831
645-745	3	483	0	0	0	0	0	494	11	3	0	0	994
700-800	2	532	0	0	0	0	0	546	11	3	0	0	1094
715-815	3	587	0	0	0	0	0	584	10	5	0	0	1189
730-830	4	584	0	0	0	0	0	597	14	7	0	0	1206
745-845	3	542	0	0	0	0	0	549	15	6	0	0	1115
800-900	4	524	0	0	0	0	0	519	15	6	0	0	1068

AM PEAK HOUR: 730-830



GREVILIA STREET

WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969 info@wiltecusa.com

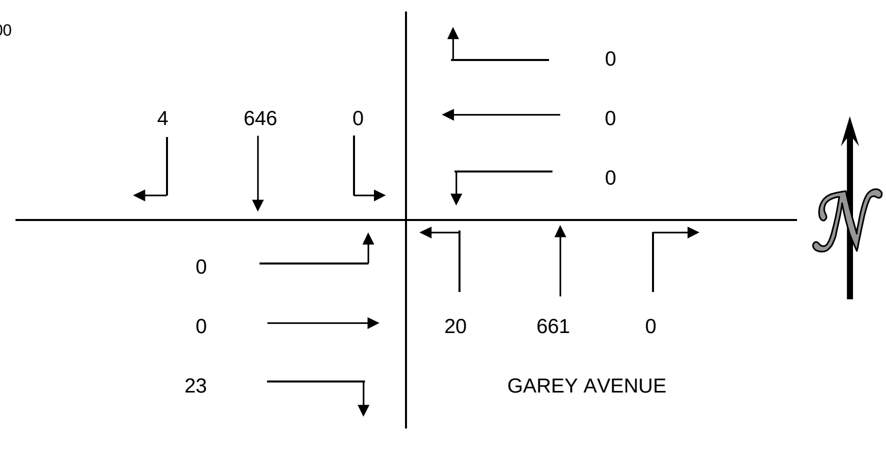
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M HILL, INC.
PROJECT:		FOOTHILL GOLDLINE TRAFFIC OUNTS
DATE:		TUESDAY MAY 9, 2017
PERIOD:		4:00 PM TO 7:00 PM
INTERSECTION:	N/S	GAREY AVENUE
	E/W	GREVILIA STREET
CITY:		POMONA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	2	182	0	0	0	0	0	193	9	10	0	0	396
415-430	0	137	0	0	0	0	0	162	5	5	0	0	309
430-445	2	193	0	0	0	0	0	164	4	5	0	0	368
445-500	0	134	0	0	0	0	0	142	2	3	0	0	281
500-515	1	163	0	0	0	0	0	171	3	8	0	0	346
515-530	1	152	0	0	0	0	0	196	4	2	0	0	355
530-545	0	159	0	0	0	0	0	160	3	0	0	0	322
545-600	0	128	0	0	0	0	0	139	2	1	0	0	270
600-615	1	121	0	0	0	0	0	146	2	3	0	0	273
615-630	0	134	0	0	0	0	0	135	2	1	0	0	272
630-645	1	112	0	0	0	0	0	120	5	0	0	0	238
645-700	0	103	0	0	0	0	0	132	2	1	0	0	238
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	4	646	0	0	0	0	0	661	20	23	0	0	1354
415-515	3	627	0	0	0	0	0	639	14	21	0	0	1304
430-530	4	642	0	0	0	0	0	673	13	18	0	0	1350
445-545	2	608	0	0	0	0	0	669	12	13	0	0	1304
500-600	2	602	0	0	0	0	0	666	12	11	0	0	1293
515-615	2	560	0	0	0	0	0	641	11	6	0	0	1220
530-630	1	542	0	0	0	0	0	580	9	5	0	0	1137
545-645	2	495	0	0	0	0	0	540	11	5	0	0	1053
600-700	2	470	0	0	0	0	0	533	11	5	0	0	1021

AM PEAK HOUR: 400-500



GREVILIA STREET

WILTEC

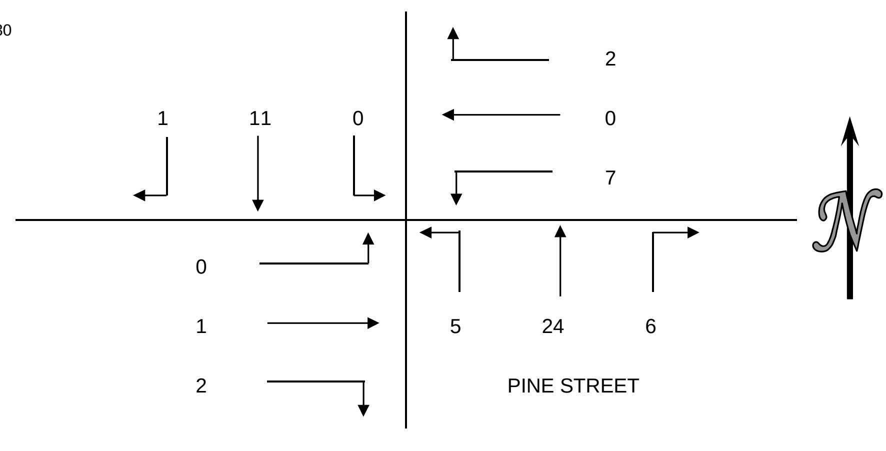
Phone: (626) 564-1944 Fax: (626) 564-0969 info@wiltecusa.com

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M HILL, INC.
PROJECT:		FOOTHILL GOLDLINE TRAFFIC OUNTS
DATE:		TUESDAY MAY 9, 2017
PERIOD:		6:00 AM TO 9:00 AM
INTERSECTION:	N/S	PINE STREET
	E/W	GREVILIA STREET
CITY:		POMONA

VEHICLE COUNTS													
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-615	0	1	0	1	3	1	0	1	1	0	0	1	9
615-630	0	2	0	0	1	1	1	3	0	0	0	0	8
630-645	0	0	0	0	0	0	0	6	2	0	0	0	8
645-700	0	2	0	0	0	2	0	6	1	0	0	0	11
700-715	0	1	1	1	0	1	1	4	0	1	1	0	11
715-730	0	1	0	1	0	0	0	3	0	1	0	0	6
730-745	1	2	0	1	0	2	0	13	3	1	1	0	24
745-800	0	4	0	0	0	3	1	5	2	0	0	0	15
800-815	0	1	0	0	0	1	1	1	0	0	0	0	4
815-830	0	4	0	1	0	1	4	5	0	1	0	0	16
830-845	0	3	0	0	0	3	1	5	1	1	0	0	14
845-900	0	1	0	0	0	2	1	1	1	1	0	0	7
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-700	0	5	0	1	4	4	1	16	4	0	0	1	36
615-715	0	5	1	1	1	4	2	19	3	1	1	0	38
630-730	0	4	1	2	0	3	1	19	3	2	1	0	36
645-745	1	6	1	3	0	5	1	26	4	3	2	0	52
700-800	1	8	1	3	0	6	2	25	5	3	2	0	56
715-815	1	8	0	2	0	6	2	22	5	2	1	0	49
730-830	1	11	0	2	0	7	6	24	5	2	1	0	59
745-845	0	12	0	1	0	8	7	16	3	2	0	0	49
800-900	0	9	0	1	0	7	7	12	2	3	0	0	41

AM PEAK HOUR: 730-830



GREVILIA STREET

WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969 info@wiltecusa.com

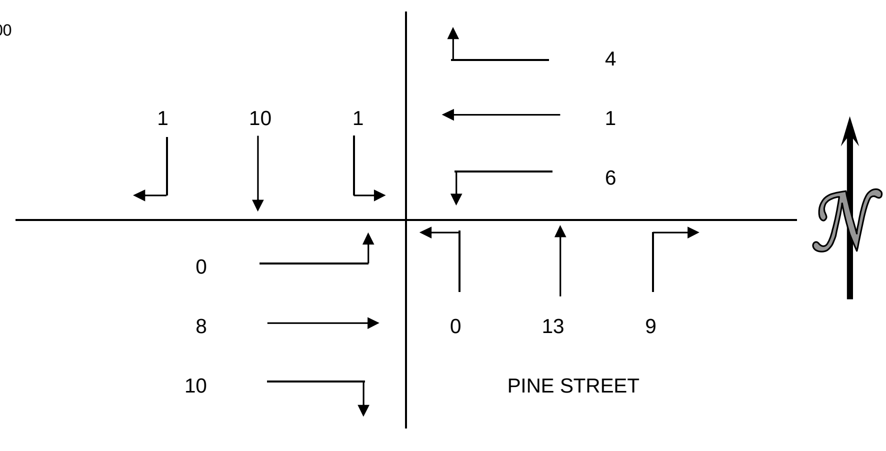
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M HILL, INC.
PROJECT:		FOOTHILL GOLDLINE TRAFFIC OUNTS
DATE:		TUESDAY MAY 9, 2017
PERIOD:		4:00 PM TO 7:00 PM
INTERSECTION:	N/S	PINE STREET
	E/W	GREVILIA STREET
CITY:		POMONA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	1	5	0	1	0	3	4	3	0	2	4	0	23
415-430	0	2	0	3	0	1	1	2	0	3	2	0	14
430-445	0	2	0	0	1	2	3	6	0	5	2	0	21
445-500	0	1	1	0	0	0	1	2	0	0	0	0	5
500-515	0	2	1	1	0	2	3	7	0	0	2	0	18
515-530	0	2	0	2	0	1	1	3	0	1	0	0	10
530-545	0	2	0	1	0	0	0	1	0	0	0	0	4
545-600	0	3	0	1	0	0	0	3	0	0	0	0	7
600-615	0	3	3	1	0	2	0	4	0	0	0	0	13
615-630	0	5	0	0	0	1	1	4	0	0	0	0	11
630-645	0	2	0	1	0	2	0	2	0	0	0	0	7
645-700	0	0	2	0	0	0	0	3	0	0	0	0	5
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	1	10	1	4	1	6	9	13	0	10	8	0	63
415-515	0	7	2	4	1	5	8	17	0	8	6	0	58
430-530	0	7	2	3	1	5	8	18	0	6	4	0	54
445-545	0	7	2	4	0	3	5	13	0	1	2	0	37
500-600	0	9	1	5	0	3	4	14	0	1	2	0	39
515-615	0	10	3	5	0	3	1	11	0	1	0	0	34
530-630	0	13	3	3	0	3	1	12	0	0	0	0	35
545-645	0	13	3	3	0	5	1	13	0	0	0	0	38
600-700	0	10	5	2	0	5	1	13	0	0	0	0	36

AM PEAK HOUR: 400-500



GREVILIA STREET

PINE STREET

WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969 info@wiltecusa.com

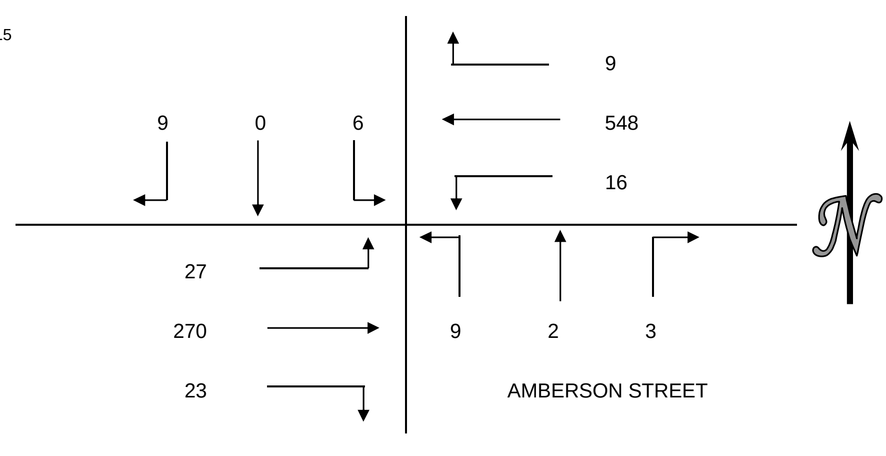
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M HILL, INC.
PROJECT:		FOOTHILL GOLDLINE TRAFFIC OUNTS
DATE:		TUESDAY MAY 9, 2017
PERIOD:		6:00 AM TO 9:00 AM
INTERSECTION:	N/S	AMBERSON STREET
	E/W	ARROW HIGHWAY
CITY:		POMONA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-615	1	0	2	2	73	0	0	0	0	0	14	5	97
615-630	1	0	1	0	124	1	0	0	0	0	34	7	168
630-645	0	0	0	1	104	0	0	0	0	0	42	2	149
645-700	1	0	1	3	113	4	0	1	0	1	46	5	175
700-715	1	0	3	2	109	2	1	0	0	2	37	7	164
715-730	1	0	1	2	134	3	1	0	1	3	49	8	203
730-745	3	0	2	2	131	4	0	0	1	7	75	6	231
745-800	1	0	2	4	151	3	1	0	2	4	74	7	249
800-815	4	0	1	1	132	6	1	2	5	9	72	6	239
815-830	1	0	0	3	112	8	1	0	3	6	60	3	197
830-845	2	0	1	4	104	4	1	0	4	3	37	3	163
845-900	4	0	2	1	84	5	0	1	2	0	47	10	156
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-700	3	0	4	6	414	5	0	1	0	1	136	19	589
615-715	3	0	5	6	450	7	1	1	0	3	159	21	656
630-730	3	0	5	8	460	9	2	1	1	6	174	22	691
645-745	6	0	7	9	487	13	2	1	2	13	207	26	773
700-800	6	0	8	10	525	12	3	0	4	16	235	28	847
715-815	9	0	6	9	548	16	3	2	9	23	270	27	922
730-830	9	0	5	10	526	21	3	2	11	26	281	22	916
745-845	8	0	4	12	499	21	4	2	14	22	243	19	848
800-900	11	0	4	9	432	23	3	3	14	18	216	22	755

AM PEAK HOUR: 715-815



ARROW HIGHWAY

WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969 info@wiltecusa.com

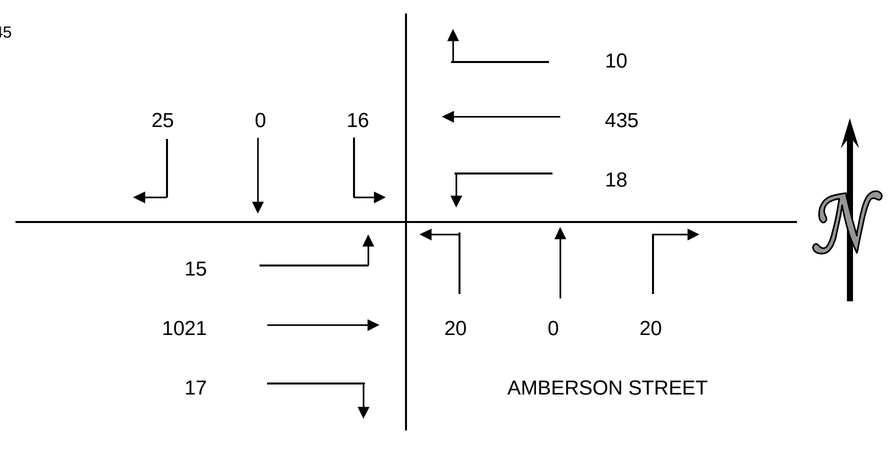
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M HILL, INC.
PROJECT:		FOOTHILL GOLDLINE TRAFFIC OUNTS
DATE:		TUESDAY MAY 9, 2017
PERIOD:		4:00 PM TO 7:00 PM
INTERSECTION:	N/S	AMBERSON STREET
	E/W	ARROW HIGHWAY
CITY:		POMONA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	6	1	11	1	104	7	5	1	1	2	182	3	324
415-430	0	0	3	3	103	6	4	0	3	6	204	4	336
430-445	7	0	8	1	149	6	2	0	9	6	205	4	397
445-500	10	0	4	4	111	6	1	0	5	4	225	4	374
500-515	9	0	4	2	125	4	9	0	5	3	237	7	405
515-530	2	0	5	1	107	5	5	0	5	4	271	1	406
530-545	4	0	3	3	92	3	5	0	5	6	288	3	412
545-600	2	0	3	6	94	4	2	1	6	3	237	3	361
600-615	7	0	4	5	82	5	2	0	6	3	218	6	338
615-630	2	0	2	0	82	0	5	0	6	5	178	1	281
630-645	1	0	1	1	78	5	0	0	6	5	152	1	250
645-700	0	0	3	2	60	3	5	0	8	5	114	2	202
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	23	1	26	9	467	25	12	1	18	18	816	15	1431
415-515	26	0	19	10	488	22	16	0	22	19	871	19	1512
430-530	28	0	21	8	492	21	17	0	24	17	938	16	1582
445-545	25	0	16	10	435	18	20	0	20	17	1021	15	1597
500-600	17	0	15	12	418	16	21	1	21	16	1033	14	1584
515-615	15	0	15	15	375	17	14	1	22	16	1014	13	1517
530-630	15	0	12	14	350	12	14	1	23	17	921	13	1392
545-645	12	0	10	12	336	14	9	1	24	16	785	11	1230
600-700	10	0	10	8	302	13	12	0	26	18	662	10	1071

AM PEAK HOUR: 445-545



ARROW HIGHWAY

March 2017 Counts

WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969 info@wiltecusa.com

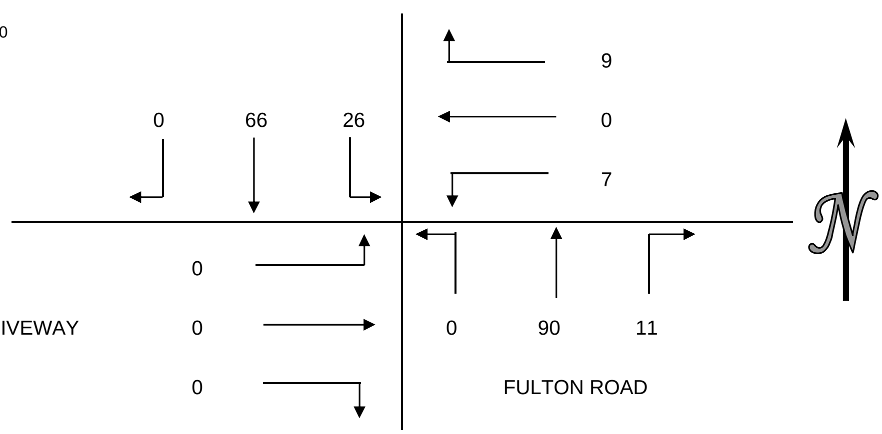
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M
PROJECT:		FOOTHILL GOLDLINE
DATE:		TUESDAY MARCH 14, 2017
PERIOD:		6:00 AM TO 9:00 AM
INTERSECTION:	N/S	FULTON ROAD
	E/W	METRO LINK STATION DRIVEWAY
CITY:		POMONA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-615	0	1	12	0	0	1	0	5	0	0	0	0	19
615-630	0	6	16	2	0	0	8	1	0	0	0	0	33
630-645	0	2	26	0	0	0	1	0	0	0	0	0	29
645-700	0	3	11	7	0	2	4	6	0	0	0	0	33
700-715	0	6	13	3	0	1	8	6	0	0	0	0	37
715-730	0	7	2	2	0	0	6	14	0	0	0	0	31
730-745	0	8	24	0	0	2	2	21	0	0	0	0	57
745-800	0	18	1	8	0	3	8	18	0	0	0	0	56
800-815	0	16	0	1	0	2	0	20	0	0	0	0	39
815-830	0	24	1	0	0	0	1	31	0	0	0	0	57
830-845	0	8	7	2	0	0	1	33	0	0	0	0	51
845-900	0	17	1	1	0	1	0	11	0	0	0	0	31
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-700	0	12	65	9	0	3	13	12	0	0	0	0	114
615-715	0	17	66	12	0	3	21	13	0	0	0	0	132
630-730	0	18	52	12	0	3	19	26	0	0	0	0	130
645-745	0	24	50	12	0	5	20	47	0	0	0	0	158
700-800	0	39	40	13	0	6	24	59	0	0	0	0	181
715-815	0	49	27	11	0	7	16	73	0	0	0	0	183
730-830	0	66	26	9	0	7	11	90	0	0	0	0	209
745-845	0	66	9	11	0	5	10	102	0	0	0	0	203
800-900	0	65	9	4	0	3	2	95	0	0	0	0	178

AM PEAK HOUR: 730-830



METRO LINK STATION DRIVEWAY

WILTEC Phone: (626) 564-1944 Fax: (626) 564-0969 info@wiltecusa.com

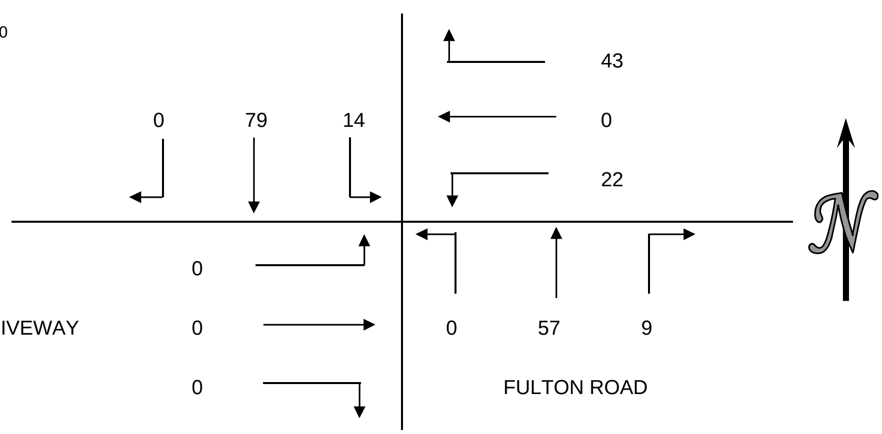
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M
PROJECT:		FOOTHILL GOLDLINE
DATE:		TUESDAY MARCH 14, 2017
PERIOD:		4:00 PM TO 7:00 PM
INTERSECTION:	N/S	FULTON ROAD
	E/W	METRO LINK STATION DRIVEWAY
CITY:		POMONA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	0	18	1	3	0	1	1	15	0	0	0	0	39
415-430	0	23	1	8	0	3	1	15	0	0	0	0	51
430-445	0	16	4	9	0	4	4	18	0	0	0	0	55
445-500	0	19	2	13	0	4	3	15	0	0	0	0	56
500-515	0	27	3	6	0	5	2	13	0	0	0	0	56
515-530	0	17	5	15	0	9	0	11	0	0	0	0	57
530-545	0	10	1	11	0	0	0	11	0	0	0	0	33
545-600	0	17	0	31	0	9	1	10	0	0	0	0	68
600-615	0	10	3	13	0	6	1	8	0	0	0	0	41
615-630	0	8	6	16	0	1	3	15	0	0	0	0	49
630-645	0	8	3	21	0	5	2	6	0	0	0	0	45
645-700	0	5	4	7	0	3	0	7	0	0	0	0	26
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	0	76	8	33	0	12	9	63	0	0	0	0	201
415-515	0	85	10	36	0	16	10	61	0	0	0	0	218
430-530	0	79	14	43	0	22	9	57	0	0	0	0	224
445-545	0	73	11	45	0	18	5	50	0	0	0	0	202
500-600	0	71	9	63	0	23	3	45	0	0	0	0	214
515-615	0	54	9	70	0	24	2	40	0	0	0	0	199
530-630	0	45	10	71	0	16	5	44	0	0	0	0	191
545-645	0	43	12	81	0	21	7	39	0	0	0	0	203
600-700	0	31	16	57	0	15	6	36	0	0	0	0	161

AM PEAK HOUR: 430-530



METRO LINK STATION DRIVEWAY

WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969 info@wiltecusa.com

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

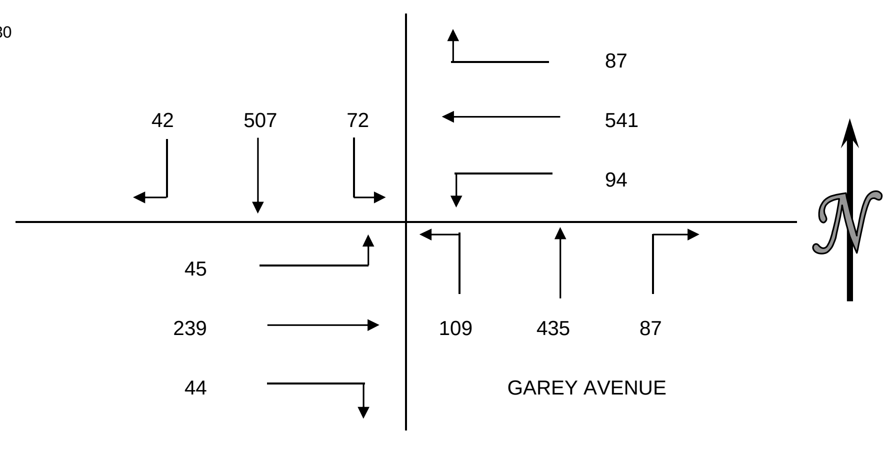
CLIENT:		CH2M
PROJECT:		FOOTHILL GOLDLINE
DATE:		TUESDAY MARCH 14, 2017
PERIOD:		6:00 AM TO 9:00 AM
INTERSECTION:	N/S	GAREY AVENUE
	E/W	ARROW HIGHWAY
CITY:		POMONA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-615	3	45	3	8	97	6	4	33	8	2	8	2	219
615-630	6	62	6	5	109	5	9	55	14	8	23	4	306
630-645	7	57	6	4	119	11	4	55	13	4	15	4	299
645-700	7	77	10	10	106	14	5	81	13	7	25	7	362
700-715	9	106	9	14	122	16	11	70	22	6	33	6	424
715-730	5	95	7	17	167	16	8	89	22	3	35	8	472
730-745	6	126	15	12	153	17	24	104	23	10	49	9	548
745-800	10	138	23	26	143	21	24	137	39	9	64	13	647
800-815	10	137	25	26	133	31	28	103	24	13	63	15	608
815-830	16	106	9	23	112	25	11	91	23	12	63	8	499
830-845	10	109	20	18	66	22	19	104	18	7	55	4	452
845-900	9	116	9	16	62	19	13	81	15	12	29	6	387
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-700	23	241	25	27	431	36	22	224	48	21	71	17	1186
615-715	29	302	31	33	456	46	29	261	62	25	96	21	1391
630-730	28	335	32	45	514	57	28	295	70	20	108	25	1557
645-745	27	404	41	53	548	63	48	344	80	26	142	30	1806
700-800	30	465	54	69	585	70	67	400	106	28	181	36	2091
715-815	31	496	70	81	596	85	84	433	108	35	211	45	2275
730-830	42	507	72	87	541	94	87	435	109	44	239	45	2302
745-845	46	490	77	93	454	99	82	435	104	41	245	40	2206
800-900	45	468	63	83	373	97	71	379	80	44	210	33	1946

AM PEAK HOUR: 730-830

ARROW HIGHWAY



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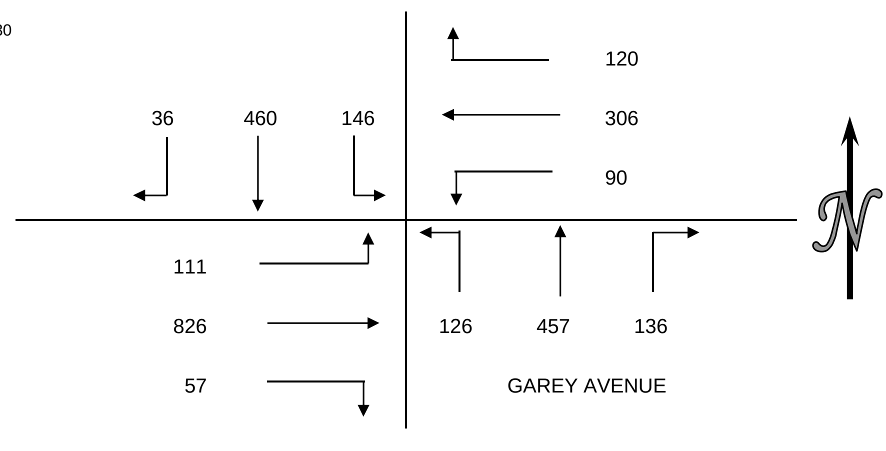
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M
PROJECT:		FOOTHILL GOLDLINE
DATE:		TUESDAY MARCH 14, 2017
PERIOD:		4:00 PM TO 7:00 PM
INTERSECTION:	N/S	GAREY AVENUE
	E/W	ARROW HIGHWAY
CITY:		POMONA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	9	138	38	17	70	13	44	113	16	13	164	19	654
415-430	12	120	23	23	80	16	41	103	26	9	147	24	624
430-445	9	119	39	39	66	24	28	92	35	17	208	26	702
445-500	11	92	29	30	77	25	40	104	27	13	194	32	674
500-515	9	130	34	30	73	18	40	121	31	11	190	31	718
515-530	7	119	44	21	90	23	28	140	33	16	234	22	777
530-545	3	102	23	23	66	22	35	116	19	10	205	25	649
545-600	10	92	32	21	74	18	30	106	16	16	246	30	691
600-615	9	120	27	31	78	13	41	101	18	8	210	17	673
615-630	7	100	17	26	72	20	25	95	20	11	200	25	618
630-645	8	112	24	17	60	19	38	87	20	3	178	21	587
645-700	4	95	18	16	39	19	23	76	13	7	156	16	482
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	41	469	129	109	293	78	153	412	104	52	713	101	2654
415-515	41	461	125	122	296	83	149	420	119	50	739	113	2718
430-530	36	460	146	120	306	90	136	457	126	57	826	111	2871
445-545	30	443	130	104	306	88	143	481	110	50	823	110	2818
500-600	29	443	133	95	303	81	133	483	99	53	875	108	2835
515-615	29	433	126	96	308	76	134	463	86	50	895	94	2790
530-630	29	414	99	101	290	73	131	418	73	45	861	97	2631
545-645	34	424	100	95	284	70	134	389	74	38	834	93	2569
600-700	28	427	86	90	249	71	127	359	71	29	744	79	2360

AM PEAK HOUR: 430-530



ARROW HIGHWAY

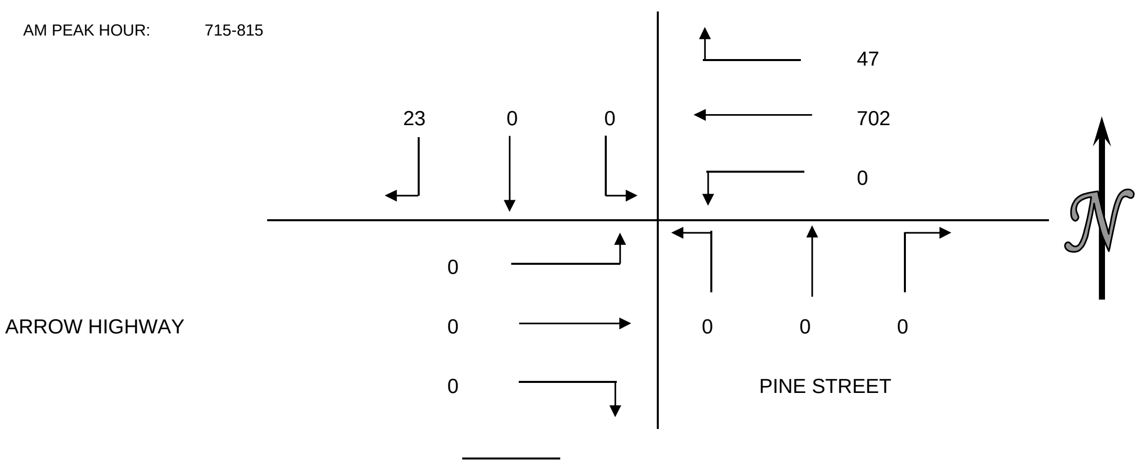
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT: CH2M
PROJECT: FOOTHILL GOLDLINE
DATE: TUESDAY MARCH 14, 2017
PERIOD: 6:00 AM TO 9:00 AM
INTERSECTION: N/S PINE STREET
E/W ARROW HIGHWAY
CITY: POMONA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-615	2	0	0	7	106	0	0	0	0	0	0	0	115
615-630	0	0	0	7	141	0	0	0	0	0	0	0	148
630-645	3	0	0	5	121	0	0	0	0	0	0	0	129
645-700	4	0	0	14	111	0	0	0	0	0	0	0	129
700-715	6	0	0	13	146	0	0	0	0	0	0	0	165
715-730	5	0	0	9	184	0	0	0	0	0	0	0	198
730-745	2	0	0	14	174	0	0	0	0	0	0	0	190
745-800	9	0	0	14	181	0	0	0	0	0	0	0	204
800-815	7	0	0	10	163	0	0	0	0	0	0	0	180
815-830	5	0	0	3	144	0	0	0	0	0	0	0	152
830-845	3	0	0	5	89	0	0	0	0	0	0	0	97
845-900	4	0	0	5	85	0	0	0	0	0	0	0	94
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
600-700	9	0	0	33	479	0	0	0	0	0	0	0	521
615-715	13	0	0	39	519	0	0	0	0	0	0	0	571
630-730	18	0	0	41	562	0	0	0	0	0	0	0	621
645-745	17	0	0	50	615	0	0	0	0	0	0	0	682
700-800	22	0	0	50	685	0	0	0	0	0	0	0	757
715-815	23	0	0	47	702	0	0	0	0	0	0	0	772
730-830	23	0	0	41	662	0	0	0	0	0	0	0	726
745-845	24	0	0	32	577	0	0	0	0	0	0	0	633
800-900	19	0	0	23	481	0	0	0	0	0	0	0	523

AM PEAK HOUR: 715-815



WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969 info@wiltecusa.com

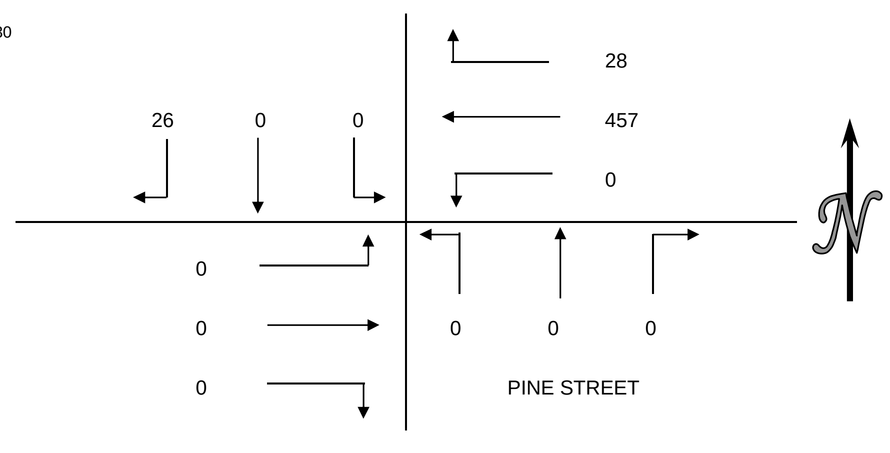
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		CH2M
PROJECT:		FOOTHILL GOLDLINE
DATE:		TUESDAY MARCH 14, 2017
PERIOD:		4:00 PM TO 7:00 PM
INTERSECTION:	N/S	PINE STREET
	E/W	ARROW HIGHWAY
CITY:		POMONA

VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	9	0	0	8	107	0	0	0	0	0	0	0	124
415-430	7	0	0	9	101	0	0	0	0	0	0	0	117
430-445	11	0	0	4	114	0	0	0	0	0	0	0	129
445-500	4	0	0	9	111	0	0	0	0	0	0	0	124
500-515	6	0	0	5	106	0	0	0	0	0	0	0	117
515-530	5	0	0	10	126	0	0	0	0	0	0	0	141
530-545	7	0	0	5	91	0	0	0	0	0	0	0	103
545-600	6	0	0	5	105	0	0	0	0	0	0	0	116
600-615	2	0	0	3	88	0	0	0	0	0	0	0	93
615-630	3	0	0	2	95	0	0	0	0	0	0	0	100
630-645	1	0	0	4	84	0	0	0	0	0	0	0	89
645-700	1	0	0	2	55	0	0	0	0	0	0	0	58
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	31	0	0	30	433	0	0	0	0	0	0	0	494
415-515	28	0	0	27	432	0	0	0	0	0	0	0	487
430-530	26	0	0	28	457	0	0	0	0	0	0	0	511
445-545	22	0	0	29	434	0	0	0	0	0	0	0	485
500-600	24	0	0	25	428	0	0	0	0	0	0	0	477
515-615	20	0	0	23	410	0	0	0	0	0	0	0	453
530-630	18	0	0	15	379	0	0	0	0	0	0	0	412
545-645	12	0	0	14	372	0	0	0	0	0	0	0	398
600-700	7	0	0	11	322	0	0	0	0	0	0	0	340

AM PEAK HOUR: 430-530



ARROW HIGHWAY

July 2016 Counts

Intersection Turning Movement
Prepared by:
National Data & Surveying Services

Project ID: 16-5483-002 **Day:** Wednesday

City: Pomona **Date:** 7/20/2016

AM

NS/EW Streets:	Jacaranda Way			Jacaranda Way			W Bonita Ave			W Bonita Ave					UTURNS			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND								
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL		NB	SB	EB	WB
LANES:	0	1	0	0	1	0	1	1	0	0	1	0						
7:00 AM	0	0	0	2	0	3	1	49	1	6	57	0	119		0	0	0	0
7:15 AM	1	0	3	2	0	12	1	50	2	5	86	2	164		0	0	0	0
7:30 AM	1	0	2	7	0	6	1	77	2	7	76	0	179		0	0	0	0
7:45 AM	2	0	6	8	0	9	1	72	10	10	90	4	212		0	0	0	0
8:00 AM	0	0	3	3	0	7	1	72	7	15	77	4	189		0	0	0	1
8:15 AM	4	0	10	2	0	8	4	72	3	22	98	1	224		0	0	0	0
8:30 AM	1	0	6	7	0	1	1	57	7	12	76	5	173		0	0	0	0
8:45 AM	3	0	9	2	0	8	4	74	3	20	75	1	199		0	0	0	0
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL		NB	SB	EB	WB
TOTAL VOLUMES :	12	0	39	33	0	54	14	523	35	97	635	17	1459		0	0	0	1
APPROACH %'s :	23.53%	0.00%	76.47%	37.93%	0.00%	62.07%	2.45%	91.43%	6.12%	12.95%	84.78%	2.27%						
PEAK HR START TIME :	730 AM												TOTAL					
PEAK HR VOL :	7	0	21	20	0	30	7	293	22	54	341	9	804					
PEAK HR FACTOR :		0.500			0.735			0.970			0.835		0.897					

CONTROL : 1-Way Stop(SB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 16-5483-002 **Day:** Wednesday

City: Pomona **Date:** 7/20/2016

PM

NS/EW Streets:	Jacaranda Way			Jacaranda Way			W Bonita Ave			W Bonita Ave			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	1	1	0	0	1	0	
4:00 PM	5	0	12	4	0	2	6	124	7	8	78	1	247
4:15 PM	4	0	15	1	0	4	3	121	2	3	92	3	248
4:30 PM	0	0	12	2	0	5	7	139	1	4	91	2	263
4:45 PM	1	0	12	6	0	4	3	148	2	3	86	2	267
5:00 PM	3	0	22	1	0	1	4	182	1	3	82	1	300
5:15 PM	4	0	13	3	0	3	4	169	3	2	96	5	302
5:30 PM	3	0	5	2	0	3	6	138	0	1	89	4	251
5:45 PM	0	0	8	10	0	8	4	131	0	0	90	6	257
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	20	0	99	29	0	30	37	1152	16	24	704	24	2135
APPROACH %'s :	16.81%	0.00%	83.19%	49.15%	0.00%	50.85%	3.07%	95.60%	1.33%	3.19%	93.62%	3.19%	
PEAK HR START TIME :	430 PM												TOTAL
PEAK HR VOL :	8	0	59	12	0	13	18	638	7	12	355	10	1132
PEAK HR FACTOR :		0.670			0.625			0.886			0.915		0.937

	UTURNS			
	NB	SB	EB	WB
4:00 PM	0	0	0	1
4:15 PM	0	0	1	0
4:30 PM	0	0	0	0
4:45 PM	0	0	0	1
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	0	0	0
5:45 PM	0	0	0	0
	NB	SB	EB	WB
TOTAL VOLUMES	0	0	1	2

CONTROL : 1-Way Stop(SB)

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Jacaranda Way and W Bonita Ave , Pomona

Date: 7/20/2016
Day: Wednesday

Project #: 16-5483-002
City: Pomona

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	430 PM

N

Jacaranda Way

W Bonita Ave

Peak Hour Summary

Southbound Approach

Lanes	0	1	0	
AM	30	0	20	16
NOON	0	0	0	0
PM	13	0	12	28

Eastbound Approach

	AM	NOON	PM
	378	0	376
1	7	0	18
1	293	0	638
0	22	0	7
Lanes	AM	NOON	PM

Westbound Approach

AM	NOON	PM	Lanes
9	0	10	0
341	0	355	1
54	0	12	0
334	0	709	
AM	NOON	PM	

CONTROL

1-Way Stop(SB)

Northbound Approach

AM	76	7	0	21
NOON	0	0	0	0
PM	19	8	0	59
		0	1	0

Lanes

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

AM	50	16
NOON	0	0
PM	25	28

West Leg

AM	NOON	PM
378	0	376
322	0	663

East Leg

AM	NOON	PM
404	0	377
334	0	709

South Leg

AM	76	28
NOON	0	0
PM	19	67

Total Volume Per Leg

North Leg

AM	66
NOON	0
PM	53

West Leg

AM	NOON	PM
700	0	1039

East Leg

AM	NOON	PM
738	0	1086

South Leg

AM	104
NOON	0
PM	86

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 16-5483-003

Day: Wednesday

City: Pomona

Date: 7/20/2016

AM

NS/EW Streets:	N Garey Ave			N Garey Ave			Metrolink Office Drwy			Metrolink Office Drwy			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	0	2	0	0	1	0	0	1	0	
7:00 AM	3	77	3	3	141	10	0	0	1	0	0	0	238
7:15 AM	3	107	1	2	128	1	0	0	0	0	0	0	242
7:30 AM	3	115	4	2	159	2	0	0	0	1	0	0	286
7:45 AM	5	132	2	1	157	2	0	0	1	3	0	0	303
8:00 AM	3	119	2	2	164	2	0	0	0	3	0	1	296
8:15 AM	2	124	3	2	153	0	0	0	0	1	0	0	285
8:30 AM	2	126	1	3	130	0	0	0	0	1	0	0	263
8:45 AM	1	139	2	1	152	2	1	0	1	1	0	0	300
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	22	939	18	16	1184	19	1	0	3	10	0	1	2213
APPROACH %'s :	2.25%	95.91%	1.84%	1.31%	97.13%	1.56%	25.00%	0.00%	75.00%	90.91%	0.00%	9.09%	
PEAK HR START TIME :	730 AM												TOTAL
PEAK HR VOL :	13	490	11	7	633	6	0	0	1	8	0	1	1170
PEAK HR FACTOR :		0.924			0.961			0.250			0.563		0.965

CONTROL : No Control

	UTURNS			
	NB	SB	EB	WB
7:00 AM	0	0	0	0
7:15 AM	0	0	0	0
7:30 AM	0	2	0	0
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	1	0	0
8:45 AM	0	1	0	0
	NB	SB	EB	WB
TOTAL VOLUMES	0	4	0	0

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 16-5483-003 **Day:** Wednesday

City: Pomona **Date:** 7/20/2016

PM

NS/EW Streets:	N Garey Ave			N Garey Ave			Metrolink Office Drwy			Metrolink Office Drwy			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	0	2	0	0	1	0	0	1	0	
4:00 PM	0	195	2	0	176	0	1	0	4	0	0	7	385
4:15 PM	1	173	0	1	158	1	1	0	5	1	0	0	341
4:30 PM	0	155	0	0	166	1	15	0	17	1	0	2	357
4:45 PM	0	177	1	0	164	0	6	0	5	0	0	3	356
5:00 PM	0	195	0	0	222	0	0	0	3	5	0	2	427
5:15 PM	0	188	0	0	162	0	7	0	4	3	0	5	369
5:30 PM	1	183	0	0	146	0	1	0	1	0	0	0	332
5:45 PM	1	152	0	0	142	0	4	0	6	0	0	0	305
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	3	1418	3	1	1336	2	35	0	45	10	0	19	2872
APPROACH %'s :	0.21%	99.58%	0.21%	0.07%	99.78%	0.15%	43.75%	0.00%	56.25%	34.48%	0.00%	65.52%	
PEAK HR START TIME :	430 PM												TOTAL
PEAK HR VOL :	0	715	1	0	714	1	28	0	29	9	0	12	1509
PEAK HR FACTOR :		0.918			0.805			0.445			0.656		0.883

CONTROL : No Control

	UTURNS		
NB	SB	EB	WB
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
1	0	0	0
NB	SB	EB	WB
1	0	0	0

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

N Garey Ave and Metrolink Office Drwy , Pomona

Date: 7/20/2016

Day: Wednesday

Project #: 16-5483-003

City: Pomona

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Peak Hour Summary

Southbound Approach (N Garey Ave)

Lanes	0	2	0		
AM	6	633	7	491	AM
NOON	0	0	0	0	NOON
PM	1	714	0	755	PM

Eastbound Approach (Metrolink Office Drwy)

	AM	NOON	PM
	19	0	1

Lanes	AM	NOON	PM
0	0	0	28
1	0	0	0
0	1	0	29

CONTROL

No Control

Westbound Approach

AM	NOON	PM	Lanes
1	0	12	0
0	0	0	1
8	0	9	0

AM	NOON	PM
18	0	1

Northbound Approach

AM	642	13	490	11	AM
NOON	0	0	0	0	NOON
PM	752	0	715	1	PM
		0	2	0	Lanes

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg			
AM	646	491	
NOON	0	0	
PM	715	755	

West Leg	AM	NOON	PM
	19	0	1
	1	0	57

East Leg	AM	NOON	PM
	9	0	21
	18	0	1

South Leg		
AM	642	514
NOON	0	0
PM	752	716

Total Volume Per Leg

	North Leg	South Leg	West Leg	East Leg
AM	1137	1156	20	27
NOON	0	0	0	0
PM	1470	1468	58	22

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 16-5483-103 **Day:** Wednesday

City: Pomona **Date:** 7/20/2016

AM

NS/EW Streets:	N Garey Ave			N Garey Ave			Metrolink Office Drwy			Metrolink Office Drwy			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	0	2	0	0	1	0	0	1	0	
7:00 AM	0	73	4	0	153	0	0	0	0	1	0	0	231
7:15 AM	0	107	0	0	130	0	0	0	0	1	0	0	238
7:30 AM	0	115	0	1	163	0	0	0	0	0	0	0	279
7:45 AM	0	131	1	1	160	0	0	0	0	0	0	1	294
8:00 AM	0	115	5	2	165	0	0	0	0	3	0	2	292
8:15 AM	0	120	4	1	154	0	0	0	0	1	0	1	281
8:30 AM	0	126	0	2	133	0	0	0	0	0	0	2	263
8:45 AM	0	138	2	6	155	0	0	0	0	0	0	2	303
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	925	16	13	1213	0	0	0	0	6	0	8	2181
APPROACH %'s :	0.00%	98.30%	1.70%	1.06%	98.94%	0.00%	#DIV/0!	#DIV/0!	#DIV/0!	42.86%	0.00%	57.14%	
PEAK HR START TIME :	730 AM												TOTAL
PEAK HR VOL :	0	481	10	5	642	0	0	0	0	4	0	4	1146
PEAK HR FACTOR :		0.930			0.969			0.000			0.400		0.974

UTURNS			
NB	SB	EB	WB
NB	SB	EB	WB
0	0	0	0

CONTROL : No Control

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 16-5483-103 **Day:** Wednesday

City: Pomona **Date:** 7/20/2016

PM

NS/EW Streets:	N Garey Ave			N Garey Ave			Metrolink Office Drwy			Metrolink Office Drwy			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	0	2	0	0	1	0	0	1	0	
4:00 PM	0	203	0	1	173	0	0	0	0	3	0	0	380
4:15 PM	0	170	4	0	159	0	0	0	0	1	0	0	334
4:30 PM	0	169	3	1	165	0	0	0	0	2	0	4	344
4:45 PM	0	184	2	1	162	0	0	0	0	2	0	2	353
5:00 PM	0	192	5	0	217	0	0	0	0	5	0	3	422
5:15 PM	0	199	1	0	156	0	0	0	0	6	0	1	363
5:30 PM	0	184	0	1	140	0	0	0	0	6	0	1	332
5:45 PM	0	153	3	2	141	0	0	0	0	1	0	1	301
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	1454	18	6	1313	0	0	0	0	26	0	12	2829
APPROACH %'s :	0.00%	98.78%	1.22%	0.45%	99.55%	0.00%	#DIV/0!	#DIV/0!	#DIV/0!	68.42%	0.00%	31.58%	
PEAK HR START TIME :	430 PM												TOTAL
PEAK HR VOL :	0	744	11	2	700	0	0	0	0	15	0	10	1482
PEAK HR FACTOR :		0.944			0.809			0.000			0.781		0.878

UTURNS			
NB	SB	EB	WB
NB	SB	EB	WB
0	0	0	0

CONTROL : No Control

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

N Garey Ave and Metrolink Office Drwy , Pomona

Date: 7/20/2016

Day: Wednesday

Project #: 16-5483-103

City: Pomona

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Peak Hour Summary

N Garey Ave

Metrolink Office Drwy

Southbound Approach

	Left	Thru	Right	Out
Lanes	0	2	0	
AM	0	642	5	485
NOON	0	0	0	0
PM	0	700	2	754

Eastbound Approach

	AM	NOON	PM
Out	0	0	0

Lanes		AM	NOON	PM
0	Left	0	0	0
1	Thru	0	0	0
0	Right	0	0	0

Westbound Approach

	AM	NOON	PM	Lanes
Right	4	0	10	0
Thru	0	0	0	1
Left	4	0	15	0
Out	15	0	13	

CONTROL

No Control

Northbound Approach

	Out	Left	Thru	Right
AM	646	0	481	10
NOON	0	0	0	0
PM	715	0	744	11
Lanes		0	2	0

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

AM	647	485
NOON	0	0
PM	702	754

West Leg

AM	NOON	PM
0	0	0
0	0	0

East Leg

AM	NOON	PM
8	0	25
15	0	13

South Leg

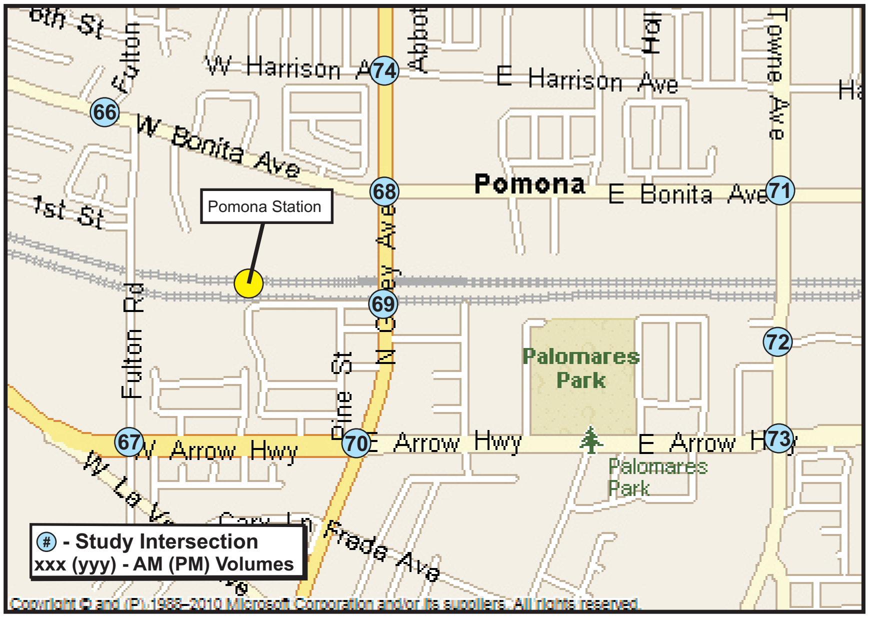
AM	646	491
NOON	0	0
PM	715	755

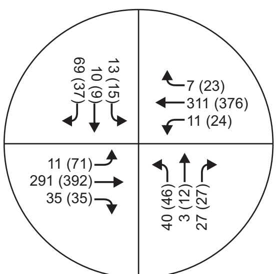
Total Volume Per Leg

	North Leg	South Leg
AM	1132	1137
NOON	0	0
PM	1456	1470

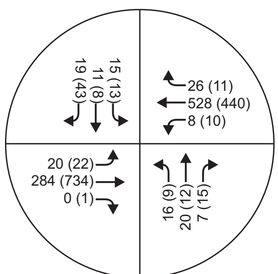
	AM	NOON	PM
West Leg	0	0	0
East Leg	23	0	38

FEIR 2010 Data

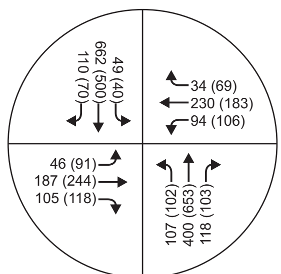




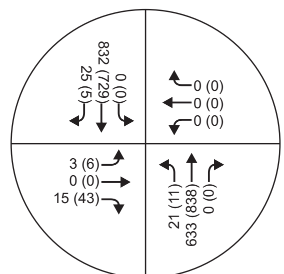
66 Fulton Rd / Bonita Ave



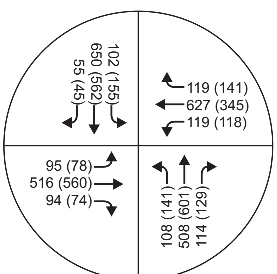
67 Fulton Rd / Arrow Hwy



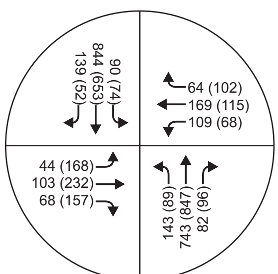
68 Garey Ave / Bonita Ave



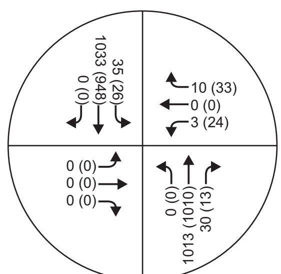
69 Garey Ave / Santa Fe St



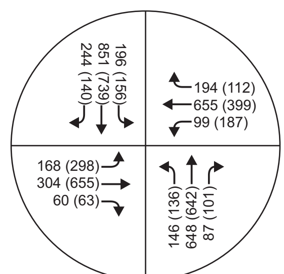
70 Garey Ave / Arrow Hwy



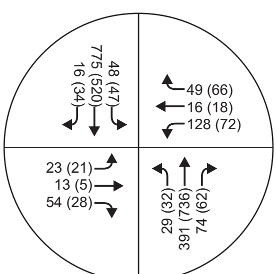
71 Towne Ave / Bonita Ave



72 Towne Ave / Towne Center Dr



73 Towne Ave / Arrow Hwy



74 Garey Ave / Harrison Ave

Appendix B
Trip Generation Worksheet

Trip Generation

Garey Avenue and Bonita Avenue Apartment Complex

Dwelling Units	648	units
Gross Site Area	8.44	acres
Density	76.8	units per acre

Per ITE Manual

Land Use		220 Apartment (Page 334 and 335)
T		Number of Trips
X		Number of Dwellings
Fitted Curve (AM)		T = 0.49 (X) + 3.73
	% entering	20%
	% exiting	80%
Fitted Curve (PM)		T = 0.55 (X) + 17.65
	% entering	65%
	% exiting	35%

AM Peak Hour		Reduction	**AM Peak Hour**		
Total Trips	**322**	15%	**Total Trips**	**274**	
Entering	**64**	15%	**Entering**	**54**	added
Exiting	**258**	15%	**Exiting**	**219**	added

PM Peak Hour		Reduction	**PM Peak Hour**		
Total Trips	**375**	15%	**Total Trips**	**319**	
Entering	**244**	15%	**Entering**	**207**	added
Exiting	**131**	15%	**Exiting**	**111**	added

Pomona Gold Line Parking Structure

Per FEIR

Total Parking Spaces	980
% Occupancy	95%
Total	931
AM Peak Hour Inbound	70%
AM Peak Hour Outbound (% of In)	10%
AM Peak Hour Outbound	65%
AM Peak Hour Inbound (% of Out)	10%

AM Peak Hour		
Total Trips	**718**	
Entering	**652**	added
Exiting	**66**	added

PM Peak Hour		
Total Trips	**606**	
Entering	**61**	added
Exiting	**606**	added

Relocation of Existing Pomona Station Parking Spaces

Assume 105 parking spots will be removed and compensated in the new parking structure

Parking Trips Removed	105	parking spaces
Daily Trips	105	trips
% Occupancy	95%	
Total	100	
AM Peak Hour Inbound	70%	
AM Peak Hour Outbound (% of In)	26%	
PM Peak Hour Outbound	65%	
PM Peak Hour Inbound (% of Out)	30%	

AM Peak Hour		Reduction	**AM Peak Hour**		
Total Trips	**89**		**Total Trips**	**65**	
Entering	**70**	28%	**Entering**	**51**	removed
Exiting	**19**		**Exiting**	**14**	removed

PM Peak Hour		Reduction	**PM Peak Hour**		
Total Trips	**85**		**Total Trips**	**71**	
Entering	**20**		**Entering**	**17**	removed
Exiting	**65**	18%	**Exiting**	**54**	removed

Appendix C
Trip Distribution Worksheet and Maps

Existing Counts

AM Peak Hour

	No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	YEAR	TOT
AM_EX	65	La Verne Avenue and Arrow Highway	TWSC														
AM_EX	66A	N. Fulton Road and Bonita Avenue	OWSC														
AM_EX	66B	S. Fulton Road and Bonita Avenue	OWSC														
AM_EX	67	Fulton Road and Arrow Highway	TWSC														
AM_EX	68	Garey Avenue and Bonita Avenue	Signal	133	454	142	77	614	110	57	286	121	101	324	57	2017	2476
AM_EX	69	Garey Avenue and Santa Fe Street	OWSC	26	736	0	0	760	25	4	0	16	0	0	0	2017	1567
AM_EX	70	Garey Avenue and Arrow Highway	Signal	123	584	116	97	613	40	61	241	38	115	487	135	2017	2650
AM_EX	71	Towne Avenue and Bonita Avenue	Signal														
AM_EX	72	Towne Avenue and Towne Centre Drive	OWSC														
AM_EX	73	Towne Avenue and Arrow Highway	Signal														
AM_EX	1001	West Parking Entrance and Fulton Road	OWSC	0	90	11	26	66	0	0	0	0	7	0	9	2017	209
AM_EX	1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	5	0	1	6	10	0	0	13	59	2017	94
AM_EX	1003	Jacaranda Way and Bonita Avenue	OWSC	2	0	23	35	0	45	16	408	14	53	505	16	2017	1117
AM_EX	1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	23	0	340	0	0	702	47	2017	1112
AM_EX	1005	Future Street B and Garey Avenue	Signal	0	490	18	0	633	0	0	0	0	0	0	9	2016	1150
AM_EX	1006	Future Street A and Garey Avenue	OWSC														
AM_EX	1007	Grevilia Street and Garey Avenue	OWSC	14	597	0	0	584	4	0	0	7	0	0	0	2017	1206
AM_EX	1008	Grevilia Street and Pine Street	TWSC	5	24	6	0	11	1	0	1	2	7	0	2	2017	59
AM_EX	1009	Amberson Street and Arrow Highway	TWSC	9	2	3	6	0	9	27	270	23	16	548	9	2017	922

PM Peak Hour

	No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	YEAR	TOT
PM_EX	65	La Verne Avenue and Arrow Highway	TWSC														
PM_EX	66A	N. Fulton Road and Bonita Avenue	OWSC														
PM_EX	66B	S. Fulton Road and Bonita Avenue	OWSC														
PM_EX	67	Fulton Road and Arrow Highway	TWSC														
PM_EX	68	Garey Avenue and Bonita Avenue	Signal	88	621	125	64	485	59	97	460	147	105	318	88	2017	2657
PM_EX	69	Garey Avenue and Santa Fe Street	OWSC	16	813	0	1	709	11	2	0	41	0	0	0	2017	1593
PM_EX	70	Garey Avenue and Arrow Highway	Signal	108	589	132	160	545	42	112	878	52	97	329	99	2017	3143
PM_EX	71	Towne Avenue and Bonita Avenue	Signal														
PM_EX	72	Towne Avenue and Towne Centre Drive	OWSC														
PM_EX	73	Towne Avenue and Arrow Highway	Signal														
PM_EX	1001	West Parking Entrance and Fulton Road	OWSC	0	57	9	14	79	0	0	0	0	22	0	43	2017	224
PM_EX	1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	48	0	5	0	5	0	0	5	13	2017	76
PM_EX	1003	Jacaranda Way and Bonita Avenue	OWSC	12	0	52	15	0	15	24	624	6	17	442	23	2017	1230
PM_EX	1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	26	0	1042	0	0	457	28	2017	1553
PM_EX	1005	Future Street B and Garey Avenue	Signal	0	715	1	0	714	0	0	0	0	0	0	21	2016	1451
PM_EX	1006	Future Street A and Garey Avenue	OWSC														
PM_EX	1007	Grevilia Street and Garey Avenue	OWSC	20	661	0	0	646	4	0	0	23	0	0	0	2017	1354
PM_EX	1008	Grevilia Street and Pine Street	TWSC	0	13	9	1	10	1	0	8	10	6	1	4	2017	63
PM_EX	1009	Amberson Street and Arrow Highway	TWSC	20	0	20	16	0	25	15	1021	17	18	435	10	2017	1597

Annual Growth Rate (FEIR Pomona)	0.70%
Build Reduction Rate (FEIR)	-1.38%

2035 No Build

AM Peak Hour

	No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	YEAR	TOT
AM_NB	65	La Verne Avenue and Arrow Highway	TWSC	215	0	4	4	1	0	5	331	271	1	576	6	FEIR	1414
AM_NB	66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	15	0	81	13	342	0	0	404	8	FEIR	863
AM_NB	66B	S. Fulton Road and Bonita Avenue	OWSC	47	0	32	0	0	0	0	316	41	13	365	0	FEIR	814
AM_NB	67	Fulton Road and Arrow Highway	TWSC	19	24	8	18	13	22	24	315	0	9	542	31	FEIR	1025
AM_NB	68	Garey Avenue and Bonita Avenue	Signal	150	511	160	87	691	124	64	322	136	114	365	64	2035	2788
AM_NB	69	Garey Avenue and Santa Fe Street	OWSC	29	829	0	0	913	28	0	0	20	0	0	0	2035	1819
AM_NB	70	Garey Avenue and Arrow Highway	Signal	138	658	131	109	690	45	69	271	43	129	548	152	2035	2983
AM_NB	71	Towne Avenue and Bonita Avenue	Signal	168	873	96	106	992	163	52	121	80	128	199	75	FEIR	3053
AM_NB	72	Towne Avenue and Towne Centre Drive	OWSC	0	1190	35	41	1214	0	0	0	0	4	0	12	FEIR	2496
AM_NB	73	Towne Avenue and Arrow Highway	Signal	172	761	119	230	1000	287	197	357	71	116	770	228	FEIR	4308
AM_NB	1001	West Parking Entrance and Fulton Road	OWSC	0	101	12	29	74	0	0	0	0	8	0	10	2035	234
AM_NB	1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	6	0	1	7	11	0	0	15	66	2035	106
AM_NB	1003	Jacaranda Way and Bonita Avenue	OWSC	2	0	26	39	0	51	18	460	16	60	555	18	2035	1245
AM_NB	1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	26	0	383	0	0	678	53	2035	1140
AM_NB	1005	Future Street B and Garey Avenue	OWSC	0	809	20	0	941	0	0	0	0	0	0	10	2035	1780
AM_NB	1006	Future Street A and Garey Avenue	OWSC	5	0	6	0	0	0	0	517	9	11	628	0	2035	1176
AM_NB	1007	Grevilia Street and Garey Avenue	OWSC	16	863	0	0	836	5	0	0	8	0	0	0	2035	1728
AM_NB	1008	Grevilia Street and Pine Street	TWSC	6	27	7	0	12	1	0	1	2	8	0	2	2035	66
AM_NB	1009	Amberson Street and Arrow Highway	TWSC	10	2	3	7	0	10	30	304	26	18	676	10	2035	1096

PM Peak Hour

	No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	YEAR	TOT
PM_NB	65	La Verne Avenue and Arrow Highway	TWSC	164	0	4	2	0	0	5	852	335	5	512	3	FEIR	1882
PM_NB	66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	18	0	43	83	461	0	0	469	27	FEIR	1101
PM_NB	66B	S. Fulton Road and Bonita Avenue	OWSC	54	0	32	0	0	0	0	438	41	28	442	0	FEIR	1035
PM_NB	67	Fulton Road and Arrow Highway	TWSC	11	14	18	15	9	51	26	831	1	12	458	13	FEIR	1459
PM_NB	68	Garey Avenue and Bonita Avenue	Signal	99	699	141	72	546	66	109	518	166	118	358	99	2035	2991
PM_NB	69	Garey Avenue and Santa Fe Street	OWSC	18	915	0	0	818	12	0	0	43	0	0	0	2035	1806
PM_NB	70	Garey Avenue and Arrow Highway	Signal	122	663	149	180	614	47	126	989	59	109	370	111	2035	3539
PM_NB	71	Towne Avenue and Bonita Avenue	Signal	105	995	113	87	767	61	197	273	184	80	135	120	FEIR	3117
PM_NB	72	Towne Avenue and Towne Centre Drive	OWSC	0	1187	15	31	1114	0	0	0	0	28	0	39	FEIR	2414
PM_NB	73	Towne Avenue and Arrow Highway	Signal	160	754	119	183	868	165	350	770	74	220	469	132	FEIR	4264
PM_NB	1001	West Parking Entrance and Fulton Road	OWSC	0	64	10	16	89	0	0	0	0	25	0	48	2035	252
PM_NB	1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	54	0	6	0	6	0	0	6	15	2035	87
PM_NB	1003	Jacaranda Way and Bonita Avenue	OWSC	14	0	59	17	0	17	27	723	7	19	475	26	2035	1384
PM_NB	1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	29	0	1173	0	0	507	32	2035	1741
PM_NB	1005	Future Street B and Garey Avenue	OWSC	0	914	1	0	830	0	0	0	0	0	0	24	2035	1769
PM_NB	1006	Future Street A and Garey Avenue	OWSC	6	0	5	0	0	0	0	788	11	9	514	0	2035	1333
PM_NB	1007	Grevilia Street and Garey Avenue	OWSC	23	877	0	0	815	5	0	0	26	0	0	0	2035	1746
PM_NB	1008	Grevilia Street and Pine Street	TWSC	0	15	10	1	11	1	0	9	11	7	1	5	2035	71
PM_NB	1009	Amberson Street and Arrow Highway	TWSC	23	0	23	18	0	28	17	1150	19	20	505	11	2035	1814

2035 No Build with Waterford

AM Peak Hour

	No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	YEAR	TOT
AM_NBW	65	La Verne Avenue and Arrow Highway	Signal	215	0	4	4	1	0	5	331	271	1	576	6	2035	1414
AM_NBW	66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	16	0	81	13	345	0	0	417	12	2035	885
AM_NBW	66B	S. Fulton Road and Bonita Avenue	OWSC	47	0	33	0	0	0	0	320	41	17	383	0	2035	841
AM_NBW	67	Fulton Road and Arrow Highway	TWSC	19	25	8	18	17	22	24	315	0	9	542	31	2035	1030
AM_NBW	68	Garey Avenue and Bonita Avenue	Signal	182	511	160	87	696	124	86	344	136	114	376	64	2035	2880
AM_NBW	69	Garey Avenue and Santa Fe Street	OWSC	29	861	0	0	1066	28	0	0	20	0	0	0	2035	2004
AM_NBW	70	Garey Avenue and Arrow Highway	Signal	138	680	131	175	778	45	69	271	43	129	548	163	2035	3168
AM_NBW	71	Towne Avenue and Bonita Avenue	Signal	174	873	96	106	992	164	56	139	80	128	203	75	2035	3086
AM_NBW	72	Towne Avenue and Towne Centre Drive	OWSC	0	1196	35	41	1203	0	0	0	0	4	0	12	2035	2491
AM_NBW	73	Towne Avenue and Arrow Highway	Signal	177	767	119	230	1000	287	197	379	115	116	775	228	2035	4390
AM_NBW	1001	West Parking Entrance and Fulton Road	OWSC	0	102	12	29	78	0	0	0	0	8	0	10	2035	239
AM_NBW	1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	6	0	1	7	11	0	0	15	66	2035	106
AM_NBW	1003	Jacaranda Way and Bonita Avenue	OWSC	2	0	26	39	0	51	18	456	16	60	577	18	2035	1263
AM_NBW	1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	26	0	383	0	0	678	53	2035	1140
AM_NBW	1005	Future Street B and Garey Avenue	Signal	0	841	20	0	941	6	0	0	153	0	0	10	2035	1971
AM_NBW	1006	Future Street A and Garey Avenue	OWSC	27	0	50	0	0	0	0	517	5	43	606	0	2035	1248
AM_NBW	1007	Grevilia Street and Garey Avenue	Signal	16	895	0	0	989	5	0	0	8	0	0	0	2035	1913
AM_NBW	1008	Grevilia Street and Pine Street	TWSC	6	27	7	0	12	1	0	1	2	8	0	2	2035	66
AM_NBW	1009	Amberson Street and Arrow Highway	TWSC	10	2	3	7	0	10	30	304	26	18	676	10	2035	1096

PM Peak Hour

	No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	YEAR	TOT
PM_NBW	65	La Verne Avenue and Arrow Highway	Signal	164	0	4	2	0	0	5	852	335	5	512	3	2035	1882
PM_NBW	66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	22	0	43	83	473	0	0	476	29	2035	1126
PM_NBW	66B	S. Fulton Road and Bonita Avenue	OWSC	54	0	36	0	0	0	0	455	41	30	451	0	2035	1067
PM_NBW	67	Fulton Road and Arrow Highway	TWSC	11	18	18	15	11	51	26	831	1	12	458	13	2035	1465
PM_NBW	68	Garey Avenue and Bonita Avenue	Signal	213	700	141	72	567	66	120	529	166	118	399	99	2035	3189
PM_NBW	69	Garey Avenue and Santa Fe Street	OWSC	18	1040	0	0	896	12	0	0	43	0	0	0	2035	2009
PM_NBW	70	Garey Avenue and Arrow Highway	Signal	122	746	149	214	658	47	126	989	59	109	370	153	2035	3742
PM_NBW	71	Towne Avenue and Bonita Avenue	Signal	125	995	113	87	767	65	199	282	184	80	152	120	2035	3169
PM_NBW	72	Towne Avenue and Towne Centre Drive	OWSC	0	1207	15	31	1108	0	0	0	0	28	0	39	2035	2428
PM_NBW	73	Towne Avenue and Arrow Highway	Signal	181	774	119	183	868	165	350	781	97	220	490	132	2035	4359
PM_NBW	1001	West Parking Entrance and Fulton Road	OWSC	0	68	10	16	91	0	0	0	0	25	0	48	2035	258
PM_NBW	1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	54	0	6	0	6	0	0	6	15	2035	87
PM_NBW	1003	Jacaranda Way and Bonita Avenue	OWSC	14	0	59	17	0	17	27	733	7	19	497	26	2035	1416
PM_NBW	1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	29	0	1173	0	0	507	32	2035	1741
PM_NBW	1005	Future Street B and Garey Avenue	Signal	0	1039	1	0	830	21	0	0	78	0	0	24	2035	1993
PM_NBW	1006	Future Street A and Garey Avenue	OWSC	17	0	27	0	0	0	0	788	21	164	514	0	2035	1530
PM_NBW	1007	Grevilia Street and Garey Avenue	Signal	23	1002	0	0	893	5	0	0	26	0	0	0	2035	1949
PM_NBW	1008	Grevilia Street and Pine Street	TWSC	0	15	10	1	11	1	0	9	11	7	1	5	2035	71
PM_NBW	1009	Amberson Street and Arrow Highway	TWSC	23	0	23	18	0	28	17	1150	19	20	505	11	2035	1814

Inbound Trips-Pomona Station

	No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM_NB	65	La Verne Avenue and Arrow Highway	Signal												
AM_NB	66A	N. Fulton Road and Bonita Avenue	OWSC				2%				6%				
AM_NB	66B	S. Fulton Road and Bonita Avenue	OWSC								8%				
AM_NB	67	Fulton Road and Arrow Highway	TWSC			2%									
AM_NB	68	Garey Avenue and Bonita Avenue	Signal					20%				8%	19%		
AM_NB	69	Garey Avenue and Santa Fe Street	OWSC					47%							
AM_NB	70	Garey Avenue and Arrow Highway	Signal	15%	5%									20%	11%
AM_NB	71	Towne Avenue and Bonita Avenue	Signal						14%					5%	
AM_NB	72	Towne Avenue and Towne Centre Drive	OWSC										2%		
AM_NB	73	Towne Avenue and Arrow Highway	Signal	17%					2%					12%	
AM_NB	1001	West Parking Entrance and Fulton Road	OWSC												
AM_NB	1002	South Parking Entrance and Santa Fe Street	OWSC											89%	
AM_NB	1003	Jacaranda Way and Bonita Avenue	OWSC								8%				
AM_NB	1004	Pine Street and Arrow Highway	OWSC											19%	16%
AM_NB	1005	Future Street B and Garey Avenue	Signal					47%							
AM_NB	1006	Future Street A and Garey Avenue	OWSC								8%	10%			
AM_NB	1007	Grevilia Street and Garey Avenue	Signal	16%					47%						
AM_NB	1008	Grevilia Street and Pine Street	TWSC		16%										63%
AM_NB	1009	Amberson Street and Arrow Highway	TWSC							2%					19%

Outbound Trips-Pomona Station

	No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM_NB	65	La Verne Avenue and Arrow Highway	Signal												
AM_NB	66A	N. Fulton Road and Bonita Avenue	OWSC											6%	2%
AM_NB	66B	S. Fulton Road and Bonita Avenue	OWSC	8%											
AM_NB	67	Fulton Road and Arrow Highway	TWSC										2%		8%
AM_NB	68	Garey Avenue and Bonita Avenue	Signal		20%	19%									
AM_NB	69	Garey Avenue and Santa Fe Street	OWSC		39%							6%			
AM_NB	70	Garey Avenue and Arrow Highway	Signal				16%	10%			15%	10%			
AM_NB	71	Towne Avenue and Bonita Avenue	Signal							14%	19%				
AM_NB	72	Towne Avenue and Towne Centre Drive	OWSC			2%									
AM_NB	73	Towne Avenue and Arrow Highway	Signal							2%	12%	17%			
AM_NB	1001	West Parking Entrance and Fulton Road	OWSC		8%										
AM_NB	1002	South Parking Entrance and Santa Fe Street	OWSC								71%				
AM_NB	1003	Jacaranda Way and Bonita Avenue	OWSC												
AM_NB	1004	Pine Street and Arrow Highway	OWSC								25%				
AM_NB	1005	Future Street B and Garey Avenue	Signal		39%										
AM_NB	1006	Future Street A and Garey Avenue	OWSC												
AM_NB	1007	Grevilia Street and Garey Avenue	Signal					6%		39%		20%			
AM_NB	1008	Grevilia Street and Pine Street	TWSC				59%								
AM_NB	1009	Amberson Street and Arrow Highway	TWSC				25%		10%						

Inbound Trips-Apartment Building

	No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM_NB	65	La Verne Avenue and Arrow Highway	Signal												
AM_NB	66A	N. Fulton Road and Bonita Avenue	OWSC				2%				6%				
AM_NB	66B	S. Fulton Road and Bonita Avenue	OWSC			2%					8%				
AM_NB	67	Fulton Road and Arrow Highway	TWSC		2%										
AM_NB	68	Garey Avenue and Bonita Avenue	Signal					10%					15%		
AM_NB	69	Garey Avenue and Santa Fe Street	OWSC		65%										
AM_NB	70	Garey Avenue and Arrow Highway	Signal		40%										25%
AM_NB	71	Towne Avenue and Bonita Avenue	Signal	5%					2%					8%	
AM_NB	72	Towne Avenue and Towne Centre Drive	OWSC		5%										
AM_NB	73	Towne Avenue and Arrow Highway	Signal	15%	5%									10%	
AM_NB	1001	West Parking Entrance and Fulton Road	OWSC		2%										
AM_NB	1002	South Parking Entrance and Santa Fe Street	OWSC												
AM_NB	1003	Jacaranda Way and Bonita Avenue	OWSC								10%				
AM_NB	1004	Pine Street and Arrow Highway	OWSC												
AM_NB	1005	Future Street B and Garey Avenue	Signal	65%					25%						
AM_NB	1006	Future Street A and Garey Avenue	OWSC									10%			
AM_NB	1007	Grevilia Street and Garey Avenue	Signal		65%										
AM_NB	1008	Grevilia Street and Pine Street	TWSC												
AM_NB	1009	Amberson Street and Arrow Highway	TWSC												

Outbound Trips-Apartment Building

	No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM_NB	65	La Verne Avenue and Arrow Highway	Signal												
AM_NB	66A	N. Fulton Road and Bonita Avenue	OWSC											6%	2%
AM_NB	66B	S. Fulton Road and Bonita Avenue	OWSC										2%	8%	
AM_NB	67	Fulton Road and Arrow Highway	TWSC					2%							
AM_NB	68	Garey Avenue and Bonita Avenue	Signal	10%	5%	5%				5%	10%				
AM_NB	69	Garey Avenue and Santa Fe Street	OWSC					65%							
AM_NB	70	Garey Avenue and Arrow Highway	Signal				25%	40%							
AM_NB	71	Towne Avenue and Bonita Avenue	Signal							2%	8%	5%			
AM_NB	72	Towne Avenue and Towne Centre Drive	OWSC												
AM_NB	73	Towne Avenue and Arrow Highway	Signal					5%			10%	15%			
AM_NB	1001	West Parking Entrance and Fulton Road	OWSC					2%							
AM_NB	1002	South Parking Entrance and Santa Fe Street	OWSC												
AM_NB	1003	Jacaranda Way and Bonita Avenue	OWSC											10%	
AM_NB	1004	Pine Street and Arrow Highway	OWSC												
AM_NB	1005	Future Street B and Garey Avenue	Signal							20%		65%			
AM_NB	1006	Future Street A and Garey Avenue	OWSC			15%									
AM_NB	1007	Grevilia Street and Garey Avenue	Signal					65%							
AM_NB	1008	Grevilia Street and Pine Street	TWSC												
AM_NB	1009	Amberson Street and Arrow Highway	TWSC												

Inbound Trips-Replace Parking

	No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM_NB	65	La Verne Avenue and Arrow Highway	Signal												
AM_NB	66A	N. Fulton Road and Bonita Avenue	OWSC				2%				26%				
AM_NB	66B	S. Fulton Road and Bonita Avenue	OWSC	0%								28%			
AM_NB	67	Fulton Road and Arrow Highway	TWSC		2%										
AM_NB	68	Garey Avenue and Bonita Avenue	Signal					10%					9%		
AM_NB	69	Garey Avenue and Santa Fe Street	OWSC	31%					19%						
AM_NB	70	Garey Avenue and Arrow Highway	Signal	10%	10%									15%	16%
AM_NB	71	Towne Avenue and Bonita Avenue	Signal						4%					5%	
AM_NB	72	Towne Avenue and Towne Centre Drive	OWSC										2%		
AM_NB	73	Towne Avenue and Arrow Highway	Signal	17%					2%					12%	
AM_NB	1001	West Parking Entrance and Fulton Road	OWSC			2%	28%								
AM_NB	1002	South Parking Entrance and Santa Fe Street	OWSC												20%
AM_NB	1003	Jacaranda Way and Bonita Avenue	OWSC												
AM_NB	1004	Pine Street and Arrow Highway	OWSC												20%
AM_NB	1005	Future Street B and Garey Avenue	Signal					19%							
AM_NB	1006	Future Street A and Garey Avenue	OWSC												
AM_NB	1007	Grevilia Street and Garey Avenue	Signal		31%										
AM_NB	1008	Grevilia Street and Pine Street	TWSC		20%										
AM_NB	1009	Amberson Street and Arrow Highway	TWSC												

Outbound Trips-Replace Parking

	No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM_NB	65	La Verne Avenue and Arrow Highway	Signal												
AM_NB	66A	N. Fulton Road and Bonita Avenue	OWSC											26%	2%
AM_NB	66B	S. Fulton Road and Bonita Avenue	OWSC	28%		19%									
AM_NB	67	Fulton Road and Arrow Highway	TWSC					2%							
AM_NB	68	Garey Avenue and Bonita Avenue	Signal							10%	9%				
AM_NB	69	Garey Avenue and Santa Fe Street	OWSC									31%			
AM_NB	70	Garey Avenue and Arrow Highway	Signal				21%	10%			10%	10%			
AM_NB	71	Towne Avenue and Bonita Avenue	Signal							4%	5%				
AM_NB	72	Towne Avenue and Towne Centre Drive	OWSC			2%									
AM_NB	73	Towne Avenue and Arrow Highway	Signal							2%	12%	17%			
AM_NB	1001	West Parking Entrance and Fulton Road	OWSC										2%		47%
AM_NB	1002	South Parking Entrance and Santa Fe Street	OWSC				20%								
AM_NB	1003	Jacaranda Way and Bonita Avenue	OWSC								19%				
AM_NB	1004	Pine Street and Arrow Highway	OWSC								20%				
AM_NB	1005	Future Street B and Garey Avenue	Signal												
AM_NB	1006	Future Street A and Garey Avenue	OWSC								19%				
AM_NB	1007	Grevilia Street and Garey Avenue	Signal					31%							
AM_NB	1008	Grevilia Street and Pine Street	TWSC												
AM_NB	1009	Amberson Street and Arrow Highway	TWSC												

AM Peak Hour

Inbound Trips-Pomona Station

No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
65	La Verne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	0	0	0	0	0	0
66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	13	0	0	0	39	0	0	0	0
66B	S. Fulton Road and Bonita Avenue	OWSC	0	0	0	0	0	0	0	52	0	0	0	0
67	Fulton Road and Arrow Highway	TWSC	0	0	13	0	0	0	0	0	0	0	0	0
68	Garey Avenue and Bonita Avenue	Signal	0	0	0	0	130	0	0	0	52	124	0	0
69	Garey Avenue and Santa Fe Street	OWSC	0	0	0	0	306	0	0	0	0	0	0	0
70	Garey Avenue and Arrow Highway	Signal	98	33	0	0	0	0	0	0	0	0	130	72
71	Towne Avenue and Bonita Avenue	Signal	0	0	0	0	0	91	0	0	0	0	33	0
72	Towne Avenue and Towne Centre Drive	OWSC	0	0	0	0	0	0	0	0	0	13	0	0
73	Towne Avenue and Arrow Highway	Signal	111	0	0	0	0	13	0	0	0	0	78	0
1001	West Parking Entrance and Fulton Road	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	0	0	0	0	0	0	0	580	0
1003	Jacaranda Way and Bonita Avenue	OWSC	0	0	0	0	0	0	0	52	0	0	0	0
1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	0	0	0	0	0	124	104
1005	Future Street B and Garey Avenue	Signal	0	0	0	0	306	0	0	0	0	0	0	0
1006	Future Street A and Garey Avenue	OWSC	0	0	0	0	0	0	0	52	65	0	0	0
1007	Grevilia Street and Garey Avenue	Signal	104	0	0	0	0	306	0	0	0	0	0	0
1008	Grevilia Street and Pine Street	TWSC	0	104	0	0	0	0	0	0	0	0	0	411
1009	Amberson Street and Arrow Highway	TWSC	0	0	0	0	0	0	13	0	0	0	0	124

Outbound Trips-Pomona Station

No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
65	La Verne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	0	0	0	0	0	0
66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	0	0	0	0	0	0	0	4	1
66B	S. Fulton Road and Bonita Avenue	OWSC	5	0	0	0	0	0	0	0	0	0	0	0
67	Fulton Road and Arrow Highway	TWSC	0	0	0	0	0	0	0	0	0	1	0	5
68	Garey Avenue and Bonita Avenue	Signal	0	13	13	0	0	0	0	0	0	0	0	0
69	Garey Avenue and Santa Fe Street	OWSC	0	26	0	0	0	0	0	0	4	0	0	0
70	Garey Avenue and Arrow Highway	Signal	0	0	0	11	7	0	0	10	7	0	0	0
71	Towne Avenue and Bonita Avenue	Signal	0	0	0	0	0	0	9	13	0	0	0	0
72	Towne Avenue and Towne Centre Drive	OWSC	0	0	1	0	0	0	0	0	0	0	0	0
73	Towne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	1	8	11	0	0	0
1001	West Parking Entrance and Fulton Road	OWSC	0	5	0	0	0	0	0	0	0	0	0	0
1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	0	0	0	0	47	0	0	0	0
1003	Jacaranda Way and Bonita Avenue	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	0	0	17	0	0	0	0
1005	Future Street B and Garey Avenue	Signal	0	26	0	0	0	0	0	0	0	0	0	0
1006	Future Street A and Garey Avenue	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1007	Grevilia Street and Garey Avenue	Signal	0	0	0	0	4	0	26	0	13	0	0	0
1008	Grevilia Street and Pine Street	TWSC	0	0	0	39	0	0	0	0	0	0	0	0
1009	Amberson Street and Arrow Highway	TWSC	0	0	0	17	0	7	0	0	0	0	0	0

Inbound and Outbound Trips-Pomona Station

No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
65	La Verne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	0	0	0	0	0	0
66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	13	0	0	0	39	0	0	4	1
66B	S. Fulton Road and Bonita Avenue	OWSC	5	0	0	0	0	0	0	52	0	0	0	0
67	Fulton Road and Arrow Highway	TWSC	0	0	13	0	0	0	0	0	0	1	0	5
68	Garey Avenue and Bonita Avenue	Signal	0	13	13	0	130	0	0	0	52	124	0	0
69	Garey Avenue and Santa Fe Street	OWSC	0	26	0	0	306	0	0	0	4	0	0	0
70	Garey Avenue and Arrow Highway	Signal	98	33	0	11	7	0	0	10	7	0	130	72
71	Towne Avenue and Bonita Avenue	Signal	0	0	0	0	0	91	9	13	0	0	33	0
72	Towne Avenue and Towne Centre Drive	OWSC	0	0	1	0	0	0	0	0	0	13	0	0
73	Towne Avenue and Arrow Highway	Signal	111	0	0	0	0	13	1	8	11	0	78	0
1001	West Parking Entrance and Fulton Road	OWSC	0	5	0	0	0	0	0	0	0	0	0	0
1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	0	0	0	0	47	0	0	580	0
1003	Jacaranda Way and Bonita Avenue	OWSC	0	0	0	0	0	0	0	52	0	0	0	0
1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	0	0	17	0	0	124	104
1005	Future Street B and Garey Avenue	Signal	0	26	0	0	306	0	0	0	0	0	0	0
1006	Future Street A and Garey Avenue	OWSC	0	0	0	0	0	0	0	52	65	0	0	0
1007	Grevilia Street and Garey Avenue	Signal	104	0	0	0	4	306	26	0	13	0	0	0
1008	Grevilia Street and Pine Street	TWSC	0	104	0	39	0	0	0	0	0	0	0	411
1009	Amberson Street and Arrow Highway	TWSC	0	0	0	17	0	7	13	0	0	0	0	124

PM Peak Hour

Inbound Trips-Pomona Station

No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
65	La Verne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	0	0	0	0	0	0
66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	1	0	0	0	4	0	0	0	0
66B	S. Fulton Road and Bonita Avenue	OWSC	0	0	0	0	0	0	0	5	0	0	0	0
67	Fulton Road and Arrow Highway	TWSC	0	0	1	0	0	0	0	0	0	0	0	0
68	Garey Avenue and Bonita Avenue	Signal	0	0	0	0	12	0	0	0	5	12	0	0
69	Garey Avenue and Santa Fe Street	OWSC	0	0	0	0	29	0	0	0	0	0	0	0
70	Garey Avenue and Arrow Highway	Signal	9	3	0	0	0	0	0	0	0	0	12	7
71	Towne Avenue and Bonita Avenue	Signal	0	0	0	0	0	9	0	0	0	0	3	0
72	Towne Avenue and Towne Centre Drive	OWSC	0	0	0	0	0	0	0	0	0	1	0	0
73	Towne Avenue and Arrow Highway	Signal	10	0	0	0	0	1	0	0	0	0	7	0
1001	West Parking Entrance and Fulton Road	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	0	0	0	0	0	0	0	54	0
1003	Jacaranda Way and Bonita Avenue	OWSC	0	0	0	0	0	0	0	5	0	0	0	0
1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	0	0	0	0	0	12	10
1005	Future Street B and Garey Avenue	Signal	0	0	0	0	29	0	0	0	0	0	0	0
1006	Future Street A and Garey Avenue	OWSC	0	0	0	0	0	0	0	5	6	0	0	0
1007	Grevilia Street and Garey Avenue	Signal	10	0	0	0	0	29	0	0	0	0	0	0
1008	Grevilia Street and Pine Street	TWSC	0	10	0	0	0	0	0	0	0	0	0	38
1009	Amberson Street and Arrow Highway	TWSC	0	0	0	0	0	0	1	0	0	0	0	12

Outbound Trips-Pomona Station

No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
65	La Verne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	0	0	0	0	0	0
66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	0	0	0	0	0	0	0	36	12
66B	S. Fulton Road and Bonita Avenue	OWSC	48	0	0	0	0	0	0	0	0	0	0	0
67	Fulton Road and Arrow Highway	TWSC	0	0	0	0	0	0	0	0	0	12	0	48
68	Garey Avenue and Bonita Avenue	Signal	0	121	115	0	0	0	0	0	0	0	0	0
69	Garey Avenue and Santa Fe Street	OWSC	0	236	0	0	0	0	0	0	36	0	0	0
70	Garey Avenue and Arrow Highway	Signal	0	0	0	97	61	0	0	91	61	0	0	0
71	Towne Avenue and Bonita Avenue	Signal	0	0	0	0	0	0	85	115	0	0	0	0
72	Towne Avenue and Towne Centre Drive	OWSC	0	0	12	0	0	0	0	0	0	0	0	0
73	Towne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	12	73	103	0	0	0
1001	West Parking Entrance and Fulton Road	OWSC	0	48	0	0	0	0	0	0	0	0	0	0
1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	0	0	0	0	430	0	0	0	0
1003	Jacaranda Way and Bonita Avenue	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	0	0	152	0	0	0	0
1005	Future Street B and Garey Avenue	Signal	0	236	0	0	0	0	0	0	0	0	0	0
1006	Future Street A and Garey Avenue	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1007	Grevilia Street and Garey Avenue	Signal	0	0	0	0	36	0	236	0	121	0	0	0
1008	Grevilia Street and Pine Street	TWSC	0	0	0	358	0	0	0	0	0	0	0	0
1009	Amberson Street and Arrow Highway	TWSC	0	0	0	152	0	61	0	0	0	0	0	0

Inbound and Outbound Trips-Pomona Station

No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
65	La Verne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	0	0	0	0	0	0
66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	1	0	0	0	4	0	0	36	12
66B	S. Fulton Road and Bonita Avenue	OWSC	48	0	0	0	0	0	0	5	0	0	0	0
67	Fulton Road and Arrow Highway	TWSC	0	0	1	0	0	0	0	0	0	12	0	48
68	Garey Avenue and Bonita Avenue	Signal	0	121	115	0	12	0	0	0	5	12	0	0
69	Garey Avenue and Santa Fe Street	OWSC	0	236	0	0	29	0	0	0	36	0	0	0
70	Garey Avenue and Arrow Highway	Signal	9	3	0	97	61	0	0	91	61	0	12	7
71	Towne Avenue and Bonita Avenue	Signal	0	0	0	0	0	9	85	115	0	0	3	0
72	Towne Avenue and Towne Centre Drive	OWSC	0	0	12	0	0	0	0	0	0	1	0	0
73	Towne Avenue and Arrow Highway	Signal	10	0	0	0	0	1	12	73	103	0	7	0
1001	West Parking Entrance and Fulton Road	OWSC	0	48	0	0	0	0	0	0	0	0	0	0
1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	0	0	0	0	430	0	0	54	0
1003	Jacaranda Way and Bonita Avenue	OWSC	0	0	0	0	0	0	0	5	0	0	0	0
1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	0	0	152	0	0	12	10
1005	Future Street B and Garey Avenue	Signal	0	236	0	0	29	0	0	0	0	0	0	0
1006	Future Street A and Garey Avenue	OWSC	0	0	0	0	0	0	0	5	6	0	0	0
1007	Grevilia Street and Garey Avenue	Signal	10	0	0	0	36	29	236	0	121	0	0	0
1008	Grevilia Street and Pine Street	TWSC	0	10	0	358	0	0	0	0	0	0	0	38
1009	Amberson Street and Arrow Highway	TWSC	0	0	0	152	0	61	1	0	0	0	0	12

AM Peak Hour

Inbound Trips-Apartment Building

No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
65	La Verne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	0	0	0	0	0	0
66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	1	0	0	0	3	0	0	0	0
66B	S. Fulton Road and Bonita Avenue	OWSC	0	0	1	0	0	0	0	4	0	0	0	0
67	Fulton Road and Arrow Highway	TWSC	0	1	0	0	0	0	0	0	0	0	0	0
68	Garey Avenue and Bonita Avenue	Signal	0	0	0	0	5	0	0	0	0	8	0	0
69	Garey Avenue and Santa Fe Street	OWSC	0	35	0	0	0	0	0	0	0	0	0	0
70	Garey Avenue and Arrow Highway	Signal	0	22	0	0	0	0	0	0	0	0	0	14
71	Towne Avenue and Bonita Avenue	Signal	3	0	0	0	0	1	0	0	0	0	4	0
72	Towne Avenue and Towne Centre Drive	OWSC	0	3	0	0	0	0	0	0	0	0	0	0
73	Towne Avenue and Arrow Highway	Signal	8	3	0	0	0	0	0	0	0	0	5	0
1001	West Parking Entrance and Fulton Road	OWSC	0	1	0	0	0	0	0	0	0	0	0	0
1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1003	Jacaranda Way and Bonita Avenue	OWSC	0	0	0	0	0	0	0	5	0	0	0	0
1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1005	Future Street B and Garey Avenue	Signal	35	0	0	0	0	14	0	0	0	0	0	0
1006	Future Street A and Garey Avenue	OWSC	0	0	0	0	0	0	0	0	5	0	0	0
1007	Grevilia Street and Garey Avenue	Signal	0	35	0	0	0	0	0	0	0	0	0	0
1008	Grevilia Street and Pine Street	TWSC	0	0	0	0	0	0	0	0	0	0	0	0
1009	Amberson Street and Arrow Highway	TWSC	0	0	0	0	0	0	0	0	0	0	0	0

Outbound Trips-Apartment Building

No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
65	La Verne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	0	0	0	0	0	0
66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	0	0	0	0	0	0	0	13	4
66B	S. Fulton Road and Bonita Avenue	OWSC	0	0	0	0	0	0	0	0	0	4	18	0
67	Fulton Road and Arrow Highway	TWSC	0	0	0	0	4	0	0	0	0	0	0	0
68	Garey Avenue and Bonita Avenue	Signal	22	11	11	0	0	0	11	22	0	0	0	0
69	Garey Avenue and Santa Fe Street	OWSC	0	0	0	0	142	0	0	0	0	0	0	0
70	Garey Avenue and Arrow Highway	Signal	0	0	0	55	88	0	0	0	0	0	0	0
71	Towne Avenue and Bonita Avenue	Signal	0	0	0	0	0	0	4	18	11	0	0	0
72	Towne Avenue and Towne Centre Drive	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
73	Towne Avenue and Arrow Highway	Signal	0	0	0	0	11	0	0	22	33	0	0	0
1001	West Parking Entrance and Fulton Road	OWSC	0	0	0	0	4	0	0	0	0	0	0	0
1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1003	Jacaranda Way and Bonita Avenue	OWSC	0	0	0	0	0	0	0	0	0	0	22	0
1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1005	Future Street B and Garey Avenue	Signal	0	0	0	0	0	0	44	0	142	0	0	0
1006	Future Street A and Garey Avenue	OWSC	0	0	33	0	0	0	0	0	0	0	0	0
1007	Grevilia Street and Garey Avenue	Signal	0	0	0	0	142	0	0	0	0	0	0	0
1008	Grevilia Street and Pine Street	TWSC	0	0	0	0	0	0	0	0	0	0	0	0
1009	Amberson Street and Arrow Highway	TWSC	0	0	0	0	0	0	0	0	0	0	0	0

Inbound and Outbound Trips-Apartment Building

No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
65	La Verne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	0	0	0	0	0	0
66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	1	0	0	0	3	0	0	13	4
66B	S. Fulton Road and Bonita Avenue	OWSC	0	0	1	0	0	0	0	4	0	4	18	0
67	Fulton Road and Arrow Highway	TWSC	0	1	0	0	4	0	0	0	0	0	0	0
68	Garey Avenue and Bonita Avenue	Signal	22	11	11	0	5	0	11	22	0	8	0	0
69	Garey Avenue and Santa Fe Street	OWSC	0	35	0	0	142	0	0	0	0	0	0	0
70	Garey Avenue and Arrow Highway	Signal	0	22	0	55	88	0	0	0	0	0	0	14
71	Towne Avenue and Bonita Avenue	Signal	3	0	0	0	0	1	4	18	11	0	4	0
72	Towne Avenue and Towne Centre Drive	OWSC	0	3	0	0	0	0	0	0	0	0	0	0
73	Towne Avenue and Arrow Highway	Signal	8	3	0	0	11	0	0	22	33	0	5	0
1001	West Parking Entrance and Fulton Road	OWSC	0	1	0	0	4	0	0	0	0	0	0	0
1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1003	Jacaranda Way and Bonita Avenue	OWSC	0	0	0	0	0	0	0	5	0	0	22	0
1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1005	Future Street B and Garey Avenue	Signal	35	0	0	0	0	14	44	0	142	0	0	0
1006	Future Street A and Garey Avenue	OWSC	0	0	33	0	0	0	0	0	5	0	0	0
1007	Grevilia Street and Garey Avenue	Signal	0	35	0	0	142	0	0	0	0	0	0	0
1008	Grevilia Street and Pine Street	TWSC	0	0	0	0	0	0	0	0	0	0	0	0
1009	Amberson Street and Arrow Highway	TWSC	0	0	0	0	0	0	0	0	0	0	0	0

PM Peak Hour

Inbound Trips-Apartment Building

No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
65	La Verne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	0	0	0	0	0	0
66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	4	0	0	0	12	0	0	0	0
66B	S. Fulton Road and Bonita Avenue	OWSC	0	0	4	0	0	0	0	17	0	0	0	0
67	Fulton Road and Arrow Highway	TWSC	0	4	0	0	0	0	0	0	0	0	0	0
68	Garey Avenue and Bonita Avenue	Signal	0	0	0	0	21	0	0	0	0	31	0	0
69	Garey Avenue and Santa Fe Street	OWSC	0	135	0	0	0	0	0	0	0	0	0	0
70	Garey Avenue and Arrow Highway	Signal	0	83	0	0	0	0	0	0	0	0	0	52
71	Towne Avenue and Bonita Avenue	Signal	10	0	0	0	0	4	0	0	0	0	17	0
72	Towne Avenue and Towne Centre Drive	OWSC	0	10	0	0	0	0	0	0	0	0	0	0
73	Towne Avenue and Arrow Highway	Signal	31	10	0	0	0	0	0	0	0	0	21	0
1001	West Parking Entrance and Fulton Road	OWSC	0	4	0	0	0	0	0	0	0	0	0	0
1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1003	Jacaranda Way and Bonita Avenue	OWSC	0	0	0	0	0	0	0	21	0	0	0	0
1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1005	Future Street B and Garey Avenue	Signal	135	0	0	0	0	52	0	0	0	0	0	0
1006	Future Street A and Garey Avenue	OWSC	0	0	0	0	0	0	0	0	21	0	0	0
1007	Grevilia Street and Garey Avenue	Signal	0	135	0	0	0	0	0	0	0	0	0	0
1008	Grevilia Street and Pine Street	TWSC	0	0	0	0	0	0	0	0	0	0	0	0
1009	Amberson Street and Arrow Highway	TWSC	0	0	0	0	0	0	0	0	0	0	0	0

Outbound Trips-Apartment Building

No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
65	La Verne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	0	0	0	0	0	0
66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	0	0	0	0	0	0	0	7	2
66B	S. Fulton Road and Bonita Avenue	OWSC	0	0	0	0	0	0	0	0	0	2	9	0
67	Fulton Road and Arrow Highway	TWSC	0	0	0	0	2	0	0	0	0	0	0	0
68	Garey Avenue and Bonita Avenue	Signal	11	6	6	0	0	0	6	11	0	0	0	0
69	Garey Avenue and Santa Fe Street	OWSC	0	0	0	0	72	0	0	0	0	0	0	0
70	Garey Avenue and Arrow Highway	Signal	0	0	0	28	44	0	0	0	0	0	0	0
71	Towne Avenue and Bonita Avenue	Signal	0	0	0	0	0	0	2	9	6	0	0	0
72	Towne Avenue and Towne Centre Drive	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
73	Towne Avenue and Arrow Highway	Signal	0	0	0	0	6	0	0	11	17	0	0	0
1001	West Parking Entrance and Fulton Road	OWSC	0	0	0	0	2	0	0	0	0	0	0	0
1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1003	Jacaranda Way and Bonita Avenue	OWSC	0	0	0	0	0	0	0	0	0	0	11	0
1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1005	Future Street B and Garey Avenue	Signal	0	0	0	0	0	0	22	0	72	0	0	0
1006	Future Street A and Garey Avenue	OWSC	0	0	17	0	0	0	0	0	0	0	0	0
1007	Grevilia Street and Garey Avenue	Signal	0	0	0	0	72	0	0	0	0	0	0	0
1008	Grevilia Street and Pine Street	TWSC	0	0	0	0	0	0	0	0	0	0	0	0
1009	Amberson Street and Arrow Highway	TWSC	0	0	0	0	0	0	0	0	0	0	0	0

Inbound and Outbound Trips-Apartment Building

No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
65	La Verne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	0	0	0	0	0	0
66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	4	0	0	0	12	0	0	7	2
66B	S. Fulton Road and Bonita Avenue	OWSC	0	0	4	0	0	0	0	17	0	2	9	0
67	Fulton Road and Arrow Highway	TWSC	0	4	0	0	2	0	0	0	0	0	0	0
68	Garey Avenue and Bonita Avenue	Signal	11	6	6	0	21	0	6	11	0	31	0	0
69	Garey Avenue and Santa Fe Street	OWSC	0	135	0	0	72	0	0	0	0	0	0	0
70	Garey Avenue and Arrow Highway	Signal	0	83	0	28	44	0	0	0	0	0	0	52
71	Towne Avenue and Bonita Avenue	Signal	10	0	0	0	0	4	2	9	6	0	17	0
72	Towne Avenue and Towne Centre Drive	OWSC	0	10	0	0	0	0	0	0	0	0	0	0
73	Towne Avenue and Arrow Highway	Signal	31	10	0	0	6	0	0	11	17	0	21	0
1001	West Parking Entrance and Fulton Road	OWSC	0	4	0	0	2	0	0	0	0	0	0	0
1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1003	Jacaranda Way and Bonita Avenue	OWSC	0	0	0	0	0	0	0	21	0	0	11	0
1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1005	Future Street B and Garey Avenue	Signal	135	0	0	0	0	52	22	0	72	0	0	0
1006	Future Street A and Garey Avenue	OWSC	0	0	17	0	0	0	0	0	21	0	0	0
1007	Grevilia Street and Garey Avenue	Signal	0	135	0	0	72	0	0	0	0	0	0	0
1008	Grevilia Street and Pine Street	TWSC	0	0	0	0	0	0	0	0	0	0	0	0
1009	Amberson Street and Arrow Highway	TWSC	0	0	0	0	0	0	0	0	0	0	0	0

AM Peak Hour

Inbound Trips-Replace Parking

No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
65	La Verne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	0	0	0	0	0	0
66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	1	0	0	0	13	0	0	0	0
66B	S. Fulton Road and Bonita Avenue	OWSC	0	0	0	0	0	0	0	0	14	0	0	0
67	Fulton Road and Arrow Highway	TWSC	0	1	0	0	0	0	0	0	0	0	0	0
68	Garey Avenue and Bonita Avenue	Signal	0	0	0	0	5	0	0	0	0	5	0	0
69	Garey Avenue and Santa Fe Street	OWSC	16	0	0	0	0	10	0	0	0	0	0	0
70	Garey Avenue and Arrow Highway	Signal	5	5	0	0	0	0	0	0	0	0	8	8
71	Towne Avenue and Bonita Avenue	Signal	0	0	0	0	0	2	0	0	0	0	3	0
72	Towne Avenue and Towne Centre Drive	OWSC	0	0	0	0	0	0	0	0	0	1	0	0
73	Towne Avenue and Arrow Highway	Signal	9	0	0	0	0	1	0	0	0	0	6	0
1001	West Parking Entrance and Fulton Road	OWSC	0	0	1	14	0	0	0	0	0	0	0	0
1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	0	0	0	0	0	0	0	0	10
1003	Jacaranda Way and Bonita Avenue	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	0	0	0	0	0	0	10
1005	Future Street B and Garey Avenue	Signal	0	0	0	0	10	0	0	0	0	0	0	0
1006	Future Street A and Garey Avenue	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1007	Grevilia Street and Garey Avenue	Signal	0	16	0	0	0	0	0	0	0	0	0	0
1008	Grevilia Street and Pine Street	TWSC	0	10	0	0	0	0	0	0	0	0	0	0
1009	Amberson Street and Arrow Highway	TWSC	0	0	0	0	0	0	0	0	0	0	0	0

Outbound Trips-Replace Parking

No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
65	La Verne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	0	0	0	0	0	0
66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	0	0	0	0	0	0	0	4	0
66B	S. Fulton Road and Bonita Avenue	OWSC	4	0	3	0	0	0	0	0	0	0	0	0
67	Fulton Road and Arrow Highway	TWSC	0	0	0	0	0	0	0	0	0	0	0	0
68	Garey Avenue and Bonita Avenue	Signal	0	0	0	0	0	0	1	1	0	0	0	0
69	Garey Avenue and Santa Fe Street	OWSC	0	0	0	0	0	0	0	0	4	0	0	0
70	Garey Avenue and Arrow Highway	Signal	0	0	0	3	1	0	0	1	1	0	0	0
71	Towne Avenue and Bonita Avenue	Signal	0	0	0	0	0	0	1	1	0	0	0	0
72	Towne Avenue and Towne Centre Drive	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
73	Towne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	0	2	2	0	0	0
1001	West Parking Entrance and Fulton Road	OWSC	0	0	0	0	0	0	0	0	0	0	0	7
1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	3	0	0	0	0	0	0	0	0
1003	Jacaranda Way and Bonita Avenue	OWSC	0	0	0	0	0	0	0	3	0	0	0	0
1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	0	0	3	0	0	0	0
1005	Future Street B and Garey Avenue	Signal	0	0	0	0	0	0	0	0	0	0	0	0
1006	Future Street A and Garey Avenue	OWSC	0	0	0	0	0	0	0	3	0	0	0	0
1007	Grevilia Street and Garey Avenue	Signal	0	0	0	0	4	0	0	0	0	0	0	0
1008	Grevilia Street and Pine Street	TWSC	0	0	0	0	0	0	0	0	0	0	0	0
1009	Amberson Street and Arrow Highway	TWSC	0	0	0	0	0	0	0	0	0	0	0	0

Inbound and Outbound Trips-Replace Parking

No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
65	La Verne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	0	0	0	0	0	0
66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	1	0	0	0	13	0	0	4	0
66B	S. Fulton Road and Bonita Avenue	OWSC	4	0	3	0	0	0	0	0	14	0	0	0
67	Fulton Road and Arrow Highway	TWSC	0	1	0	0	0	0	0	0	0	0	0	0
68	Garey Avenue and Bonita Avenue	Signal	0	0	0	0	5	0	1	1	0	5	0	0
69	Garey Avenue and Santa Fe Street	OWSC	16	0	0	0	0	10	0	0	4	0	0	0
70	Garey Avenue and Arrow Highway	Signal	5	5	0	3	1	0	0	1	1	0	8	8
71	Towne Avenue and Bonita Avenue	Signal	0	0	0	0	0	2	1	1	0	0	3	0
72	Towne Avenue and Towne Centre Drive	OWSC	0	0	0	0	0	0	0	0	0	1	0	0
73	Towne Avenue and Arrow Highway	Signal	9	0	0	0	0	1	0	2	2	0	6	0
1001	West Parking Entrance and Fulton Road	OWSC	0	0	1	14	0	0	0	0	0	0	0	7
1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	3	0	0	0	0	0	0	0	10
1003	Jacaranda Way and Bonita Avenue	OWSC	0	0	0	0	0	0	0	3	0	0	0	0
1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	0	0	3	0	0	0	10
1005	Future Street B and Garey Avenue	Signal	0	0	0	0	10	0	0	0	0	0	0	0
1006	Future Street A and Garey Avenue	OWSC	0	0	0	0	0	0	0	3	0	0	0	0
1007	Grevilia Street and Garey Avenue	Signal	0	16	0	0	4	0	0	0	0	0	0	0
1008	Grevilia Street and Pine Street	TWSC	0	10	0	0	4	0	0	0	0	0	0	0
1009	Amberson Street and Arrow Highway	TWSC	0	0	0	0	0	0	0	0	0	0	0	0

PM Peak Hour

Inbound Trips-Replace Parking

No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
65	La Verne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	0	0	0	0	0	0
66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	0	0	0	0	4	0	0	0	0
66B	S. Fulton Road and Bonita Avenue	OWSC	0	0	0	0	0	0	0	0	5	0	0	0
67	Fulton Road and Arrow Highway	TWSC	0	0	0	0	0	0	0	0	0	0	0	0
68	Garey Avenue and Bonita Avenue	Signal	0	0	0	0	2	0	0	0	0	2	0	0
69	Garey Avenue and Santa Fe Street	OWSC	5	0	0	0	0	3	0	0	0	0	0	0
70	Garey Avenue and Arrow Highway	Signal	2	2	0	0	0	0	0	0	0	0	3	3
71	Towne Avenue and Bonita Avenue	Signal	0	0	0	0	0	1	0	0	0	0	1	0
72	Towne Avenue and Towne Centre Drive	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
73	Towne Avenue and Arrow Highway	Signal	3	0	0	0	0	0	0	0	0	0	2	0
1001	West Parking Entrance and Fulton Road	OWSC	0	0	0	5	0	0	0	0	0	0	0	0
1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	0	0	0	0	0	0	0	0	3
1003	Jacaranda Way and Bonita Avenue	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	0	0	0	0	0	0	3
1005	Future Street B and Garey Avenue	Signal	0	0	0	0	3	0	0	0	0	0	0	0
1006	Future Street A and Garey Avenue	OWSC	0	0	0	0	0	0	0	0	0	0	0	0
1007	Grevilia Street and Garey Avenue	Signal	0	5	0	0	0	0	0	0	0	0	0	0
1008	Grevilia Street and Pine Street	TWSC	0	3	0	0	0	0	0	0	0	0	0	0
1009	Amberson Street and Arrow Highway	TWSC	0	0	0	0	0	0	0	0	0	0	0	0

Outbound Trips-Replace Parking

No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
65	La Verne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	0	0	0	0	0	0
66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	0	0	0	0	0	0	0	14	1
66B	S. Fulton Road and Bonita Avenue	OWSC	15	0	10	0	0	0	0	0	0	0	0	0
67	Fulton Road and Arrow Highway	TWSC	0	0	0	0	1	0	0	0	0	0	0	0
68	Garey Avenue and Bonita Avenue	Signal	0	0	0	0	0	0	5	5	0	0	0	0
69	Garey Avenue and Santa Fe Street	OWSC	0	0	0	0	0	0	0	0	17	0	0	0
70	Garey Avenue and Arrow Highway	Signal	0	0	0	11	5	0	0	5	5	0	0	0
71	Towne Avenue and Bonita Avenue	Signal	0	0	0	0	0	0	2	3	0	0	0	0
72	Towne Avenue and Towne Centre Drive	OWSC	0	0	1	0	0	0	0	0	0	0	0	0
73	Towne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	1	6	9	0	0	0
1001	West Parking Entrance and Fulton Road	OWSC	0	0	0	0	0	0	0	0	0	1	0	25
1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	11	0	0	0	0	0	0	0	0
1003	Jacaranda Way and Bonita Avenue	OWSC	0	0	0	0	0	0	0	10	0	0	0	0
1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	0	0	11	0	0	0	0
1005	Future Street B and Garey Avenue	Signal	0	0	0	0	0	0	0	0	0	0	0	0
1006	Future Street A and Garey Avenue	OWSC	0	0	0	0	0	0	0	10	0	0	0	0
1007	Grevilia Street and Garey Avenue	Signal	0	0	0	0	17	0	0	0	0	0	0	0
1008	Grevilia Street and Pine Street	TWSC	0	0	0	0	0	0	0	0	0	0	0	0
1009	Amberson Street and Arrow Highway	TWSC	0	0	0	0	0	0	0	0	0	0	0	0

Inbound and Outbound Trips-Replace Parking

No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
65	La Verne Avenue and Arrow Highway	Signal	0	0	0	0	0	0	0	0	0	0	0	0
66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	0	0	0	0	4	0	0	14	1
66B	S. Fulton Road and Bonita Avenue	OWSC	15	0	10	0	0	0	0	0	5	0	0	0
67	Fulton Road and Arrow Highway	TWSC	0	0	0	0	1	0	0	0	0	0	0	0
68	Garey Avenue and Bonita Avenue	Signal	0	0	0	0	2	0	5	5	0	2	0	0
69	Garey Avenue and Santa Fe Street	OWSC	5	0	0	0	0	3	0	0	17	0	0	0
70	Garey Avenue and Arrow Highway	Signal	2	2	0	11	5	0	0	5	5	0	3	3
71	Towne Avenue and Bonita Avenue	Signal	0	0	0	0	0	1	2	3	0	0	1	0
72	Towne Avenue and Towne Centre Drive	OWSC	0	0	1	0	0	0	0	0	0	0	0	0
73	Towne Avenue and Arrow Highway	Signal	3	0	0	0	0	0	1	6	9	0	2	0
1001	West Parking Entrance and Fulton Road	OWSC	0	0	0	5	0	0	0	0	0	1	0	25
1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	11	0	0	0	0	0	0	0	3
1003	Jacaranda Way and Bonita Avenue	OWSC	0	0	0	0	0	0	0	10	0	0	0	0
1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	0	0	11	0	0	0	3
1005	Future Street B and Garey Avenue	Signal	0	0	0	0	3	0	0	0	0	0	0	0
1006	Future Street A and Garey Avenue	OWSC	0	0	0	0	0	0	0	10	0	0	0	0
1007	Grevilia Street and Garey Avenue	Signal	0	5	0	0	17	0	0	0	0	0	0	0
1008	Grevilia Street and Pine Street	TWSC	0	3	0	0	0	0	0	0	0	0	0	0
1009	Amberson Street and Arrow Highway	TWSC	0	0	0	0	0	0	0	0	0	0	0	0

2035 Build

AM Peak Hour

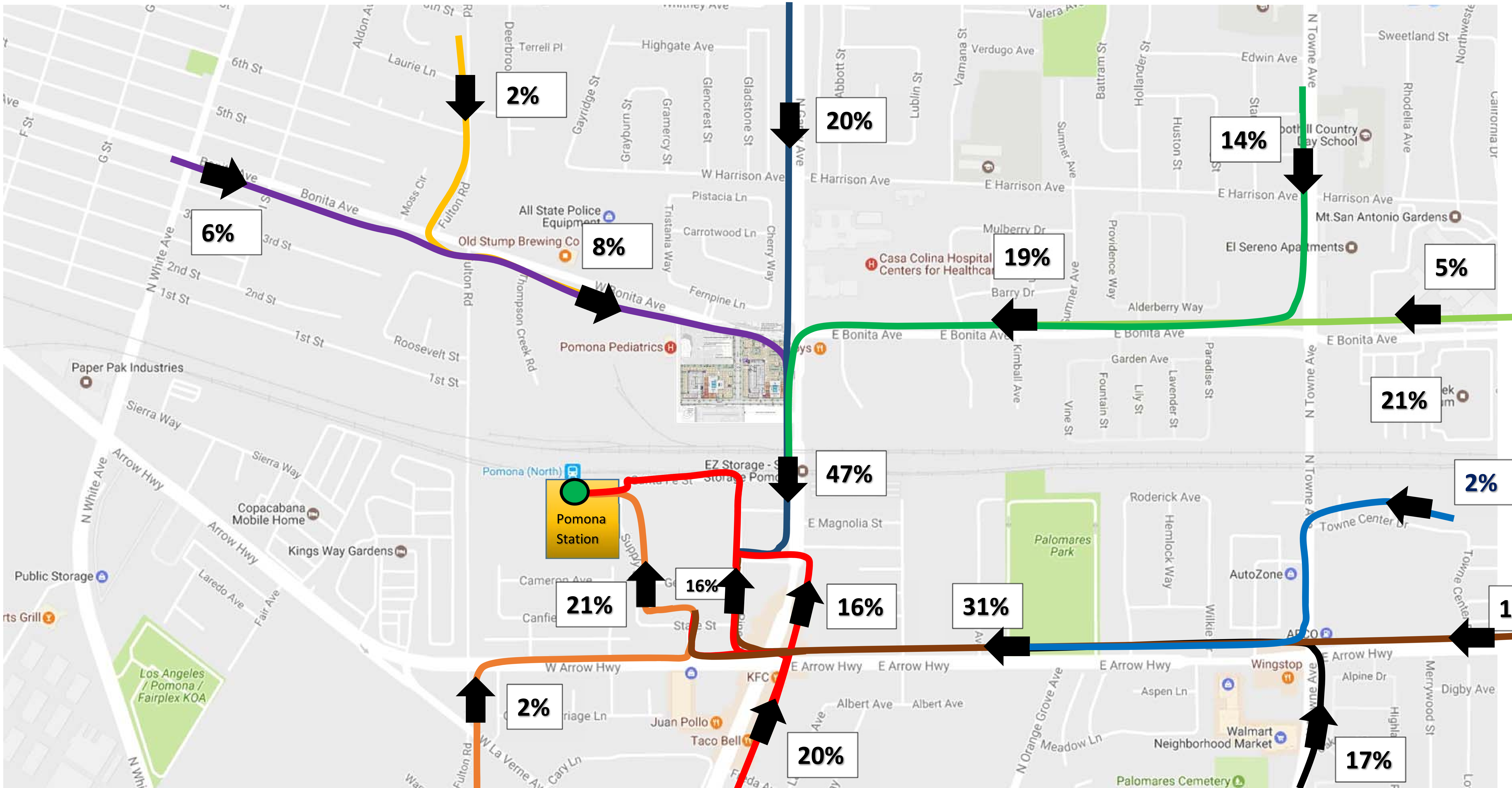
	No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	YEAR	TOT
AM_BD	65	La Verne Avenue and Arrow Highway	Signal	212	0	4	4	1	0	5	326	267	1	568	6	2035	1394
AM_BD	66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	28	0	80	13	366	0	0	419	13	2035	919
AM_BD	66B	S. Fulton Road and Bonita Avenue	OWSC	47	0	30	0	0	0	0	383	11	17	385	0	2035	873
AM_BD	67	Fulton Road and Arrow Highway	TWSC	19	24	21	18	9	22	24	311	0	18	535	36	2035	1037
AM_BD	68	Garey Avenue and Bonita Avenue	Signal	180	517	170	86	812	122	88	339	186	231	371	63	2035	3165
AM_BD	69	Garey Avenue and Santa Fe Street	OWSC	0	876	0	0	1348	0	0	0	20	0	0	0	2035	2244
AM_BD	70	Garey Avenue and Arrow Highway	Signal	242	698	129	180	773	44	68	276	47	127	663	224	2035	3471
AM_BD	71	Towne Avenue and Bonita Avenue	Signal	172	861	95	105	978	251	64	148	79	126	230	74	2035	3183
AM_BD	72	Towne Avenue and Towne Centre Drive	OWSC	0	1180	36	40	1186	0	0	0	0	16	0	12	2035	2470
AM_BD	73	Towne Avenue and Arrow Highway	Signal	277	756	117	227	986	295	195	380	123	114	837	225	2035	4532
AM_BD	1001	West Parking Entrance and Fulton Road	OWSC	0	106	11	0	77	0	0	0	0	0	0	3	2035	197
AM_BD	1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	11	0	1	7	58	0	0	595	55	2035	727
AM_BD	1003	Jacaranda Way and Bonita Avenue	OWSC	2	0	26	38	0	50	18	589	16	59	575	18	2035	1391
AM_BD	1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	26	0	392	0	0	793	159	2035	1370
AM_BD	1005	Future Street B and Garey Avenue	Signal	0	856	20	0	1195	34	0	0	153	0	0	10	2035	2268
AM_BD	1006	Future Street A and Garey Avenue	OWSC	22	0	53	0	0	0	0	560	93	43	630	0	2035	1401
AM_BD	1007	Grevilia Street and Garey Avenue	Signal	120	867	0	0	977	311	26	0	21	0	0	0	2035	2322
AM_BD	1008	Grevilia Street and Pine Street	TWSC	6	121	7	39	12	1	0	1	2	8	0	413	2035	610
AM_BD	1009	Amberson Street and Arrow Highway	TWSC	10	2	3	24	0	17	43	300	26	18	667	134	2035	1244

PM Peak Hour

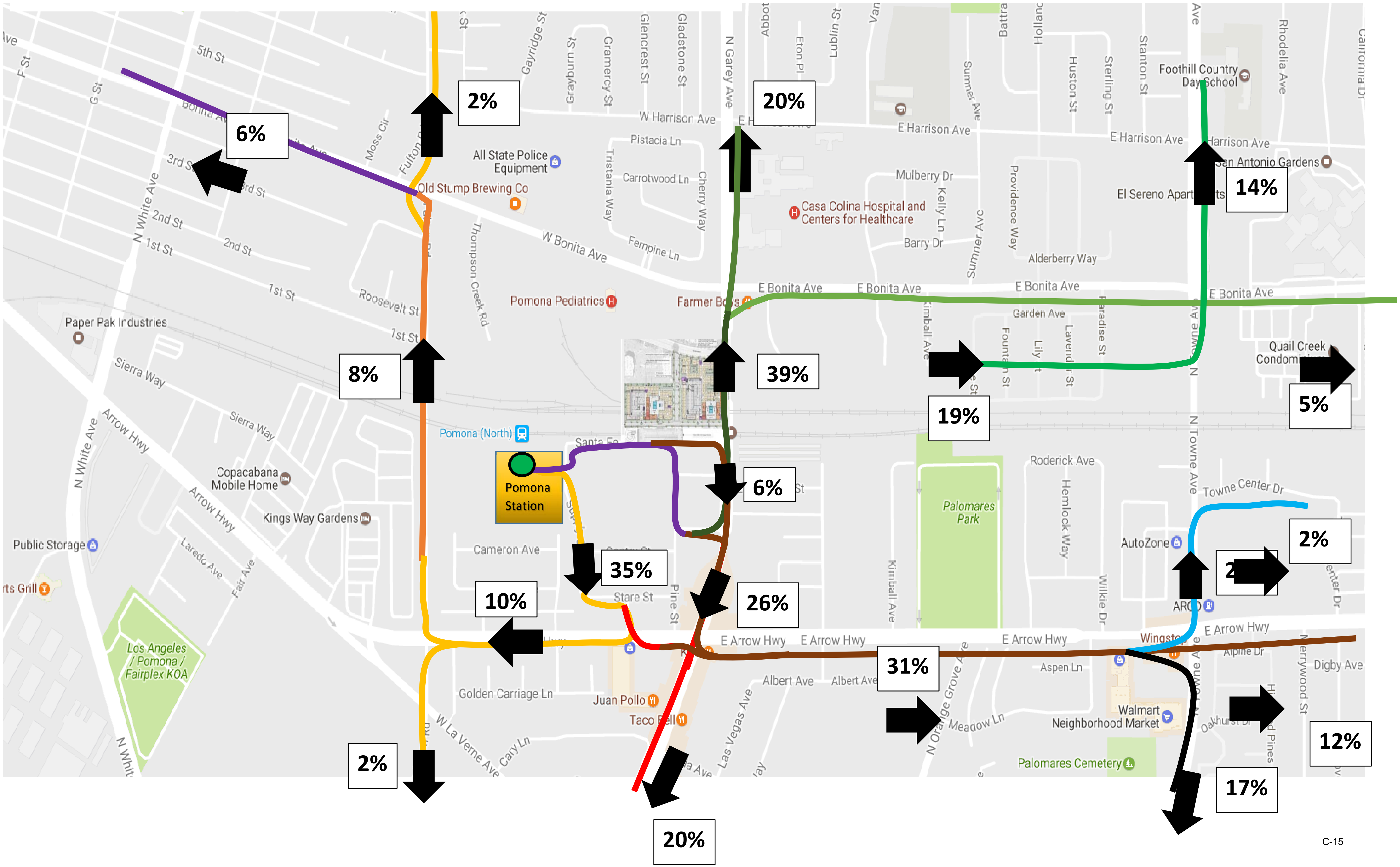
	No.	Intersection Name	Control	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	YEAR	TOT
PM_BD	65	La Verne Avenue and Arrow Highway	Signal	162	0	4	2	0	0	5	840	330	5	493	3	2035	1844
PM_BD	66A	N. Fulton Road and Bonita Avenue	OWSC	0	0	0	23	0	42	82	467	0	0	518	40	2035	1172
PM_BD	66B	S. Fulton Road and Bonita Avenue	OWSC	86	0	26	0	0	0	0	466	24	30	472	0	2035	1104
PM_BD	67	Fulton Road and Arrow Highway	TWSC	11	18	19	15	10	26	26	820	1	48	452	61	2035	1507
PM_BD	68	Garey Avenue and Bonita Avenue	Signal	223	811	254	71	569	65	117	517	169	147	394	98	2035	3435
PM_BD	69	Garey Avenue and Santa Fe Street	OWSC	0	1263	0	0	904	0	0	0	62	0	0	0	2035	2229
PM_BD	70	Garey Avenue and Arrow Highway	Signal	140	738	147	297	706	46	124	1061	113	107	375	155	2035	4009
PM_BD	71	Towne Avenue and Bonita Avenue	Signal	124	981	111	86	756	72	279	390	181	79	152	118	2035	3329
PM_BD	72	Towne Avenue and Towne Centre Drive	OWSC	0	1191	26	31	1093	0	0	0	0	29	0	38	2035	2408
PM_BD	73	Towne Avenue and Arrow Highway	Signal	187	764	117	180	856	164	356	836	189	217	489	130	2035	4485
PM_BD	1001	West Parking Entrance and Fulton Road	OWSC	0	116	10	0	90	0	0	0	0	0	0	22	2035	238
PM_BD	1002	South Parking Entrance and Santa Fe Street	OWSC	0	0	0	66	0	6	0	436	0	0	60	12	2035	580
PM_BD	1003	Jacaranda Way and Bonita Avenue	OWSC	14	0	58	17	0	17	27	746	7	19	482	26	2035	1413
PM_BD	1004	Pine Street and Arrow Highway	OWSC	0	0	0	0	0	29	0	1298	0	0	512	51	2035	1890
PM_BD	1005	Future Street B and Garey Avenue	Signal	0	1262	1	0	826	59	0	0	78	0	0	24	2035	2250
PM_BD	1006	Future Street A and Garey Avenue	OWSC	11	0	31	0	0	0	0	773	48	116	516	0	2035	1495
PM_BD	1007	Grevilia Street and Garey Avenue	Signal	33	984	0	0	902	34	236	0	147	0	0	0	2035	2336
PM_BD	1008	Grevilia Street and Pine Street	TWSC	0	21	10	359	11	1	0	9	11	7	1	43	2035	473
PM_BD	1009	Amberson Street and Arrow Highway	TWSC	23	0	23	170	0	89	18	1134	19	20	498	23	2035	2017

Restricted movements that need to be re-routed (must equal 0)

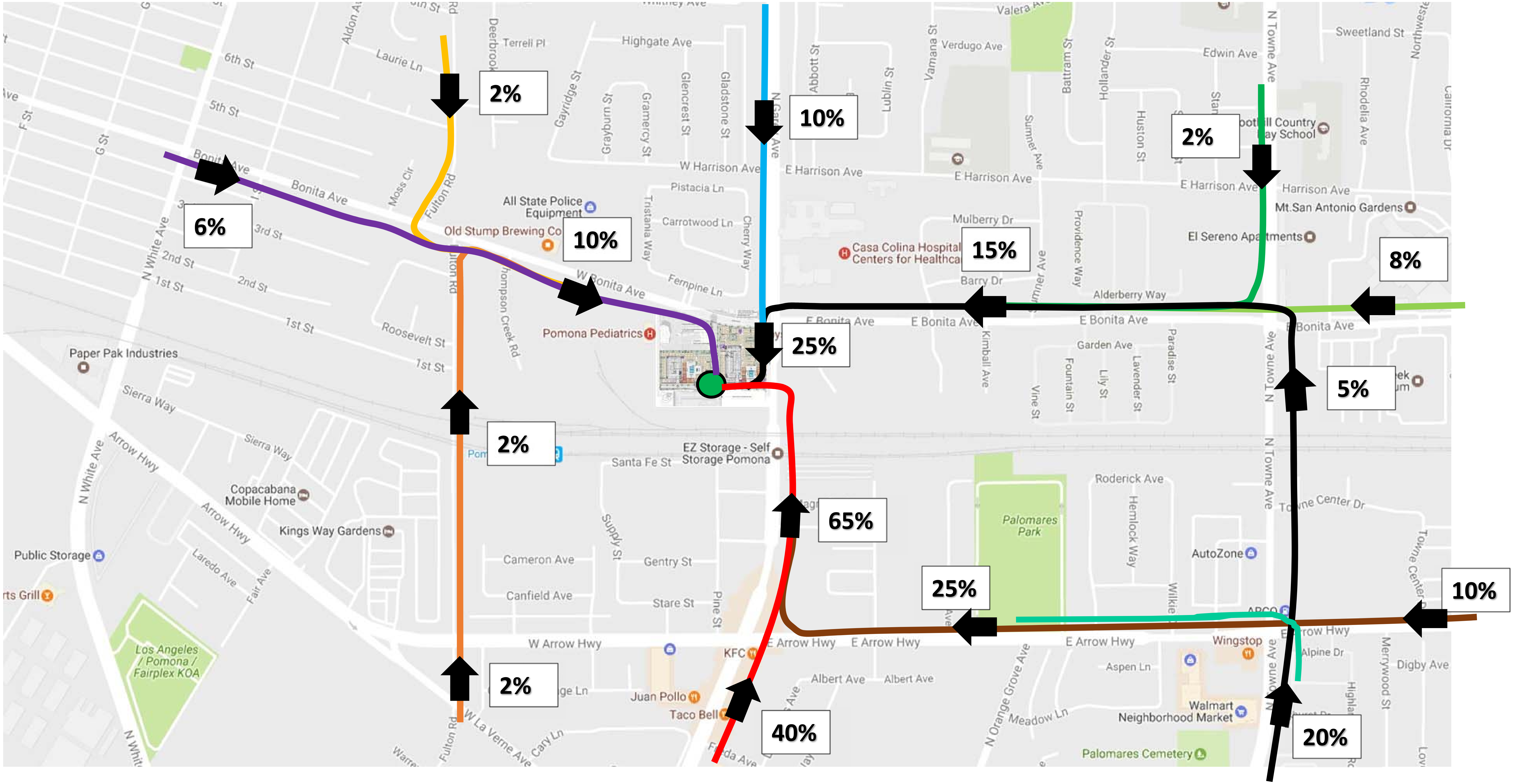
Inbound Trip Distribution for the New Parking Garage at Pomona Station



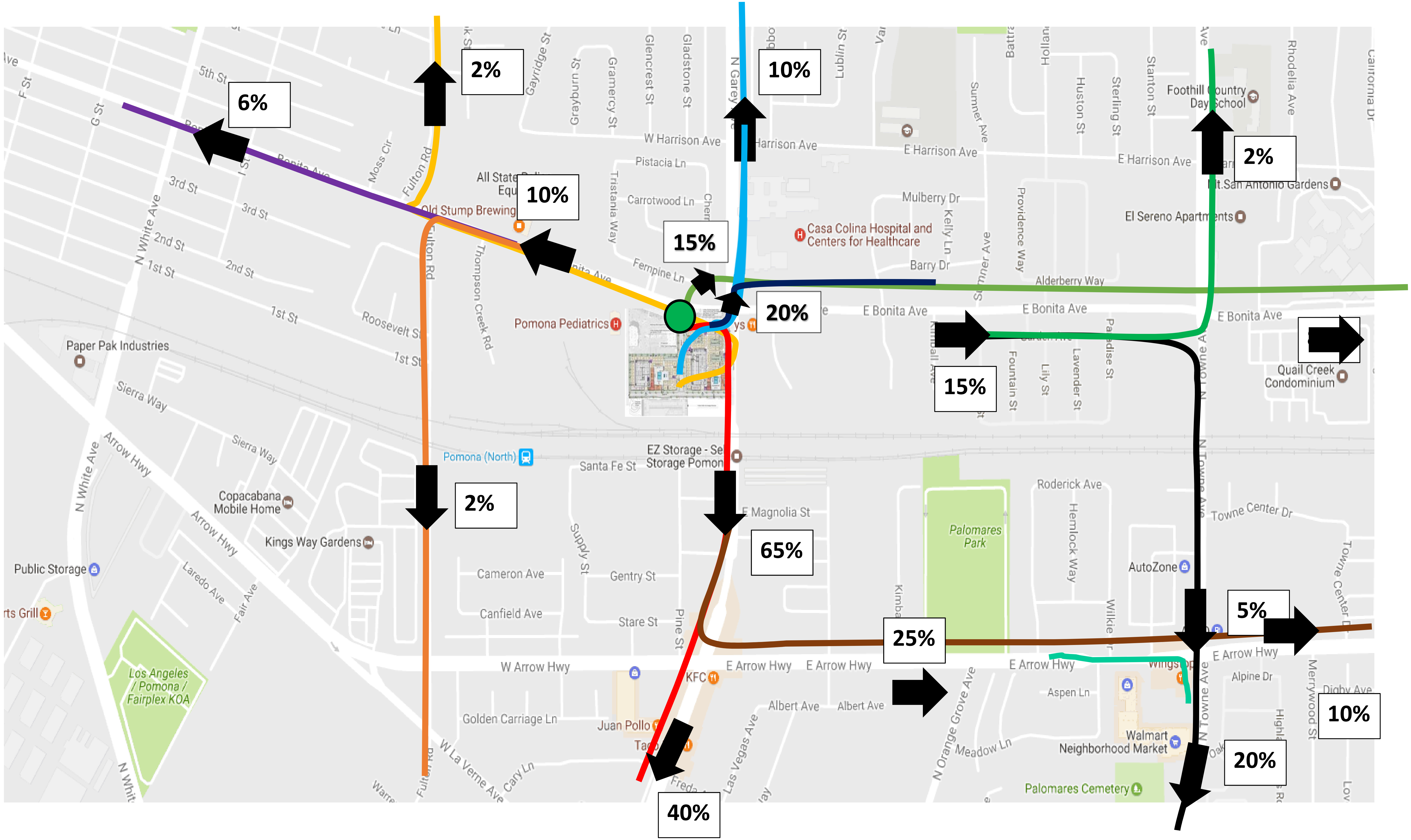
Outbound Trip Distribution for the New Parking Garage at Pomona Station



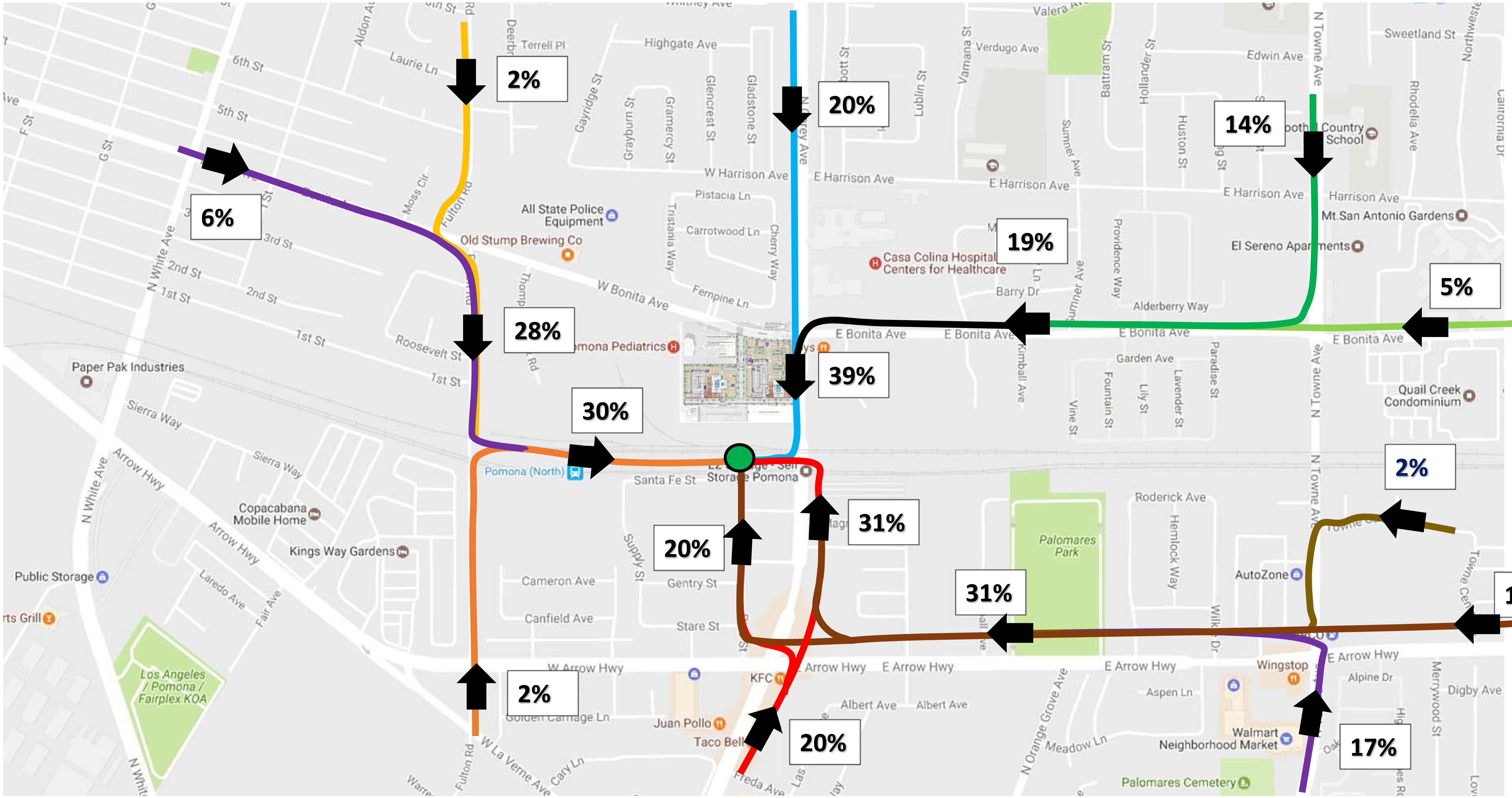
Inbound Trip Distribution for the Waterford Group Site



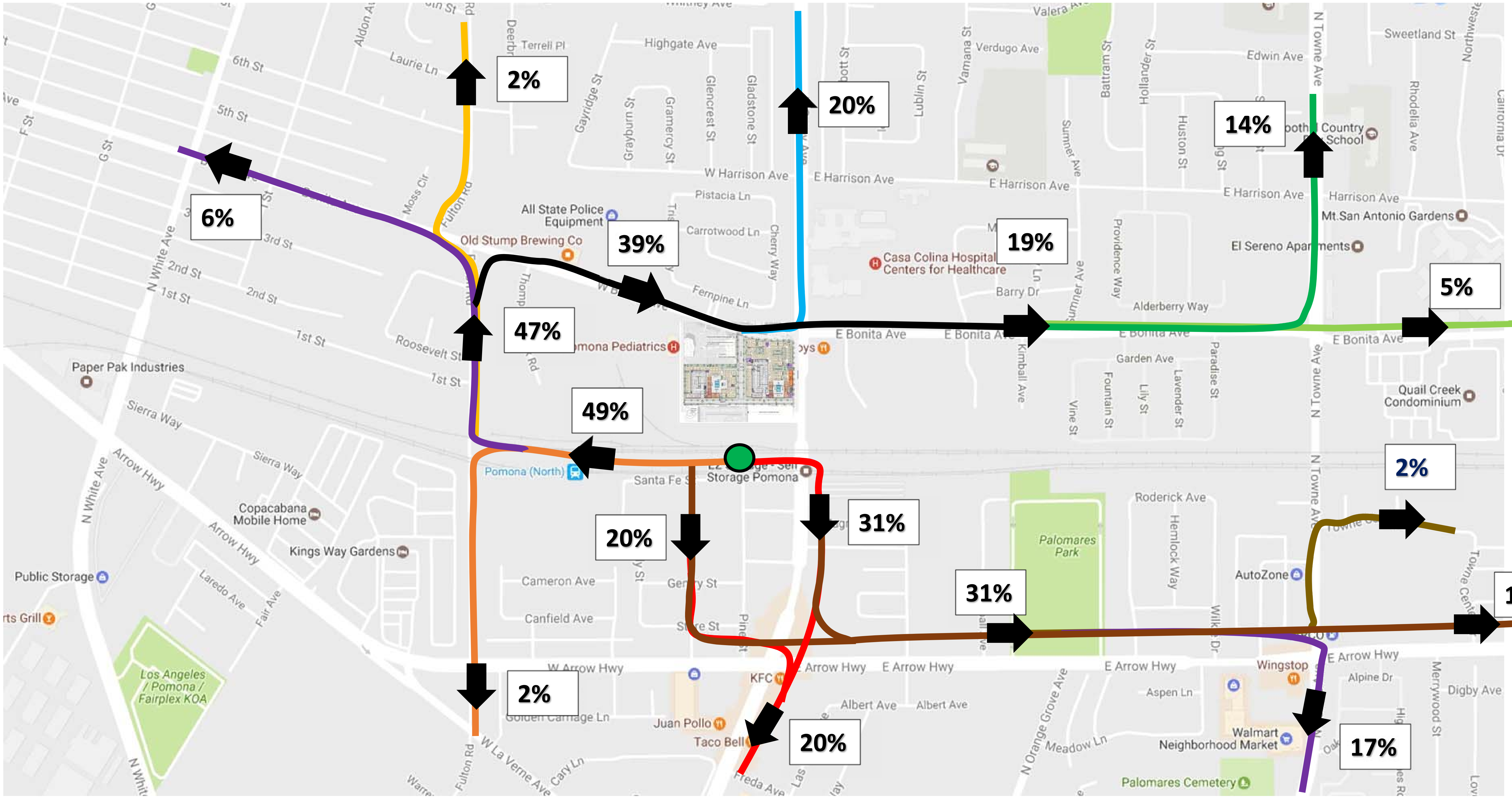
Outbound Trip Distribution for the Waterford Group Site



Inbound Trip Distribution for the Removal of Existing Parking Pomona Station



Outbound Trip Distribution for the Removal of Existing Parking at Pomona Station



Appendix D
2035 No Build Intersection LOS Worksheets

Notes:

Intersection 66A is summarized as Node 166 in the Synchro reports

Intersection 70 is summarized as Node 170 in the Synchro reports

Intersection 1009 is summarized as Node 1109 in the Synchro reports

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	331	271	1	576	6	215	0	4	4	1	0
Future Vol, veh/h	5	331	271	1	576	6	215	0	4	4	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	110	-	-	120	-	190	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	360	295	1	626	7	234	0	4	4	1	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	626	0	-	360	0	0	687	999	180	783	999	313
Stage 1	-	-	-	-	-	-	371	371	-	628	628	-
Stage 2	-	-	-	-	-	-	316	628	-	155	371	-
Critical Hdwy	4.14	-	-	5.34	-	-	6.99	6.54	7.14	6.99	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.74	5.54	-
Follow-up Hdwy	2.22	-	-	3.12	-	-	3.67	4.02	3.92	3.67	4.02	3.32
Pot Cap-1 Maneuver	952	-	0	787	-	-	359	242	708	311	242	683
Stage 1	-	-	0	-	-	-	553	618	-	424	474	-
Stage 2	-	-	0	-	-	-	646	474	-	793	618	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	952	-	-	787	-	-	356	240	708	308	240	683
Mov Cap-2 Maneuver	-	-	-	-	-	-	356	240	-	308	240	-
Stage 1	-	-	-	-	-	-	550	615	-	422	473	-
Stage 2	-	-	-	-	-	-	644	473	-	784	615	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	32.7	17.6
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	359	952	-	787	-	-	291
HCM Lane V/C Ratio	0.663	0.006	-	0.001	-	-	0.019
HCM Control Delay (s)	32.7	8.8	-	9.6	-	-	17.6
HCM Lane LOS	D	A	-	A	-	-	C
HCM 95th %tile Q(veh)	4.5	0	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	320	41	17	383	47	33
Future Vol, veh/h	320	41	17	383	47	33
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	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	348	45	18	416	51	36

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	392	0	823	370
Stage 1	-	-	-	-	370	-
Stage 2	-	-	-	-	453	-
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	-	-	1167	-	343	676
Stage 1	-	-	-	-	699	-
Stage 2	-	-	-	-	640	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1167	-	336	676
Mov Cap-2 Maneuver	-	-	-	-	336	-
Stage 1	-	-	-	-	699	-
Stage 2	-	-	-	-	627	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	14.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	336	676	-	-	1167	-
HCM Lane V/C Ratio	0.152	0.053	-	-	0.016	-
HCM Control Delay (s)	17.6	10.6	-	-	8.1	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	315	0	9	542	31	19	25	8	18	17	22
Future Vol, veh/h	24	315	0	9	542	31	19	25	8	18	17	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	115	-	-	115	-	-	-	-	50	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	342	0	10	589	34	21	27	9	20	18	24

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	623	0	0	342	0	0	718	1037	171	829	1021	311
Stage 1	-	-	-	-	-	-	395	395	-	626	626	-
Stage 2	-	-	-	-	-	-	323	642	-	203	395	-
Critical Hdwy	4.14	-	-	5.34	-	-	6.99	6.54	7.14	6.99	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.74	5.54	-
Follow-up Hdwy	2.22	-	-	3.12	-	-	3.67	4.02	3.92	3.67	4.02	3.32
Pot Cap-1 Maneuver	954	-	-	803	-	-	343	230	717	291	235	685
Stage 1	-	-	-	-	-	-	533	603	-	426	475	-
Stage 2	-	-	-	-	-	-	640	467	-	743	603	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	954	-	-	803	-	-	301	221	717	253	226	685
Mov Cap-2 Maneuver	-	-	-	-	-	-	301	221	-	253	226	-
Stage 1	-	-	-	-	-	-	518	587	-	414	469	-
Stage 2	-	-	-	-	-	-	586	461	-	681	587	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.1	20.8	18.1
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	250	717	954	-	-	803	-	-	239	685
HCM Lane V/C Ratio	0.191	0.012	0.027	-	-	0.012	-	-	0.159	0.035
HCM Control Delay (s)	22.8	10.1	8.9	-	-	9.5	-	-	22.9	10.4
HCM Lane LOS	C	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.7	0	0.1	-	-	0	-	-	0.6	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	344	136	114	376	64	171	511	160	87	696	124
Future Volume (veh/h)	86	344	136	114	376	64	171	511	160	87	696	124
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	93	374	148	124	409	70	186	555	174	95	757	135
Adj No. of Lanes	1	1	1	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	272	642	546	284	642	546	233	1333	597	122	1113	498
Arrive On Green	0.34	0.34	0.34	0.34	0.34	0.34	0.13	0.38	0.38	0.07	0.31	0.31
Sat Flow, veh/h	912	1863	1583	876	1863	1583	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	93	374	148	124	409	70	186	555	174	95	757	135
Grp Sat Flow(s),veh/h/ln	912	1863	1583	876	1863	1583	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	5.5	9.4	3.9	7.7	10.6	1.7	5.8	6.6	4.4	3.0	10.7	3.7
Cycle Q Clear(g_c), s	16.0	9.4	3.9	17.2	10.6	1.7	5.8	6.6	4.4	3.0	10.7	3.7
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	272	642	546	284	642	546	233	1333	597	122	1113	498
V/C Ratio(X)	0.34	0.58	0.27	0.44	0.64	0.13	0.80	0.42	0.29	0.78	0.68	0.27
Avail Cap(c_a), veh/h	276	651	553	288	651	553	310	1333	597	248	1113	498
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	22.5	15.4	13.6	22.4	15.8	12.9	24.1	13.2	12.5	26.2	17.1	14.7
Incr Delay (d2), s/veh	0.7	1.3	0.3	1.1	2.0	0.1	10.3	1.0	1.2	10.1	3.4	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	5.0	1.7	1.9	5.7	0.8	3.5	3.4	2.1	1.8	5.7	1.8
LnGrp Delay(d),s/veh	23.2	16.7	13.8	23.5	17.8	13.0	34.4	14.1	13.7	36.3	20.5	16.0
LnGrp LOS	C	B	B	C	B	B	C	B	B	D	C	B
Approach Vol, veh/h		615			603			915			987	
Approach Delay, s/veh		17.0			18.4			18.2			21.4	
Approach LOS		B			B			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.9	25.6		23.7	11.5	22.0		23.7
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	8.0	20.0		20.0	10.0	18.0		20.0
Max Q Clear Time (g_c+I1), s	5.0	8.6		18.0	7.8	12.7		19.2
Green Ext Time (p_c), s	0.0	7.2		1.3	0.1	3.9		0.6

Intersection Summary			
HCM 2010 Ctrl Delay			19.0
HCM 2010 LOS			B

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	20	29	861	1066	28
Future Vol, veh/h	0	20	29	861	1066	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	80	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	22	32	936	1159	30

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	595	1189	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	447	583	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	447	583	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.5	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	583	-	447	-	-
HCM Lane V/C Ratio	0.054	-	0.049	-	-
HCM Control Delay (s)	11.5	-	13.5	-	-
HCM Lane LOS	B	-	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	139	80	128	203	75	174	873	96	106	992	164
Future Volume (veh/h)	56	139	80	128	203	75	174	873	96	106	992	164
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	61	151	87	139	221	82	189	949	104	115	1078	178
Adj No. of Lanes	1	1	1	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	271	445	378	320	445	378	326	2204	986	383	2204	986
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.62	0.62	0.62	0.62	0.62	0.62
Sat Flow, veh/h	1072	1863	1583	1138	1863	1583	440	3539	1583	534	3539	1583
Grp Volume(v), veh/h	61	151	87	139	221	82	189	949	104	115	1078	178
Grp Sat Flow(s),veh/h/ln	1072	1863	1583	1138	1863	1583	440	1770	1583	534	1770	1583
Q Serve(g_s), s	3.0	3.9	2.6	6.7	5.9	2.4	23.6	8.0	1.5	8.2	9.6	2.8
Cycle Q Clear(g_c), s	8.9	3.9	2.6	10.5	5.9	2.4	33.1	8.0	1.5	16.2	9.6	2.8
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	271	445	378	320	445	378	326	2204	986	383	2204	986
V/C Ratio(X)	0.23	0.34	0.23	0.43	0.50	0.22	0.58	0.43	0.11	0.30	0.49	0.18
Avail Cap(c_a), veh/h	311	516	438	363	516	438	326	2204	986	383	2204	986
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	22.9	18.2	17.7	22.6	19.0	17.7	14.9	5.6	4.4	9.8	5.9	4.6
Incr Delay (d2), s/veh	0.4	0.4	0.3	0.9	0.9	0.3	7.3	0.6	0.2	2.0	0.8	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	2.0	1.1	2.2	3.1	1.1	3.5	4.0	0.7	1.4	4.9	1.3
LnGrp Delay(d),s/veh	23.3	18.7	18.0	23.5	19.9	17.9	22.2	6.2	4.6	11.8	6.7	5.0
LnGrp LOS	C	B	B	C	B	B	C	A	A	B	A	A
Approach Vol, veh/h		299			442			1242			1371	
Approach Delay, s/veh		19.4			20.7			8.5			6.9	
Approach LOS		B			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		40.0		17.8		40.0		17.8
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		36.0		16.0		36.0		16.0
Max Q Clear Time (g_c+I1), s		35.1		10.9		18.2		12.5
Green Ext Time (p_c), s		0.8		1.7		15.5		1.3

Intersection Summary	
HCM 2010 Ctrl Delay	10.4
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	12	1196	35	41	1203
Future Vol, veh/h	4	12	1196	35	41	1203
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	30	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	13	1300	38	45	1308

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2062	669	0	0	1338	0
Stage 1	1319	-	-	-	-	-
Stage 2	743	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	47	400	-	-	511	-
Stage 1	214	-	-	-	-	-
Stage 2	431	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	43	400	-	-	511	-
Mov Cap-2 Maneuver	144	-	-	-	-	-
Stage 1	214	-	-	-	-	-
Stage 2	393	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.4	0	0.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	144	400	511	-
HCM Lane V/C Ratio	-	-	0.03	0.033	0.087	-
HCM Control Delay (s)	-	-	30.8	14.3	12.7	-
HCM Lane LOS	-	-	D	B	B	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	0.3	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	197	379	115	116	775	228	177	767	119	230	1000	287
Future Volume (veh/h)	197	379	115	116	775	228	177	767	119	230	1000	287
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	214	412	125	126	842	248	192	834	129	250	1087	312
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	237	999	292	158	825	241	217	990	153	276	1258	563
Arrive On Green	0.13	0.26	0.26	0.09	0.21	0.21	0.12	0.32	0.32	0.16	0.36	0.36
Sat Flow, veh/h	1774	3910	1142	1774	3907	1144	1774	3073	475	1774	3539	1583
Grp Volume(v), veh/h	214	355	182	126	730	360	192	480	483	250	1087	312
Grp Sat Flow(s),veh/h/ln	1774	1695	1661	1774	1695	1661	1774	1770	1779	1774	1770	1583
Q Serve(g_s), s	10.7	7.8	8.2	6.3	19.0	19.0	9.6	22.7	22.7	12.5	25.7	9.3
Cycle Q Clear(g_c), s	10.7	7.8	8.2	6.3	19.0	19.0	9.6	22.7	22.7	12.5	25.7	9.3
Prop In Lane	1.00		0.69	1.00		0.69	1.00		0.27	1.00		1.00
Lane Grp Cap(c), veh/h	237	866	424	158	716	351	217	570	573	276	1258	563
V/C Ratio(X)	0.90	0.41	0.43	0.80	1.02	1.03	0.89	0.84	0.84	0.91	0.86	0.55
Avail Cap(c_a), veh/h	237	866	424	237	716	351	217	570	573	276	1258	563
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	38.4	27.9	28.0	40.2	35.5	35.5	38.9	28.4	28.4	37.4	27.0	10.0
Incr Delay (d2), s/veh	34.2	0.3	0.7	10.8	38.7	55.2	32.4	14.1	14.0	30.9	8.0	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.5	3.7	3.9	3.6	12.7	14.0	6.6	13.3	13.4	8.5	13.9	4.7
LnGrp Delay(d),s/veh	72.6	28.2	28.7	51.0	74.2	90.7	71.2	42.4	42.4	68.3	35.0	13.9
LnGrp LOS	E	C	C	D	F	F	E	D	D	E	C	B
Approach Vol, veh/h		751			1216			1155			1649	
Approach Delay, s/veh		41.0			76.7			47.2			36.0	
Approach LOS		D			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	33.0	12.0	27.0	15.0	36.0	16.0	23.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	14.0	29.0	12.0	19.0	11.0	32.0	12.0	19.0
Max Q Clear Time (g_c+I1), s	14.5	24.7	8.3	10.2	11.6	27.7	12.7	21.0
Green Ext Time (p_c), s	0.0	3.8	0.1	2.8	0.0	3.9	0.0	0.0

Intersection Summary			
HCM 2010 Ctrl Delay			49.9
HCM 2010 LOS			D

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	13	345	417	12	16	81
Future Vol, veh/h	13	345	417	12	16	81
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	50
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	375	453	13	17	88

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	466	0	-	0	863	460
Stage 1	-	-	-	-	460	-
Stage 2	-	-	-	-	403	-
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	1095	-	-	-	325	601
Stage 1	-	-	-	-	636	-
Stage 2	-	-	-	-	675	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1095	-	-	-	320	601
Mov Cap-2 Maneuver	-	-	-	-	320	-
Stage 1	-	-	-	-	636	-
Stage 2	-	-	-	-	664	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	12.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1095	-	-	-	320	601
HCM Lane V/C Ratio	0.013	-	-	-	0.054	0.146
HCM Control Delay (s)	8.3	0	-	-	16.9	12
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	271	43	129	548	163	138	680	131	175	778	45
Future Volume (veh/h)	69	271	43	129	548	163	138	680	131	175	778	45
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	75	295	47	140	596	177	150	739	142	190	846	49
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	96	801	124	177	885	257	190	964	185	235	1193	69
Arrive On Green	0.05	0.18	0.18	0.10	0.23	0.23	0.11	0.33	0.33	0.13	0.35	0.35
Sat Flow, veh/h	1774	4444	687	1774	3914	1138	1774	2963	569	1774	3401	197
Grp Volume(v), veh/h	75	223	119	140	515	258	150	441	440	190	440	455
Grp Sat Flow(s),veh/h/ln	1774	1695	1741	1774	1695	1662	1774	1770	1762	1774	1770	1828
Q Serve(g_s), s	2.6	3.5	3.7	4.7	8.5	8.7	5.0	13.7	13.7	6.4	13.1	13.1
Cycle Q Clear(g_c), s	2.6	3.5	3.7	4.7	8.5	8.7	5.0	13.7	13.7	6.4	13.1	13.1
Prop In Lane	1.00		0.39	1.00		0.68	1.00		0.32	1.00		0.11
Lane Grp Cap(c), veh/h	96	611	314	177	767	376	190	576	573	235	621	641
V/C Ratio(X)	0.78	0.36	0.38	0.79	0.67	0.69	0.79	0.77	0.77	0.81	0.71	0.71
Avail Cap(c_a), veh/h	203	888	456	203	888	435	261	608	606	290	637	658
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.5	22.0	22.0	26.9	21.6	21.7	26.6	18.5	18.5	25.7	17.1	17.1
Incr Delay (d2), s/veh	13.0	0.4	0.8	16.7	1.6	3.7	10.5	5.6	5.6	12.8	3.5	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	1.7	1.8	3.1	4.1	4.3	3.0	7.5	7.5	3.9	7.0	7.2
LnGrp Delay(d),s/veh	41.5	22.3	22.8	43.6	23.2	25.4	37.1	24.1	24.1	38.5	20.7	20.6
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		417			913			1031			1085	
Approach Delay, s/veh		25.9			26.9			26.0			23.8	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.1	23.9	10.1	15.0	10.5	25.4	7.3	17.8
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	10.0	21.0	7.0	16.0	9.0	22.0	7.0	16.0
Max Q Clear Time (g_c+I1), s	8.4	15.7	6.7	5.7	7.0	15.1	4.6	10.7
Green Ext Time (p_c), s	0.1	4.2	0.0	5.1	0.1	5.2	0.0	3.1

Intersection Summary	
HCM 2010 Ctrl Delay	25.5
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	10	102	12	29	78
Future Vol, veh/h	8	10	102	12	29	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	11	111	13	32	85

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	265	117	0	0	124	0
Stage 1	117	-	-	-	-	-
Stage 2	148	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	724	935	-	-	1463	-
Stage 1	908	-	-	-	-	-
Stage 2	880	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	707	935	-	-	1463	-
Mov Cap-2 Maneuver	707	-	-	-	-	-
Stage 1	908	-	-	-	-	-
Stage 2	860	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	818	1463	-
HCM Lane V/C Ratio	-	-	0.024	0.022	-
HCM Control Delay (s)	-	-	9.5	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

Intersection						
Int Delay, s/veh	1.1					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	11	15	66	6	1
Future Vol, veh/h	7	11	15	66	6	1
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	12	16	72	7	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	88	0	-	0	79	52
Stage 1	-	-	-	-	52	-
Stage 2	-	-	-	-	27	-
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	1508	-	-	-	924	1016
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	996	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1508	-	-	-	919	1016
Mov Cap-2 Maneuver	-	-	-	-	919	-
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	991	-

Approach	EB	WB	SB
HCM Control Delay, s	2.9	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1508	-	-	-	932
HCM Lane V/C Ratio	0.005	-	-	-	0.008
HCM Control Delay (s)	7.4	0	-	-	8.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	456	16	60	577	18	2	0	26	39	0	51
Future Vol, veh/h	18	456	16	60	577	18	2	0	26	39	0	51
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	50	-	50	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	496	17	65	627	20	2	0	28	42	0	55

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	627	0	0	513	0	0	1328	1301	504	1316	1310	627
Stage 1	-	-	-	-	-	-	543	543	-	758	758	-
Stage 2	-	-	-	-	-	-	785	758	-	558	552	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	955	-	-	1052	-	-	132	161	568	135	159	484
Stage 1	-	-	-	-	-	-	524	520	-	399	415	-
Stage 2	-	-	-	-	-	-	386	415	-	514	515	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	955	-	-	1052	-	-	110	148	568	120	146	484
Mov Cap-2 Maneuver	-	-	-	-	-	-	110	148	-	120	146	-
Stage 1	-	-	-	-	-	-	513	509	-	391	389	-
Stage 2	-	-	-	-	-	-	321	389	-	478	504	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.8	13.8	36.5
HCM LOS			B	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	438	955	-	-	1052	-	-	209
HCM Lane V/C Ratio	0.069	0.02	-	-	0.062	-	-	0.468
HCM Control Delay (s)	13.8	8.8	-	-	8.6	-	-	36.5
HCM Lane LOS	B	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.2	-	-	2.3

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	678	53	0	26
Future Vol, veh/h	0	0	678	53	0	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	-	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	737	58	0	28

Major/Minor	Major2		Minor2	
Conflicting Flow All	-	0	-	397
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	515
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	515
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	SB
HCM Control Delay, s	0	12.4
HCM LOS		B

Minor Lane/Major Mvmt	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	515
HCM Lane V/C Ratio	-	-	0.055
HCM Control Delay (s)	-	-	12.4
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.2

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	153	0	0	10	0	841	20	0	941	6
Future Vol, veh/h	0	0	153	0	0	10	0	841	20	0	941	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	166	0	0	11	0	914	22	0	1023	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	515	-	-	468	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	6.94	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	3.32	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	505	0	0	542	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	505	-	-	542	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.6	11.8	0	0
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	505	542	-	-
HCM Lane V/C Ratio	-	-	0.329	0.02	-	-
HCM Control Delay (s)	-	-	15.6	11.8	-	-
HCM Lane LOS	-	-	C	B	-	-
HCM 95th %tile Q(veh)	-	-	1.4	0.1	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	516	5	43	628	27	50
Future Vol, veh/h	516	5	43	628	27	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	50	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	561	5	47	683	29	54

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	566	0	1340	564
Stage 1	-	-	-	-	564	-
Stage 2	-	-	-	-	776	-
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	-	-	1006	-	168	525
Stage 1	-	-	-	-	569	-
Stage 2	-	-	-	-	454	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1006	-	160	525
Mov Cap-2 Maneuver	-	-	-	-	295	-
Stage 1	-	-	-	-	569	-
Stage 2	-	-	-	-	433	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	16
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	412	-	-	1006	-
HCM Lane V/C Ratio	0.203	-	-	0.046	-
HCM Control Delay (s)	16	-	-	8.8	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.8	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	8	16	895	989	5
Future Vol, veh/h	0	8	16	895	989	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	9	17	973	1075	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	540	1080	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	486	641	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	486	641	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.5	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	641	-	486	-	-
HCM Lane V/C Ratio	0.027	-	0.018	-	-
HCM Control Delay (s)	10.8	-	12.5	-	-
HCM Lane LOS	B	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1	2	8	0	2	6	27	7	0	12	1
Future Vol, veh/h	0	1	2	8	0	2	6	27	7	0	12	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1	2	9	0	2	7	29	8	0	13	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	61	64	14	61	60	33	14	0	0	37	0	0
Stage 1	14	14	-	46	46	-	-	-	-	-	-	-
Stage 2	47	50	-	15	14	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	934	827	1066	934	831	1041	1604	-	-	1574	-	-
Stage 1	1006	884	-	968	857	-	-	-	-	-	-	-
Stage 2	967	853	-	1005	884	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	929	824	1066	928	828	1041	1604	-	-	1574	-	-
Mov Cap-2 Maneuver	929	824	-	928	828	-	-	-	-	-	-	-
Stage 1	1002	884	-	964	854	-	-	-	-	-	-	-
Stage 2	961	850	-	1002	884	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.7	8.8	1.1	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1604	-	-	971	949	1574	-	-
HCM Lane V/C Ratio	0.004	-	-	0.003	0.011	-	-	-
HCM Control Delay (s)	7.3	0	-	8.7	8.8	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	304	26	18	676	10	10	2	3	7	0	10
Future Vol, veh/h	30	304	26	18	676	10	10	2	3	7	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	110	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	33	330	28	20	735	11	11	2	3	8	0	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	746	0	0	359	0	0	817	1195	179	977	1203	373
Stage 1	-	-	-	-	-	-	410	410	-	779	779	-
Stage 2	-	-	-	-	-	-	407	785	-	198	424	-
Critical Hdwy	4.14	-	-	5.34	-	-	6.99	6.54	7.14	6.99	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.74	5.54	-
Follow-up Hdwy	2.22	-	-	3.12	-	-	3.67	4.02	3.92	3.67	4.02	3.32
Pot Cap-1 Maneuver	858	-	-	788	-	-	296	185	709	232	183	624
Stage 1	-	-	-	-	-	-	520	594	-	345	404	-
Stage 2	-	-	-	-	-	-	572	402	-	748	585	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	858	-	-	788	-	-	277	173	709	218	171	624
Mov Cap-2 Maneuver	-	-	-	-	-	-	277	173	-	218	171	-
Stage 1	-	-	-	-	-	-	500	571	-	332	394	-
Stage 2	-	-	-	-	-	-	548	392	-	713	563	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0.2	18.2	15.8
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	289	858	-	-	788	-	-	353
HCM Lane V/C Ratio	0.056	0.038	-	-	0.025	-	-	0.052
HCM Control Delay (s)	18.2	9.4	-	-	9.7	-	-	15.8
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.1	-	-	0.2

Intersection	
Int Delay, s/veh	18.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	852	335	5	512	3	164	0	4	2	0	0
Future Vol, veh/h	5	852	335	5	512	3	164	0	4	2	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	110	-	-	120	-	190	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	926	364	5	557	3	178	0	4	2	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	557	0	-	926	0	0	1226	1504	463	948	1504	278
Stage 1	-	-	-	-	-	-	937	937	-	567	567	-
Stage 2	-	-	-	-	-	-	289	567	-	381	937	-
Critical Hdwy	4.14	-	-	5.34	-	-	6.99	6.54	7.14	6.99	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.74	5.54	-
Follow-up Hdwy	2.22	-	-	3.12	-	-	3.67	4.02	3.92	3.67	4.02	3.32
Pot Cap-1 Maneuver	1010	-	0	425	-	-	~ 159	120	467	243	120	719
Stage 1	-	-	0	-	-	-	225	342	-	461	505	-
Stage 2	-	-	0	-	-	-	670	505	-	580	342	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1010	-	-	425	-	-	~ 157	118	467	238	118	719
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 157	118	-	238	118	-
Stage 1	-	-	-	-	-	-	224	340	-	459	499	-
Stage 2	-	-	-	-	-	-	662	499	-	572	340	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	171.4	20.3
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	160	1010	-	425	-	-	238
HCM Lane V/C Ratio	1.141	0.005	-	0.013	-	-	0.009
HCM Control Delay (s)	171.4	8.6	-	13.6	-	-	20.3
HCM Lane LOS	F	A	-	B	-	-	C
HCM 95th %tile Q(veh)	9.8	0	-	0	-	-	0

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	455	41	30	451	54	36
Future Vol, veh/h	455	41	30	451	54	36
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	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	495	45	33	490	59	39

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	539	0	1072	517
Stage 1	-	-	-	-	517	-
Stage 2	-	-	-	-	555	-
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	-	-	1029	-	244	558
Stage 1	-	-	-	-	598	-
Stage 2	-	-	-	-	575	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1029	-	233	558
Mov Cap-2 Maneuver	-	-	-	-	233	-
Stage 1	-	-	-	-	598	-
Stage 2	-	-	-	-	550	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	20.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	233	558	-	-	1029	-
HCM Lane V/C Ratio	0.252	0.07	-	-	0.032	-
HCM Control Delay (s)	25.6	11.9	-	-	8.6	0
HCM Lane LOS	D	B	-	-	A	A
HCM 95th %tile Q(veh)	1	0.2	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	831	1	12	458	13	11	18	18	15	11	51
Future Vol, veh/h	26	831	1	12	458	13	11	18	18	15	11	51
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	115	-	-	115	-	-	-	-	50	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	903	1	13	498	14	12	20	20	16	12	55

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	512	0	0	904	0	0	1241	1498	452	959	1492	256
Stage 1	-	-	-	-	-	-	960	960	-	531	531	-
Stage 2	-	-	-	-	-	-	281	538	-	428	961	-
Critical Hdwy	4.14	-	-	5.34	-	-	6.99	6.54	7.14	6.99	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.74	5.54	-
Follow-up Hdwy	2.22	-	-	3.12	-	-	3.67	4.02	3.92	3.67	4.02	3.32
Pot Cap-1 Maneuver	1050	-	-	435	-	-	155	121	474	239	122	743
Stage 1	-	-	-	-	-	-	217	333	-	484	524	-
Stage 2	-	-	-	-	-	-	677	521	-	543	333	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1050	-	-	435	-	-	126	114	474	191	115	743
Mov Cap-2 Maneuver	-	-	-	-	-	-	126	114	-	191	115	-
Stage 1	-	-	-	-	-	-	211	324	-	471	508	-
Stage 2	-	-	-	-	-	-	593	505	-	476	324	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.3	33.5	18.5
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	118	474	1050	-	-	435	-	-	149	743
HCM Lane V/C Ratio	0.267	0.041	0.027	-	-	0.03	-	-	0.19	0.075
HCM Control Delay (s)	46.3	12.9	8.5	-	-	13.5	-	-	34.7	10.2
HCM Lane LOS	E	B	A	-	-	B	-	-	D	B
HCM 95th %tile Q(veh)	1	0.1	0.1	-	-	0.1	-	-	0.7	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	529	166	118	399	99	213	700	141	72	567	66
Future Volume (veh/h)	120	529	166	118	399	99	213	700	141	72	567	66
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	130	575	180	128	434	108	232	761	153	78	616	72
Adj No. of Lanes	1	1	1	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	308	774	658	212	774	658	274	1260	564	100	913	409
Arrive On Green	0.42	0.42	0.42	0.42	0.42	0.42	0.15	0.36	0.36	0.06	0.26	0.26
Sat Flow, veh/h	860	1863	1583	706	1863	1583	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	130	575	180	128	434	108	232	761	153	78	616	72
Grp Sat Flow(s),veh/h/ln	860	1863	1583	706	1863	1583	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	9.5	18.2	5.2	10.8	12.4	3.0	8.9	12.3	4.8	3.0	10.9	2.5
Cycle Q Clear(g_c), s	21.8	18.2	5.2	29.0	12.4	3.0	8.9	12.3	4.8	3.0	10.9	2.5
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	308	774	658	212	774	658	274	1260	564	100	913	409
V/C Ratio(X)	0.42	0.74	0.27	0.60	0.56	0.16	0.85	0.60	0.27	0.78	0.67	0.18
Avail Cap(c_a), veh/h	308	774	658	212	774	658	280	1260	564	127	913	409
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	23.8	17.2	13.4	30.3	15.5	12.8	28.7	18.4	16.0	32.5	23.3	20.1
Incr Delay (d2), s/veh	0.9	3.9	0.2	4.7	0.9	0.1	20.6	2.2	1.2	21.1	4.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	10.1	2.3	2.7	6.5	1.3	5.9	6.4	2.3	2.1	5.8	1.2
LnGrp Delay(d),s/veh	24.8	21.1	13.7	35.0	16.4	12.9	49.3	20.6	17.2	53.6	27.2	21.1
LnGrp LOS	C	C	B	C	B	B	D	C	B	D	C	C
Approach Vol, veh/h		885			670			1146			766	
Approach Delay, s/veh		20.1			19.4			25.9			29.3	
Approach LOS		C			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.9	28.8		33.0	14.8	22.0		33.0
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	5.0	24.0		29.0	11.0	18.0		29.0
Max Q Clear Time (g_c+I1), s	5.0	14.3		23.8	10.9	12.9		31.0
Green Ext Time (p_c), s	0.0	6.4		3.7	0.0	3.8		0.0

Intersection Summary			
HCM 2010 Ctrl Delay			23.9
HCM 2010 LOS			C

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	43	18	1040	896	12
Future Vol, veh/h	0	43	18	1040	896	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	80	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	47	20	1130	974	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	493	987	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	522	696	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	522	696	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.6	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	696	-	522	-	-
HCM Lane V/C Ratio	0.028	-	0.09	-	-
HCM Control Delay (s)	10.3	-	12.6	-	-
HCM Lane LOS	B	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	199	282	184	80	152	120	125	995	113	87	767	65
Future Volume (veh/h)	199	282	184	80	152	120	125	995	113	87	767	65
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	216	307	200	87	165	130	136	1082	123	95	834	71
Adj No. of Lanes	1	1	1	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	369	555	472	262	555	472	387	2011	900	295	2011	900
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.57	0.57	0.57	0.57	0.57	0.57
Sat Flow, veh/h	1080	1863	1583	889	1863	1583	613	3539	1583	462	3539	1583
Grp Volume(v), veh/h	216	307	200	87	165	130	136	1082	123	95	834	71
Grp Sat Flow(s),veh/h/ln	1080	1863	1583	889	1863	1583	613	1770	1583	462	1770	1583
Q Serve(g_s), s	11.5	8.3	6.1	5.5	4.1	3.8	9.6	11.4	2.2	9.6	8.0	1.2
Cycle Q Clear(g_c), s	15.6	8.3	6.1	13.7	4.1	3.8	17.6	11.4	2.2	21.0	8.0	1.2
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	369	555	472	262	555	472	387	2011	900	295	2011	900
V/C Ratio(X)	0.59	0.55	0.42	0.33	0.30	0.28	0.35	0.54	0.14	0.32	0.41	0.08
Avail Cap(c_a), veh/h	371	560	476	265	560	476	387	2011	900	295	2011	900
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	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	22.2	17.6	16.9	23.4	16.2	16.1	12.3	8.0	6.1	14.6	7.3	5.8
Incr Delay (d2), s/veh	2.3	1.2	0.6	0.7	0.3	0.3	2.5	1.0	0.3	2.9	0.6	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	8.7	4.4	2.7	1.4	2.1	1.7	1.9	5.7	1.0	1.4	4.0	0.6
LnGrp Delay(d),s/veh	24.5	18.8	17.5	24.2	16.5	16.4	14.8	9.1	6.4	17.4	7.9	6.0
LnGrp LOS	C	B	B	C	B	B	B	A	A	B	A	A
Approach Vol, veh/h		723			382			1341			1000	
Approach Delay, s/veh		20.1			18.2			9.4			8.7	
Approach LOS		C			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		38.0		21.8		38.0		21.8
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		34.0		18.0		34.0		18.0
Max Q Clear Time (g_c+I1), s		19.6		17.6		23.0		15.7
Green Ext Time (p_c), s		12.0		0.2		9.5		1.3

Intersection Summary	
HCM 2010 Ctrl Delay	12.4
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	28	39	1207	15	31	1108
Future Vol, veh/h	28	39	1207	15	31	1108
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	30	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	42	1312	16	34	1204

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1990	664	0	0	1328	0
Stage 1	1320	-	-	-	-	-
Stage 2	670	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	53	403	-	-	516	-
Stage 1	214	-	-	-	-	-
Stage 2	470	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	50	403	-	-	516	-
Mov Cap-2 Maneuver	151	-	-	-	-	-
Stage 1	214	-	-	-	-	-
Stage 2	439	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	23.3	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	151	403	516	-
HCM Lane V/C Ratio	-	-	0.202	0.105	0.065	-
HCM Control Delay (s)	-	-	34.8	15	12.5	-
HCM Lane LOS	-	-	D	C	B	-
HCM 95th %tile Q(veh)	-	-	0.7	0.4	0.2	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	350	781	97	220	490	132	181	774	119	183	868	165
Future Volume (veh/h)	350	781	97	220	490	132	181	774	119	183	868	165
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	380	849	105	239	533	143	197	841	129	199	943	179
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	400	1081	133	276	664	174	220	937	144	220	1078	482
Arrive On Green	0.23	0.24	0.24	0.16	0.17	0.17	0.12	0.30	0.30	0.12	0.30	0.30
Sat Flow, veh/h	1774	4588	565	1774	4016	1051	1774	3077	472	1774	3539	1583
Grp Volume(v), veh/h	380	626	328	239	448	228	197	484	486	199	943	179
Grp Sat Flow(s),veh/h/ln	1774	1695	1763	1774	1695	1677	1774	1770	1779	1774	1770	1583
Q Serve(g_s), s	18.7	15.4	15.5	11.7	11.3	11.6	9.7	23.2	23.2	9.8	22.4	4.3
Cycle Q Clear(g_c), s	18.7	15.4	15.5	11.7	11.3	11.6	9.7	23.2	23.2	9.8	22.4	4.3
Prop In Lane	1.00		0.32	1.00		0.63	1.00		0.27	1.00		1.00
Lane Grp Cap(c), veh/h	400	798	415	276	561	277	220	539	542	220	1078	482
V/C Ratio(X)	0.95	0.78	0.79	0.87	0.80	0.82	0.90	0.90	0.90	0.90	0.87	0.37
Avail Cap(c_a), veh/h	400	798	415	320	612	303	220	539	542	220	1078	482
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.8	31.8	31.8	36.5	35.6	35.7	38.3	29.5	29.5	38.3	29.2	7.2
Incr Delay (d2), s/veh	32.2	5.2	9.9	19.3	6.9	15.5	33.9	20.3	20.2	35.8	9.9	2.2
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	12.8	7.7	8.7	7.2	5.8	6.6	6.8	14.3	14.4	7.0	12.4	3.3
LnGrp Delay(d),s/veh	66.1	36.9	41.7	55.9	42.4	51.2	72.2	49.8	49.7	74.1	39.2	9.4
LnGrp LOS	E	D	D	E	D	D	E	D	D	E	D	A
Approach Vol, veh/h		1334			915			1167			1321	
Approach Delay, s/veh		46.4			48.1			53.6			40.4	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	31.0	17.8	24.9	15.0	31.0	24.0	18.7
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	11.0	27.0	16.0	20.0	11.0	27.0	20.0	16.0
Max Q Clear Time (g_c+I1), s	11.8	25.2	13.7	17.5	11.7	24.4	20.7	13.6
Green Ext Time (p_c), s	0.0	1.6	0.2	1.7	0.0	2.3	0.0	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	46.8
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	83	473	476	29	22	43
Future Vol, veh/h	83	473	476	29	22	43
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	50
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	90	514	517	32	24	47

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	549	0	-	0	1228	533
Stage 1	-	-	-	-	533	-
Stage 2	-	-	-	-	695	-
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	1021	-	-	-	197	547
Stage 1	-	-	-	-	588	-
Stage 2	-	-	-	-	495	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1021	-	-	-	173	547
Mov Cap-2 Maneuver	-	-	-	-	173	-
Stage 1	-	-	-	-	588	-
Stage 2	-	-	-	-	434	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	17.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1021	-	-	-	173	547
HCM Lane V/C Ratio	0.088	-	-	-	0.138	0.085
HCM Control Delay (s)	8.9	0	-	-	29.1	12.2
HCM Lane LOS	A	A	-	-	D	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.5	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	126	989	59	109	370	153	122	746	149	214	658	47
Future Volume (veh/h)	126	989	59	109	370	153	122	746	149	214	658	47
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	137	1075	64	118	402	166	133	811	162	233	715	51
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	154	1203	72	128	828	326	168	902	180	256	1195	85
Arrive On Green	0.09	0.25	0.25	0.07	0.23	0.23	0.09	0.31	0.31	0.14	0.36	0.36
Sat Flow, veh/h	1774	4909	292	1774	3591	1413	1774	2941	588	1774	3351	239
Grp Volume(v), veh/h	137	742	397	118	378	190	133	488	485	233	377	389
Grp Sat Flow(s),veh/h/ln	1774	1695	1811	1774	1695	1613	1774	1770	1759	1774	1770	1821
Q Serve(g_s), s	5.3	14.6	14.7	4.6	6.7	7.1	5.1	18.3	18.3	8.9	12.1	12.1
Cycle Q Clear(g_c), s	5.3	14.6	14.7	4.6	6.7	7.1	5.1	18.3	18.3	8.9	12.1	12.1
Prop In Lane	1.00		0.16	1.00		0.88	1.00		0.33	1.00		0.13
Lane Grp Cap(c), veh/h	154	831	444	128	782	372	168	543	539	256	631	649
V/C Ratio(X)	0.89	0.89	0.89	0.92	0.48	0.51	0.79	0.90	0.90	0.91	0.60	0.60
Avail Cap(c_a), veh/h	154	833	445	128	784	373	205	563	560	256	631	649
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	31.3	25.2	25.2	31.9	23.0	23.2	30.6	23.0	23.0	29.1	18.2	18.2
Incr Delay (d2), s/veh	42.3	12.0	20.0	55.6	0.5	1.1	15.6	17.0	17.1	33.1	1.6	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	8.2	9.7	4.2	3.2	3.3	3.2	11.4	11.3	6.7	6.1	6.3
LnGrp Delay(d),s/veh	73.6	37.2	45.3	87.4	23.5	24.3	46.3	40.0	40.0	62.2	19.8	19.7
LnGrp LOS	E	D	D	F	C	C	D	D	D	E	B	B
Approach Vol, veh/h		1276			686			1106			999	
Approach Delay, s/veh		43.6			34.7			40.8			29.6	
Approach LOS		D			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	25.2	9.0	21.0	10.6	28.7	10.0	20.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	10.0	22.0	5.0	17.0	8.0	24.0	6.0	16.0
Max Q Clear Time (g_c+I1), s	10.9	20.3	6.6	16.7	7.1	14.1	7.3	9.1
Green Ext Time (p_c), s	0.0	1.0	0.0	0.3	0.0	7.0	0.0	5.2

Intersection Summary	
HCM 2010 Ctrl Delay	37.9
HCM 2010 LOS	D

Intersection						
Int Delay, s/veh	3.1					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	48	68	10	16	91
Future Vol, veh/h	25	48	68	10	16	91
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	52	74	11	17	99

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	213	79	0	0	85	0
Stage 1	79	-	-	-	-	-
Stage 2	134	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	775	981	-	-	1512	-
Stage 1	944	-	-	-	-	-
Stage 2	892	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	766	981	-	-	1512	-
Mov Cap-2 Maneuver	766	-	-	-	-	-
Stage 1	944	-	-	-	-	-
Stage 2	881	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	1.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	895	1512	-
HCM Lane V/C Ratio	-	-	0.089	0.012	-
HCM Control Delay (s)	-	-	9.4	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	6	6	15	54	6
Future Vol, veh/h	0	6	6	15	54	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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	7	7	16	59	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	23	0	-	0	22	15
Stage 1	-	-	-	-	15	-
Stage 2	-	-	-	-	7	-
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	1592	-	-	-	995	1065
Stage 1	-	-	-	-	1008	-
Stage 2	-	-	-	-	1016	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1592	-	-	-	995	1065
Mov Cap-2 Maneuver	-	-	-	-	995	-
Stage 1	-	-	-	-	1008	-
Stage 2	-	-	-	-	1016	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1592	-	-	-	1002
HCM Lane V/C Ratio	-	-	-	-	0.065
HCM Control Delay (s)	0	-	-	-	8.8
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	733	7	19	486	26	14	0	59	17	0	17
Future Vol, veh/h	27	733	7	19	486	26	14	0	59	17	0	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	50	-	50	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	797	8	21	528	28	15	0	64	18	0	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	528	0	0	804	0	0	1438	1429	801	1461	1433	528
Stage 1	-	-	-	-	-	-	859	859	-	570	570	-
Stage 2	-	-	-	-	-	-	579	570	-	891	863	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1039	-	-	820	-	-	111	135	384	107	134	550
Stage 1	-	-	-	-	-	-	351	373	-	506	505	-
Stage 2	-	-	-	-	-	-	501	505	-	337	372	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1039	-	-	820	-	-	103	128	384	86	127	550
Mov Cap-2 Maneuver	-	-	-	-	-	-	103	128	-	86	127	-
Stage 1	-	-	-	-	-	-	341	363	-	492	492	-
Stage 2	-	-	-	-	-	-	472	492	-	273	362	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.3	25.7	37
HCM LOS			D	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	252	1039	-	-	820	-	-	149
HCM Lane V/C Ratio	0.315	0.028	-	-	0.025	-	-	0.248
HCM Control Delay (s)	25.7	8.6	-	-	9.5	-	-	37
HCM Lane LOS	D	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	1.3	0.1	-	-	0.1	-	-	0.9

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	507	32	0	29
Future Vol, veh/h	0	0	507	32	0	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	-	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	551	35	0	32

Major/Minor	Major2		Minor2	
Conflicting Flow All	-	0	-	293
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	600
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	600
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	SB
HCM Control Delay, s	0	11.3
HCM LOS		B

Minor Lane/Major Mvmt	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	600
HCM Lane V/C Ratio	-	-	0.053
HCM Control Delay (s)	-	-	11.3
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.2

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	78	0	0	24	0	1039	1	0	830	21
Future Vol, veh/h	0	0	78	0	0	24	0	1039	1	0	830	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	85	0	0	26	0	1129	1	0	902	23

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	463	-	-	565	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	6.94	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	3.32	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	546	0	0	468	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	546	-	-	468	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.8	13.1	0	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	546	468	-	-
HCM Lane V/C Ratio	-	-	0.155	0.056	-	-
HCM Control Delay (s)	-	-	12.8	13.1	-	-
HCM Lane LOS	-	-	B	B	-	-
HCM 95th %tile Q(veh)	-	-	0.5	0.2	-	-

Intersection						
Int Delay, s/veh	1.8					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	788	21	164	514	17	27
Future Vol, veh/h	788	21	164	514	17	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	50	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	857	23	178	559	18	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	879	0	1783	868
Stage 1	-	-	-	-	868	-
Stage 2	-	-	-	-	915	-
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	-	-	769	-	90	352
Stage 1	-	-	-	-	411	-
Stage 2	-	-	-	-	390	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	769	-	69	352
Mov Cap-2 Maneuver	-	-	-	-	189	-
Stage 1	-	-	-	-	411	-
Stage 2	-	-	-	-	300	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.7	21.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	264	-	-	769	-
HCM Lane V/C Ratio	0.181	-	-	0.232	-
HCM Control Delay (s)	21.6	-	-	11.1	-
HCM Lane LOS	C	-	-	B	-
HCM 95th %tile Q(veh)	0.6	-	-	0.9	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	26	23	1002	893	5
Future Vol, veh/h	0	26	23	1002	893	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	28	25	1089	971	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	488	976	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	526	703	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	526	703	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.2	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	703	-	526	-	-
HCM Lane V/C Ratio	0.036	-	0.054	-	-
HCM Control Delay (s)	10.3	-	12.2	-	-
HCM Lane LOS	B	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	9	11	7	1	5	0	15	10	1	11	1
Future Vol, veh/h	0	9	11	7	1	5	0	15	10	1	11	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	10	12	8	1	5	0	16	11	1	12	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	40	42	13	48	37	22	13	0	0	27	0	0
Stage 1	15	15	-	22	22	-	-	-	-	-	-	-
Stage 2	25	27	-	26	15	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	964	850	1067	953	855	1055	1606	-	-	1587	-	-
Stage 1	1005	883	-	996	877	-	-	-	-	-	-	-
Stage 2	993	873	-	992	883	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	957	849	1067	933	854	1055	1606	-	-	1587	-	-
Mov Cap-2 Maneuver	957	849	-	933	854	-	-	-	-	-	-	-
Stage 1	1005	882	-	996	877	-	-	-	-	-	-	-
Stage 2	987	873	-	969	882	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.9	8.8	0	0.6
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1606	-	-	956	969	1587	-	-
HCM Lane V/C Ratio	-	-	-	0.023	0.015	0.001	-	-
HCM Control Delay (s)	0	-	-	8.9	8.8	7.3	0	-
HCM Lane LOS	A	-	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	1150	19	20	505	11	23	0	23	18	0	28
Future Vol, veh/h	17	1150	19	20	505	11	23	0	23	18	0	28
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	110	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	1250	21	22	549	12	25	0	25	20	0	30

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	561	0	0	1271	0	0	1615	1901	635	1135	1906	280
Stage 1	-	-	-	-	-	-	1297	1297	-	598	598	-
Stage 2	-	-	-	-	-	-	318	604	-	537	1308	-
Critical Hdwy	4.14	-	-	5.34	-	-	6.99	6.54	7.14	6.99	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.74	5.54	-
Follow-up Hdwy	2.22	-	-	3.12	-	-	3.67	4.02	3.92	3.67	4.02	3.32
Pot Cap-1 Maneuver	1006	-	-	289	-	-	87	68	361	183	68	717
Stage 1	-	-	-	-	-	-	126	230	-	442	489	-
Stage 2	-	-	-	-	-	-	645	486	-	466	228	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1006	-	-	289	-	-	77	62	361	158	62	717
Mov Cap-2 Maneuver	-	-	-	-	-	-	77	62	-	158	62	-
Stage 1	-	-	-	-	-	-	124	226	-	434	452	-
Stage 2	-	-	-	-	-	-	571	449	-	426	224	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.7	50.7	19.3
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	127	1006	-	-	289	-	-	301
HCM Lane V/C Ratio	0.394	0.018	-	-	0.075	-	-	0.166
HCM Control Delay (s)	50.7	8.6	-	-	18.5	-	-	19.3
HCM Lane LOS	F	A	-	-	C	-	-	C
HCM 95th %tile Q(veh)	1.7	0.1	-	-	0.2	-	-	0.6

2035 Build (Northern Site) Intersection Operations Summary (AM Peak Hour)

No.	Intersection Name	Control	EBL DELAY	EBL LOS	EBT DELAY	EBT LOS	EBR DELAY	EBR LOS	WBL DELAY	WBL LOS	WBT DELAY	WBT LOS	WBR DELAY	WBR LOS	NBL DELAY	NBL LOS	NBT DELAY	NBT LOS	NBR DELAY	NBR LOS	SBL DELAY	SBL LOS	SBT DELAY	SBT LOS	SBR DELAY	SBR LOS
66A	N. Fulton Road and Bonita Avenue	OWSC																								
66B	S. Fulton Road and Bonita Avenue	OWSC																								
67	Fulton Road and Arrow Highway	TWSC																								
68	Garey Avenue and Bonita Avenue	Signal													73.9	E										
69	Garey Avenue and Santa Fe Street	OWSC																								
70	Garey Avenue and Arrow Highway	Signal							70.1	E																
71	Towne Avenue and Bonita Avenue	Signal																								
72	Towne Avenue and Towne Centre Drive	OWSC																								
73	Towne Avenue and Arrow Highway	Signal	94.0	F							74.3	F	89.4	F	94.6	F					60.8	E				
1001	West Parking Entrance and Fulton Road	OWSC																								
1002	South Parking Entrance and Santa Fe Street	OWSC																								
1003	Jacaranda Way and Bonita Avenue	TWSC																			47.9	E				
1004	Pine Street and Arrow Highway	OWSC																								
1005	Future Street B and Garey Avenue	TWSC																								
1006	Future Street A and Bonita Avenue	OWSC																								
1007	Garey Avenue and Grevilia Street	Signal																								
1008	Grevilia Street and Pine Street	OWSC																								
1009	Amberson Street and Arrow Highway	TWSC																								

2035 Build (Northern Site) Intersection Operations Summary (PM Peak Hour)

No.	Intersection Name	Control	EBL DELAY	EBL LOS	EBT DELAY	EBT LOS	EBR DELAY	EBR LOS	WBL DELAY	WBL LOS	WBT DELAY	WBT LOS	WBR DELAY	WBR LOS	NBL DELAY	NBL LOS	NBT DELAY	NBT LOS	NBR DELAY	NBR LOS	SBL DELAY	SBL LOS	SBT DELAY	SBT LOS	SBR DELAY	SBR LOS
66A	N. Fulton Road and Bonita Avenue	OWSC																								
66B	S. Fulton Road and Bonita Avenue	OWSC																								
67	Fulton Road and Arrow Highway	TWSC															59.8	F					44.0	E		
68	Garey Avenue and Bonita Avenue	Signal																								
69	Garey Avenue and Santa Fe Street	OWSC																								
70	Garey Avenue and Arrow Highway	Signal			57.7	E	69.5	E	79.0	E							55.3	E	55.4	E	73.7	E				
71	Towne Avenue and Bonita Avenue	Signal																								
72	Towne Avenue and Towne Centre Drive	OWSC																								
73	Towne Avenue and Arrow Highway	Signal	64.8	E					71.5	E					80.2	F					72.9	E				
1001	West Parking Entrance and Fulton Road	OWSC																								
1002	South Parking Entrance and Santa Fe Street	OWSC																								
1003	Jacaranda Way and Bonita Avenue	TWSC																			37.8	E				
1004	Pine Street and Arrow Highway	OWSC																								
1005	Future Street B and Garey Avenue	TWSC																								
1006	Future Street A and Bonita Avenue	OWSC							56.4	E																
1007	Garey Avenue and Grevilia Street	Signal																								
1008	Grevilia Street and Pine Street	OWSC																								
1009	Amberson Street and Arrow Highway	TWSC													54.9	F					207.5	F				

Appendix E
2035 No Build Queueing Analysis Worksheets

Notes:

Intersection 66A is summarized as Node 166 in the Synchro reports

Intersection 70 is summarized as Node 170 in the Synchro reports

Intersection 1009 is summarized as Node 1109 in the Synchro reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	93	374	148	124	409	70	186	555	174	95	757	135
v/c Ratio	0.63	0.68	0.26	0.70	0.75	0.13	0.64	0.39	0.24	0.41	0.66	0.22
Control Delay	38.7	24.5	4.5	41.9	27.2	3.4	34.3	15.0	3.9	29.5	20.5	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.7	24.5	4.5	41.9	27.2	3.4	34.3	15.0	3.9	29.5	20.5	4.7
Queue Length 50th (ft)	27	111	0	37	124	0	61	77	0	31	121	0
Queue Length 95th (ft)	#86	189	32	#108	209	17	#137	122	35	71	182	33
Internal Link Dist (ft)		399			3566			443			1017	
Turn Bay Length (ft)	135		135	135		135	145		100	100		100
Base Capacity (vph)	182	671	665	216	671	628	319	1415	737	255	1147	604
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.56	0.22	0.57	0.61	0.11	0.58	0.39	0.24	0.37	0.66	0.22

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	61	151	87	139	221	82	189	949	104	115	1078	178
v/c Ratio	0.32	0.39	0.22	0.55	0.57	0.21	0.68	0.41	0.10	0.35	0.47	0.16
Control Delay	23.0	21.9	6.4	28.6	26.1	6.4	24.9	5.9	1.6	9.3	6.3	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.0	21.9	6.4	28.6	26.1	6.4	24.9	5.9	1.6	9.3	6.3	1.4
Queue Length 50th (ft)	17	43	0	42	66	0	32	65	0	14	77	0
Queue Length 95th (ft)	45	86	28	88	121	27	#156	120	14	51	143	19
Internal Link Dist (ft)		3566			2463			1270			1407	
Turn Bay Length (ft)	100		100	130		130	130		80	90		80
Base Capacity (vph)	256	516	501	335	516	498	279	2313	1070	331	2313	1096
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.29	0.17	0.41	0.43	0.16	0.68	0.41	0.10	0.35	0.47	0.16

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	214	537	126	1090	192	963	250	1087	312
v/c Ratio	0.91	0.46	0.61	0.99	0.89	0.85	0.91	0.86	0.45
Control Delay	79.4	27.3	50.3	60.1	79.1	36.7	74.7	35.7	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.4	27.3	50.3	60.1	79.1	36.7	74.7	35.7	10.6
Queue Length 50th (ft)	122	83	68	214	109	261	142	298	45
Queue Length 95th (ft)	#252	118	125	#313	#232	#367	#281	#398	115
Internal Link Dist (ft)		3770		827		760		836	
Turn Bay Length (ft)	170		200		100		170		120
Base Capacity (vph)	236	1174	236	1096	216	1131	275	1258	689
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	0.91	0.46	0.53	0.99	0.89	0.85	0.91	0.86	0.45

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	75	342	140	773	150	881	190	895
v/c Ratio	0.42	0.32	0.74	0.60	0.66	0.84	0.74	0.71
Control Delay	37.3	20.6	57.2	22.5	44.7	30.2	48.6	24.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.3	20.6	57.2	22.5	44.7	30.2	48.6	24.4
Queue Length 50th (ft)	31	39	60	95	63	178	80	182
Queue Length 95th (ft)	69	62	#150	134	#139	#274	#176	#256
Internal Link Dist (ft)		606		752		640		733
Turn Bay Length (ft)	190		200		220		300	
Base Capacity (vph)	188	1243	188	1306	242	1126	269	1252
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.28	0.74	0.59	0.62	0.78	0.71	0.71

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	130	575	180	128	434	108	232	761	153	78	616	72
v/c Ratio	0.57	0.81	0.25	1.08	0.61	0.16	0.81	0.55	0.21	0.58	0.63	0.13
Control Delay	27.4	28.8	3.6	131.2	20.6	2.2	51.8	19.2	4.4	51.1	25.6	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.4	28.8	3.6	131.2	20.6	2.2	51.8	19.2	4.4	51.1	25.6	1.0
Queue Length 50th (ft)	40	202	1	52	138	0	98	142	1	33	125	0
Queue Length 95th (ft)	97	#321	34	#156	222	17	#213	197	36	#92	178	5
Internal Link Dist (ft)		399			3566			443			1017	
Turn Bay Length (ft)	135		135	135		135	145		100	100		100
Base Capacity (vph)	265	823	797	139	823	777	297	1392	712	134	971	536
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.70	0.23	0.92	0.53	0.14	0.78	0.55	0.21	0.58	0.63	0.13

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	216	307	200	87	165	130	136	1082	123	95	834	71
v/c Ratio	0.69	0.63	0.38	0.46	0.34	0.27	0.40	0.51	0.12	0.40	0.39	0.07
Control Delay	31.6	24.9	7.4	25.8	18.8	8.7	11.7	8.3	1.8	13.7	7.2	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.6	24.9	7.4	25.8	18.8	8.7	11.7	8.3	1.8	13.7	7.2	2.0
Queue Length 50th (ft)	66	92	11	25	45	11	24	109	0	17	76	0
Queue Length 95th (ft)	#133	160	52	62	88	45	66	160	17	55	114	13
Internal Link Dist (ft)		3566			2463			1270			1407	
Turn Bay Length (ft)	100		100	130		130	130		80	90		80
Base Capacity (vph)	378	590	609	232	590	560	338	2118	996	237	2118	975
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.52	0.33	0.38	0.28	0.23	0.40	0.51	0.12	0.40	0.39	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	380	954	239	676	197	970	199	943	179
v/c Ratio	0.96	0.83	0.81	0.76	0.90	0.91	0.91	0.88	0.32
Control Delay	72.3	39.7	57.5	37.8	81.4	43.7	83.2	40.9	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.3	39.7	57.5	37.8	81.4	43.7	83.2	40.9	10.8
Queue Length 50th (ft)	215	187	131	121	112	274	114	267	24
Queue Length 95th (ft)	#392	#243	#242	163	#240	#398	#242	#380	74
Internal Link Dist (ft)		3770		827		760		836	
Turn Bay Length (ft)	170		200		100		170		120
Base Capacity (vph)	397	1152	317	937	218	1063	218	1071	562
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	0.96	0.83	0.75	0.72	0.90	0.91	0.91	0.88	0.32

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	137	1139	118	568	133	973	233	766
v/c Ratio	0.90	0.92	0.93	0.46	0.68	0.89	0.92	0.58
Control Delay	87.6	39.1	101.5	18.8	48.9	33.7	72.7	20.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.6	39.1	101.5	18.8	48.9	33.7	72.7	20.2
Queue Length 50th (ft)	60	173	52	57	56	199	101	141
Queue Length 95th (ft)	#158	#257	#145	88	#129	#310	#225	197
Internal Link Dist (ft)		349		568		576		664
Turn Bay Length (ft)	190		200		220		300	
Base Capacity (vph)	152	1239	127	1222	203	1113	253	1320
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.92	0.93	0.46	0.66	0.87	0.92	0.58

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Appendix F
2035 Build Intersection LOS Worksheets

Notes:

Intersection 66A is summarized as Node 166 in the Synchro reports

Intersection 70 is summarized as Node 170 in the Synchro reports

Intersection 1009 is summarized as Node 1109 in the Synchro reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	326	267	1	568	6	212	0	4	4	1	0
Future Volume (veh/h)	5	326	267	1	568	6	212	0	4	4	1	0
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	5	354	0	1	617	7	230	0	4	4	1	0
Adj No. of Lanes	1	3	0	1	2	1	1	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	10	1936	0	6	1332	596	560	0	369	465	94	0
Arrive On Green	0.01	0.38	0.00	0.00	0.38	0.38	0.23	0.00	0.23	0.23	0.23	0.00
Sat Flow, veh/h	1774	5253	0	1774	3539	1583	1410	0	1583	1102	403	0
Grp Volume(v), veh/h	5	354	0	1	617	7	230	0	4	5	0	0
Grp Sat Flow(s),veh/h/ln	1774	1695	0	1774	1770	1583	1410	0	1583	1505	0	0
Q Serve(g_s), s	0.1	1.4	0.0	0.0	4.1	0.1	4.6	0.0	0.1	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	1.4	0.0	0.0	4.1	0.1	4.6	0.0	0.1	0.1	0.0	0.0
Prop In Lane	1.00		0.00	1.00		1.00	1.00		1.00	0.80		0.00
Lane Grp Cap(c), veh/h	10	1936	0	6	1332	596	560	0	369	559	0	0
V/C Ratio(X)	0.52	0.18	0.00	0.18	0.46	0.01	0.41	0.00	0.01	0.01	0.00	0.00
Avail Cap(c_a), veh/h	228	3264	0	228	2272	1016	1318	0	1220	1353	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	15.5	6.4	0.0	15.5	7.3	6.1	10.9	0.0	9.2	9.2	0.0	0.0
Incr Delay (d2), s/veh	37.1	0.0	0.0	14.0	0.3	0.0	0.5	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.7	0.0	0.0	2.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0
LnGrp Delay(d),s/veh	52.5	6.5	0.0	29.5	7.6	6.1	11.4	0.0	9.2	9.2	0.0	0.0
LnGrp LOS	D	A		C	A	A	B		A	A		
Approach Vol, veh/h		359			625			234			5	
Approach Delay, s/veh		7.1			7.6			11.4			9.2	
Approach LOS		A			A			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		11.3	4.0	15.9		11.3	4.2	15.7
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		24.0	4.0	20.0		24.0	4.0	20.0
Max Q Clear Time (g_c+I1), s		6.6	2.0	3.4		2.1	2.1	6.1
Green Ext Time (p_c), s		0.6	0.0	6.2		0.7	0.0	5.6

Intersection Summary	
HCM 2010 Ctrl Delay	8.2
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	383	11	17	385	47	30
Future Vol, veh/h	383	11	17	385	47	30
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	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	416	12	18	418	51	33

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	428	0	877	422
Stage 1	-	-	-	-	422	-
Stage 2	-	-	-	-	455	-
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	-	-	1131	-	319	632
Stage 1	-	-	-	-	662	-
Stage 2	-	-	-	-	639	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1131	-	312	632
Mov Cap-2 Maneuver	-	-	-	-	312	-
Stage 1	-	-	-	-	662	-
Stage 2	-	-	-	-	626	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	15.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	312	632	-	-	1131	-
HCM Lane V/C Ratio	0.164	0.052	-	-	0.016	-
HCM Control Delay (s)	18.8	11	-	-	8.2	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	0.2	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	311	0	18	535	36	19	24	21	18	9	22
Future Vol, veh/h	24	311	0	18	535	36	19	24	21	18	9	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	115	-	-	115	-	-	-	-	50	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	338	0	20	582	39	21	26	23	20	10	24

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	621	0	0	338	0	0	725	1050	169	840	1030	310
Stage 1	-	-	-	-	-	-	390	390	-	640	640	-
Stage 2	-	-	-	-	-	-	335	660	-	200	390	-
Critical Hdwy	4.14	-	-	5.34	-	-	6.99	6.54	7.14	6.99	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.74	5.54	-
Follow-up Hdwy	2.22	-	-	3.12	-	-	3.67	4.02	3.92	3.67	4.02	3.32
Pot Cap-1 Maneuver	956	-	-	806	-	-	340	226	719	286	232	686
Stage 1	-	-	-	-	-	-	537	606	-	418	468	-
Stage 2	-	-	-	-	-	-	630	458	-	746	606	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	956	-	-	806	-	-	305	214	719	241	220	686
Mov Cap-2 Maneuver	-	-	-	-	-	-	305	214	-	241	220	-
Stage 1	-	-	-	-	-	-	522	590	-	407	456	-
Stage 2	-	-	-	-	-	-	580	447	-	672	590	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.3	18.8	17.1
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	246	719	956	-	-	806	-	-	234	686
HCM Lane V/C Ratio	0.19	0.032	0.027	-	-	0.024	-	-	0.125	0.035
HCM Control Delay (s)	23	10.2	8.9	-	-	9.6	-	-	22.6	10.4
HCM Lane LOS	C	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.7	0.1	0.1	-	-	0.1	-	-	0.4	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	88	339	186	231	371	63	180	517	170	86	812	122
Future Volume (veh/h)	88	339	186	231	371	63	180	517	170	86	812	122
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	96	368	202	251	403	68	196	562	185	93	883	133
Adj No. of Lanes	1	1	1	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	296	683	581	297	683	581	207	1296	580	119	1121	501
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.12	0.37	0.37	0.07	0.32	0.32
Sat Flow, veh/h	919	1863	1583	838	1863	1583	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	96	368	202	251	403	68	196	562	185	93	883	133
Grp Sat Flow(s),veh/h/ln	919	1863	1583	838	1863	1583	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	5.7	9.4	5.6	12.6	10.5	1.7	6.6	7.2	5.0	3.1	13.6	3.8
Cycle Q Clear(g_c), s	16.1	9.4	5.6	22.0	10.5	1.7	6.6	7.2	5.0	3.1	13.6	3.8
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	296	683	581	297	683	581	207	1296	580	119	1121	501
V/C Ratio(X)	0.32	0.54	0.35	0.85	0.59	0.12	0.95	0.43	0.32	0.78	0.79	0.27
Avail Cap(c_a), veh/h	296	683	581	297	683	581	207	1296	580	177	1121	501
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	21.9	15.0	13.8	25.5	15.4	12.6	26.3	14.3	13.6	27.6	18.7	15.3
Incr Delay (d2), s/veh	0.6	0.8	0.4	19.7	1.3	0.1	47.6	1.1	1.4	12.2	5.6	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	5.0	2.5	5.7	5.6	0.8	5.9	3.7	2.4	1.9	7.5	1.8
LnGrp Delay(d),s/veh	22.5	15.8	14.2	45.2	16.7	12.7	73.9	15.4	15.1	39.7	24.3	16.6
LnGrp LOS	C	B	B	D	B	B	E	B	B	D	C	B
Approach Vol, veh/h		666			722			943			1109	
Approach Delay, s/veh		16.3			26.2			27.5			24.7	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.0	26.0		26.0	11.0	23.0		26.0
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	6.0	20.0		22.0	7.0	19.0		22.0
Max Q Clear Time (g_c+I1), s	5.1	9.2		18.1	8.6	15.6		24.0
Green Ext Time (p_c), s	0.0	7.5		2.6	0.0	2.7		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	24.1
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑↑	
Traffic Vol, veh/h	0	20	0	876	1348	0
Future Vol, veh/h	0	20	0	876	1348	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	22	0	952	1465	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	733	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	363	0	-	-	0
Stage 1	0	-	0	-	-	0
Stage 2	0	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	-	363	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.5	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT
Capacity (veh/h)	-	363	-
HCM Lane V/C Ratio	-	0.06	-
HCM Control Delay (s)	-	15.5	-
HCM Lane LOS	-	C	-
HCM 95th %tile Q(veh)	-	0.2	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	148	79	126	230	74	172	861	95	105	978	251
Future Volume (veh/h)	64	148	79	126	230	74	172	861	95	105	978	251
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	70	161	86	137	250	80	187	936	103	114	1063	273
Adj No. of Lanes	1	1	1	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	255	452	384	317	452	384	310	2194	981	385	2194	981
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.62	0.62	0.62	0.62	0.62	0.62
Sat Flow, veh/h	1046	1863	1583	1128	1863	1583	408	3539	1583	541	3539	1583
Grp Volume(v), veh/h	70	161	86	137	250	80	187	936	103	114	1063	273
Grp Sat Flow(s),veh/h/ln	1046	1863	1583	1128	1863	1583	408	1770	1583	541	1770	1583
Q Serve(g_s), s	3.6	4.2	2.5	6.7	6.8	2.3	26.5	7.9	1.5	8.0	9.5	4.6
Cycle Q Clear(g_c), s	10.5	4.2	2.5	10.8	6.8	2.3	36.0	7.9	1.5	16.0	9.5	4.6
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	255	452	384	317	452	384	310	2194	981	385	2194	981
V/C Ratio(X)	0.27	0.36	0.22	0.43	0.55	0.21	0.60	0.43	0.10	0.30	0.48	0.28
Avail Cap(c_a), veh/h	289	513	436	354	513	436	310	2194	981	385	2194	981
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	23.8	18.2	17.6	22.7	19.3	17.6	15.8	5.7	4.5	9.8	6.0	5.1
Incr Delay (d2), s/veh	0.6	0.5	0.3	0.9	1.1	0.3	8.4	0.6	0.2	2.0	0.8	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	2.2	1.1	2.1	3.6	1.1	3.7	4.0	0.7	1.4	4.8	2.2
LnGrp Delay(d),s/veh	24.4	18.7	17.9	23.7	20.3	17.8	24.2	6.3	4.7	11.8	6.8	5.8
LnGrp LOS	C	B	B	C	C	B	C	A	A	B	A	A
Approach Vol, veh/h		317			467			1226			1450	
Approach Delay, s/veh		19.8			20.9			8.9			7.0	
Approach LOS		B			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		40.0		18.1		40.0		18.1
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		36.0		16.0		36.0		16.0
Max Q Clear Time (g_c+I1), s		38.0		12.5		18.0		12.8
Green Ext Time (p_c), s		0.0		1.4		15.8		1.3

Intersection Summary		
HCM 2010 Ctrl Delay		10.7
HCM 2010 LOS		B

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	12	1180	36	40	1186
Future Vol, veh/h	16	12	1180	36	40	1186
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	30	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	13	1283	39	43	1289

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2034	661	0	0	1322	0
Stage 1	1302	-	-	-	-	-
Stage 2	732	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	49	405	-	-	519	-
Stage 1	219	-	-	-	-	-
Stage 2	437	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	45	405	-	-	519	-
Mov Cap-2 Maneuver	148	-	-	-	-	-
Stage 1	219	-	-	-	-	-
Stage 2	401	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.7	0	0.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	148	405	519	-
HCM Lane V/C Ratio	-	-	0.118	0.032	0.084	-
HCM Control Delay (s)	-	-	32.5	14.2	12.6	-
HCM Lane LOS	-	-	D	B	B	-
HCM 95th %tile Q(veh)	-	-	0.4	0.1	0.3	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	195	380	123	114	837	225	277	756	117	227	986	295
Future Volume (veh/h)	195	380	123	114	837	225	277	756	117	227	986	295
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	212	413	134	124	910	245	301	822	127	247	1072	321
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	217	987	308	156	887	238	296	981	152	281	1101	493
Arrive On Green	0.12	0.26	0.26	0.09	0.22	0.22	0.17	0.32	0.32	0.16	0.31	0.31
Sat Flow, veh/h	1774	3843	1198	1774	3993	1071	1774	3074	475	1774	3539	1583
Grp Volume(v), veh/h	212	362	185	124	772	383	301	473	476	247	1072	321
Grp Sat Flow(s),veh/h/ln	1774	1695	1651	1774	1695	1674	1774	1770	1779	1774	1770	1583
Q Serve(g_s), s	10.7	8.0	8.4	6.2	20.0	20.0	15.0	22.4	22.4	12.2	26.9	10.9
Cycle Q Clear(g_c), s	10.7	8.0	8.4	6.2	20.0	20.0	15.0	22.4	22.4	12.2	26.9	10.9
Prop In Lane	1.00		0.73	1.00		0.64	1.00		0.27	1.00		1.00
Lane Grp Cap(c), veh/h	217	870	424	156	753	372	296	565	568	281	1101	493
V/C Ratio(X)	0.98	0.42	0.44	0.80	1.02	1.03	1.02	0.84	0.84	0.88	0.97	0.65
Avail Cap(c_a), veh/h	217	870	424	237	753	372	296	565	568	296	1101	493
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	39.4	27.8	28.0	40.3	35.0	35.0	37.5	28.5	28.5	37.0	30.6	12.9
Incr Delay (d2), s/veh	54.6	0.3	0.7	10.4	39.3	54.4	57.0	13.9	13.8	23.8	21.5	6.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.5	3.8	3.9	3.5	13.4	14.8	12.0	13.1	13.1	7.8	16.4	5.6
LnGrp Delay(d),s/veh	94.0	28.2	28.7	50.6	74.3	89.4	94.6	42.3	42.3	60.8	52.1	19.4
LnGrp LOS	F	C	C	D	F	F	F	D	D	E	D	B
Approach Vol, veh/h		759			1279			1250			1640	
Approach Delay, s/veh		46.7			76.5			54.9			47.0	
Approach LOS		D			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.3	32.7	11.9	27.1	19.0	32.0	15.0	24.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	15.0	28.0	12.0	19.0	15.0	28.0	11.0	20.0
Max Q Clear Time (g_c+I1), s	14.2	24.4	8.2	10.4	17.0	28.9	12.7	22.0
Green Ext Time (p_c), s	0.1	3.3	0.1	2.8	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	56.6
HCM 2010 LOS	E

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	13	366	419	13	28	80
Future Vol, veh/h	13	366	419	13	28	80
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	50
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	398	455	14	30	87

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	470	0	-	0	889	463
Stage 1	-	-	-	-	463	-
Stage 2	-	-	-	-	426	-
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	1092	-	-	-	314	599
Stage 1	-	-	-	-	634	-
Stage 2	-	-	-	-	659	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1092	-	-	-	309	599
Mov Cap-2 Maneuver	-	-	-	-	309	-
Stage 1	-	-	-	-	634	-
Stage 2	-	-	-	-	648	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	13.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1092	-	-	-	309	599
HCM Lane V/C Ratio	0.013	-	-	-	0.098	0.145
HCM Control Delay (s)	8.3	0	-	-	17.9	12
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	276	47	127	663	224	242	698	129	180	773	44
Future Volume (veh/h)	68	276	47	127	663	224	242	698	129	180	773	44
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	74	300	51	138	721	243	263	759	140	196	840	48
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	94	900	148	157	905	301	306	1011	187	235	1017	58
Arrive On Green	0.05	0.20	0.20	0.09	0.24	0.24	0.17	0.34	0.34	0.13	0.30	0.30
Sat Flow, veh/h	1774	4400	725	1774	3775	1257	1774	2985	550	1774	3404	194
Grp Volume(v), veh/h	74	229	122	138	647	317	263	450	449	196	437	451
Grp Sat Flow(s),veh/h/ln	1774	1695	1735	1774	1695	1641	1774	1770	1766	1774	1770	1828
Q Serve(g_s), s	2.8	3.9	4.1	5.2	12.2	12.4	9.8	15.3	15.3	7.3	15.6	15.6
Cycle Q Clear(g_c), s	2.8	3.9	4.1	5.2	12.2	12.4	9.8	15.3	15.3	7.3	15.6	15.6
Prop In Lane	1.00		0.42	1.00		0.77	1.00		0.31	1.00		0.11
Lane Grp Cap(c), veh/h	94	693	355	157	812	393	306	600	598	235	529	546
V/C Ratio(X)	0.78	0.33	0.34	0.88	0.80	0.81	0.86	0.75	0.75	0.83	0.83	0.83
Avail Cap(c_a), veh/h	131	799	409	157	849	411	314	600	598	235	529	546
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	31.7	23.0	23.1	30.6	24.2	24.3	27.3	19.9	19.9	28.7	22.1	22.2
Incr Delay (d2), s/veh	18.6	0.3	0.6	39.5	5.1	10.9	20.3	8.4	8.4	21.9	13.7	13.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	1.8	2.0	4.2	6.2	6.7	6.5	8.8	8.8	5.0	9.5	9.8
LnGrp Delay(d),s/veh	50.4	23.3	23.7	70.1	29.4	35.3	47.6	28.3	28.3	50.6	35.9	35.5
LnGrp LOS	D	C	C	E	C	D	D	C	C	D	D	D
Approach Vol, veh/h		425			1102			1162			1084	
Approach Delay, s/veh		28.1			36.2			32.7			38.4	
Approach LOS		C			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	27.0	10.0	17.9	15.7	24.3	7.6	20.3
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	9.0	23.0	6.0	16.0	12.0	20.0	5.0	17.0
Max Q Clear Time (g_c+I1), s	9.3	17.3	7.2	6.1	11.8	17.6	4.8	14.4
Green Ext Time (p_c), s	0.0	4.5	0.0	5.8	0.0	2.0	0.0	1.9

Intersection Summary	
HCM 2010 Ctrl Delay	34.8
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	3	106	11	0	77
Future Vol, veh/h	0	3	106	11	0	77
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	3	115	12	0	84

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	121	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	10
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	930	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	930	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	930	-
HCM Lane V/C Ratio	-	-	0.004	-
HCM Control Delay (s)	-	-	8.9	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	0	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	58	595	55	11	1
Future Vol, veh/h	7	58	595	55	11	1
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	63	647	60	12	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	707	0	-	0	755	677
Stage 1	-	-	-	-	677	-
Stage 2	-	-	-	-	78	-
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	891	-	-	-	376	453
Stage 1	-	-	-	-	505	-
Stage 2	-	-	-	-	945	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	891	-	-	-	373	453
Mov Cap-2 Maneuver	-	-	-	-	373	-
Stage 1	-	-	-	-	505	-
Stage 2	-	-	-	-	936	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	14.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	891	-	-	-	379
HCM Lane V/C Ratio	0.009	-	-	-	0.034
HCM Control Delay (s)	9.1	0	-	-	14.8
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	589	16	59	575	18	2	0	26	38	0	50
Future Vol, veh/h	18	589	16	59	575	18	2	0	26	38	0	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	50	-	50	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	640	17	64	625	20	2	0	28	41	0	54

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	625	0	0	658	0	0	1468	1441	649	1455	1450	625
Stage 1	-	-	-	-	-	-	688	688	-	753	753	-
Stage 2	-	-	-	-	-	-	780	753	-	702	697	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	956	-	-	930	-	-	106	133	470	108	131	485
Stage 1	-	-	-	-	-	-	436	447	-	402	417	-
Stage 2	-	-	-	-	-	-	388	417	-	429	443	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	956	-	-	930	-	-	88	121	470	95	119	485
Mov Cap-2 Maneuver	-	-	-	-	-	-	88	121	-	95	119	-
Stage 1	-	-	-	-	-	-	427	438	-	394	388	-
Stage 2	-	-	-	-	-	-	321	388	-	395	434	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.8	16	47.9
HCM LOS			C	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	359	956	-	-	930	-	-	175
HCM Lane V/C Ratio	0.085	0.02	-	-	0.069	-	-	0.547
HCM Control Delay (s)	16	8.8	-	-	9.2	-	-	47.9
HCM Lane LOS	C	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0.2	-	-	2.8

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	793	159	0	26
Future Vol, veh/h	0	0	793	159	0	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	-	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	862	173	0	28

Major/Minor	Major2		Minor2	
Conflicting Flow All	-	0	-	517
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	431
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	431
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	SB
HCM Control Delay, s	0	13.9
HCM LOS		B

Minor Lane/Major Mvmt	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	431
HCM Lane V/C Ratio	-	-	0.066
HCM Control Delay (s)	-	-	13.9
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.2

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	153	0	0	10	0	856	20	0	1195	34
Future Vol, veh/h	0	0	153	0	0	10	0	856	20	0	1195	34
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	166	0	0	11	0	930	22	0	1299	37

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	668	-	-	476	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	6.94	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	3.32	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	401	0	0	535	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	401	-	-	535	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.2	11.9	0	0
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	401	535	-	-
HCM Lane V/C Ratio	-	-	0.415	0.02	-	-
HCM Control Delay (s)	-	-	20.2	11.9	-	-
HCM Lane LOS	-	-	C	B	-	-
HCM 95th %tile Q(veh)	-	-	2	0.1	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	560	93	43	630	22	53
Future Vol, veh/h	560	93	43	630	22	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	609	101	47	685	24	58

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	710	0	1437	659
Stage 1	-	-	-	-	659	-
Stage 2	-	-	-	-	778	-
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	-	-	889	-	147	464
Stage 1	-	-	-	-	515	-
Stage 2	-	-	-	-	453	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	889	-	139	464
Mov Cap-2 Maneuver	-	-	-	-	276	-
Stage 1	-	-	-	-	515	-
Stage 2	-	-	-	-	429	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	16.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	387	-	-	889	-
HCM Lane V/C Ratio	0.211	-	-	0.053	-
HCM Control Delay (s)	16.8	-	-	9.3	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.8	-	-	0.2	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	26	21	120	867	977	311
Future Volume (veh/h)	26	21	120	867	977	311
Number	7	14	5	2	6	16
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1863	1863	1900
Adj Flow Rate, veh/h	28	23	130	942	1062	338
Adj No. of Lanes	0	0	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	39	32	166	2711	1530	482
Arrive On Green	0.04	0.04	0.09	0.77	0.58	0.58
Sat Flow, veh/h	908	746	1774	3632	2743	835
Grp Volume(v), veh/h	52	0	130	942	706	694
Grp Sat Flow(s),veh/h/ln	1686	0	1774	1770	1770	1715
Q Serve(g_s), s	1.3	0.0	3.0	3.6	11.8	12.1
Cycle Q Clear(g_c), s	1.3	0.0	3.0	3.6	11.8	12.1
Prop In Lane	0.54	0.44	1.00			0.49
Lane Grp Cap(c), veh/h	73	0	166	2711	1021	990
V/C Ratio(X)	0.71	0.00	0.78	0.35	0.69	0.70
Avail Cap(c_a), veh/h	642	0	254	3035	1096	1062
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.8	0.0	18.6	1.6	6.2	6.3
Incr Delay (d2), s/veh	12.0	0.0	8.5	0.1	1.7	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	1.9	1.7	6.0	6.1
LnGrp Delay(d),s/veh	31.9	0.0	27.1	1.6	8.0	8.2
LnGrp LOS	C		C	A	A	A
Approach Vol, veh/h	52			1072	1400	
Approach Delay, s/veh	31.9			4.7	8.1	
Approach LOS	C			A	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		36.2		5.8	7.9	28.2		
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0		
Max Green Setting (Gmax), s		36.0		16.0	6.0	26.0		
Max Q Clear Time (g_c+I1), s		5.6		3.3	5.0	14.1		
Green Ext Time (p_c), s		21.9		0.1	0.0	10.2		

Intersection Summary		
HCM 2010 Ctrl Delay		7.2
HCM 2010 LOS		A

Notes

Intersection	
Int Delay, s/veh	9.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1	2	8	0	413	6	121	7	39	12	1
Future Vol, veh/h	0	1	2	8	0	413	6	121	7	39	12	1
Conflicting Peds, #/hr	0	0	0	421	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Stop	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1	2	9	0	449	7	132	8	42	13	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	246	250	435	669	247	135	14	0	0	139	0	0
Stage 1	98	98	-	148	148	-	-	-	-	-	-	-
Stage 2	148	152	-	521	99	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	708	653	621	371	655	914	1604	-	-	1445	-	-
Stage 1	908	814	-	855	775	-	-	-	-	-	-	-
Stage 2	855	772	-	539	813	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	350	630	403	233	632	914	1041	-	-	1445	-	-
Mov Cap-2 Maneuver	350	630	-	233	632	-	-	-	-	-	-	-
Stage 1	902	790	-	849	770	-	-	-	-	-	-	-
Stage 2	432	767	-	337	789	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.9	12.9	0.4	5.7
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1041	-	-	458	910	1445	-	-
HCM Lane V/C Ratio	0.006	-	-	0.007	0.503	0.029	-	-
HCM Control Delay (s)	8.5	0	-	12.9	12.9	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	2.9	0.1	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	43	300	26	18	667	134	10	2	3	24	0	17
Future Vol, veh/h	43	300	26	18	667	134	10	2	3	24	0	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	110	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	47	326	28	20	725	146	11	2	3	26	0	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	871	0	0	354	0	0	836	1344	177	1062	1285	435
Stage 1	-	-	-	-	-	-	434	434	-	837	837	-
Stage 2	-	-	-	-	-	-	402	910	-	225	448	-
Critical Hdwy	4.14	-	-	5.34	-	-	6.99	6.54	7.14	6.99	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.74	5.54	-
Follow-up Hdwy	2.22	-	-	3.12	-	-	3.67	4.02	3.92	3.67	4.02	3.32
Pot Cap-1 Maneuver	770	-	-	793	-	-	288	151	711	204	163	569
Stage 1	-	-	-	-	-	-	501	579	-	319	380	-
Stage 2	-	-	-	-	-	-	576	352	-	720	571	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	770	-	-	793	-	-	261	138	711	188	149	569
Mov Cap-2 Maneuver	-	-	-	-	-	-	261	138	-	188	149	-
Stage 1	-	-	-	-	-	-	470	544	-	300	370	-
Stage 2	-	-	-	-	-	-	543	343	-	670	536	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	0.2	19.6	21.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	263	770	-	-	793	-	-	260
HCM Lane V/C Ratio	0.062	0.061	-	-	0.025	-	-	0.171
HCM Control Delay (s)	19.6	10	-	-	9.7	-	-	21.7
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.2	0.2	-	-	0.1	-	-	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	840	330	5	493	3	162	0	4	2	0	0
Future Volume (veh/h)	5	840	330	5	493	3	162	0	4	2	0	0
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	5	913	0	5	536	3	176	0	4	2	0	0
Adj No. of Lanes	1	3	0	1	2	1	1	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	10	1746	0	10	1215	544	728	0	656	723	0	0
Arrive On Green	0.01	0.34	0.00	0.01	0.34	0.34	0.41	0.00	0.41	0.41	0.00	0.00
Sat Flow, veh/h	1774	5253	0	1774	3539	1583	1412	0	1583	1402	0	0
Grp Volume(v), veh/h	5	913	0	5	536	3	176	0	4	2	0	0
Grp Sat Flow(s),veh/h/ln	1774	1695	0	1774	1770	1583	1412	0	1583	1402	0	0
Q Serve(g_s), s	0.1	7.3	0.0	0.1	5.9	0.1	4.1	0.0	0.1	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	7.3	0.0	0.1	5.9	0.1	4.2	0.0	0.1	0.1	0.0	0.0
Prop In Lane	1.00		0.00	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	10	1746	0	10	1215	544	728	0	656	723	0	0
V/C Ratio(X)	0.53	0.52	0.00	0.53	0.44	0.01	0.24	0.00	0.01	0.00	0.00	0.00
Avail Cap(c_a), veh/h	140	2309	0	140	1607	719	728	0	656	723	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	25.1	13.3	0.0	25.1	12.9	10.9	9.9	0.0	8.7	8.7	0.0	0.0
Incr Delay (d2), s/veh	38.3	0.2	0.0	38.3	0.3	0.0	0.8	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	3.4	0.0	0.2	2.9	0.0	1.8	0.0	0.0	0.0	0.0	0.0
LnGrp Delay(d),s/veh	63.5	13.6	0.0	63.5	13.1	10.9	10.7	0.0	8.7	8.8	0.0	0.0
LnGrp LOS	E	B		E	B	B	B		A	A		
Approach Vol, veh/h		918			544			180			2	
Approach Delay, s/veh		13.8			13.6			10.6			8.8	
Approach LOS		B			B			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		25.0	4.3	21.4		25.0	4.3	21.4
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		21.0	4.0	23.0		21.0	4.0	23.0
Max Q Clear Time (g_c+I1), s		6.2	2.1	9.3		2.1	2.1	7.9
Green Ext Time (p_c), s		0.4	0.0	8.1		0.5	0.0	8.6

Intersection Summary	
HCM 2010 Ctrl Delay	13.4
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	466	24	30	472	86	26
Future Vol, veh/h	466	24	30	472	86	26
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	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	507	26	33	513	93	28

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	533	0	1098	520
Stage 1	-	-	-	-	520	-
Stage 2	-	-	-	-	578	-
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	-	-	1035	-	235	556
Stage 1	-	-	-	-	597	-
Stage 2	-	-	-	-	561	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1035	-	224	556
Mov Cap-2 Maneuver	-	-	-	-	224	-
Stage 1	-	-	-	-	597	-
Stage 2	-	-	-	-	536	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	27.4
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	224	556	-	-	1035	-
HCM Lane V/C Ratio	0.417	0.051	-	-	0.032	-
HCM Control Delay (s)	32.1	11.8	-	-	8.6	0
HCM Lane LOS	D	B	-	-	A	A
HCM 95th %tile Q(veh)	1.9	0.2	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	820	1	48	452	61	11	18	19	15	10	26
Future Vol, veh/h	26	820	1	48	452	61	11	18	19	15	10	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	115	-	-	115	-	-	-	-	50	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	891	1	52	491	66	12	20	21	16	11	28

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	558	0	0	892	0	0	1303	1610	446	1052	1578	279
Stage 1	-	-	-	-	-	-	948	948	-	629	629	-
Stage 2	-	-	-	-	-	-	355	662	-	423	949	-
Critical Hdwy	4.14	-	-	5.34	-	-	6.99	6.54	7.14	6.99	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.74	5.54	-
Follow-up Hdwy	2.22	-	-	3.12	-	-	3.67	4.02	3.92	3.67	4.02	3.32
Pot Cap-1 Maneuver	1009	-	-	441	-	-	141	104	479	207	108	718
Stage 1	-	-	-	-	-	-	221	338	-	424	474	-
Stage 2	-	-	-	-	-	-	613	457	-	547	337	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1009	-	-	441	-	-	110	89	479	147	93	718
Mov Cap-2 Maneuver	-	-	-	-	-	-	110	89	-	147	93	-
Stage 1	-	-	-	-	-	-	215	329	-	412	418	-
Stage 2	-	-	-	-	-	-	506	403	-	479	328	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	1.2	41.2	26.8
HCM LOS			E	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	96	479	1009	-	-	441	-	-	119	718
HCM Lane V/C Ratio	0.328	0.043	0.028	-	-	0.118	-	-	0.228	0.039
HCM Control Delay (s)	59.8	12.9	8.7	-	-	14.3	-	-	44	10.2
HCM Lane LOS	F	B	A	-	-	B	-	-	E	B
HCM 95th %tile Q(veh)	1.3	0.1	0.1	-	-	0.4	-	-	0.8	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	517	169	147	394	98	223	811	254	71	569	65
Future Volume (veh/h)	117	517	169	147	394	98	223	811	254	71	569	65
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	127	562	184	160	428	107	242	882	276	77	618	71
Adj No. of Lanes	1	1	1	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	326	798	679	232	798	679	279	1219	546	98	860	385
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.43	0.16	0.34	0.34	0.06	0.24	0.24
Sat Flow, veh/h	866	1863	1583	712	1863	1583	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	127	562	184	160	428	107	242	882	276	77	618	71
Grp Sat Flow(s),veh/h/ln	866	1863	1583	712	1863	1583	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	8.9	17.3	5.3	12.7	11.9	2.9	9.3	15.2	9.7	3.0	11.2	2.5
Cycle Q Clear(g_c), s	20.9	17.3	5.3	30.0	11.9	2.9	9.3	15.2	9.7	3.0	11.2	2.5
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	326	798	679	232	798	679	279	1219	546	98	860	385
V/C Ratio(X)	0.39	0.70	0.27	0.69	0.54	0.16	0.87	0.72	0.51	0.78	0.72	0.18
Avail Cap(c_a), veh/h	326	798	679	232	798	679	279	1219	546	127	860	385
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	22.6	16.4	12.9	29.9	14.8	12.3	28.8	20.0	18.2	32.6	24.3	21.0
Incr Delay (d2), s/veh	0.8	2.8	0.2	8.3	0.7	0.1	24.0	3.7	3.3	20.9	5.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	9.4	2.3	3.6	6.2	1.3	6.4	8.0	4.7	2.0	6.1	1.2
LnGrp Delay(d),s/veh	23.3	19.2	13.1	38.2	15.5	12.4	52.8	23.8	21.5	53.6	29.5	22.1
LnGrp LOS	C	B	B	D	B	B	D	C	C	D	C	C
Approach Vol, veh/h		873			695			1400			766	
Approach Delay, s/veh		18.5			20.3			28.3			31.2	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.9	28.1		34.0	15.0	21.0		34.0
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	5.0	23.0		30.0	11.0	17.0		30.0
Max Q Clear Time (g_c+I1), s	5.0	17.2		22.9	11.3	13.2		32.0
Green Ext Time (p_c), s	0.0	4.5		4.8	0.0	3.1		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	25.1
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	62	0	1263	904	0
Future Vol, veh/h	0	62	0	1263	904	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	67	0	1373	983	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	491	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	523	0	-	-	0
Stage 1	0	-	0	-	-	0
Stage 2	0	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	-	523	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT
Capacity (veh/h)	-	523	-
HCM Lane V/C Ratio	-	0.129	-
HCM Control Delay (s)	-	12.9	-
HCM Lane LOS	-	B	-
HCM 95th %tile Q(veh)	-	0.4	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	279	390	181	79	152	118	124	981	111	86	756	72
Future Volume (veh/h)	279	390	181	79	152	118	124	981	111	86	756	72
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	303	424	197	86	165	128	135	1066	121	93	822	78
Adj No. of Lanes	1	1	1	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	430	652	554	247	652	554	348	1829	818	265	1829	818
Arrive On Green	0.35	0.35	0.35	0.35	0.35	0.35	0.52	0.52	0.52	0.52	0.52	0.52
Sat Flow, veh/h	1082	1863	1583	800	1863	1583	616	3539	1583	470	3539	1583
Grp Volume(v), veh/h	303	424	197	86	165	128	135	1066	121	93	822	78
Grp Sat Flow(s),veh/h/ln	1082	1863	1583	800	1863	1583	616	1770	1583	470	1770	1583
Q Serve(g_s), s	16.6	11.5	5.5	6.1	3.8	3.4	10.6	12.5	2.4	10.2	8.8	1.5
Cycle Q Clear(g_c), s	20.4	11.5	5.5	17.6	3.8	3.4	19.4	12.5	2.4	22.7	8.8	1.5
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	430	652	554	247	652	554	348	1829	818	265	1829	818
V/C Ratio(X)	0.70	0.65	0.36	0.35	0.25	0.23	0.39	0.58	0.15	0.35	0.45	0.10
Avail Cap(c_a), veh/h	430	652	554	247	652	554	348	1829	818	265	1829	818
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	21.2	16.4	14.5	23.8	13.9	13.8	15.2	10.0	7.6	17.9	9.1	7.4
Incr Delay (d2), s/veh	5.1	2.3	0.4	0.8	0.2	0.2	3.2	1.4	0.4	3.6	0.8	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	5.6	6.3	2.5	1.4	2.0	1.5	2.1	6.4	1.1	1.6	4.4	0.7
LnGrp Delay(d),s/veh	26.3	18.7	14.9	24.6	14.1	14.0	18.5	11.4	8.0	21.5	9.9	7.6
LnGrp LOS	C	B	B	C	B	B	B	B	A	C	A	A
Approach Vol, veh/h		924			379			1322			993	
Approach Delay, s/veh		20.4			16.5			11.8			10.8	
Approach LOS		C			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		35.0		25.0		35.0		25.0
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		31.0		21.0		31.0		21.0
Max Q Clear Time (g_c+I1), s		21.4		22.4		24.7		19.6
Green Ext Time (p_c), s		8.3		0.0		5.6		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	14.2
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	29	38	1191	26	31	1093
Future Vol, veh/h	29	38	1191	26	31	1093
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	30	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	41	1295	28	34	1188

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1970	661	0	0	1323	0
Stage 1	1309	-	-	-	-	-
Stage 2	661	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	55	405	-	-	518	-
Stage 1	217	-	-	-	-	-
Stage 2	475	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	51	405	-	-	518	-
Mov Cap-2 Maneuver	153	-	-	-	-	-
Stage 1	217	-	-	-	-	-
Stage 2	444	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	23.4	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	153	405	518	-
HCM Lane V/C Ratio	-	-	0.206	0.102	0.065	-
HCM Control Delay (s)	-	-	34.5	14.9	12.4	-
HCM Lane LOS	-	-	D	B	B	-
HCM 95th %tile Q(veh)	-	-	0.7	0.3	0.2	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	356	836	189	217	489	130	187	764	117	180	856	164
Future Volume (veh/h)	356	836	189	217	489	130	187	764	117	180	856	164
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	387	909	205	236	532	141	203	830	127	196	930	178
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	409	1036	233	258	662	171	219	931	142	219	1071	479
Arrive On Green	0.23	0.25	0.25	0.15	0.16	0.16	0.12	0.30	0.30	0.12	0.30	0.30
Sat Flow, veh/h	1774	4155	933	1774	4027	1042	1774	3078	471	1774	3539	1583
Grp Volume(v), veh/h	387	741	373	236	446	227	203	477	480	196	930	178
Grp Sat Flow(s),veh/h/ln	1774	1695	1698	1774	1695	1679	1774	1770	1780	1774	1770	1583
Q Serve(g_s), s	19.2	18.7	18.9	11.7	11.3	11.7	10.1	23.0	23.0	9.7	22.2	4.3
Cycle Q Clear(g_c), s	19.2	18.7	18.9	11.7	11.3	11.7	10.1	23.0	23.0	9.7	22.2	4.3
Prop In Lane	1.00		0.55	1.00		0.62	1.00		0.26	1.00		1.00
Lane Grp Cap(c), veh/h	409	845	423	258	557	276	219	535	538	219	1071	479
V/C Ratio(X)	0.95	0.88	0.88	0.91	0.80	0.82	0.93	0.89	0.89	0.90	0.87	0.37
Avail Cap(c_a), veh/h	409	874	438	258	608	301	219	535	538	219	1071	479
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.8	32.2	32.2	37.6	35.9	36.0	38.7	29.7	29.7	38.6	29.5	7.2
Incr Delay (d2), s/veh	31.0	9.8	18.1	33.9	7.0	15.6	41.5	19.7	19.6	34.4	9.6	2.2
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	12.9	9.9	10.9	8.1	5.8	6.6	7.5	14.1	14.1	6.8	12.3	3.3
LnGrp Delay(d),s/veh	64.8	42.0	50.3	71.5	42.8	51.7	80.2	49.4	49.3	72.9	39.0	9.4
LnGrp LOS	E	D	D	E	D	D	F	D	D	E	D	A
Approach Vol, veh/h		1501			909			1160			1304	
Approach Delay, s/veh		49.9			52.5			54.8			40.1	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	31.0	17.0	26.3	15.0	31.0	24.6	18.7
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	11.0	27.0	13.0	23.0	11.0	27.0	20.0	16.0
Max Q Clear Time (g_c+I1), s	11.7	25.0	13.7	20.9	12.1	24.2	21.2	13.7
Green Ext Time (p_c), s	0.0	1.8	0.0	1.4	0.0	2.5	0.0	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	48.9
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	82	467	518	40	23	42
Future Vol, veh/h	82	467	518	40	23	42
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	50
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	89	508	563	43	25	46

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	607	0	-	0	1271	585
Stage 1	-	-	-	-	585	-
Stage 2	-	-	-	-	686	-
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	971	-	-	-	185	511
Stage 1	-	-	-	-	557	-
Stage 2	-	-	-	-	500	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	971	-	-	-	161	511
Mov Cap-2 Maneuver	-	-	-	-	161	-
Stage 1	-	-	-	-	557	-
Stage 2	-	-	-	-	436	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	19.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	971	-	-	-	161	511
HCM Lane V/C Ratio	0.092	-	-	-	0.155	0.089
HCM Control Delay (s)	9.1	0	-	-	31.4	12.7
HCM Lane LOS	A	A	-	-	D	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.5	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	124	1061	113	107	375	155	140	738	147	297	706	46
Future Volume (veh/h)	124	1061	113	107	375	155	140	738	147	297	706	46
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	135	1153	123	116	408	168	152	802	160	323	767	50
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	169	1167	124	133	825	324	187	846	169	333	1246	81
Arrive On Green	0.10	0.25	0.25	0.08	0.23	0.23	0.11	0.29	0.29	0.19	0.37	0.37
Sat Flow, veh/h	1774	4667	498	1774	3593	1411	1774	2942	587	1774	3374	220
Grp Volume(v), veh/h	135	837	439	116	384	192	152	482	480	323	402	415
Grp Sat Flow(s),veh/h/ln	1774	1695	1775	1774	1695	1614	1774	1770	1759	1774	1770	1824
Q Serve(g_s), s	6.0	19.7	19.7	5.2	7.9	8.3	6.7	21.4	21.4	14.5	14.8	14.9
Cycle Q Clear(g_c), s	6.0	19.7	19.7	5.2	7.9	8.3	6.7	21.4	21.4	14.5	14.8	14.9
Prop In Lane	1.00		0.28	1.00		0.87	1.00		0.33	1.00		0.12
Lane Grp Cap(c), veh/h	169	848	444	133	779	371	187	509	506	333	654	674
V/C Ratio(X)	0.80	0.99	0.99	0.87	0.49	0.52	0.81	0.95	0.95	0.97	0.62	0.62
Avail Cap(c_a), veh/h	222	848	444	133	779	371	222	509	506	333	654	674
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.4	29.9	29.9	36.6	26.8	26.9	35.0	27.9	27.9	32.3	20.6	20.6
Incr Delay (d2), s/veh	14.1	27.8	39.6	42.4	0.5	1.3	17.3	27.4	27.5	41.4	1.7	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	12.5	14.5	4.1	3.7	3.8	4.2	14.2	14.1	10.9	7.6	7.8
LnGrp Delay(d),s/veh	49.6	57.7	69.5	79.0	27.2	28.2	52.3	55.3	55.4	73.7	22.3	22.3
LnGrp LOS	D	E	E	E	C	C	D	E	E	E	C	C
Approach Vol, veh/h		1411			692			1114			1140	
Approach Delay, s/veh		60.6			36.2			54.9			36.9	
Approach LOS		E			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.0	27.0	10.0	24.0	12.5	33.5	11.6	22.4
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	15.0	23.0	6.0	20.0	10.0	28.0	10.0	16.0
Max Q Clear Time (g_c+I1), s	16.5	23.4	7.2	21.7	8.7	16.9	8.0	10.3
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	7.8	0.1	4.6

Intersection Summary	
HCM 2010 Ctrl Delay	49.1
HCM 2010 LOS	D

Intersection						
Int Delay, s/veh	0.8					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	22	116	10	0	90
Future Vol, veh/h	0	22	116	10	0	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	24	126	11	0	98

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	132	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	917	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	917	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	917	-
HCM Lane V/C Ratio	-	-	0.026	-
HCM Control Delay (s)	-	-	9	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	436	60	12	66	6
Future Vol, veh/h	0	436	60	12	66	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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	474	65	13	72	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	78	0	-	0	546	72
Stage 1	-	-	-	-	72	-
Stage 2	-	-	-	-	474	-
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	1520	-	-	-	499	990
Stage 1	-	-	-	-	951	-
Stage 2	-	-	-	-	626	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1520	-	-	-	499	990
Mov Cap-2 Maneuver	-	-	-	-	499	-
Stage 1	-	-	-	-	951	-
Stage 2	-	-	-	-	626	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	13.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1520	-	-	-	521
HCM Lane V/C Ratio	-	-	-	-	0.15
HCM Control Delay (s)	0	-	-	-	13.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.5

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	746	7	19	482	26	14	0	58	17	0	17
Future Vol, veh/h	27	746	7	19	482	26	14	0	58	17	0	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	50	-	50	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	811	8	21	524	28	15	0	63	18	0	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	524	0	0	818	0	0	1447	1438	815	1470	1442	524
Stage 1	-	-	-	-	-	-	873	873	-	565	565	-
Stage 2	-	-	-	-	-	-	574	565	-	905	877	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1043	-	-	810	-	-	109	133	377	105	132	553
Stage 1	-	-	-	-	-	-	345	368	-	510	508	-
Stage 2	-	-	-	-	-	-	504	508	-	331	366	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1043	-	-	810	-	-	101	126	377	84	125	553
Mov Cap-2 Maneuver	-	-	-	-	-	-	101	126	-	84	125	-
Stage 1	-	-	-	-	-	-	335	358	-	496	495	-
Stage 2	-	-	-	-	-	-	475	495	-	268	356	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.3	26.3	37.8
HCM LOS			D	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	246	1043	-	-	810	-	-	146
HCM Lane V/C Ratio	0.318	0.028	-	-	0.025	-	-	0.253
HCM Control Delay (s)	26.3	8.6	-	-	9.6	-	-	37.8
HCM Lane LOS	D	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	1.3	0.1	-	-	0.1	-	-	1

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	512	51	0	29
Future Vol, veh/h	0	0	512	51	0	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	-	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	557	55	0	32

Major/Minor	Major2		Minor2	
Conflicting Flow All	-	0	-	306
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	589
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	589
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	SB
HCM Control Delay, s	0	11.5
HCM LOS		B

Minor Lane/Major Mvmt	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	589
HCM Lane V/C Ratio	-	-	0.054
HCM Control Delay (s)	-	-	11.5
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.2

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	78	0	0	24	0	1262	1	0	826	59
Future Vol, veh/h	0	0	78	0	0	24	0	1262	1	0	826	59
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	85	0	0	26	0	1372	1	0	898	64

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	481	-	-	686	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	6.94	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	3.32	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	531	0	0	390	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	531	-	-	390	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.1	14.9	0	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	531	390	-	-
HCM Lane V/C Ratio	-	-	0.16	0.067	-	-
HCM Control Delay (s)	-	-	13.1	14.9	-	-
HCM Lane LOS	-	-	B	B	-	-
HCM 95th %tile Q(veh)	-	-	0.6	0.2	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	773	48	166	516	11	31
Future Vol, veh/h	773	48	166	516	11	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	840	52	180	561	12	34

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	892	0	1788	866
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	922	-
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	-	-	760	-	89	353
Stage 1	-	-	-	-	412	-
Stage 2	-	-	-	-	387	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	760	-	68	353
Mov Cap-2 Maneuver	-	-	-	-	187	-
Stage 1	-	-	-	-	412	-
Stage 2	-	-	-	-	295	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.7	20
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	286	-	-	760	-
HCM Lane V/C Ratio	0.16	-	-	0.237	-
HCM Control Delay (s)	20	-	-	11.2	-
HCM Lane LOS	C	-	-	B	-
HCM 95th %tile Q(veh)	0.6	-	-	0.9	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	236	147	33	984	902	34
Future Volume (veh/h)	236	147	33	984	902	34
Number	7	14	5	2	6	16
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1863	1863	1900
Adj Flow Rate, veh/h	257	160	36	1070	980	37
Adj No. of Lanes	0	0	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	298	186	56	1966	1547	58
Arrive On Green	0.29	0.29	0.03	0.56	0.44	0.44
Sat Flow, veh/h	1043	649	1774	3632	3571	131
Grp Volume(v), veh/h	418	0	36	1070	499	518
Grp Sat Flow(s),veh/h/ln	1696	0	1774	1770	1770	1840
Q Serve(g_s), s	11.8	0.0	1.0	9.7	11.0	11.0
Cycle Q Clear(g_c), s	11.8	0.0	1.0	9.7	11.0	11.0
Prop In Lane	0.61	0.38	1.00			0.07
Lane Grp Cap(c), veh/h	485	0	56	1966	787	818
V/C Ratio(X)	0.86	0.00	0.65	0.54	0.63	0.63
Avail Cap(c_a), veh/h	638	0	140	2312	876	910
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.1	0.0	24.2	7.2	10.8	10.8
Incr Delay (d2), s/veh	9.2	0.0	11.9	0.2	1.3	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	0.0	0.7	4.7	5.5	5.8
LnGrp Delay(d),s/veh	26.3	0.0	36.0	7.4	12.1	12.1
LnGrp LOS	C		D	A	B	B
Approach Vol, veh/h	418			1106	1017	
Approach Delay, s/veh	26.3			8.3	12.1	
Approach LOS	C			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		32.1		18.5	5.6	26.5		
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0		
Max Green Setting (Gmax), s		33.0		19.0	4.0	25.0		
Max Q Clear Time (g_c+I1), s		11.7		13.8	3.0	13.0		
Green Ext Time (p_c), s		14.9		0.7	0.0	9.5		

Intersection Summary	
HCM 2010 Ctrl Delay	12.8
HCM 2010 LOS	B

Notes

Intersection	
Int Delay, s/veh	7.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	9	11	7	1	43	0	21	10	359	11	1
Future Vol, veh/h	0	9	11	7	1	43	0	21	10	359	11	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	10	12	8	1	47	0	23	11	390	12	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	845	827	12	832	821	28	13	0	0	34	0	0
Stage 1	793	793	-	28	28	-	-	-	-	-	-	-
Stage 2	52	34	-	804	793	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	283	307	1069	288	309	1047	1606	-	-	1578	-	-
Stage 1	382	400	-	989	872	-	-	-	-	-	-	-
Stage 2	961	867	-	377	400	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	218	231	1069	223	232	1047	1606	-	-	1578	-	-
Mov Cap-2 Maneuver	218	231	-	223	232	-	-	-	-	-	-	-
Stage 1	382	300	-	989	872	-	-	-	-	-	-	-
Stage 2	917	867	-	271	300	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.4	10.9	0	7.8
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1606	-	-	406	664	1578	-	-
HCM Lane V/C Ratio	-	-	-	0.054	0.083	0.247	-	-
HCM Control Delay (s)	0	-	-	14.4	10.9	8	0	-
HCM Lane LOS	A	-	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.3	1	-	-

Intersection	
Int Delay, s/veh	28.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	1134	19	20	498	23	23	0	23	170	0	89
Future Vol, veh/h	18	1134	19	20	498	23	23	0	23	170	0	89
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	110	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	1233	21	22	541	25	25	0	25	185	0	97

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	566	0	0	1253	0	0	1596	1892	627	1129	1889	283
Stage 1	-	-	-	-	-	-	1282	1282	-	597	597	-
Stage 2	-	-	-	-	-	-	314	610	-	532	1292	-
Critical Hdwy	4.14	-	-	5.34	-	-	6.99	6.54	7.14	6.99	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.74	5.54	-
Follow-up Hdwy	2.22	-	-	3.12	-	-	3.67	4.02	3.92	3.67	4.02	3.32
Pot Cap-1 Maneuver	1002	-	-	295	-	-	90	69	365	~ 184	70	714
Stage 1	-	-	-	-	-	-	129	234	-	443	490	-
Stage 2	-	-	-	-	-	-	648	483	-	469	232	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1002	-	-	295	-	-	72	63	365	~ 159	63	714
Mov Cap-2 Maneuver	-	-	-	-	-	-	72	63	-	~ 159	63	-
Stage 1	-	-	-	-	-	-	126	229	-	434	453	-
Stage 2	-	-	-	-	-	-	518	447	-	428	227	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.7	54.9	207.5
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	120	1002	-	-	295	-	-	217
HCM Lane V/C Ratio	0.417	0.02	-	-	0.074	-	-	1.297
HCM Control Delay (s)	54.9	8.7	-	-	18.2	-	-	207.5
HCM Lane LOS	F	A	-	-	C	-	-	F
HCM 95th %tile Q(veh)	1.8	0.1	-	-	0.2	-	-	15.1

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

2035 Build (Northern Site) Intersection Operations Summary (AM Peak Hour)

No.	Intersection Name	Control	EBL DELAY	EBL LOS	EBT DELAY	EBT LOS	EBR DELAY	EBR LOS	WBL DELAY	WBL LOS	WBT DELAY	WBT LOS	WBR DELAY	WBR LOS	NBL DELAY	NBL LOS	NBT DELAY	NBT LOS	NBR DELAY	NBR LOS	SBL DELAY	SBL LOS	SBT DELAY	SBT LOS	SBR DELAY	SBR LOS
66A	N. Fulton Road and Bonita Avenue	OWSC																								
66B	S. Fulton Road and Bonita Avenue	OWSC																								
67	Fulton Road and Arrow Highway	TWSC																								
68	Garey Avenue and Bonita Avenue	Signal													73.9	E										
69	Garey Avenue and Santa Fe Street	OWSC																								
70	Garey Avenue and Arrow Highway	Signal							70.1	E																
71	Towne Avenue and Bonita Avenue	Signal																								
72	Towne Avenue and Towne Centre Drive	OWSC																								
73	Towne Avenue and Arrow Highway	Signal	94.0	F							74.3	F	89.4	F	94.6	F					60.8	E				
1001	West Parking Entrance and Fulton Road	OWSC																								
1002	South Parking Entrance and Santa Fe Street	OWSC																								
1003	Jacaranda Way and Bonita Avenue	Signal																			47.9	E				
1004	Pine Street and Arrow Highway	OWSC																								
1005	Future Street B and Garey Avenue	TWSC																								
1006	Future Street A and Bonita Avenue	Signal																								
1007	Garey Avenue and Grevilia Street	Signal																								
1008	Grevilia Street and Pine Street	OWSC																								
1009	Amberson Street and Arrow Highway	TWSC																								

2035 Build (Northern Site) Intersection Operations Summary (PM Peak Hour)

No.	Intersection Name	Control	EBL DELAY	EBL LOS	EBT DELAY	EBT LOS	EBR DELAY	EBR LOS	WBL DELAY	WBL LOS	WBT DELAY	WBT LOS	WBR DELAY	WBR LOS	NBL DELAY	NBL LOS	NBT DELAY	NBT LOS	NBR DELAY	NBR LOS	SBL DELAY	SBL LOS	SBT DELAY	SBT LOS	SBR DELAY	SBR LOS
66A	N. Fulton Road and Bonita Avenue	OWSC																								
66B	S. Fulton Road and Bonita Avenue	OWSC																								
67	Fulton Road and Arrow Highway	TWSC															59.8	F					44.0	E		
68	Garey Avenue and Bonita Avenue	Signal																								
69	Garey Avenue and Santa Fe Street	OWSC																								
70	Garey Avenue and Arrow Highway	Signal			57.7	E	69.5	E	79.0	E							55.3	E	55.4	E	73.7	E				
71	Towne Avenue and Bonita Avenue	Signal																								
72	Towne Avenue and Towne Centre Drive	OWSC																								
73	Towne Avenue and Arrow Highway	Signal	64.8	E					71.5	E					80.2	F					72.9	E				
1001	West Parking Entrance and Fulton Road	OWSC																								
1002	South Parking Entrance and Santa Fe Street	OWSC																								
1003	Jacaranda Way and Bonita Avenue	Signal																			37.8	E				
1004	Pine Street and Arrow Highway	OWSC																								
1005	Future Street B and Garey Avenue	TWSC																								
1006	Future Street A and Bonita Avenue	Signal							56.4	E																
1007	Garey Avenue and Grevilia Street	Signal																								
1008	Grevilia Street and Pine Street	OWSC																								
1009	Amberson Street and Arrow Highway	TWSC													54.9	F					207.5	F				

Appendix G
2035 Build Queuing Analysis Worksheets

Notes:

Intersection 66A is summarized as Node 166 in the Synchro reports

Intersection 70 is summarized as Node 170 in the Synchro reports

Intersection 1009 is summarized as Node 1109 in the Synchro reports

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	5	644	1	617	7	230	4	5
v/c Ratio	0.02	0.33	0.00	0.47	0.01	0.48	0.00	0.01
Control Delay	19.8	5.3	20.0	10.5	0.0	14.1	0.0	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.8	5.3	20.0	10.5	0.0	14.1	0.0	9.8
Queue Length 50th (ft)	1	12	0	34	0	26	0	1
Queue Length 95th (ft)	10	51	4	122	0	111	0	7
Internal Link Dist (ft)		886		357			386	161
Turn Bay Length (ft)	110		120		190	50		
Base Capacity (vph)	229	3173	229	2293	1057	1071	1304	1269
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.20	0.00	0.27	0.01	0.21	0.00	0.00

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	96	368	202	251	403	68	196	562	185	93	883	133
v/c Ratio	0.41	0.55	0.29	0.97	0.60	0.11	0.94	0.43	0.26	0.53	0.78	0.22
Control Delay	20.9	18.9	3.7	72.0	20.1	2.8	80.4	16.2	3.9	37.9	24.5	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.9	18.9	3.7	72.0	20.1	2.8	80.4	16.2	3.9	37.9	24.5	5.0
Queue Length 50th (ft)	25	102	0	85	114	0	72	83	0	33	150	2
Queue Length 95th (ft)	64	174	35	#214	193	15	#182	123	35	#82	#218	33
Internal Link Dist (ft)		399			3566			443			1017	
Turn Bay Length (ft)	135		135	135		135	145		100	100		100
Base Capacity (vph)	240	692	714	269	692	645	209	1320	706	179	1134	593
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.53	0.28	0.93	0.58	0.11	0.94	0.43	0.26	0.52	0.78	0.22

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	70	161	86	137	250	80	187	936	103	114	1063	273
v/c Ratio	0.39	0.40	0.21	0.54	0.62	0.20	0.68	0.41	0.10	0.35	0.47	0.24
Control Delay	25.2	21.7	6.2	27.5	26.9	6.3	25.0	6.2	1.6	9.5	6.6	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.2	21.7	6.2	27.5	26.9	6.3	25.0	6.2	1.6	9.5	6.6	1.4
Queue Length 50th (ft)	20	46	0	41	76	0	34	68	0	15	81	0
Queue Length 95th (ft)	52	91	28	87	137	27	#153	118	14	50	140	23
Internal Link Dist (ft)		3566			2463			1270			1407	
Turn Bay Length (ft)	100		100	130		130	130		80	90		80
Base Capacity (vph)	230	516	500	326	516	496	276	2275	1054	329	2275	1115
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.31	0.17	0.42	0.48	0.16	0.68	0.41	0.10	0.35	0.47	0.24

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	212	547	124	1155	301	949	247	1072	321
v/c Ratio	0.98	0.46	0.60	1.01	1.02	0.86	0.86	0.97	0.51
Control Delay	98.7	27.1	50.1	62.2	97.1	37.6	65.6	53.3	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	98.7	27.1	50.1	62.2	97.1	37.6	65.6	53.3	13.3
Queue Length 50th (ft)	122	84	67	~231	~178	261	138	314	55
Queue Length 95th (ft)	#262	120	123	#332	#342	#371	#266	#453	133
Internal Link Dist (ft)		3770		827		760		836	
Turn Bay Length (ft)	170		200		100		170		120
Base Capacity (vph)	216	1180	236	1147	295	1109	295	1101	624
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	0.98	0.46	0.53	1.01	1.02	0.86	0.84	0.97	0.51

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.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	74	351	138	964	263	899	196	888
v/c Ratio	0.57	0.33	0.88	0.74	0.86	0.76	0.84	0.85
Control Delay	50.9	20.7	83.8	24.9	56.8	24.8	61.9	32.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.9	20.7	83.8	24.9	56.8	24.8	61.9	32.5
Queue Length 50th (ft)	32	39	60	124	112	174	84	189
Queue Length 95th (ft)	#87	63	#159	169	#236	243	#194	#295
Internal Link Dist (ft)		582		1006		600		560
Turn Bay Length (ft)	190		200		220		300	
Base Capacity (vph)	130	1203	156	1309	312	1190	234	1050
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.29	0.88	0.74	0.84	0.76	0.84	0.85

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	51	130	942	1400
v/c Ratio	0.20	0.56	0.30	0.59
Control Delay	14.8	33.7	2.1	8.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.8	33.7	2.1	8.3
Queue Length 50th (ft)	6	31	0	62
Queue Length 95th (ft)	31	#105	71	241
Internal Link Dist (ft)	304		659	502
Turn Bay Length (ft)	100	100		
Base Capacity (vph)	612	232	3108	2359
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.08	0.56	0.30	0.59

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	5	1272	5	536	3	176	4	2
v/c Ratio	0.04	0.61	0.04	0.38	0.00	0.30	0.01	0.00
Control Delay	25.2	11.8	25.2	12.0	0.0	13.6	0.0	11.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.2	11.8	25.2	12.0	0.0	13.6	0.0	11.5
Queue Length 50th (ft)	2	81	2	53	0	35	0	0
Queue Length 95th (ft)	11	153	11	107	0	92	0	4
Internal Link Dist (ft)		959		347			462	70
Turn Bay Length (ft)	110		120		190	50		
Base Capacity (vph)	139	2312	139	1603	766	583	771	581
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.55	0.04	0.33	0.00	0.30	0.01	0.00

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	127	562	184	160	428	107	242	882	276	77	618	71
v/c Ratio	0.50	0.76	0.25	1.05	0.58	0.15	0.84	0.66	0.38	0.58	0.68	0.14
Control Delay	22.6	24.5	3.2	113.6	18.9	2.0	55.8	22.2	7.2	51.3	27.8	1.0
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.6	24.6	3.2	113.6	18.9	2.0	55.8	22.2	7.2	51.3	27.8	1.0
Queue Length 50th (ft)	37	190	0	65	131	0	103	176	21	33	128	0
Queue Length 95th (ft)	87	302	32	#180	212	16	#224	242	73	#92	183	4
Internal Link Dist (ft)		399			3566			443			1017	
Turn Bay Length (ft)	135		135	135		135	145		100	100		100
Base Capacity (vph)	289	842	816	172	842	792	293	1331	724	133	906	509
Starvation Cap Reductn	0	17	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.68	0.23	0.93	0.51	0.14	0.83	0.66	0.38	0.58	0.68	0.14

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	303	424	197	86	165	128	135	1066	121	93	822	78
v/c Ratio	0.78	0.72	0.33	0.51	0.28	0.23	0.45	0.56	0.13	0.46	0.43	0.09
Control Delay	34.2	24.8	7.2	27.6	15.7	8.7	15.5	10.6	2.6	18.7	9.3	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.2	24.8	7.2	27.6	15.7	8.7	15.5	10.6	2.6	18.7	9.3	2.5
Queue Length 50th (ft)	93	126	15	24	41	14	29	128	1	20	90	0
Queue Length 95th (ft)	#203	211	54	64	81	45	76	180	21	#65	128	16
Internal Link Dist (ft)		3566			2463			1270			1407	
Turn Bay Length (ft)	100		100	130		130	130		80	90		80
Base Capacity (vph)	446	684	666	195	684	625	298	1919	910	203	1919	894
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.62	0.30	0.44	0.24	0.20	0.45	0.56	0.13	0.46	0.43	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	387	1114	236	673	203	957	196	930	178
v/c Ratio	0.95	0.86	0.93	0.76	0.94	0.91	0.91	0.87	0.32
Control Delay	71.0	38.4	79.9	38.0	88.6	43.3	82.1	40.7	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.0	38.4	79.9	38.0	88.6	43.3	82.1	40.7	10.6
Queue Length 50th (ft)	220	211	134	120	116	269	112	263	23
Queue Length 95th (ft)	#402	#269	#273	163	#248	#389	#239	#372	73
Internal Link Dist (ft)		3770		827		760		836	
Turn Bay Length (ft)	170		200		100		170		120
Base Capacity (vph)	406	1305	255	930	216	1055	216	1063	560
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	0.95	0.85	0.93	0.72	0.94	0.91	0.91	0.87	0.32

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	135	1276	116	576	152	962	323	817
v/c Ratio	0.65	1.01	0.88	0.52	0.72	0.95	0.98	0.65
Control Delay	49.4	57.6	91.6	24.3	54.2	47.2	79.0	24.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.4	57.6	91.6	24.3	54.2	47.2	79.0	24.5
Queue Length 50th (ft)	65	~232	59	74	74	240	162	176
Queue Length 95th (ft)	#134	#335	#154	109	#157	#367	#320	238
Internal Link Dist (ft)		451		583		487		613
Turn Bay Length (ft)	190		200		220		300	
Base Capacity (vph)	221	1269	132	1104	221	1012	331	1251
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	1.01	0.88	0.52	0.69	0.95	0.98	0.65

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.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	29	819	21	524	28	78	36
v/c Ratio	0.26	0.80	0.07	0.36	0.02	0.31	0.15
Control Delay	41.0	22.1	29.9	0.7	0.0	3.1	1.3
Queue Delay	0.0	0.1	0.3	0.2	0.8	0.2	0.1
Total Delay	41.0	22.2	30.2	1.0	0.8	3.3	1.4
Queue Length 50th (ft)	14	300	7	1	0	0	0
Queue Length 95th (ft)	39	#472	m24	5	m0	0	0
Internal Link Dist (ft)		1702		61		94	397
Turn Bay Length (ft)	150		50		50		
Base Capacity (vph)	112	1019	315	1457	1251	455	429
Starvation Cap Reductn	0	0	130	356	1101	0	0
Spillback Cap Reductn	0	5	0	0	0	112	104
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.81	0.11	0.48	0.19	0.23	0.11

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Appendix H
2035 Refined Build Intersection LOS Worksheets

Notes:

Intersection 66A is summarized as Node 166 in the Synchro reports

Intersection 70 is summarized as Node 170 in the Synchro reports

Intersection 1009 is summarized as Node 1109 in the Synchro reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	326	267	18	550	6	231	0	4	4	1	0
Future Volume (veh/h)	5	326	267	18	550	6	231	0	4	4	1	0
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	5	354	0	20	598	7	251	0	4	4	1	0
Adj No. of Lanes	1	3	0	1	2	1	1	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	10	1311	0	34	962	430	830	0	773	693	160	0
Arrive On Green	0.01	0.26	0.00	0.02	0.27	0.27	0.49	0.00	0.49	0.49	0.49	0.00
Sat Flow, veh/h	1774	5253	0	1774	3539	1583	1410	0	1583	1160	327	0
Grp Volume(v), veh/h	5	354	0	20	598	7	251	0	4	5	0	0
Grp Sat Flow(s),veh/h/ln	1774	1695	0	1774	1770	1583	1410	0	1583	1487	0	0
Q Serve(g_s), s	0.1	2.8	0.0	0.6	7.6	0.2	5.6	0.0	0.1	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	2.8	0.0	0.6	7.6	0.2	5.6	0.0	0.1	0.1	0.0	0.0
Prop In Lane	1.00		0.00	1.00		1.00	1.00		1.00	0.80		0.00
Lane Grp Cap(c), veh/h	10	1311	0	34	962	430	830	0	773	853	0	0
V/C Ratio(X)	0.53	0.27	0.00	0.58	0.62	0.02	0.30	0.00	0.01	0.01	0.00	0.00
Avail Cap(c_a), veh/h	139	1888	0	139	1314	588	830	0	773	853	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	25.4	15.2	0.0	24.9	16.3	13.6	8.1	0.0	6.7	6.7	0.0	0.0
Incr Delay (d2), s/veh	38.4	0.1	0.0	14.7	0.7	0.0	0.9	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.3	0.0	0.4	3.7	0.1	2.4	0.0	0.0	0.0	0.0	0.0
LnGrp Delay(d),s/veh	63.8	15.3	0.0	39.6	17.0	13.6	9.1	0.0	6.7	6.7	0.0	0.0
LnGrp LOS	E	B		D	B	B	A		A	A		
Approach Vol, veh/h		359			625			255			5	
Approach Delay, s/veh		15.9			17.7			9.0			6.7	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		29.0	5.0	17.2		29.0	4.3	17.9
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		25.0	4.0	19.0		25.0	4.0	19.0
Max Q Clear Time (g_c+I1), s		7.6	2.6	4.8		2.1	2.1	9.6
Green Ext Time (p_c), s		0.7	0.0	5.6		0.7	0.0	4.3

Intersection Summary			
HCM 2010 Ctrl Delay			15.4
HCM 2010 LOS			B

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	311	0	0	553	36	0	24	21	18	9	22
Future Vol, veh/h	24	311	0	0	553	36	0	24	21	18	9	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	115	-	-	-	-	-	-	-	50	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	338	0	0	601	39	0	26	23	20	10	24

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	640	0	0	-	-	0	-	1030	169	821	1011	320
Stage 1	-	-	-	-	-	-	-	390	-	621	621	-
Stage 2	-	-	-	-	-	-	-	640	-	200	390	-
Critical Hdwy	4.14	-	-	-	-	-	-	6.54	7.14	6.99	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	5.54	-	6.74	5.54	-
Follow-up Hdwy	2.22	-	-	-	-	-	-	4.02	3.92	3.67	4.02	3.32
Pot Cap-1 Maneuver	940	-	-	0	-	-	0	232	719	294	238	676
Stage 1	-	-	-	0	-	-	0	606	-	428	477	-
Stage 2	-	-	-	0	-	-	0	468	-	746	606	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	940	-	-	-	-	-	-	226	719	254	231	676
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	226	-	254	231	-
Stage 1	-	-	-	-	-	-	-	589	-	416	477	-
Stage 2	-	-	-	-	-	-	-	468	-	671	589	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0	17	16.6
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	226	719	940	-	-	-	-	246	676
HCM Lane V/C Ratio	0.115	0.032	0.028	-	-	-	-	0.119	0.035
HCM Control Delay (s)	23	10.2	8.9	-	-	-	-	21.6	10.5
HCM Lane LOS	C	B	A	-	-	-	-	C	B
HCM 95th %tile Q(veh)	0.4	0.1	0.1	-	-	-	-	0.4	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	195	380	123	130	837	225	277	756	117	227	986	295
Future Volume (veh/h)	195	380	123	130	837	225	277	756	117	227	986	295
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	212	413	134	141	910	245	301	822	127	247	1072	321
Adj No. of Lanes	1	3	0	1	3	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	237	987	308	175	887	238	344	956	148	276	1298	581
Arrive On Green	0.13	0.26	0.26	0.10	0.22	0.22	0.10	0.31	0.31	0.16	0.37	0.37
Sat Flow, veh/h	1774	3843	1198	1774	3993	1071	3442	3074	475	1774	3539	1583
Grp Volume(v), veh/h	212	362	185	141	772	383	301	473	476	247	1072	321
Grp Sat Flow(s),veh/h/ln	1774	1695	1651	1774	1695	1674	1721	1770	1779	1774	1770	1583
Q Serve(g_s), s	10.6	8.0	8.4	7.0	20.0	20.0	7.8	22.6	22.6	12.3	24.8	9.4
Cycle Q Clear(g_c), s	10.6	8.0	8.4	7.0	20.0	20.0	7.8	22.6	22.6	12.3	24.8	9.4
Prop In Lane	1.00		0.73	1.00		0.64	1.00		0.27	1.00		1.00
Lane Grp Cap(c), veh/h	237	871	424	175	753	372	344	551	553	276	1298	581
V/C Ratio(X)	0.90	0.42	0.44	0.81	1.02	1.03	0.87	0.86	0.86	0.90	0.83	0.55
Avail Cap(c_a), veh/h	237	871	424	276	753	372	344	551	553	276	1298	581
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	38.4	27.8	28.0	39.7	35.0	35.0	39.9	29.2	29.2	37.3	25.9	9.5
Incr Delay (d2), s/veh	32.5	0.3	0.7	9.0	39.3	54.4	21.3	16.0	15.9	28.9	6.1	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	3.8	3.9	3.9	13.4	14.8	4.7	13.5	13.5	8.2	13.2	4.7
LnGrp Delay(d),s/veh	70.9	28.1	28.7	48.7	74.3	89.4	61.2	45.1	45.1	66.1	32.0	13.3
LnGrp LOS	E	C	C	D	F	F	E	D	D	E	C	B
Approach Vol, veh/h		759			1296			1250			1640	
Approach Delay, s/veh		40.2			76.0			49.0			33.5	
Approach LOS		D			E			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	32.0	12.9	27.1	13.0	37.0	16.0	24.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	14.0	28.0	14.0	18.0	9.0	33.0	12.0	20.0
Max Q Clear Time (g_c+I1), s	14.3	24.6	9.0	10.4	9.8	26.8	12.6	22.0
Green Ext Time (p_c), s	0.0	3.0	0.1	2.6	0.0	5.4	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	49.6
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	589	16	59	575	18	2	0	26	38	0	50
Future Volume (vph)	18	589	16	59	575	18	2	0	26	38	0	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.87			0.92	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00			0.98	
Satd. Flow (prot)	1770	1856		1770	1863	1583		1623			1683	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.98			0.85	
Satd. Flow (perm)	1770	1856		1770	1863	1583		1601			1456	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	640	17	64	625	20	2	0	28	41	0	54
RTOR Reduction (vph)	0	1	0	0	0	6	0	27	0	0	85	0
Lane Group Flow (vph)	20	656	0	64	625	14	0	3	0	0	10	0
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	7	4		3 13	8 13			2			6	
Permitted Phases						8 13	2			6		
Actuated Green, G (s)	0.7	30.1		7.1	40.5	40.5		6.0			6.0	
Effective Green, g (s)	0.7	30.1		7.1	40.5	40.5		6.0			6.0	
Actuated g/C Ratio	0.01	0.51		0.12	0.68	0.68		0.10			0.10	
Clearance Time (s)	4.0	4.0						4.0			4.0	
Vehicle Extension (s)	3.0	3.0						3.0			3.0	
Lane Grp Cap (vph)	20	943		212	1274	1082		162			147	
v/s Ratio Prot	c0.01	c0.35		0.04	c0.34							
v/s Ratio Perm						0.01		0.00			c0.01	
v/c Ratio	1.00	0.70		0.30	0.49	0.01		0.02			0.07	
Uniform Delay, d1	29.2	11.1		23.8	4.4	3.0		23.9			24.1	
Progression Factor	1.00	1.00		1.55	0.05	1.00		1.00			1.00	
Incremental Delay, d2	201.2	2.2		0.7	0.2	0.0		0.0			0.2	
Delay (s)	230.5	13.3		37.4	0.4	3.0		24.0			24.3	
Level of Service	F	B		D	A	A		C			C	
Approach Delay (s)		19.7			3.9			24.0			24.3	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	59.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	560	93	43	630	22	53
Future Volume (vph)	560	93	43	630	22	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	1.00	1.00	
Frt	0.98		1.00	1.00	0.90	
Flt Protected	1.00		0.95	1.00	0.99	
Satd. Flow (prot)	1827		1770	1863	1661	
Flt Permitted	1.00		0.95	1.00	0.99	
Satd. Flow (perm)	1827		1770	1863	1661	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	609	101	47	685	24	58
RTOR Reduction (vph)	7	0	0	0	54	0
Lane Group Flow (vph)	703	0	47	685	28	0
Turn Type	NA		Prot	NA	Prot	
Protected Phases	4		3	8	13	
Permitted Phases						
Actuated Green, G (s)	30.1		3.0	32.4	4.1	
Effective Green, g (s)	30.1		3.0	32.4	4.1	
Actuated g/C Ratio	0.51		0.05	0.55	0.07	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	928		89	1019	115	
v/s Ratio Prot	c0.38		c0.03	0.37	c0.02	
v/s Ratio Perm						
v/c Ratio	0.76		0.53	0.67	0.24	
Uniform Delay, d1	11.6		27.4	9.6	26.1	
Progression Factor	0.23		1.00	1.00	1.00	
Incremental Delay, d2	2.9		5.6	1.8	1.1	
Delay (s)	5.5		33.0	11.4	27.2	
Level of Service	A		C	B	C	
Approach Delay (s)	5.5			12.7	27.2	
Approach LOS	A			B	C	

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	59.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	43	300	26	18	667	134	10	2	3	24	0	17
Future Volume (veh/h)	43	300	26	18	667	134	10	2	3	24	0	17
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	47	326	28	20	725	146	11	2	3	26	0	18
Adj No. of Lanes	1	3	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	76	2321	196	36	1361	274	287	55	36	262	26	77
Arrive On Green	0.04	0.49	0.49	0.02	0.46	0.46	0.12	0.12	0.12	0.12	0.00	0.12
Sat Flow, veh/h	1774	4778	404	1774	2937	591	803	446	288	689	214	625
Grp Volume(v), veh/h	47	230	124	20	437	434	16	0	0	44	0	0
Grp Sat Flow(s),veh/h/ln	1774	1695	1791	1774	1770	1758	1538	0	0	1528	0	0
Q Serve(g_s), s	0.8	1.2	1.2	0.4	5.7	5.7	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.8	1.2	1.2	0.4	5.7	5.7	0.3	0.0	0.0	0.7	0.0	0.0
Prop In Lane	1.00		0.23	1.00		0.34	0.69		0.19	0.59		0.41
Lane Grp Cap(c), veh/h	76	1647	870	36	820	815	377	0	0	365	0	0
V/C Ratio(X)	0.62	0.14	0.14	0.55	0.53	0.53	0.04	0.00	0.00	0.12	0.00	0.00
Avail Cap(c_a), veh/h	274	2616	1382	219	1311	1303	1058	0	0	1048	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	15.3	4.6	4.6	15.7	6.2	6.2	12.6	0.0	0.0	12.8	0.0	0.0
Incr Delay (d2), s/veh	8.1	0.0	0.1	12.6	0.5	0.5	0.0	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.6	0.6	0.3	2.8	2.8	0.1	0.0	0.0	0.4	0.0	0.0
LnGrp Delay(d),s/veh	23.3	4.6	4.7	28.3	6.7	6.7	12.6	0.0	0.0	12.9	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	B			B		
Approach Vol, veh/h		401			891			16			44	
Approach Delay, s/veh		6.8			7.2			12.6			12.9	
Approach LOS		A			A			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		8.0	4.7	19.7		8.0	5.4	19.0
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		19.0	4.0	25.0		19.0	5.0	24.0
Max Q Clear Time (g_c+I1), s		2.3	2.4	3.2		2.7	2.8	7.7
Green Ext Time (p_c), s		0.2	0.0	8.4		0.2	0.0	7.3

Intersection Summary	
HCM 2010 Ctrl Delay	7.4
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	840	330	41	482	3	173	0	4	2	0	0
Future Volume (veh/h)	5	840	330	41	482	3	173	0	4	2	0	0
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	5	913	0	45	524	3	188	0	4	2	0	0
Adj No. of Lanes	1	3	0	1	2	1	1	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	10	1674	0	65	1276	571	709	0	639	704	0	0
Arrive On Green	0.01	0.33	0.00	0.04	0.36	0.36	0.40	0.00	0.40	0.40	0.00	0.00
Sat Flow, veh/h	1774	5253	0	1774	3539	1583	1412	0	1583	1401	0	0
Grp Volume(v), veh/h	5	913	0	45	524	3	188	0	4	2	0	0
Grp Sat Flow(s),veh/h/ln	1774	1695	0	1774	1770	1583	1412	0	1583	1401	0	0
Q Serve(g_s), s	0.1	7.6	0.0	1.3	5.8	0.1	4.6	0.0	0.1	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	7.6	0.0	1.3	5.8	0.1	4.7	0.0	0.1	0.1	0.0	0.0
Prop In Lane	1.00		0.00	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	10	1674	0	65	1276	571	709	0	639	704	0	0
V/C Ratio(X)	0.53	0.55	0.00	0.69	0.41	0.01	0.27	0.00	0.01	0.00	0.00	0.00
Avail Cap(c_a), veh/h	136	2150	0	170	1564	700	709	0	639	704	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	25.8	14.3	0.0	24.8	12.5	10.7	10.7	0.0	9.3	9.3	0.0	0.0
Incr Delay (d2), s/veh	38.4	0.3	0.0	12.2	0.2	0.0	0.9	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	3.6	0.0	0.9	2.8	0.0	2.0	0.0	0.0	0.0	0.0	0.0
LnGrp Delay(d),s/veh	64.3	14.6	0.0	37.0	12.7	10.7	11.6	0.0	9.3	9.3	0.0	0.0
LnGrp LOS	E	B		D	B	B	B		A	A		
Approach Vol, veh/h		918			572			192			2	
Approach Delay, s/veh		14.8			14.6			11.5			9.3	
Approach LOS		B			B			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		25.0	5.9	21.1		25.0	4.3	22.8
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		21.0	5.0	22.0		21.0	4.0	23.0
Max Q Clear Time (g_c+I1), s		6.7	3.3	9.6		2.1	2.1	7.8
Green Ext Time (p_c), s		0.4	0.0	7.5		0.5	0.0	8.6

Intersection Summary			
HCM 2010 Ctrl Delay			14.4
HCM 2010 LOS			B

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	820	1	0	500	61	0	18	19	15	10	26
Future Vol, veh/h	26	820	1	0	500	61	0	18	19	15	10	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	115	-	-	-	-	-	-	-	50	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	891	1	0	543	66	0	20	21	16	11	28

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	610	0	0	-	-	0	-	1558	446	1000	1526	305
Stage 1	-	-	-	-	-	-	-	948	-	577	577	-
Stage 2	-	-	-	-	-	-	-	610	-	423	949	-
Critical Hdwy	4.14	-	-	-	-	-	-	6.54	7.14	6.99	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	5.54	-	6.74	5.54	-
Follow-up Hdwy	2.22	-	-	-	-	-	-	4.02	3.92	3.67	4.02	3.32
Pot Cap-1 Maneuver	965	-	-	0	-	-	0	111	479	224	117	691
Stage 1	-	-	-	0	-	-	0	338	-	455	500	-
Stage 2	-	-	-	0	-	-	0	483	-	547	337	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	965	-	-	-	-	-	-	108	479	181	114	691
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	108	-	181	114	-
Stage 1	-	-	-	-	-	-	-	328	-	442	500	-
Stage 2	-	-	-	-	-	-	-	483	-	478	327	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	28.8	22.5
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	108	479	965	-	-	-	-	147	691
HCM Lane V/C Ratio	0.181	0.043	0.029	-	-	-	-	0.185	0.041
HCM Control Delay (s)	45.6	12.9	8.8	-	-	-	-	35	10.4
HCM Lane LOS	E	B	A	-	-	-	-	E	B
HCM 95th %tile Q(veh)	0.6	0.1	0.1	-	-	-	-	0.7	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	356	836	189	217	489	130	187	764	117	180	856	164
Future Volume (veh/h)	356	836	189	217	489	130	187	764	117	180	856	164
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	387	909	205	236	532	141	203	830	127	196	930	178
Adj No. of Lanes	1	3	0	1	3	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	409	1036	233	258	662	171	270	931	142	219	1229	550
Arrive On Green	0.23	0.25	0.25	0.15	0.16	0.16	0.08	0.30	0.30	0.12	0.35	0.35
Sat Flow, veh/h	1774	4155	933	1774	4027	1042	3442	3078	471	1774	3539	1583
Grp Volume(v), veh/h	387	741	373	236	446	227	203	477	480	196	930	178
Grp Sat Flow(s),veh/h/ln	1774	1695	1698	1774	1695	1679	1721	1770	1780	1774	1770	1583
Q Serve(g_s), s	19.2	18.7	18.9	11.7	11.3	11.7	5.2	23.0	23.0	9.7	20.8	3.8
Cycle Q Clear(g_c), s	19.2	18.7	18.9	11.7	11.3	11.7	5.2	23.0	23.0	9.7	20.8	3.8
Prop In Lane	1.00		0.55	1.00		0.62	1.00		0.26	1.00		1.00
Lane Grp Cap(c), veh/h	409	845	423	258	557	276	270	535	538	219	1229	550
V/C Ratio(X)	0.95	0.88	0.88	0.91	0.80	0.82	0.75	0.89	0.89	0.90	0.76	0.32
Avail Cap(c_a), veh/h	409	874	438	258	608	301	270	535	538	219	1229	550
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.8	32.2	32.2	37.6	35.9	36.0	40.3	29.7	29.7	38.6	25.8	5.6
Incr Delay (d2), s/veh	31.0	9.8	18.1	33.9	7.0	15.6	11.2	19.7	19.6	34.4	4.4	1.6
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	12.9	9.9	10.9	8.1	5.8	6.6	2.9	14.1	14.1	6.8	10.8	3.1
LnGrp Delay(d),s/veh	64.8	42.0	50.3	71.5	42.8	51.7	51.5	49.4	49.3	72.9	30.2	7.1
LnGrp LOS	E	D	D	E	D	D	D	D	D	E	C	A
Approach Vol, veh/h		1501			909			1160			1304	
Approach Delay, s/veh		49.9			52.5			49.7			33.4	
Approach LOS		D			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	31.0	17.0	26.3	11.0	35.0	24.6	18.7
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	11.0	27.0	13.0	23.0	7.0	31.0	20.0	16.0
Max Q Clear Time (g_c+I1), s	11.7	25.0	13.7	20.9	7.2	22.8	21.2	13.7
Green Ext Time (p_c), s	0.0	1.8	0.0	1.4	0.0	6.7	0.0	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	46.0
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	746	7	19	482	26	14	0	58	17	0	17
Future Volume (vph)	27	746	7	19	482	26	14	0	58	17	0	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.89			0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.98	
Satd. Flow (prot)	1770	1860		1770	1863	1583		1644			1695	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.92			0.81	
Satd. Flow (perm)	1770	1860		1770	1863	1583		1533			1410	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	811	8	21	524	28	15	0	63	18	0	18
RTOR Reduction (vph)	0	0	0	0	0	7	0	73	0	0	34	0
Lane Group Flow (vph)	29	819	0	21	524	21	0	5	0	0	2	0
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	7	4		3 13	8 13			2			6	
Permitted Phases						8 13	2			6		
Actuated Green, G (s)	2.0	45.4		14.0	61.4	61.4		5.5			5.5	
Effective Green, g (s)	2.0	45.4		14.0	61.4	61.4		5.5			5.5	
Actuated g/C Ratio	0.02	0.56		0.17	0.76	0.76		0.07			0.07	
Clearance Time (s)	4.0	4.0						4.0			4.0	
Vehicle Extension (s)	3.0	3.0						3.0			3.0	
Lane Grp Cap (vph)	43	1043		306	1413	1201		104			95	
v/s Ratio Prot	c0.02	c0.44		0.01	c0.28							
v/s Ratio Perm						0.01		c0.00			0.00	
v/c Ratio	0.67	0.78		0.07	0.37	0.02		0.05			0.03	
Uniform Delay, d1	39.1	13.9		28.0	3.3	2.4		35.3			35.2	
Progression Factor	1.00	1.00		1.62	0.04	0.00		1.00			1.00	
Incremental Delay, d2	34.5	3.9		0.1	0.2	0.0		0.2			0.1	
Delay (s)	73.7	17.9		45.6	0.3	0.0		35.5			35.3	
Level of Service	E	B		D	A	A		D			D	
Approach Delay (s)		19.8			1.9			35.5			35.3	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	80.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	773	48	166	516	11	31
Future Volume (vph)	773	48	166	516	11	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	1.00	1.00	
Frt	0.99		1.00	1.00	0.90	
Flt Protected	1.00		0.95	1.00	0.99	
Satd. Flow (prot)	1848		1770	1863	1655	
Flt Permitted	1.00		0.95	1.00	0.99	
Satd. Flow (perm)	1848		1770	1863	1655	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	840	52	180	561	12	34
RTOR Reduction (vph)	2	0	0	0	32	0
Lane Group Flow (vph)	890	0	180	561	14	0
Turn Type	NA		Prot	NA	Prot	
Protected Phases	4		3	8	13	
Permitted Phases						
Actuated Green, G (s)	45.4		10.0	53.4	4.0	
Effective Green, g (s)	45.4		10.0	53.4	4.0	
Actuated g/C Ratio	0.56		0.12	0.66	0.05	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1037		218	1229	81	
v/s Ratio Prot	c0.48		c0.10	0.30	c0.01	
v/s Ratio Perm						
v/c Ratio	0.86		0.83	0.46	0.17	
Uniform Delay, d1	15.0		34.6	6.7	36.9	
Progression Factor	0.18		1.00	1.00	1.00	
Incremental Delay, d2	4.8		21.8	0.3	1.0	
Delay (s)	7.6		56.4	7.0	37.8	
Level of Service	A		E	A	D	
Approach Delay (s)	7.6			19.0	37.8	
Approach LOS	A			B	D	

Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	80.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	1134	19	20	498	23	23	0	23	170	0	89
Future Volume (veh/h)	18	1134	19	20	498	23	23	0	23	170	0	89
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	20	1233	21	22	541	25	25	0	25	185	0	97
Adj No. of Lanes	1	3	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	34	1787	30	37	1201	55	380	31	313	483	22	208
Arrive On Green	0.02	0.35	0.35	0.02	0.35	0.35	0.42	0.00	0.42	0.42	0.00	0.42
Sat Flow, veh/h	1774	5150	88	1774	3445	159	680	74	754	904	53	502
Grp Volume(v), veh/h	20	812	442	22	278	288	50	0	0	282	0	0
Grp Sat Flow(s),veh/h/ln	1774	1695	1847	1774	1770	1835	1508	0	0	1458	0	0
Q Serve(g_s), s	0.6	11.4	11.4	0.7	6.7	6.7	0.0	0.0	0.0	6.5	0.0	0.0
Cycle Q Clear(g_c), s	0.6	11.4	11.4	0.7	6.7	6.7	1.0	0.0	0.0	7.6	0.0	0.0
Prop In Lane	1.00		0.05	1.00		0.09	0.50		0.50	0.66		0.34
Lane Grp Cap(c), veh/h	34	1177	641	37	617	640	724	0	0	713	0	0
V/C Ratio(X)	0.59	0.69	0.69	0.60	0.45	0.45	0.07	0.00	0.00	0.40	0.00	0.00
Avail Cap(c_a), veh/h	128	1286	701	128	671	696	724	0	0	713	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	26.9	15.5	15.5	26.9	13.9	13.9	9.7	0.0	0.0	11.6	0.0	0.0
Incr Delay (d2), s/veh	15.2	1.4	2.6	14.6	0.5	0.5	0.2	0.0	0.0	1.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	5.5	6.2	0.5	3.3	3.5	0.5	0.0	0.0	3.4	0.0	0.0
LnGrp Delay(d),s/veh	42.1	16.9	18.1	41.4	14.4	14.4	9.9	0.0	0.0	13.2	0.0	0.0
LnGrp LOS	D	B	B	D	B	B	A			B		
Approach Vol, veh/h		1274			588			50			282	
Approach Delay, s/veh		17.7			15.4			9.9			13.2	
Approach LOS		B			B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		27.0	5.1	23.2		27.0	5.1	23.3
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		23.0	4.0	21.0		23.0	4.0	21.0
Max Q Clear Time (g_c+I1), s		3.0	2.7	13.4		9.6	2.6	8.7
Green Ext Time (p_c), s		2.0	0.0	5.8		1.7	0.0	8.6

Intersection Summary	
HCM 2010 Ctrl Delay	16.4
HCM 2010 LOS	B

LOS Worksheets

2035 No Build AM Peak Hour LOS Worksheets

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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	328	73	184	196	66	395
Future Volume (vph)	328	73	184	196	66	395
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5			4.5
Lane Util. Factor	0.97	1.00	0.95			0.95
Frt	1.00	0.85	0.92			1.00
Flt Protected	0.95	1.00	1.00			0.99
Satd. Flow (prot)	3433	1583	3265			3514
Flt Permitted	0.95	1.00	1.00			0.85
Satd. Flow (perm)	3433	1583	3265			2999
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	357	79	200	213	72	429
RTOR Reduction (vph)	0	56	128	0	0	0
Lane Group Flow (vph)	357	23	285	0	0	501
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	8.7	8.7	11.8			11.8
Effective Green, g (s)	8.7	8.7	11.8			11.8
Actuated g/C Ratio	0.29	0.29	0.40			0.40
Clearance Time (s)	4.5	4.5	4.5			4.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	1012	466	1306			1199
v/s Ratio Prot	c0.10		0.09			
v/s Ratio Perm		0.01				c0.17
v/c Ratio	0.35	0.05	0.22			0.42
Uniform Delay, d1	8.2	7.4	5.8			6.4
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.2	0.0	0.1			0.2
Delay (s)	8.4	7.5	5.9			6.6
Level of Service	A	A	A			A
Approach Delay (s)	8.2		5.9			6.6
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	29.5	Sum of lost time (s)	9.0
Intersection Capacity Utilization	44.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	187	176	208	641	35	175	303	122	114	445	173
Future Volume (vph)	82	187	176	208	641	35	175	303	122	114	445	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.93		1.00	0.99		1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3282		1770	3512		1770	3386		1770	3391	
Flt Permitted	0.26	1.00		0.51	1.00		0.36	1.00		0.49	1.00	
Satd. Flow (perm)	483	3282		947	3512		676	3386		906	3391	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	89	203	191	226	697	38	190	329	133	124	484	188
RTOR Reduction (vph)	0	127	0	0	7	0	0	66	0	0	46	0
Lane Group Flow (vph)	89	267	0	226	728	0	190	396	0	124	626	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.2	19.2		19.2	19.2		28.7	28.7		28.7	28.7	
Effective Green, g (s)	19.2	19.2		19.2	19.2		28.7	28.7		28.7	28.7	
Actuated g/C Ratio	0.34	0.34		0.34	0.34		0.50	0.50		0.50	0.50	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	162	1107		319	1185		340	1707		456	1710	
v/s Ratio Prot		0.08			0.21			0.12			0.18	
v/s Ratio Perm	0.18			c0.24			c0.28			0.14		
v/c Ratio	0.55	0.24		0.71	0.61		0.56	0.23		0.27	0.37	
Uniform Delay, d1	15.3	13.6		16.4	15.8		9.7	7.9		8.1	8.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.8	0.1		7.0	1.0		6.5	0.3		1.5	0.6	
Delay (s)	19.1	13.7		23.4	16.7		16.2	8.2		9.6	9.2	
Level of Service	B	B		C	B		B	A		A	A	
Approach Delay (s)		14.7			18.3			10.6			9.2	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	56.9	Sum of lost time (s)	9.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	296	101	272	553	108	136	617	231	105	486	105
Future Volume (vph)	68	296	101	272	553	108	136	617	231	105	486	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3404		1770	3453		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3404		1770	3453		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	74	322	110	296	601	117	148	671	251	114	528	114
RTOR Reduction (vph)	0	38	0	0	18	0	0	0	174	0	0	84
Lane Group Flow (vph)	74	394	0	296	700	0	148	671	77	114	528	30
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	6.3	15.7		17.3	26.7		11.2	25.9	25.9	7.7	22.4	22.4
Effective Green, g (s)	6.3	15.7		17.3	26.7		11.2	25.9	25.9	7.7	22.4	22.4
Actuated g/C Ratio	0.07	0.19		0.20	0.32		0.13	0.31	0.31	0.09	0.26	0.26
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	131	631		361	1089		234	1083	484	161	937	419
v/s Ratio Prot	0.04	0.12		c0.17	c0.20		c0.08	c0.19		0.06	0.15	
v/s Ratio Perm									0.05			0.02
v/c Ratio	0.56	0.62		0.82	0.64		0.63	0.62	0.16	0.71	0.56	0.07
Uniform Delay, d1	37.8	31.7		32.2	24.9		34.8	25.1	21.4	37.4	26.9	23.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.5	1.9		13.5	1.3		5.5	2.7	0.7	13.3	2.4	0.3
Delay (s)	43.3	33.7		45.7	26.2		40.2	27.8	22.1	50.7	29.3	23.6
Level of Service	D	C		D	C		D	C	C	D	C	C
Approach Delay (s)		35.1			31.9			28.2			31.7	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	31.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	84.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	101	58	119	33	29	140
Future Volume (Veh/h)	101	58	119	33	29	140
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	110	63	129	36	32	152
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						1253
pX, platoon unblocked						
vC, conflicting volume	363	147			165	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	363	147			165	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	82	93			98	
cM capacity (veh/h)	622	900			1413	

Direction, Lane #	NW 1	NE 1	SW 1
Volume Total	173	165	184
Volume Left	110	0	32
Volume Right	63	36	0
cSH	701	1700	1413
Volume to Capacity	0.25	0.10	0.02
Queue Length 95th (ft)	24	0	2
Control Delay (s)	11.8	0.0	1.5
Lane LOS	B		A
Approach Delay (s)	11.8	0.0	1.5
Approach LOS	B		

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	515	10	10	1372	110	9	41	12	21	33	52
Future Volume (vph)	34	515	10	10	1372	110	9	41	12	21	33	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.97			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	3529		1770	3500			1801			1722	
Flt Permitted	0.95	1.00		0.95	1.00			0.96			0.95	
Satd. Flow (perm)	1770	3529		1770	3500			1749			1647	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	560	11	11	1491	120	10	45	13	23	36	57
RTOR Reduction (vph)	0	2	0	0	9	0	0	9	0	0	38	0
Lane Group Flow (vph)	37	569	0	11	1602	0	0	59	0	0	78	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	2.2	24.5		1.1	23.4			18.6			18.6	
Effective Green, g (s)	2.2	24.5		1.1	23.4			18.6			18.6	
Actuated g/C Ratio	0.04	0.43		0.02	0.41			0.33			0.33	
Clearance Time (s)	4.0	4.5		4.0	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	68	1511		34	1431			568			535	
v/s Ratio Prot	c0.02	0.16		0.01	c0.46							
v/s Ratio Perm								0.03			c0.05	
v/c Ratio	0.54	0.38		0.32	1.12			0.10			0.14	
Uniform Delay, d1	27.0	11.1		27.7	16.9			13.5			13.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	8.6	0.2		5.5	63.6			0.4			0.6	
Delay (s)	35.6	11.3		33.2	80.5			13.8			14.2	
Level of Service	D	B		C	F			B			B	
Approach Delay (s)		12.8			80.2			13.8			14.2	
Approach LOS		B			F			B			B	

Intersection Summary			
HCM 2000 Control Delay	58.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	57.2	Sum of lost time (s)	13.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	353	22	61	830	77	61	106	33	35	105	70
Future Volume (vph)	23	353	22	61	830	77	61	106	33	35	105	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.98			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	3508		1770	3494			1794			1764	
Flt Permitted	0.19	1.00		0.51	1.00			0.86			0.93	
Satd. Flow (perm)	350	3508		954	3494			1558			1652	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	384	24	66	902	84	66	115	36	38	114	76
RTOR Reduction (vph)	0	9	0	0	13	0	0	11	0	0	28	0
Lane Group Flow (vph)	25	399	0	66	973	0	0	206	0	0	200	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	22.5	22.5		22.5	22.5			21.7			21.7	
Effective Green, g (s)	22.5	22.5		22.5	22.5			21.7			21.7	
Actuated g/C Ratio	0.42	0.42		0.42	0.42			0.41			0.41	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	148	1483		403	1477			635			673	
v/s Ratio Prot		0.11			c0.28							
v/s Ratio Perm	0.07			0.07				c0.13			0.12	
v/c Ratio	0.17	0.27		0.16	0.66			0.32			0.30	
Uniform Delay, d1	9.5	10.0		9.5	12.3			10.7			10.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.5	0.1		0.2	1.1			1.4			1.1	
Delay (s)	10.1	10.1		9.7	13.4			12.1			11.7	
Level of Service	B	B		A	B			B			B	
Approach Delay (s)		10.1			13.1			12.1			11.7	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	53.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	64	16	35	90	150	101
Future Volume (Veh/h)	64	16	35	90	150	101
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	70	17	38	98	163	110
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1274		
pX, platoon unblocked						
vC, conflicting volume	392	218	273			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	392	218	273			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	98	97			
cM capacity (veh/h)	594	822	1290			

Direction, Lane #	SE 1	NE 1	SW 1
Volume Total	87	136	273
Volume Left	70	38	0
Volume Right	17	0	110
cSH	628	1290	1700
Volume to Capacity	0.14	0.03	0.16
Queue Length 95th (ft)	12	2	0
Control Delay (s)	11.6	2.4	0.0
Lane LOS	B	A	
Approach Delay (s)	11.6	2.4	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	339	73	152	700	61	190	188	35	58	185	63
Future Volume (vph)	28	339	73	152	700	61	190	188	35	58	185	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3445		1770	3497		1770	1863	1583	1770	1863	1583
Flt Permitted	0.23	1.00		0.33	1.00		0.50	1.00	1.00	0.63	1.00	1.00
Satd. Flow (perm)	433	3445		613	3497		934	1863	1583	1173	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	368	79	165	761	66	207	204	38	63	201	68
RTOR Reduction (vph)	0	27	0	0	9	0	0	0	25	0	0	47
Lane Group Flow (vph)	30	420	0	165	818	0	207	204	13	63	201	21
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	19.2	17.2		26.8	21.0		30.8	24.2	24.2	23.8	20.7	20.7
Effective Green, g (s)	19.2	17.2		26.8	21.0		30.8	24.2	24.2	23.8	20.7	20.7
Actuated g/C Ratio	0.28	0.25		0.39	0.31		0.45	0.35	0.35	0.35	0.30	0.30
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	160	867		338	1075		501	660	560	435	564	479
v/s Ratio Prot	0.01	0.12		c0.04	c0.23		c0.04	0.11		0.01	0.11	
v/s Ratio Perm	0.05			0.15			c0.15		0.01	0.04		0.01
v/c Ratio	0.19	0.48		0.49	0.76		0.41	0.31	0.02	0.14	0.36	0.04
Uniform Delay, d1	18.3	21.8		14.3	21.4		11.9	16.0	14.4	15.0	18.6	16.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.4		1.1	3.2		0.6	1.2	0.1	0.2	1.8	0.2
Delay (s)	18.9	22.2		15.5	24.6		12.4	17.2	14.4	15.2	20.4	17.0
Level of Service	B	C		B	C		B	B	B	B	C	B
Approach Delay (s)		22.0			23.1			14.8			18.7	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	68.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Sign Control		Stop			Stop			Stop		Stop		
Traffic Volume (vph)	30	23	87	27	56	44	30	316	9	55	450	3
Future Volume (vph)	30	23	87	27	56	44	30	316	9	55	450	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	25	95	29	61	48	33	343	10	60	489	3

Direction, Lane #	EB 1	WB 1	SB 1	SB 2	NW 1	NW 2
Volume Total (vph)	153	138	205	182	305	248
Volume Left (vph)	33	29	33	0	60	0
Volume Right (vph)	95	48	0	10	0	3
Hadj (s)	-0.30	-0.13	0.11	0.00	0.13	0.03
Departure Headway (s)	6.1	6.3	6.3	6.2	6.2	6.0
Degree Utilization, x	0.26	0.24	0.36	0.31	0.52	0.42
Capacity (veh/h)	532	513	540	550	560	577
Control Delay (s)	11.2	11.3	11.7	10.9	14.4	12.1
Approach Delay (s)	11.2	11.3	11.3		13.4	
Approach LOS	B	B	B		B	

Intersection Summary			
Delay	12.2		
Level of Service	B		
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	503	12	266	1199	157	139	554	372	106	352	44
Future Volume (vph)	35	503	12	266	1199	157	139	554	372	106	352	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3480	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3480	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	547	13	289	1303	171	151	602	404	115	383	48
RTOR Reduction (vph)	0	0	10	0	0	86	0	0	45	0	12	0
Lane Group Flow (vph)	38	547	3	289	1303	85	151	602	359	115	419	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	2.9	18.9	18.9	15.5	31.5	31.5	7.8	20.4	35.9	6.2	18.8	
Effective Green, g (s)	2.9	18.9	18.9	15.5	31.5	31.5	7.8	20.4	35.9	6.2	18.8	
Actuated g/C Ratio	0.04	0.24	0.24	0.20	0.40	0.40	0.10	0.26	0.45	0.08	0.24	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	64	846	378	347	1411	631	174	913	809	138	828	
v/s Ratio Prot	0.02	0.15		c0.16	c0.37		c0.09	c0.17	0.09	0.06	0.12	
v/s Ratio Perm			0.00			0.05			0.14			
v/c Ratio	0.59	0.65	0.01	0.83	0.92	0.13	0.87	0.66	0.44	0.83	0.51	
Uniform Delay, d1	37.5	27.0	22.9	30.5	22.6	15.1	35.1	26.2	14.7	35.9	26.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	13.9	1.7	0.0	15.6	10.3	0.1	33.7	3.7	0.4	33.0	2.2	
Delay (s)	51.4	28.8	22.9	46.1	32.9	15.2	68.7	29.9	15.1	68.9	28.3	
Level of Service	D	C	C	D	C	B	E	C	B	E	C	
Approach Delay (s)		30.1			33.4			29.8			36.8	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	32.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	5	12	35	10	29	7	78	15	20	99	5
Future Volume (vph)	5	5	12	35	10	29	7	78	15	20	99	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	13	38	11	32	8	85	16	22	108	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	23	81	109	135
Volume Left (vph)	5	38	8	22
Volume Right (vph)	13	32	16	5
Hadj (s)	-0.26	-0.11	-0.04	0.04
Departure Headway (s)	4.3	4.4	4.2	4.3
Degree Utilization, x	0.03	0.10	0.13	0.16
Capacity (veh/h)	787	771	816	814
Control Delay (s)	7.4	7.8	7.9	8.1
Approach Delay (s)	7.4	7.8	7.9	8.1
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.9		
Level of Service	A		
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	888	28	35	1524	76	43	22	58	45	24	76
Future Volume (vph)	117	888	28	35	1524	76	43	22	58	45	24	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		0.91	0.91			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.94			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1770	3523		1610	3366			1714			1704	
Flt Permitted	0.95	1.00		0.95	0.95			0.71			0.78	
Satd. Flow (perm)	1770	3523		1610	3210			1238			1342	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	127	965	30	38	1657	83	47	24	63	49	26	83
RTOR Reduction (vph)	0	1	0	0	2	0	0	21	0	0	27	0
Lane Group Flow (vph)	127	994	0	34	1742	0	0	113	0	0	131	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	10.5	109.3		6.6	112.0			21.5			21.5	
Effective Green, g (s)	10.5	109.3		6.6	112.0			21.5			21.5	
Actuated g/C Ratio	0.07	0.72		0.04	0.74			0.14			0.14	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	123	2551		70	2389			176			191	
v/s Ratio Prot	c0.07	c0.28		0.02	0.03							
v/s Ratio Perm					c0.51			0.09			c0.10	
v/c Ratio	1.03	0.39		0.49	0.73			0.64			0.69	
Uniform Delay, d1	70.2	8.0		70.5	10.9			61.0			61.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	90.1	0.1		5.2	1.1			16.5			18.4	
Delay (s)	160.3	8.1		75.7	12.1			77.5			79.9	
Level of Service	F	A		E	B			E			E	
Approach Delay (s)		25.3			13.3			77.5			79.9	
Approach LOS		C			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	13.5
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	13	15	3	6	5	9	75	3	9	110	6
Future Volume (Veh/h)	2	13	15	3	6	5	9	75	3	9	110	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	14	16	3	7	5	10	82	3	10	120	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								564				
pX, platoon unblocked												
vC, conflicting volume	256	248	124	270	250	84	127			85		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	256	248	124	270	250	84	127			85		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	98	100	99	99	99			99		
cM capacity (veh/h)	681	645	927	653	644	976	1459			1512		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	32	15	95	137
Volume Left	2	3	10	10
Volume Right	16	5	3	7
cSH	764	728	1459	1512
Volume to Capacity	0.04	0.02	0.01	0.01
Queue Length 95th (ft)	3	2	1	0
Control Delay (s)	9.9	10.0	0.8	0.6
Lane LOS	A	B	A	A
Approach Delay (s)	9.9	10.0	0.8	0.6
Approach LOS	A	B		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	18.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	876	7	19	1627	41	12	3	6	87	1	51
Future Volume (vph)	47	876	7	19	1627	41	12	3	6	87	1	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.96			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.97	
Satd. Flow (prot)	1770	3535		1770	3526			1737			1717	
Flt Permitted	0.95	1.00		0.95	1.00			0.86			0.80	
Satd. Flow (perm)	1770	3535		1770	3526			1527			1414	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	51	952	8	21	1768	45	13	3	7	95	1	55
RTOR Reduction (vph)	0	1	0	0	2	0	0	5	0	0	26	0
Lane Group Flow (vph)	51	959	0	21	1811	0	0	18	0	0	125	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	3.0	44.6		1.9	43.5			18.8			18.8	
Effective Green, g (s)	3.0	44.6		1.9	43.5			18.8			18.8	
Actuated g/C Ratio	0.04	0.57		0.02	0.55			0.24			0.24	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	67	2000		42	1946			364			337	
v/s Ratio Prot	c0.03	0.27		0.01	c0.51							
v/s Ratio Perm								0.01			c0.09	
v/c Ratio	0.76	0.48		0.50	0.93			0.05			0.37	
Uniform Delay, d1	37.5	10.2		38.0	16.3			23.1			25.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	39.2	0.2		9.1	8.6			0.3			3.1	
Delay (s)	76.7	10.4		47.0	24.9			23.4			28.2	
Level of Service	E	B		D	C			C			C	
Approach Delay (s)		13.7			25.1			23.4			28.2	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	78.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (veh/h)	1	23	8	7	12	0	1	100	2	7	108	0
Future Volume (Veh/h)	1	23	8	7	12	0	1	100	2	7	108	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	25	9	8	13	0	1	109	2	8	117	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								560				
pX, platoon unblocked												
vC, conflicting volume	252	246	117	266	245	110	117			111		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	252	246	117	266	245	110	117			111		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	96	99	99	98	100	100			99		
cM capacity (veh/h)	688	652	935	657	653	943	1471			1479		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	35	21	112	125
Volume Left	1	8	1	8
Volume Right	9	0	2	0
cSH	708	654	1471	1479
Volume to Capacity	0.05	0.03	0.00	0.01
Queue Length 95th (ft)	4	2	0	0
Control Delay (s)	10.3	10.7	0.1	0.5
Lane LOS	B	B	A	A
Approach Delay (s)	10.3	10.7	0.1	0.5
Approach LOS	B	B		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	21.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	838	24	23	1610	36	14	5	13	63	7	52
Future Volume (vph)	52	838	24	23	1610	36	14	5	13	63	7	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.94			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1770	3524		1770	3528			1721			1711	
Flt Permitted	0.95	1.00		0.95	1.00			0.88			0.84	
Satd. Flow (perm)	1770	3524		1770	3528			1548			1470	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	911	26	25	1750	39	15	5	14	68	8	57
RTOR Reduction (vph)	0	2	0	0	2	0	0	11	0	0	33	0
Lane Group Flow (vph)	57	935	0	25	1787	0	0	23	0	0	100	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	3.0	44.3		2.1	43.4			18.8			18.8	
Effective Green, g (s)	3.0	44.3		2.1	43.4			18.8			18.8	
Actuated g/C Ratio	0.04	0.56		0.03	0.55			0.24			0.24	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	67	1983		47	1945			369			351	
v/s Ratio Prot	c0.03	0.27		0.01	c0.51							
v/s Ratio Perm								0.02			c0.07	
v/c Ratio	0.85	0.47		0.53	0.92			0.06			0.28	
Uniform Delay, d1	37.6	10.2		37.8	16.0			23.1			24.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	61.0	0.2		11.1	7.5			0.3			2.0	
Delay (s)	98.6	10.4		48.9	23.5			23.5			26.5	
Level of Service	F	B		D	C			C			C	
Approach Delay (s)		15.5			23.9			23.5			26.5	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	78.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	5	28	12	26	10	9	330	3	7	563	2
Future Volume (Veh/h)	13	5	28	12	26	10	9	330	3	7	563	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	5	30	13	28	11	10	359	3	8	612	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								542				
pX, platoon unblocked												
vC, conflicting volume	854	1011	307	735	1010	181	614			362		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	854	1011	307	735	1010	181	614			362		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	98	96	95	88	99	99			99		
cM capacity (veh/h)	223	234	689	286	234	831	961			1193		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	49	52	190	182	314	308
Volume Left	14	13	10	0	8	0
Volume Right	30	11	0	3	0	2
cSH	384	292	961	1700	1193	1700
Volume to Capacity	0.13	0.18	0.01	0.11	0.01	0.18
Queue Length 95th (ft)	11	16	1	0	1	0
Control Delay (s)	15.7	20.0	0.6	0.0	0.3	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	15.7	20.0	0.3		0.1	
Approach LOS	C	C				

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	31.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	126	838	1388	189	393	178
Future Volume (vph)	126	838	1388	189	393	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.95	0.95		0.97	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3476		3433	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3476		3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	137	911	1509	205	427	193
RTOR Reduction (vph)	0	0	12	0	0	151
Lane Group Flow (vph)	137	911	1702	0	427	42
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	9.2	61.0	47.3		19.5	19.5
Effective Green, g (s)	9.2	61.0	47.3		19.5	19.5
Actuated g/C Ratio	0.10	0.68	0.53		0.22	0.22
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	181	2412	1837		747	344
v/s Ratio Prot	c0.08	0.26	c0.49		c0.12	
v/s Ratio Perm						0.03
v/c Ratio	0.76	0.38	0.93		0.57	0.12
Uniform Delay, d1	39.1	6.1	19.5		31.3	28.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	16.4	0.1	8.6		3.2	0.7
Delay (s)	55.5	6.2	28.1		34.4	28.9
Level of Service	E	A	C		C	C
Approach Delay (s)		12.7	28.1		32.7	
Approach LOS		B	C		C	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	89.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	360	412	563	218	736	996
Future Volume (vph)	360	412	563	218	736	996
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	0.97	1.00	0.91		0.97	0.95
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3090	1425	4385		3090	3185
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3090	1425	4385		3090	3185
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	391	448	612	237	800	1083
RTOR Reduction (vph)	0	353	97	0	0	0
Lane Group Flow (vph)	391	95	752	0	800	1083
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	14.0	14.0	18.1		20.5	43.1
Effective Green, g (s)	14.0	14.0	18.1		20.5	43.1
Actuated g/C Ratio	0.21	0.21	0.27		0.31	0.65
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	654	301	1200		958	2076
v/s Ratio Prot	c0.13		c0.17		c0.26	0.34
v/s Ratio Perm		0.07				
v/c Ratio	0.60	0.32	0.63		0.84	0.52
Uniform Delay, d1	23.5	22.0	21.0		21.2	6.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.5	0.6	2.5		8.5	0.9
Delay (s)	25.0	22.6	23.5		29.8	7.0
Level of Service	C	C	C		C	A
Approach Delay (s)	23.7		23.5			16.7
Approach LOS	C		C			B

Intersection Summary			
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	66.1	Sum of lost time (s)	13.5
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	212	94	207	477	36	118
Future Volume (Veh/h)	212	94	207	477	36	118
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	230	102	225	518	39	128
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						1
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			332		1249	281
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			332		1249	281
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			82		75	83
cM capacity (veh/h)			1227		156	758

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	332	743	167
Volume Left	0	225	39
Volume Right	102	0	128
cSH	1700	1227	668
Volume to Capacity	0.20	0.18	0.25
Queue Length 95th (ft)	0	17	25
Control Delay (s)	0.0	4.2	16.5
Lane LOS		A	C
Approach Delay (s)	0.0	4.2	16.5
Approach LOS			C

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	9	290	42	87	503	1	132	8	36	7	12	9
Future Volume (vph)	9	290	42	87	503	1	132	8	36	7	12	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	315	46	95	547	1	143	9	39	8	13	10

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	371	642	1	152	39	31
Volume Left (vph)	10	95	0	143	0	8
Volume Right (vph)	46	0	1	0	39	10
Hadj (s)	-0.04	0.11	-0.67	0.50	-0.67	-0.11
Departure Headway (s)	6.2	6.0	5.2	7.7	6.6	7.7
Degree Utilization, x	0.64	1.07	0.00	0.33	0.07	0.07
Capacity (veh/h)	563	596	674	449	524	425
Control Delay (s)	19.8	79.1	7.0	13.2	8.9	11.3
Approach Delay (s)	19.8	79.0		12.4		11.3
Approach LOS	C	F		B		B

Intersection Summary			
Delay	49.2		
Level of Service	E		
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	230	2	84	6	0	2	48	512	6	38	816	405
Future Volume (vph)	230	2	84	6	0	2	48	512	6	38	816	405
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	0.95	0.95	0.88		1.00		0.97	0.91		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.97		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.96		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1687	2787		1739		3433	5076		1770	3539	1583
Flt Permitted	0.75	0.73	1.00		1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1330	1300	2787		1807		3433	5076		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	250	2	91	7	0	2	52	557	7	41	887	440
RTOR Reduction (vph)	0	0	69	0	9	0	0	1	0	0	0	237
Lane Group Flow (vph)	125	127	22	0	0	0	52	563	0	41	887	203
Turn Type	pm+pt	NA	Perm	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8								6
Actuated Green, G (s)	12.0	12.0	12.0		0.9		1.8	23.3		1.8	23.3	23.3
Effective Green, g (s)	12.0	12.0	12.0		0.9		1.8	23.3		1.8	23.3	23.3
Actuated g/C Ratio	0.24	0.24	0.24		0.02		0.04	0.46		0.04	0.46	0.46
Clearance Time (s)	4.5	4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	361	358	660		32		122	2337		62	1629	728
v/s Ratio Prot	0.05	c0.05					0.02	0.11		c0.02	c0.25	
v/s Ratio Perm	0.04	c0.04	0.01		0.00							0.13
v/c Ratio	0.35	0.35	0.03		0.01		0.43	0.24		0.66	0.54	0.28
Uniform Delay, d1	16.2	16.1	14.8		24.4		23.9	8.3		24.1	9.8	8.4
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	0.6	0.0		0.1		2.4	0.2		23.4	1.3	1.0
Delay (s)	16.8	16.7	14.9		24.5		26.3	8.5		47.5	11.1	9.4
Level of Service	B	B	B		C		C	A		D	B	A
Approach Delay (s)		16.3			24.5			10.0			11.7	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	50.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	34	17	467	734	17
Future Volume (Veh/h)	0	34	17	467	734	17
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	37	18	508	798	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1038	287	
pX, platoon unblocked	0.97	0.97	0.97			
vC, conflicting volume	1097	408	816			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1037	326	747			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	94	98			
cM capacity (veh/h)	215	649	831			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	37	187	339	532	284
Volume Left	0	18	0	0	0
Volume Right	37	0	0	0	18
cSH	649	831	1700	1700	1700
Volume to Capacity	0.06	0.02	0.20	0.31	0.17
Queue Length 95th (ft)	5	2	0	0	0
Control Delay (s)	10.9	1.1	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	10.9	0.4		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	44	53	0	921	79	14	748
Future Volume (vph)	44	53	0	921	79	14	748
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5		4.5	4.5
Lane Util. Factor	1.00			0.91		1.00	0.91
Frt	0.93			0.99		1.00	1.00
Flt Protected	0.98			1.00		0.95	1.00
Satd. Flow (prot)	1687			5025		1770	5085
Flt Permitted	0.98			1.00		0.95	1.00
Satd. Flow (perm)	1687			5025		1770	5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	48	58	0	1001	86	15	813
RTOR Reduction (vph)	51	0	0	10	0	0	0
Lane Group Flow (vph)	55	0	0	1077	0	15	813
Turn Type	Prot		Prot	NA		Prot	NA
Protected Phases	8		5	2		1	6
Permitted Phases							
Actuated Green, G (s)	5.9			31.5		1.0	37.0
Effective Green, g (s)	5.9			31.5		1.0	37.0
Actuated g/C Ratio	0.11			0.61		0.02	0.71
Clearance Time (s)	4.5			4.5		4.5	4.5
Vehicle Extension (s)	3.0			3.0		3.0	3.0
Lane Grp Cap (vph)	191			3049		34	3625
v/s Ratio Prot	c0.03			c0.21		0.01	c0.16
v/s Ratio Perm							
v/c Ratio	0.29			0.35		0.44	0.22
Uniform Delay, d1	21.1			5.1		25.2	2.5
Progression Factor	1.00			1.00		1.00	1.00
Incremental Delay, d2	0.8			0.3		8.9	0.1
Delay (s)	21.9			5.4		34.1	2.7
Level of Service	C			A		C	A
Approach Delay (s)	21.9			5.4			3.3
Approach LOS	C			A			A

Intersection Summary			
HCM 2000 Control Delay	5.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	51.9	Sum of lost time (s)	13.5
Intersection Capacity Utilization	32.7%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Existing to No Build			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	321	159	243	872	120	214	866	229	70	718	85
Future Volume (vph)	85	321	159	243	872	120	214	866	229	70	718	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3475		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3475		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	349	173	264	948	130	233	941	249	76	780	92
RTOR Reduction (vph)	0	0	133	0	13	0	0	0	156	0	0	66
Lane Group Flow (vph)	92	349	40	264	1065	0	233	941	93	76	780	26
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	4.3	18.3	18.3	9.6	23.6		11.5	30.0	30.0	4.1	22.6	22.6
Effective Green, g (s)	4.3	18.3	18.3	9.6	23.6		11.5	30.0	30.0	4.1	22.6	22.6
Actuated g/C Ratio	0.05	0.23	0.23	0.12	0.30		0.14	0.38	0.38	0.05	0.28	0.28
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	95	809	362	411	1025		254	1327	593	90	999	447
v/s Ratio Prot	c0.05	0.10		0.08	c0.31		c0.13	c0.27		0.04	0.22	
v/s Ratio Perm			0.02						0.06			0.02
v/c Ratio	0.97	0.43	0.11	0.64	1.04		0.92	0.71	0.16	0.84	0.78	0.06
Uniform Delay, d1	37.8	26.4	24.4	33.6	28.2		33.8	21.3	16.6	37.6	26.4	20.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	81.1	0.4	0.1	3.4	38.6		34.8	3.2	0.6	47.9	6.0	0.2
Delay (s)	118.9	26.8	24.5	37.0	66.8		68.6	24.5	17.2	85.6	32.5	21.2
Level of Service	F	C	C	D	E		E	C	B	F	C	C
Approach Delay (s)		39.9			61.0			30.4			35.6	
Approach LOS		D			E			C			D	

Intersection Summary			
HCM 2000 Control Delay	42.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (veh/h)	9	3	15	6	7	8	10	164	8	7	164	3
Future Volume (Veh/h)	9	3	15	6	7	8	10	164	8	7	164	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	3	16	7	8	9	11	178	9	8	178	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											647	
pX, platoon unblocked												
vC, conflicting volume	413	404	180	418	402	182	181			187		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	413	404	180	418	402	182	181			187		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	99	98	99	98	99	99			99		
cM capacity (veh/h)	532	528	863	528	530	860	1394			1387		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	29	24	198	189
Volume Left	10	7	11	8
Volume Right	16	9	9	3
cSH	674	618	1394	1387
Volume to Capacity	0.04	0.04	0.01	0.01
Queue Length 95th (ft)	3	3	1	0
Control Delay (s)	10.6	11.1	0.5	0.4
Lane LOS	B	B	A	A
Approach Delay (s)	10.6	11.1	0.5	0.4
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	23.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	11	16	7	20	20	461	5	6	382	5
Future Volume (Veh/h)	5	5	11	16	7	20	20	461	5	6	382	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	12	17	8	22	22	501	5	7	415	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											650	
pX, platoon unblocked	0.92	0.92	0.92	0.92	0.92		0.92					
vC, conflicting volume	752	982	418	994	982	253	420			506		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	688	937	325	950	937	253	328			506		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	98	98	91	97	97	98			99		
cM capacity (veh/h)	284	236	618	187	236	746	1132			1055		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	22	47	272	256	427
Volume Left	5	17	22	0	7
Volume Right	12	22	0	5	5
cSH	378	305	1132	1700	1055
Volume to Capacity	0.06	0.15	0.02	0.15	0.01
Queue Length 95th (ft)	5	13	1	0	1
Control Delay (s)	15.1	19.0	0.8	0.0	0.2
Lane LOS	C	C	A		A
Approach Delay (s)	15.1	19.0	0.4		0.2
Approach LOS	C	C			

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	35.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	22	9	452	10	0	416
Future Volume (Veh/h)	22	9	452	10	0	416
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	10	491	11	0	452
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			None
Median storage veh)			2			
Upstream signal (ft)			430			
pX, platoon unblocked	0.94	0.94			0.94	
vC, conflicting volume	722	251			502	
vC1, stage 1 conf vol	496					
vC2, stage 2 conf vol	226					
vCu, unblocked vol	571	68			336	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	99			100	
cM capacity (veh/h)	596	920			1144	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	34	327	175	226	226
Volume Left	24	0	0	0	0
Volume Right	10	0	11	0	0
cSH	665	1700	1700	1700	1700
Volume to Capacity	0.05	0.19	0.10	0.13	0.13
Queue Length 95th (ft)	4	0	0	0	0
Control Delay (s)	10.7	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.7	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	22.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Volume (veh/h)	117	10	3	303	320	0
Future Volume (Veh/h)	117	10	3	303	320	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	127	11	3	329	348	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	518	174	348			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	518	174	348			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	74	99	100			
cM capacity (veh/h)	486	839	1208			

Direction, Lane #	WB 1	WB 2	SE 1	SE 2	SE 3	NW 1	NW 2
Volume Total	127	11	3	164	164	174	174
Volume Left	127	0	3	0	0	0	0
Volume Right	0	11	0	0	0	0	0
cSH	486	839	1208	1700	1700	1700	1700
Volume to Capacity	0.26	0.01	0.00	0.10	0.10	0.10	0.10
Queue Length 95th (ft)	26	1	0	0	0	0	0
Control Delay (s)	15.0	9.3	8.0	0.0	0.0	0.0	0.0
Lane LOS	C	A	A				
Approach Delay (s)	14.6		0.1			0.0	
Approach LOS	B						

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	22.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	1	0	25	8	3	0	129	14	5	92	2
Future Volume (Veh/h)	2	1	0	25	8	3	0	129	14	5	92	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	1	0	27	9	3	0	140	15	5	100	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	266	266	101	259	260	148	102			155		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	266	266	101	259	260	148	102			155		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	96	99	100	100			100		
cM capacity (veh/h)	675	637	954	691	643	899	1490			1425		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	3	39	155	107
Volume Left	2	27	0	5
Volume Right	0	3	15	2
cSH	662	692	1700	1425
Volume to Capacity	0.00	0.06	0.09	0.00
Queue Length 95th (ft)	0	4	0	0
Control Delay (s)	10.5	10.5	0.0	0.4
Lane LOS	B	B		A
Approach Delay (s)	10.5	10.5	0.0	0.4
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	563	48	70	812	41	95
Future Volume (Veh/h)	563	48	70	812	41	95
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	612	52	76	883	45	103
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			664		1673	638
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			664		1673	638
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			92		53	78
cM capacity (veh/h)			925		97	477

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	664	959	148
Volume Left	0	76	45
Volume Right	52	0	103
cSH	1700	925	217
Volume to Capacity	0.39	0.08	0.68
Queue Length 95th (ft)	0	7	107
Control Delay (s)	0.0	2.2	51.1
Lane LOS		A	F
Approach Delay (s)	0.0	2.2	51.1
Approach LOS			F

Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	97.3%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	610	16	20	828	15	25	27	29	6	23	36
Future Volume (Veh/h)	31	610	16	20	828	15	25	27	29	6	23	36
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	34	663	17	22	900	16	27	29	32	7	25	39
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	916			680			1743	1700	672	1738	1700	908
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	916			680			1743	1700	672	1738	1700	908
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			98			39	66	93	84	71	88
cM capacity (veh/h)	745			912			44	86	456	45	86	334

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	714	938	88	71
Volume Left	34	22	27	7
Volume Right	17	16	32	39
cSH	745	912	86	126
Volume to Capacity	0.05	0.02	1.02	0.57
Queue Length 95th (ft)	4	2	146	69
Control Delay (s)	1.2	0.7	190.0	65.8
Lane LOS	A	A	F	F
Approach Delay (s)	1.2	0.7	190.0	65.8
Approach LOS			F	F

Intersection Summary			
Average Delay	12.6		
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	173	184	151	147	450	71	147	306	106	123	501	323
Future Volume (vph)	173	184	151	147	450	71	147	306	106	123	501	323
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.93		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3300		1770	3467		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3300		1770	3467		3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	188	200	164	160	489	77	160	333	115	134	545	351
RTOR Reduction (vph)	0	128	0	0	19	0	0	0	78	0	0	246
Lane Group Flow (vph)	188	236	0	160	547	0	160	333	37	134	545	105
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	7.8	14.7		9.0	15.9		5.5	21.7	21.7	3.9	20.1	20.1
Effective Green, g (s)	7.8	14.7		9.0	15.9		5.5	21.7	21.7	3.9	20.1	20.1
Actuated g/C Ratio	0.12	0.22		0.13	0.24		0.08	0.32	0.32	0.06	0.30	0.30
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	397	720		236	819		280	1141	510	198	1056	472
v/s Ratio Prot	0.05	0.07		c0.09	c0.16		c0.05	0.09		0.04	c0.15	
v/s Ratio Perm									0.02			0.07
v/c Ratio	0.47	0.33		0.68	0.67		0.57	0.29	0.07	0.68	0.52	0.22
Uniform Delay, d1	27.8	22.1		27.8	23.3		29.8	17.1	15.8	31.1	19.6	17.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.3		7.5	2.1		2.8	0.6	0.3	8.8	1.8	1.1
Delay (s)	28.7	22.4		35.3	25.4		32.6	17.7	16.1	39.9	21.4	18.8
Level of Service	C	C		D	C		C	B	B	D	C	B
Approach Delay (s)		24.6			27.6			21.3			22.9	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	67.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	855	41	177	856	377	17	0	18	171	63	216
Future Volume (vph)	0	855	41	177	856	377	17	0	18	171	63	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		4.5	4.5		4.5		4.5	4.5	4.5	4.5
Lane Util. Factor		0.91		1.00	0.91		0.97		1.00	0.95	0.95	1.00
Frt		0.99		1.00	0.95		1.00		0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.98	1.00
Satd. Flow (prot)		5050		1770	4852		3433		1583	1681	1729	1583
Flt Permitted		1.00		0.95	1.00		0.22		1.00	0.95	0.98	1.00
Satd. Flow (perm)		5050		1770	4852		777		1583	1681	1729	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	929	45	192	930	410	18	0	20	186	68	235
RTOR Reduction (vph)	0	6	0	0	95	0	0	0	15	0	0	198
Lane Group Flow (vph)	0	968	0	192	1245	0	18	0	5	125	129	37
Turn Type		NA		Prot	NA		Perm		Perm	Split	NA	Perm
Protected Phases		4		3	8					6	6	
Permitted Phases							2		2			6
Actuated Green, G (s)		17.8		7.5	29.8		18.6		18.6	11.6	11.6	11.6
Effective Green, g (s)		17.8		7.5	29.8		18.6		18.6	11.6	11.6	11.6
Actuated g/C Ratio		0.24		0.10	0.41		0.25		0.25	0.16	0.16	0.16
Clearance Time (s)		4.5		4.5	4.5		4.5		4.5	4.5	4.5	4.5
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		1222		180	1967		196		400	265	272	249
v/s Ratio Prot		c0.19		c0.11	0.26					0.07	c0.07	
v/s Ratio Perm							c0.02		0.00			0.02
v/c Ratio		0.79		1.07	0.63		0.09		0.01	0.47	0.47	0.15
Uniform Delay, d1		26.1		33.0	17.5		21.0		20.6	28.2	28.2	26.7
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		3.6		85.9	0.7		0.9		0.1	1.3	1.3	0.3
Delay (s)		29.7		118.9	18.2		21.9		20.6	29.5	29.5	27.0
Level of Service		C		F	B		C		C	C	C	C
Approach Delay (s)		29.7			30.8			21.2			28.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	73.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	283	463	204	692	41	661	200	155	105	124	300
Future Volume (vph)	163	283	463	204	692	41	661	200	155	105	124	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	0.97	0.95	1.00	1.00	0.91		1.00	1.00		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	5042		1770	1741		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	5042		1770	1741		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	177	308	503	222	752	45	718	217	168	114	135	326
RTOR Reduction (vph)	0	0	426	0	6	0	0	24	0	0	0	160
Lane Group Flow (vph)	177	308	77	222	791	0	718	361	0	114	135	166
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4									6
Actuated Green, G (s)	8.0	16.0	16.0	13.6	21.6		42.7	42.7		14.5	14.5	14.5
Effective Green, g (s)	8.0	16.0	16.0	13.6	21.6		42.7	42.7		14.5	14.5	14.5
Actuated g/C Ratio	0.08	0.15	0.15	0.13	0.21		0.41	0.41		0.14	0.14	0.14
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	262	540	241	229	1039		721	709		244	489	219
v/s Ratio Prot	0.05	0.09		c0.13	c0.16		c0.41	0.21		0.06	0.04	
v/s Ratio Perm			0.05									c0.10
v/c Ratio	0.68	0.57	0.32	0.97	0.76		1.00	0.51		0.47	0.28	0.76
Uniform Delay, d1	47.1	41.2	39.5	45.4	39.2		31.0	23.2		41.6	40.4	43.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.7	1.5	0.8	50.2	3.3		32.5	2.6		1.4	0.3	13.8
Delay (s)	53.9	42.7	40.3	95.6	42.5		63.5	25.8		43.0	40.8	57.3
Level of Service	D	D	D	F	D		E	C		D	D	E
Approach Delay (s)		43.5			54.1			50.3			50.6	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	49.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	104.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	46	61	21	59	1	43	43	12	0	4	2
Future Volume (vph)	0	46	61	21	59	1	43	43	12	0	4	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	50	66	23	64	1	47	47	13	0	4	2

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	116	88	107	6
Volume Left (vph)	0	23	47	0
Volume Right (vph)	66	1	13	2
Hadj (s)	-0.31	0.08	0.05	-0.17
Departure Headway (s)	4.0	4.4	4.4	4.3
Degree Utilization, x	0.13	0.11	0.13	0.01
Capacity (veh/h)	879	799	779	779
Control Delay (s)	7.5	7.9	8.1	7.3
Approach Delay (s)	7.5	7.9	8.1	7.3
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.8		
Level of Service	A		
Intersection Capacity Utilization	29.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	11	1	65	9	5	128
Future Volume (Veh/h)	11	1	65	9	5	128
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	1	71	10	5	139
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			749			
pX, platoon unblocked						
vC, conflicting volume	225	76			81	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	225	76			81	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	761	985			1517	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	13	81	144
Volume Left	12	0	5
Volume Right	1	10	0
cSH	774	1700	1517
Volume to Capacity	0.02	0.05	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	9.7	0.0	0.3
Lane LOS	A		A
Approach Delay (s)	9.7	0.0	0.3
Approach LOS	A		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	20.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	339	15	78	421	11	15	18	23	16	55	80
Future Volume (vph)	37	339	15	78	421	11	15	18	23	16	55	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.94			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	3517		1770	3526			1737			1720	
Flt Permitted	0.44	1.00		0.52	1.00			0.94			0.98	
Satd. Flow (perm)	824	3517		977	3526			1647			1693	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	368	16	85	458	12	16	20	25	17	60	87
RTOR Reduction (vph)	0	7	0	0	4	0	0	11	0	0	39	0
Lane Group Flow (vph)	40	377	0	85	466	0	0	50	0	0	125	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.2	12.2		12.2	12.2			25.6			25.6	
Effective Green, g (s)	12.2	12.2		12.2	12.2			25.6			25.6	
Actuated g/C Ratio	0.26	0.26		0.26	0.26			0.55			0.55	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	214	916		254	919			900			926	
v/s Ratio Prot		0.11			c0.13							
v/s Ratio Perm	0.05			0.09				0.03			c0.07	
v/c Ratio	0.19	0.41		0.33	0.51			0.06			0.13	
Uniform Delay, d1	13.4	14.3		14.0	14.7			5.0			5.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.4	0.3		0.8	0.4			0.1			0.3	
Delay (s)	13.9	14.6		14.8	15.2			5.1			5.5	
Level of Service	B	B		B	B			A			A	
Approach Delay (s)		14.6			15.1			5.1			5.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	46.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	385	94	350	783	12	16	44	179	18	121	5
Future Volume (vph)	1	385	94	350	783	12	16	44	179	18	121	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4936		1770	5074		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.67	1.00	1.00	0.73	1.00	1.00
Satd. Flow (perm)	1770	4936		1770	5074		1253	1863	1583	1352	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	418	102	380	851	13	17	48	195	20	132	5
RTOR Reduction (vph)	0	61	0	0	2	0	0	0	139	0	0	4
Lane Group Flow (vph)	1	459	0	380	862	0	17	48	56	20	132	1
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)	0.9	15.2		17.0	31.3		18.2	18.2	18.2	18.2	18.2	18.2
Effective Green, g (s)	0.9	15.2		17.0	31.3		18.2	18.2	18.2	18.2	18.2	18.2
Actuated g/C Ratio	0.01	0.24		0.27	0.49		0.28	0.28	0.28	0.28	0.28	0.28
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	24	1174		470	2485		356	530	450	385	530	450
v/s Ratio Prot	0.00	0.09		c0.21	c0.17			0.03			c0.07	
v/s Ratio Perm							0.01		0.04	0.01		0.00
v/c Ratio	0.04	0.39		0.81	0.35		0.05	0.09	0.12	0.05	0.25	0.00
Uniform Delay, d1	31.1	20.5		21.9	10.0		16.6	16.8	16.9	16.6	17.6	16.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.2		9.9	0.1		0.3	0.3	0.6	0.3	1.1	0.0
Delay (s)	31.8	20.7		31.8	10.1		16.8	17.1	17.5	16.8	18.7	16.4
Level of Service	C	C		C	B		B	B	B	B	B	B
Approach Delay (s)		20.7			16.7			17.4			18.4	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	63.9	Sum of lost time (s)	13.5
Intersection Capacity Utilization	53.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	52	5	7	67	12	4
Future Volume (Veh/h)	52	5	7	67	12	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	57	5	8	73	13	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			62		148	60
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			62		148	60
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		98	100
cM capacity (veh/h)			1541		839	1006

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	62	81	17
Volume Left	0	8	13
Volume Right	5	0	4
cSH	1700	1541	873
Volume to Capacity	0.04	0.01	0.02
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.8	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	0.8	9.2
Approach LOS			A

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	19.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	12	5	4	15	2	2	2	0	2	1	5
Future Volume (Veh/h)	0	12	5	4	15	2	2	2	0	2	1	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	13	5	4	16	2	2	2	0	2	1	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	24	14	4	25	16	2	6			2		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	24	14	4	25	16	2	6			2		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	100	100	98	100	100			100		
cM capacity (veh/h)	971	879	1080	968	876	1082	1615			1620		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	18	22	4	8
Volume Left	0	4	2	2
Volume Right	5	2	0	5
cSH	927	907	1615	1620
Volume to Capacity	0.02	0.02	0.00	0.00
Queue Length 95th (ft)	1	2	0	0
Control Delay (s)	9.0	9.1	3.6	1.8
Lane LOS	A	A	A	A
Approach Delay (s)	9.0	9.1	3.6	1.8
Approach LOS	A	A		

Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	14.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	293	11	34	550	0	7	0	22	0	0	1
Future Volume (Veh/h)	0	293	11	34	550	0	7	0	22	0	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	318	12	37	598	0	8	0	24	0	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)		661										
pX, platoon unblocked												
vC, conflicting volume	598			330			698	996	165	855	1002	299
vC1, stage 1 conf vol							324	324		672	672	
vC2, stage 2 conf vol							374	672		183	330	
vCu, unblocked vol	598			330			698	996	165	855	1002	299
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			98	100	97	100	100	100
cM capacity (veh/h)	975			1226			512	401	850	379	396	697

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	0	212	118	37	399	199	32	1
Volume Left	0	0	0	37	0	0	8	0
Volume Right	0	0	12	0	0	0	24	1
cSH	1700	1700	1700	1226	1700	1700	730	697
Volume to Capacity	0.00	0.12	0.07	0.03	0.23	0.12	0.04	0.00
Queue Length 95th (ft)	0	0	0	2	0	0	3	0
Control Delay (s)	0.0	0.0	0.0	8.0	0.0	0.0	10.2	10.2
Lane LOS				A			B	B
Approach Delay (s)	0.0			0.5			10.2	10.2
Approach LOS							B	B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	36.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	7	5	17	10	1	10	55	10	5	68	0
Future Volume (Veh/h)	4	7	5	17	10	1	10	55	10	5	68	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	8	5	18	11	1	11	60	11	5	74	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	12			13			103	66	10	107	68	12
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	12			13			103	66	10	107	68	12
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	93	99	99	91	100
cM capacity (veh/h)	1607			1606			808	813	1071	806	811	1069

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	17	30	82	79
Volume Left	4	18	11	5
Volume Right	5	1	11	0
cSH	1607	1606	839	811
Volume to Capacity	0.00	0.01	0.10	0.10
Queue Length 95th (ft)	0	1	8	8
Control Delay (s)	1.7	4.4	9.8	9.9
Lane LOS	A	A	A	A
Approach Delay (s)	1.7	4.4	9.8	9.9
Approach LOS			A	A

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	16.6%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	12.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	261	10	100	529	10	13	50	26	9	49	34
Future Vol, veh/h	13	261	10	100	529	10	13	50	26	9	49	34
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	284	11	109	575	11	14	54	28	10	53	37
Number of Lanes	1	2	0	1	2	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	3	3
HCM Control Delay	11.1	14	11.2	11.1
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	15%	100%	0%	0%	100%	0%	0%	10%
Vol Thru, %	56%	0%	100%	90%	0%	100%	95%	53%
Vol Right, %	29%	0%	0%	10%	0%	0%	5%	37%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	89	13	174	97	100	353	186	92
LT Vol	13	13	0	0	100	0	0	9
Through Vol	50	0	174	87	0	353	176	49
RT Vol	26	0	0	10	0	0	10	34
Lane Flow Rate	97	14	189	105	109	383	203	100
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.185	0.026	0.32	0.176	0.186	0.601	0.316	0.189
Departure Headway (Hd)	6.869	6.603	6.096	6.023	6.152	5.646	5.608	6.786
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	521	542	588	595	584	640	640	528
Service Time	4.624	4.35	3.842	3.769	3.888	3.382	3.344	4.54
HCM Lane V/C Ratio	0.186	0.026	0.321	0.176	0.187	0.598	0.317	0.189
HCM Control Delay	11.2	9.5	11.7	10.1	10.3	16.6	10.9	11.1
HCM Lane LOS	B	A	B	B	B	C	B	B
HCM 95th-tile Q	0.7	0.1	1.4	0.6	0.7	4	1.4	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	18	2	6	16	9	0	22	4	0	21	6
Future Volume (Veh/h)	6	18	2	6	16	9	0	22	4	0	21	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	20	2	7	17	10	0	24	4	0	23	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	71	54	26	64	56	26	30			28		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	71	54	26	64	56	26	30			28		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	98	100	99	98	99	100			100		
cM capacity (veh/h)	898	837	1049	911	835	1050	1583			1585		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	29	34	28	30
Volume Left	7	7	0	0
Volume Right	2	10	4	7
cSH	863	905	1583	1585
Volume to Capacity	0.03	0.04	0.00	0.00
Queue Length 95th (ft)	3	3	0	0
Control Delay (s)	9.3	9.1	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	9.3	9.1	0.0	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	18	294	11	11	659	12	5	2	7	4	2	37
Future Volume (vph)	18	294	11	11	659	12	5	2	7	4	2	37
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	320	12	12	716	13	5	2	8	4	2	40

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	20	332	12	729	15	46
Volume Left (vph)	20	0	12	0	5	4
Volume Right (vph)	0	12	0	13	8	40
Hadj (s)	0.53	0.01	0.53	0.02	-0.22	-0.47
Departure Headway (s)	5.8	5.3	5.5	5.0	6.2	5.9
Degree Utilization, x	0.03	0.48	0.02	1.02	0.03	0.08
Capacity (veh/h)	616	676	632	713	541	571
Control Delay (s)	7.8	11.9	7.4	58.6	9.4	9.4
Approach Delay (s)	11.7		57.8		9.4	9.4
Approach LOS	B		F		A	A

Intersection Summary			
Delay	41.2		
Level of Service	E		
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	10	7	1	9	15	7	399	4	9	535	12
Future Volume (Veh/h)	7	10	7	1	9	15	7	399	4	9	535	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	11	8	1	10	16	8	434	4	10	582	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								744				
pX, platoon unblocked												
vC, conflicting volume	1080	1062	588	1068	1067	436	595			438		
vC1, stage 1 conf vol	608	608		452	452							
vC2, stage 2 conf vol	471	454		616	615							
vCu, unblocked vol	1080	1062	588	1068	1067	436	595			438		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	97	98	100	98	97	99			99		
cM capacity (veh/h)	387	405	509	385	401	620	981			1122		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	27	27	8	438	10	595
Volume Left	8	1	8	0	10	0
Volume Right	8	16	0	4	0	13
cSH	425	507	981	1700	1122	1700
Volume to Capacity	0.06	0.05	0.01	0.26	0.01	0.35
Queue Length 95th (ft)	5	4	1	0	1	0
Control Delay (s)	14.0	12.5	8.7	0.0	8.2	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	14.0	12.5	0.2		0.1	
Approach LOS	B	B				

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	233	15	93	464	82	62	239	61	132	274	110
Future Volume (vph)	44	233	15	93	464	82	62	239	61	132	274	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1821		1770	1863	1583	1770	1783	
Flt Permitted	0.17	1.00	1.00	0.54	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	308	1863	1583	1014	1821		1770	1863	1583	1770	1783	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	48	253	16	101	504	89	67	260	66	143	298	120
RTOR Reduction (vph)	0	0	10	0	9	0	0	0	45	0	20	0
Lane Group Flow (vph)	48	253	6	101	584	0	67	260	21	143	398	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			
Actuated Green, G (s)	24.2	24.2	24.2	24.2	24.2		3.8	21.4	21.4	6.8	24.4	
Effective Green, g (s)	24.2	24.2	24.2	24.2	24.2		3.8	21.4	21.4	6.8	24.4	
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.37		0.06	0.32	0.32	0.10	0.37	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	113	684	581	372	668		102	604	514	182	660	
v/s Ratio Prot		0.14			c0.32		0.04	0.14		c0.08	c0.22	
v/s Ratio Perm	0.16		0.00	0.10					0.01			
v/c Ratio	0.42	0.37	0.01	0.27	0.87		0.66	0.43	0.04	0.79	0.60	
Uniform Delay, d1	15.6	15.3	13.2	14.7	19.4		30.4	17.5	15.2	28.8	16.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.6	0.3	0.0	0.4	12.1		14.2	2.2	0.2	19.6	4.1	
Delay (s)	18.2	15.6	13.2	15.1	31.6		44.6	19.7	15.4	48.5	20.9	
Level of Service	B	B	B	B	C		D	B	B	D	C	
Approach Delay (s)		15.9			29.2			23.2			27.9	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	65.9	Sum of lost time (s)	13.5
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	718	66	191	1360	69	146	221	234	107	155	88
Future Volume (vph)	83	718	66	191	1360	69	146	221	234	107	155	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5021		1770	5048		1770	1863	1583	1770	3346	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	5021		1770	5048		1770	1863	1583	1770	3346	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	90	780	72	208	1478	75	159	240	254	116	168	96
RTOR Reduction (vph)	0	14	0	0	7	0	0	0	174	0	69	0
Lane Group Flow (vph)	90	838	0	208	1546	0	159	240	80	116	195	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	4.3	18.7		11.8	26.2		9.2	25.3	25.3	6.5	22.6	
Effective Green, g (s)	4.3	18.7		11.8	26.2		9.2	25.3	25.3	6.5	22.6	
Actuated g/C Ratio	0.05	0.23		0.15	0.33		0.11	0.32	0.32	0.08	0.28	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	94	1169		260	1647		202	586	498	143	941	
v/s Ratio Prot	0.05	0.17		c0.12	c0.31		c0.09	c0.13		0.07	0.06	
v/s Ratio Perm									0.05			
v/c Ratio	0.96	0.72		0.80	0.94		0.79	0.41	0.16	0.81	0.21	
Uniform Delay, d1	37.9	28.4		33.1	26.3		34.6	21.6	19.8	36.3	22.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	78.1	2.1		16.0	10.7		18.1	2.1	0.7	28.2	0.5	
Delay (s)	116.0	30.5		49.1	37.0		52.7	23.7	20.5	64.5	22.5	
Level of Service	F	C		D	D		D	C	C	E	C	
Approach Delay (s)		38.7			38.4			29.5			35.3	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	36.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	80.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	245	51	74	656	59	45	115	65	68	107	110
Future Volume (vph)	49	245	51	74	656	59	45	115	65	68	107	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.95		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3448		1770	3495		1770	1762		1770	1721	
Flt Permitted	0.26	1.00		0.56	1.00		0.61	1.00		0.63	1.00	
Satd. Flow (perm)	483	3448		1038	3495		1140	1762		1182	1721	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	53	266	55	80	713	64	49	125	71	74	116	120
RTOR Reduction (vph)	0	34	0	0	13	0	0	30	0	0	55	0
Lane Group Flow (vph)	53	287	0	80	764	0	49	166	0	74	181	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.6	18.6		18.6	18.6		23.7	23.7		23.7	23.7	
Effective Green, g (s)	18.6	18.6		18.6	18.6		23.7	23.7		23.7	23.7	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.46	0.46		0.46	0.46	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	175	1250		376	1267		526	814		546	795	
v/s Ratio Prot		0.08			c0.22			0.09			c0.11	
v/s Ratio Perm	0.11			0.08			0.04			0.06		
v/c Ratio	0.30	0.23		0.21	0.60		0.09	0.20		0.14	0.23	
Uniform Delay, d1	11.7	11.4		11.3	13.3		7.8	8.2		7.9	8.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.1		0.3	0.8		0.4	0.6		0.5	0.7	
Delay (s)	12.7	11.5		11.6	14.2		8.1	8.8		8.4	9.0	
Level of Service	B	B		B	B		A	A		A	A	
Approach Delay (s)		11.6			13.9			8.6			8.8	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	51.3	Sum of lost time (s)	9.0
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	759	45	21	1347	35	79	30	27	34	18	150
Future Volume (vph)	168	759	45	21	1347	35	79	30	27	34	18	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.97			0.90	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.99	
Satd. Flow (prot)	1770	5043		1770	5066			1762			1662	
Flt Permitted	0.95	1.00		0.95	1.00			0.75			0.93	
Satd. Flow (perm)	1770	5043		1770	5066			1358			1566	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	183	825	49	23	1464	38	86	33	29	37	20	163
RTOR Reduction (vph)	0	9	0	0	4	0	0	15	0	0	112	0
Lane Group Flow (vph)	183	865	0	23	1498	0	0	133	0	0	108	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	7.9	29.2		1.0	22.3			19.9			19.9	
Effective Green, g (s)	7.9	29.2		1.0	22.3			19.9			19.9	
Actuated g/C Ratio	0.12	0.46		0.02	0.35			0.31			0.31	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	219	2315		27	1776			424			489	
v/s Ratio Prot	c0.10	0.17		0.01	c0.30							
v/s Ratio Perm								c0.10			0.07	
v/c Ratio	0.84	0.37		0.85	0.84			0.31			0.22	
Uniform Delay, d1	27.2	11.2		31.2	19.0			16.6			16.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	23.2	0.1		110.0	3.9			1.9			1.0	
Delay (s)	50.4	11.3		141.2	22.9			18.6			17.2	
Level of Service	D	B		F	C			B			B	
Approach Delay (s)		18.1			24.7			18.6			17.2	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	63.6	Sum of lost time (s)	13.5
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	249	60	61	384	110	84	250	205	177	189	127
Future Volume (vph)	73	249	60	61	384	110	84	250	205	177	189	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.97		1.00	0.93		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3437		1770	3421		1770	3300		1770	3326	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3437		1770	3421		1770	3300		1770	3326	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	79	271	65	66	417	120	91	272	223	192	205	138
RTOR Reduction (vph)	0	31	0	0	39	0	0	155	0	0	90	0
Lane Group Flow (vph)	79	305	0	66	498	0	91	340	0	192	253	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.2	16.7		2.8	15.3		6.5	20.5		9.3	23.3	
Effective Green, g (s)	4.2	16.7		2.8	15.3		6.5	20.5		9.3	23.3	
Actuated g/C Ratio	0.06	0.25		0.04	0.23		0.10	0.30		0.14	0.35	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	110	852		73	777		170	1005		244	1151	
v/s Ratio Prot	c0.04	0.09		0.04	c0.15		0.05	c0.10		c0.11	c0.08	
v/s Ratio Perm												
v/c Ratio	0.72	0.36		0.90	0.64		0.54	0.34		0.79	0.22	
Uniform Delay, d1	31.0	20.9		32.1	23.5		29.0	18.1		28.0	15.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	20.0	0.3		72.7	1.8		3.2	0.9		15.3	0.4	
Delay (s)	50.9	21.1		104.8	25.3		32.2	19.1		43.4	16.0	
Level of Service	D	C		F	C		C	B		D	B	
Approach Delay (s)		26.8			34.0			21.1			25.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	67.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	239	512	18	26	1076	128	41	52	69	134	34	268
Future Volume (vph)	239	512	18	26	1076	128	41	52	69	134	34	268
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.98		1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5059		1770	5004		1770	1704		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.73	1.00		0.67	1.00	1.00
Satd. Flow (perm)	1770	5059		1770	5004		1365	1704		1253	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	260	557	20	28	1170	139	45	57	75	146	37	291
RTOR Reduction (vph)	0	5	0	0	23	0	0	53	0	0	0	179
Lane Group Flow (vph)	260	572	0	28	1286	0	45	79	0	146	37	112
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		6
Actuated Green, G (s)	9.9	28.6		2.0	20.7		18.6	18.6		18.6	18.6	18.6
Effective Green, g (s)	9.9	28.6		2.0	20.7		18.6	18.6		18.6	18.6	18.6
Actuated g/C Ratio	0.16	0.46		0.03	0.33		0.30	0.30		0.30	0.30	0.30
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	279	2307		56	1652		404	505		371	552	469
v/s Ratio Prot	c0.15	0.11		0.02	c0.26			0.05			0.02	
v/s Ratio Perm							0.03			c0.12		0.07
v/c Ratio	0.93	0.25		0.50	0.78		0.11	0.16		0.39	0.07	0.24
Uniform Delay, d1	26.1	10.5		29.9	18.9		16.0	16.3		17.6	15.8	16.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	36.0	0.1		6.9	2.4		0.6	0.7		3.1	0.2	1.2
Delay (s)	62.1	10.5		36.7	21.3		16.6	16.9		20.7	16.1	17.9
Level of Service	E	B		D	C		B	B		C	B	B
Approach Delay (s)		26.5			21.6			16.8			18.6	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	22.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	62.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	9	49	17	8	39	30	301	9	53	536	10
Future Volume (Veh/h)	16	9	49	17	8	39	30	301	9	53	536	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	10	53	18	9	42	33	327	10	58	583	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								1070				
pX, platoon unblocked												
vC, conflicting volume	980	1108	297	864	1108	168	594			337		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	980	1108	297	864	1108	168	594			337		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	90	95	92	91	95	95	97			95		
cM capacity (veh/h)	176	192	699	207	192	846	978			1219		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	80	69	196	174	350	302
Volume Left	17	18	33	0	58	0
Volume Right	53	42	0	10	0	11
cSH	356	376	978	1700	1219	1700
Volume to Capacity	0.22	0.18	0.03	0.10	0.05	0.18
Queue Length 95th (ft)	21	17	3	0	4	0
Control Delay (s)	18.0	16.7	1.8	0.0	1.7	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	18.0	16.7	0.9		0.9	
Approach LOS	C	C				

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	41.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	489	34	35	980	343	30	32	15	334	98	177
Future Volume (vph)	102	489	34	35	980	343	30	32	15	334	98	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.5	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00		0.95	
Frt	1.00	0.99		1.00	0.96		1.00	1.00	0.85		0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1770	5036		1770	4887		1770	1863	1583		3295	
Flt Permitted	0.95	1.00		0.95	1.00		0.20	1.00	1.00		0.79	
Satd. Flow (perm)	1770	5036		1770	4887		382	1863	1583		2676	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	111	532	37	38	1065	373	33	35	16	363	107	192
RTOR Reduction (vph)	0	10	0	0	85	0	0	0	10	0	69	0
Lane Group Flow (vph)	111	559	0	38	1353	0	33	35	6	0	593	0
Turn Type	Prot	NA		Prot	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							2		2	6		
Actuated Green, G (s)	5.3	26.2		2.1	23.0		25.9	25.9	25.9		19.5	
Effective Green, g (s)	5.3	26.2		2.1	23.0		25.9	25.9	25.9		19.5	
Actuated g/C Ratio	0.08	0.40		0.03	0.35		0.39	0.39	0.39		0.29	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.5	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	141	1993		56	1697		189	728	619		788	
v/s Ratio Prot	c0.06	c0.11		0.02	c0.28		c0.01	0.02				
v/s Ratio Perm							0.06		0.00		c0.22	
v/c Ratio	0.79	0.28		0.68	0.80		0.17	0.05	0.01		0.75	
Uniform Delay, d1	29.9	13.6		31.7	19.5		13.6	12.5	12.3		21.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	24.5	0.1		28.0	2.7		0.4	0.1	0.0		4.1	
Delay (s)	54.4	13.7		59.7	22.2		14.0	12.6	12.3		25.2	
Level of Service	D	B		E	C		B	B	B		C	
Approach Delay (s)		20.3			23.2			13.1			25.2	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	22.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	66.2	Sum of lost time (s)	16.5
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	58	3	3	62	2	15	53	11	0	48	10
Future Volume (Veh/h)	3	58	3	3	62	2	15	53	11	0	48	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	63	3	3	67	2	16	58	12	0	52	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	69			66			182	146	64	186	146	68
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	69			66			182	146	64	186	146	68
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			98	92	99	100	93	99
cM capacity (veh/h)	1532			1536			728	743	1000	718	742	995

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	69	72	86	63
Volume Left	3	3	16	0
Volume Right	3	2	12	11
cSH	1532	1536	767	777
Volume to Capacity	0.00	0.00	0.11	0.08
Queue Length 95th (ft)	0	0	9	7
Control Delay (s)	0.3	0.3	10.3	10.0
Lane LOS	A	A	B	B
Approach Delay (s)	0.3	0.3	10.3	10.0
Approach LOS			B	B

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	22.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	2	10	3	1	2	1	65	2	3	48	5
Future Volume (Veh/h)	3	2	10	3	1	2	1	65	2	3	48	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	2	11	3	1	2	1	71	2	3	52	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	137	136	54	146	137	72	57			73		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	137	136	54	146	137	72	57			73		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	100	100	100	100			100		
cM capacity (veh/h)	830	753	1012	810	752	990	1547			1527		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	16	6	74	60
Volume Left	3	3	1	3
Volume Right	11	2	2	5
cSH	934	851	1547	1527
Volume to Capacity	0.02	0.01	0.00	0.00
Queue Length 95th (ft)	1	1	0	0
Control Delay (s)	8.9	9.3	0.1	0.4
Lane LOS	A	A	A	A
Approach Delay (s)	8.9	9.3	0.1	0.4
Approach LOS	A	A		

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	14.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	772	5	8	1335	26	7	6	7	32	2	25
Future Volume (Veh/h)	32	772	5	8	1335	26	7	6	7	32	2	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	35	839	5	9	1451	28	8	7	8	35	2	27
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		1243										
pX, platoon unblocked												
vC, conflicting volume	1479			844			1441	2408	282	1844	2397	498
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1479			844			1441	2408	282	1844	2397	498
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			99			90	76	99	0	93	95
cM capacity (veh/h)	451			788			78	30	715	35	30	518

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	35	336	336	173	9	580	580	318	23	64
Volume Left	35	0	0	0	9	0	0	0	8	35
Volume Right	0	0	0	5	0	0	0	28	8	27
cSH	451	1700	1700	1700	788	1700	1700	1700	66	57
Volume to Capacity	0.08	0.20	0.20	0.10	0.01	0.34	0.34	0.19	0.35	1.12
Queue Length 95th (ft)	6	0	0	0	1	0	0	0	32	133
Control Delay (s)	13.6	0.0	0.0	0.0	9.6	0.0	0.0	0.0	86.6	273.1
Lane LOS	B				A				F	F
Approach Delay (s)	0.5				0.1				86.6	273.1
Approach LOS									F	F

Intersection Summary				
Average Delay	8.2			
Intersection Capacity Utilization	38.7%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	14	27	19	9	106	30	67	103	11	19	165	48
Future Volume (vph)	14	27	19	9	106	30	67	103	11	19	165	48
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	29	21	10	115	33	73	112	12	21	179	52

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	65	158	197	252
Volume Left (vph)	15	10	73	21
Volume Right (vph)	21	33	12	52
Hadj (s)	-0.11	-0.08	0.07	-0.07
Departure Headway (s)	5.1	5.0	4.9	4.7
Degree Utilization, x	0.09	0.22	0.27	0.33
Capacity (veh/h)	625	655	698	729
Control Delay (s)	8.6	9.4	9.6	9.9
Approach Delay (s)	8.6	9.4	9.6	9.9
Approach LOS	A	A	A	A

Intersection Summary			
Delay	9.6		
Level of Service	A		
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	11	29	169	157	9
Future Volume (Veh/h)	3	11	29	169	157	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	12	32	184	171	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				259		
pX, platoon unblocked						
vC, conflicting volume	419	171	181			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	419	171	181			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	98			
cM capacity (veh/h)	577	873	1394			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	15	32	184	171	10
Volume Left	3	32	0	0	0
Volume Right	12	0	0	0	10
cSH	792	1394	1700	1700	1700
Volume to Capacity	0.02	0.02	0.11	0.10	0.01
Queue Length 95th (ft)	1	2	0	0	0
Control Delay (s)	9.6	7.6	0.0	0.0	0.0
Lane LOS	A	A			
Approach Delay (s)	9.6	1.1		0.0	
Approach LOS	A				

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	24.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	700	29	14	1269	95	57	27	15	66	39	47
Future Volume (vph)	55	700	29	14	1269	95	57	27	15	66	39	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00		0.97	1.00
Satd. Flow (prot)	1770	5055		1770	5032			1801	1583		1806	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.76	1.00		0.78	1.00
Satd. Flow (perm)	1770	5055		1770	5032			1422	1583		1451	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	761	32	15	1379	103	62	29	16	72	42	51
RTOR Reduction (vph)	0	4	0	0	9	0	0	0	12	0	0	37
Lane Group Flow (vph)	60	789	0	15	1473	0	0	91	4	0	114	14
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)	10.0	56.4		2.6	49.0			27.5	27.5		27.5	27.5
Effective Green, g (s)	10.0	56.4		2.6	49.0			27.5	27.5		27.5	27.5
Actuated g/C Ratio	0.10	0.56		0.03	0.49			0.28	0.28		0.28	0.28
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	177	2851		46	2465			391	435		399	435
v/s Ratio Prot	c0.03	0.16		0.01	c0.29							
v/s Ratio Perm								0.06	0.00		c0.08	0.01
v/c Ratio	0.34	0.28		0.33	0.60			0.23	0.01		0.29	0.03
Uniform Delay, d1	41.9	11.3		47.8	18.4			28.1	26.4		28.5	26.5
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	1.1	0.2		4.1	1.1			1.4	0.0		1.8	0.1
Delay (s)	43.1	11.5		51.9	19.5			29.5	26.4		30.3	26.7
Level of Service	D	B		D	B			C	C		C	C
Approach Delay (s)		13.7			19.8			29.0			29.2	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	11	19	16	23	74	24	66	175	7	9	223	8
Future Volume (vph)	11	19	16	23	74	24	66	175	7	9	223	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	21	17	25	80	26	72	190	8	10	242	9

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	50	131	270	261
Volume Left (vph)	12	25	72	10
Volume Right (vph)	17	26	8	9
Hadj (s)	-0.12	-0.05	0.07	0.02
Departure Headway (s)	5.3	5.2	4.8	4.8
Degree Utilization, x	0.07	0.19	0.36	0.34
Capacity (veh/h)	598	622	719	720
Control Delay (s)	8.7	9.4	10.4	10.2
Approach Delay (s)	8.7	9.4	10.4	10.2
Approach LOS	A	A	B	B

Intersection Summary			
Delay	10.1		
Level of Service	B		
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	10	30	6	34	13	47	222	5	1	255	17
Future Volume (vph)	7	10	30	6	34	13	47	222	5	1	255	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	11	33	7	37	14	51	241	5	1	277	18

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	52	58	297	296
Volume Left (vph)	8	7	51	1
Volume Right (vph)	33	14	5	18
Hadj (s)	-0.32	-0.09	0.06	0.00
Departure Headway (s)	5.0	5.3	4.6	4.5
Degree Utilization, x	0.07	0.08	0.38	0.37
Capacity (veh/h)	626	604	758	764
Control Delay (s)	8.4	8.7	10.4	10.2
Approach Delay (s)	8.4	8.7	10.4	10.2
Approach LOS	A	A	B	B

Intersection Summary			
Delay	10.0		
Level of Service	B		
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	14	14	255	16	26	259
Future Volume (Veh/h)	14	14	255	16	26	259
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	15	277	17	28	282
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			277			
pX, platoon unblocked	0.90	0.90			0.90	
vC, conflicting volume	624	286			294	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	528	153			162	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	98			98	
cM capacity (veh/h)	451	805			1277	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	30	294	310
Volume Left	15	0	28
Volume Right	15	17	0
cSH	578	1700	1277
Volume to Capacity	0.05	0.17	0.02
Queue Length 95th (ft)	4	0	2
Control Delay (s)	11.6	0.0	0.9
Lane LOS	B		A
Approach Delay (s)	11.6	0.0	0.9
Approach LOS	B		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	527	234	145	1135	55	215	222	41	34	170	46
Future Volume (vph)	15	527	234	145	1135	55	215	222	41	34	170	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4851		1770	5050		1770	1863	1583	1770	1803	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.41	1.00	
Satd. Flow (perm)	1770	4851		1770	5050		1770	1863	1583	760	1803	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	573	254	158	1234	60	234	241	45	37	185	50
RTOR Reduction (vph)	0	89	0	0	5	0	0	0	32	0	12	0
Lane Group Flow (vph)	16	738	0	158	1289	0	234	241	13	37	223	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8	4		
Actuated Green, G (s)	3.7	25.5		16.3	38.1		14.3	26.9	26.9	19.2	15.9	
Effective Green, g (s)	3.7	25.5		16.3	38.1		14.3	26.9	26.9	19.2	15.9	
Actuated g/C Ratio	0.04	0.28		0.18	0.42		0.16	0.30	0.30	0.21	0.18	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	72	1374		320	2137		281	556	473	199	318	
v/s Ratio Prot	0.01	0.15		c0.09	c0.26		c0.13	0.13		0.01	c0.12	
v/s Ratio Perm									0.01	0.03		
v/c Ratio	0.22	0.54		0.49	0.60		0.83	0.43	0.03	0.19	0.70	
Uniform Delay, d1	41.8	27.3		33.1	20.1		36.7	25.4	22.3	33.2	34.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.6	1.5		1.2	0.5		18.6	2.5	0.1	0.5	12.3	
Delay (s)	43.3	28.8		34.3	20.6		55.3	27.9	22.4	33.7	47.1	
Level of Service	D	C		C	C		E	C	C	C	D	
Approach Delay (s)		29.0			22.1			39.7			45.3	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	29.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1	22	3	5	19	59	534	3	2	708	33
Future Volume (Veh/h)	0	1	22	3	5	19	59	534	3	2	708	33
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	24	3	5	21	64	580	3	2	770	36
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)											382	
pX, platoon unblocked	0.70	0.70	0.70	0.70	0.70		0.70					
vC, conflicting volume	1525	1503	788	1526	1520	582	806			583		
vC1, stage 1 conf vol	792	792		710	710							
vC2, stage 2 conf vol	733	711		816	810							
vCu, unblocked vol	1536	1504	479	1537	1528	582	505			583		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	94	99	98	96	91			100		
cM capacity (veh/h)	261	279	409	231	249	513	739			991		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	25	29	647	808
Volume Left	0	3	64	2
Volume Right	24	21	3	36
cSH	402	392	739	991
Volume to Capacity	0.06	0.07	0.09	0.00
Queue Length 95th (ft)	5	6	7	0
Control Delay (s)	14.6	14.9	2.2	0.1
Lane LOS	B	B	A	A
Approach Delay (s)	14.6	14.9	2.2	0.1
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Volume (veh/h)	2	1	15	7	0	18	27	549	2	11	712	14
Future Volume (Veh/h)	2	1	15	7	0	18	27	549	2	11	712	14
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	1	16	8	0	20	29	597	2	12	774	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								1253			753	
pX, platoon unblocked	0.77	0.77	0.73	0.77	0.77	0.91	0.73			0.91		
vC, conflicting volume	1482	1462	782	1478	1469	598	789			599		
vC1, stage 1 conf vol	806	806		656	656							
vC2, stage 2 conf vol	676	657		822	813							
vCu, unblocked vol	1200	1176	509	1196	1184	504	519			505		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	96	97	100	96	96			99		
cM capacity (veh/h)	290	304	409	274	290	514	759			960		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	19	28	628	801
Volume Left	2	8	29	12
Volume Right	16	20	2	15
cSH	385	411	759	960
Volume to Capacity	0.05	0.07	0.04	0.01
Queue Length 95th (ft)	4	5	3	1
Control Delay (s)	14.8	14.4	1.0	0.3
Lane LOS	B	B	A	A
Approach Delay (s)	14.8	14.4	1.0	0.3
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	10	13	3	38	34	555	26	39	686	10
Future Volume (Veh/h)	2	0	10	13	3	38	34	555	26	39	686	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	0	11	14	3	41	37	603	28	42	746	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (ft)								1055			951	
pX, platoon unblocked	0.79	0.79	0.74	0.79	0.79	0.89	0.74			0.89		
vC, conflicting volume	1555	1540	752	1524	1518	603	757			631		
vC1, stage 1 conf vol	836	836		677	677							
vC2, stage 2 conf vol	720	705		846	841							
vCu, unblocked vol	1251	1233	484	1211	1204	490	492			521		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	97	95	99	92	95			95		
cM capacity (veh/h)	250	274	429	255	268	514	790			928		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1
Volume Total	13	58	37	603	28	799
Volume Left	2	14	37	0	0	42
Volume Right	11	41	0	0	28	11
cSH	387	398	790	1700	1700	928
Volume to Capacity	0.03	0.15	0.05	0.35	0.02	0.05
Queue Length 95th (ft)	3	13	4	0	0	4
Control Delay (s)	14.6	15.6	9.8	0.0	0.0	1.2
Lane LOS	B	C	A			A
Approach Delay (s)	14.6	15.6	0.5			1.2
Approach LOS	B	C				

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	80.2%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	25	561	9	25	680
Future Volume (Veh/h)	5	25	561	9	25	680
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	27	610	10	27	739
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type			None			None
Median storage veh)						
Upstream signal (ft)			255			
pX, platoon unblocked	0.92	0.92			0.92	
vC, conflicting volume	1038	310			620	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	873	83			419	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	97			97	
cM capacity (veh/h)	260	885			1048	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	32	407	213	27	370	370
Volume Left	5	0	0	27	0	0
Volume Right	27	0	10	0	0	0
cSH	1049	1700	1700	1048	1700	1700
Volume to Capacity	0.03	0.24	0.13	0.03	0.22	0.22
Queue Length 95th (ft)	2	0	0	2	0	0
Control Delay (s)	10.7	0.0	0.0	8.5	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	10.7	0.0		0.3		
Approach LOS	B					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	247	336	86	106	441	135	53	415	175	90	957	187
Future Volume (vph)	247	336	86	106	441	135	53	415	175	90	957	187
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.91		1.00	0.91	
Frt	1.00	0.97		1.00	0.96		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3431		1770	3415		1770	4859		1770	4961	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3431		1770	3415		1770	4859		1770	4961	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	268	365	93	115	479	147	58	451	190	98	1040	203
RTOR Reduction (vph)	0	26	0	0	35	0	0	94	0	0	36	0
Lane Group Flow (vph)	268	432	0	115	591	0	58	547	0	98	1207	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	15.1	26.9		8.5	20.3		4.1	20.3		6.3	22.5	
Effective Green, g (s)	15.1	26.9		8.5	20.3		4.1	20.3		6.3	22.5	
Actuated g/C Ratio	0.19	0.34		0.11	0.25		0.05	0.25		0.08	0.28	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	334	1153		188	866		90	1232		139	1395	
v/s Ratio Prot	c0.15	0.13		0.06	c0.17		0.03	0.11		c0.06	c0.24	
v/s Ratio Perm												
v/c Ratio	0.80	0.37		0.61	0.68		0.64	0.44		0.71	0.87	
Uniform Delay, d1	31.0	20.2		34.2	26.9		37.2	25.1		35.9	27.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.0	0.9		5.8	4.3		14.7	0.3		15.0	5.9	
Delay (s)	44.0	21.1		40.0	31.3		52.0	25.4		51.0	33.2	
Level of Service	D	C		D	C		D	C		D	C	
Approach Delay (s)		29.6			32.6			27.6			34.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	31.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	278	34	34	454	86	37	96	18	106	152	149
Future Volume (vph)	85	278	34	34	454	86	37	96	18	106	152	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.98			0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	1.00
Satd. Flow (prot)	1770	1832		1770	1818			1810		1770	1863	1583
Flt Permitted	0.20	1.00		0.44	1.00			0.91		0.59	1.00	1.00
Satd. Flow (perm)	369	1832		820	1818			1659		1095	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	302	37	37	493	93	40	104	20	115	165	162
RTOR Reduction (vph)	0	7	0	0	12	0	0	9	0	0	0	82
Lane Group Flow (vph)	92	332	0	37	574	0	0	155	0	115	165	80
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	20.2	20.2		20.2	20.2			20.2		28.6	28.6	28.6
Effective Green, g (s)	20.2	20.2		20.2	20.2			20.2		28.6	28.6	28.6
Actuated g/C Ratio	0.35	0.35		0.35	0.35			0.35		0.49	0.49	0.49
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	128	640		286	635			579		587	921	783
v/s Ratio Prot		0.18			c0.32					0.01	c0.09	
v/s Ratio Perm	0.25			0.05				c0.09		0.08		0.05
v/c Ratio	0.72	0.52		0.13	0.90			0.27		0.20	0.18	0.10
Uniform Delay, d1	16.3	14.9		12.8	17.9			13.5		8.3	8.1	7.8
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	17.5	0.7		0.2	16.3			0.2		0.2	0.4	0.3
Delay (s)	33.8	15.6		13.0	34.2			13.7		8.5	8.5	8.0
Level of Service	C	B		B	C			B		A	A	A
Approach Delay (s)		19.5			33.0			13.7			8.3	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	21.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	57.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	333	71	80	623	207	122	338	24	214	543	227
Future Volume (vph)	145	333	71	80	623	207	122	338	24	214	543	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	4952		1770	3539	1583	3433	3504		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	4952		1770	3539	1583	3433	3504		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	158	362	77	87	677	225	133	367	26	233	590	247
RTOR Reduction (vph)	0	39	0	0	0	170	0	6	0	0	0	160
Lane Group Flow (vph)	158	400	0	87	677	55	133	387	0	233	590	87
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	10.3	22.4		7.2	19.3	19.3	5.7	20.1		13.5	27.9	27.9
Effective Green, g (s)	10.3	22.4		7.2	19.3	19.3	5.7	20.1		13.5	27.9	27.9
Actuated g/C Ratio	0.13	0.28		0.09	0.24	0.24	0.07	0.25		0.17	0.35	0.35
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	230	1400		160	862	385	247	889		301	1246	557
v/s Ratio Prot	c0.09	c0.08		0.05	c0.19		0.04	0.11		c0.13	c0.17	
v/s Ratio Perm						0.03						0.05
v/c Ratio	0.69	0.29		0.54	0.79	0.14	0.54	0.44		0.77	0.47	0.16
Uniform Delay, d1	32.9	22.2		34.4	28.0	23.5	35.5	24.8		31.4	19.9	17.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	8.2	0.1		3.7	4.7	0.2	2.3	1.6		11.7	1.3	0.6
Delay (s)	41.2	22.3		38.2	32.8	23.6	37.7	26.3		43.1	21.2	18.2
Level of Service	D	C		D	C	C	D	C		D	C	B
Approach Delay (s)		27.3			31.2			29.2			25.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	79.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	251	71	102	461	86	80	378	56	75	513	101
Future Volume (vph)	37	251	71	102	461	86	80	378	56	75	513	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.19	1.00	1.00	0.40	1.00	1.00	0.19	1.00	1.00	0.35	1.00	1.00
Satd. Flow (perm)	362	1863	1583	750	1863	1583	350	1863	1583	648	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	273	77	111	501	93	87	411	61	82	558	110
RTOR Reduction (vph)	0	0	56	0	0	65	0	0	38	0	0	69
Lane Group Flow (vph)	40	273	21	111	501	28	87	411	23	82	558	41
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	23.3	20.6	20.6	27.1	22.5	22.5	32.1	28.3	28.3	32.1	28.3	28.3
Effective Green, g (s)	23.3	20.6	20.6	27.1	22.5	22.5	32.1	28.3	28.3	32.1	28.3	28.3
Actuated g/C Ratio	0.31	0.27	0.27	0.36	0.30	0.30	0.43	0.38	0.38	0.43	0.38	0.38
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	162	509	433	332	556	473	220	700	594	332	700	594
v/s Ratio Prot	0.01	0.15		c0.02	c0.27		c0.02	0.22		0.01	c0.30	
v/s Ratio Perm	0.07		0.01	0.10		0.02	0.15		0.01	0.09		0.03
v/c Ratio	0.25	0.54	0.05	0.33	0.90	0.06	0.40	0.59	0.04	0.25	0.80	0.07
Uniform Delay, d1	19.7	23.3	20.1	16.8	25.3	18.8	15.1	18.8	14.9	13.6	20.9	15.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	1.1	0.0	0.6	17.7	0.1	1.2	3.6	0.1	0.4	9.2	0.2
Delay (s)	20.5	24.4	20.2	17.4	43.1	18.9	16.2	22.4	15.0	14.0	30.1	15.3
Level of Service	C	C	C	B	D	B	B	C	B	B	C	B
Approach Delay (s)		23.2			35.8			20.6			26.2	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	75.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	346	0	1	568	7	246	0	5	5	1	0
Future Volume (Veh/h)	3	346	0	1	568	7	246	0	5	5	1	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	376	0	1	617	8	267	0	5	5	1	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	625			376			693	1009	188	818	1001	308
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	625			376			693	1009	188	818	1001	308
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			19	100	99	98	100	100
cM capacity (veh/h)	952			1179			328	238	822	265	240	687

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	3	188	188	0	1	308	308	8	272	6
Volume Left	3	0	0	0	1	0	0	0	267	5
Volume Right	0	0	0	0	0	0	0	8	5	0
cSH	952	1700	1700	1700	1179	1700	1700	1700	331	261
Volume to Capacity	0.00	0.11	0.11	0.00	0.00	0.18	0.18	0.00	0.82	0.02
Queue Length 95th (ft)	0	0	0	0	0	0	0	0	176	2
Control Delay (s)	8.8	0.0	0.0	0.0	8.1	0.0	0.0	0.0	50.6	19.1
Lane LOS	A				A				F	C
Approach Delay (s)	0.1				0.0				50.6	19.1
Approach LOS									F	C

Intersection Summary			
Average Delay	10.8		
Intersection Capacity Utilization	37.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	75	59	67	160	63	87	425	101	7	515	133
Future Volume (vph)	50	75	59	67	160	63	87	425	101	7	515	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1765	1583		1836	1583	1770	3539	1583	1770	4928	
Flt Permitted	0.33	0.99	1.00		0.87	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	591	1747	1583		1623	1583	1770	3539	1583	1770	4928	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	82	64	73	174	68	95	462	110	8	560	145
RTOR Reduction (vph)	0	0	43	0	0	54	0	0	60	0	47	0
Lane Group Flow (vph)	49	87	21	0	247	14	95	462	50	8	658	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)	20.6	20.6	20.6		13.4	13.4	5.7	29.0	29.0	0.8	24.1	
Effective Green, g (s)	20.6	20.6	20.6		13.4	13.4	5.7	29.0	29.0	0.8	24.1	
Actuated g/C Ratio	0.32	0.32	0.32		0.21	0.21	0.09	0.45	0.45	0.01	0.38	
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	236	563	510		340	331	157	1606	718	22	1858	
v/s Ratio Prot	0.01	c0.01					c0.05	0.13		0.00	c0.13	
v/s Ratio Perm	0.06	0.04	0.01		c0.15	0.01			0.03			
v/c Ratio	0.21	0.15	0.04		0.73	0.04	0.61	0.29	0.07	0.36	0.35	
Uniform Delay, d1	15.6	15.4	14.9		23.5	20.1	28.0	11.0	9.8	31.3	14.3	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	0.1	0.0		7.5	0.1	6.4	0.5	0.2	9.9	0.5	
Delay (s)	16.1	15.6	14.9		31.1	20.2	34.5	11.4	10.0	41.2	14.8	
Level of Service	B	B	B		C	C	C	B	B	D	B	
Approach Delay (s)		15.5			28.7			14.5			15.1	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	63.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	320	41	17	383	47	33
Future Volume (Veh/h)	320	41	17	383	47	33
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	348	45	18	416	51	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None			TWLTL		
Median storage veh)				2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			393		822	370
vC1, stage 1 conf vol					370	
vC2, stage 2 conf vol					452	
vCu, unblocked vol			393		822	370
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		91	95
cM capacity (veh/h)			1166		540	675

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	393	434	87
Volume Left	0	18	51
Volume Right	45	0	36
cSH	1700	1166	921
Volume to Capacity	0.23	0.02	0.09
Queue Length 95th (ft)	0	1	8
Control Delay (s)	0.0	0.5	11.6
Lane LOS		A	B
Approach Delay (s)	0.0	0.5	11.6
Approach LOS			B

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	315	0	9	542	31	19	25	8	18	17	22
Future Volume (Veh/h)	24	315	0	9	542	31	19	25	8	18	17	22
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	342	0	10	589	34	21	27	9	20	18	24
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			2
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	623			342			718	1037	114	810	1020	312
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	623			342			718	1037	114	810	1020	312
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			99			92	88	99	92	92	96
cM capacity (veh/h)	954			1214			279	222	917	237	227	684

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	26	137	137	68	10	393	230	57	62
Volume Left	26	0	0	0	10	0	0	21	20
Volume Right	0	0	0	0	0	0	34	9	24
cSH	954	1700	1700	1700	1214	1700	1700	293	379
Volume to Capacity	0.03	0.08	0.08	0.04	0.01	0.23	0.14	0.19	0.16
Queue Length 95th (ft)	2	0	0	0	1	0	0	18	14
Control Delay (s)	8.9	0.0	0.0	0.0	8.0	0.0	0.0	20.8	18.4
Lane LOS	A				A			C	C
Approach Delay (s)	0.6				0.1			20.8	18.4
Approach LOS								C	C

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	35.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	344	136	114	376	64	171	511	160	87	696	124
Future Volume (vph)	86	344	136	114	376	64	171	511	160	87	696	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.27	1.00	1.00	0.32	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	505	1863	1583	600	1863	1583	1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	374	148	124	409	70	186	555	174	95	757	135
RTOR Reduction (vph)	0	0	105	0	0	50	0	0	105	0	0	89
Lane Group Flow (vph)	93	374	43	124	409	20	186	555	69	95	757	46
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	16.4	16.4	16.4	16.4	16.4	16.4	9.2	22.4	22.4	6.0	19.2	19.2
Effective Green, g (s)	16.4	16.4	16.4	16.4	16.4	16.4	9.2	22.4	22.4	6.0	19.2	19.2
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.29	0.16	0.39	0.39	0.11	0.34	0.34
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	145	537	457	173	537	457	286	1395	624	186	1196	535
v/s Ratio Prot		0.20			c0.22		c0.11	c0.16		0.05	c0.21	
v/s Ratio Perm	0.18		0.03	0.21		0.01			0.04			0.03
v/c Ratio	0.64	0.70	0.09	0.72	0.76	0.04	0.65	0.40	0.11	0.51	0.63	0.09
Uniform Delay, d1	17.6	18.0	14.8	18.1	18.4	14.6	22.3	12.4	10.9	24.0	15.8	12.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.3	3.9	0.1	13.2	6.3	0.0	5.2	0.8	0.4	2.4	2.6	0.3
Delay (s)	27.0	21.9	14.9	31.3	24.7	14.6	27.5	13.2	11.2	26.4	18.4	13.1
Level of Service	C	C	B	C	C	B	C	B	B	C	B	B
Approach Delay (s)		21.0			24.9			15.7			18.4	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	56.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	20	29	861	1066	28
Future Volume (Veh/h)	0	20	29	861	1066	28
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	22	32	936	1159	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1319	1000	
pX, platoon unblocked	0.91	0.86	0.86			
vC, conflicting volume	1706	594	1189			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1058	197	890			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	95			
cM capacity (veh/h)	190	696	650			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	22	32	468	468	773	416
Volume Left	0	32	0	0	0	0
Volume Right	22	0	0	0	0	30
cSH	696	650	1700	1700	1700	1700
Volume to Capacity	0.03	0.05	0.28	0.28	0.45	0.24
Queue Length 95th (ft)	2	4	0	0	0	0
Control Delay (s)	10.3	10.8	0.0	0.0	0.0	0.0
Lane LOS	B	B				
Approach Delay (s)	10.3	0.4			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	40.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR2
Lane Configurations												
Traffic Volume (vph)	69	271	43	129	548	163	138	680	131	175	778	45
Future Volume (vph)	69	271	43	129	548	163	138	680	131	175	778	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.76		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.85		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4980		1770	3610		1770	3454		1770	3510	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	4980		1770	3610		1770	3454		1770	3510	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	75	295	47	140	596	177	150	739	142	190	846	49
RTOR Reduction (vph)	0	32	0	0	104	0	0	22	0	0	95	0
Lane Group Flow (vph)	75	310	0	140	669	0	150	859	0	190	800	0
Turn Type	Prot	NA		Prot	Perm		Prot	NA		Prot	NA	
Protected Phases	7	4		3			5	2		1	6	
Permitted Phases					8							
Actuated Green, G (s)	3.9	14.4		7.0	17.5		8.6	21.1		9.6	22.1	
Effective Green, g (s)	3.9	14.4		7.0	17.5		8.6	21.1		9.6	22.1	
Actuated g/C Ratio	0.06	0.21		0.10	0.26		0.13	0.31		0.14	0.32	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	101	1053		181	927		223	1070		249	1139	
v/s Ratio Prot	0.04	0.06		c0.08			0.08	c0.25		c0.11	0.23	
v/s Ratio Perm					c0.19							
v/c Ratio	0.74	0.29		0.77	0.72		0.67	0.80		0.76	0.70	
Uniform Delay, d1	31.6	22.6		29.8	23.1		28.4	21.6		28.2	20.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	25.2	0.2		18.4	2.8		7.8	6.4		13.0	3.6	
Delay (s)	56.8	22.7		48.1	25.9		36.2	28.0		41.1	23.8	
Level of Service	E	C		D	C		D	C		D	C	
Approach Delay (s)		28.9						29.2			26.8	
Approach LOS		C						C			C	

Intersection Summary			
HCM 2000 Control Delay	28.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	68.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	139	80	128	203	75	174	873	96	106	992	164
Future Volume (vph)	56	139	80	128	203	75	174	873	96	106	992	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.50	1.00	1.00	0.65	1.00	1.00	0.23	1.00	1.00	0.27	1.00	1.00
Satd. Flow (perm)	923	1863	1583	1211	1863	1583	426	3539	1583	507	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	61	151	87	139	221	82	189	949	104	115	1078	178
RTOR Reduction (vph)	0	0	69	0	0	65	0	0	36	0	0	62
Lane Group Flow (vph)	61	151	18	139	221	17	189	949	68	115	1078	116
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	12.0	12.0	12.0	12.0	12.0	12.0	37.8	37.8	37.8	37.8	37.8	37.8
Effective Green, g (s)	12.0	12.0	12.0	12.0	12.0	12.0	37.8	37.8	37.8	37.8	37.8	37.8
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21	0.21	0.65	0.65	0.65	0.65	0.65	0.65
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	191	386	328	251	386	328	278	2314	1035	331	2314	1035
v/s Ratio Prot		0.08			c0.12			0.27			0.30	
v/s Ratio Perm	0.07		0.01	0.11		0.01	c0.44		0.04	0.23		0.07
v/c Ratio	0.32	0.39	0.06	0.55	0.57	0.05	0.68	0.41	0.07	0.35	0.47	0.11
Uniform Delay, d1	19.4	19.7	18.4	20.5	20.6	18.3	6.2	4.7	3.6	4.5	5.0	3.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.7	0.1	2.6	2.1	0.1	12.6	0.5	0.1	2.9	0.7	0.2
Delay (s)	20.4	20.4	18.4	23.1	22.6	18.4	18.9	5.3	3.7	7.3	5.7	4.0
Level of Service	C	C	B	C	C	B	B	A	A	A	A	A
Approach Delay (s)		19.8			22.0			7.2			5.6	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	57.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (veh/h)	4	12	1196	35	41	1203	
Future Volume (Veh/h)	4	12	1196	35	41	1203	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	4	13	1300	38	45	1308	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh)							
Upstream signal (ft)			916				
pX, platoon unblocked	0.77	0.77			0.77		
vC, conflicting volume	2063	669			1338		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1787	0			848		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	92	98			93		
cM capacity (veh/h)	52	837			607		

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	4	13	867	471	45	654	654
Volume Left	4	0	0	0	45	0	0
Volume Right	0	13	0	38	0	0	0
cSH	52	837	1700	1700	607	1700	1700
Volume to Capacity	0.08	0.02	0.51	0.28	0.07	0.38	0.38
Queue Length 95th (ft)	6	1	0	0	6	0	0
Control Delay (s)	80.1	9.4	0.0	0.0	11.4	0.0	0.0
Lane LOS	F	A			B		
Approach Delay (s)	26.0		0.0		0.4		
Approach LOS	D						

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	197	379	115	116	775	228	177	767	119	230	1000	287
Future Volume (vph)	197	379	115	116	775	228	177	767	119	230	1000	287
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.97		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	4908		1770	4912		1770	3468		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	4908		1770	4912		1770	3468		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	214	412	125	126	842	248	192	834	129	250	1087	312
RTOR Reduction (vph)	0	59	0	0	59	0	0	14	0	0	0	126
Lane Group Flow (vph)	214	478	0	126	1031	0	192	949	0	250	1087	186
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	12.0	20.5		10.5	19.0		11.0	29.0		14.0	32.0	32.0
Effective Green, g (s)	12.0	20.5		10.5	19.0		11.0	29.0		14.0	32.0	32.0
Actuated g/C Ratio	0.13	0.23		0.12	0.21		0.12	0.32		0.16	0.36	0.36
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	236	1117		206	1036		216	1117		275	1258	562
v/s Ratio Prot	c0.12	0.10		0.07	c0.21		0.11	0.27		c0.14	c0.31	
v/s Ratio Perm												0.12
v/c Ratio	0.91	0.43		0.61	1.00		0.89	0.85		0.91	0.86	0.33
Uniform Delay, d1	38.4	29.7		37.8	35.5		38.9	28.5		37.4	27.0	21.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	34.3	0.3		5.3	26.6		32.6	8.1		31.2	8.0	1.6
Delay (s)	72.7	30.0		43.1	62.0		71.5	36.6		68.6	35.0	22.7
Level of Service	E	C		D	E		E	D		E	D	C
Approach Delay (s)		42.2			60.1			42.4			37.8	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	45.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	15	63	150	19	58	35	539	87	56	684	19
Future Volume (vph)	27	15	63	150	19	58	35	539	87	56	684	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.92			0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1690			1741		1770	3539	1583	1770	3539	1583
Flt Permitted		0.91			0.78		0.35	1.00	1.00	0.42	1.00	1.00
Satd. Flow (perm)		1553			1396		649	3539	1583	791	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	16	68	163	21	63	38	586	95	61	743	21
RTOR Reduction (vph)	0	52	0	0	23	0	0	0	36	0	0	8
Lane Group Flow (vph)	0	61	0	0	224	0	38	586	59	61	743	13
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		13.8			13.8		35.7	35.7	35.7	35.7	35.7	35.7
Effective Green, g (s)		13.8			13.8		35.7	35.7	35.7	35.7	35.7	35.7
Actuated g/C Ratio		0.24			0.24		0.62	0.62	0.62	0.62	0.62	0.62
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		372			335		402	2197	982	491	2197	982
v/s Ratio Prot								0.17			c0.21	
v/s Ratio Perm		0.04			c0.16		0.06		0.04	0.08		0.01
v/c Ratio		0.16			0.67		0.09	0.27	0.06	0.12	0.34	0.01
Uniform Delay, d1		17.3			19.8		4.4	5.0	4.3	4.5	5.2	4.2
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.2			5.0		0.5	0.3	0.1	0.5	0.4	0.0
Delay (s)		17.5			24.8		4.9	5.3	4.4	5.0	5.6	4.2
Level of Service		B			C		A	A	A	A	A	A
Approach Delay (s)		17.5			24.8			5.1			5.6	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	57.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	345	417	12	16	81
Future Volume (Veh/h)	13	345	417	12	16	81
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	375	453	13	17	88
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	466				862	460
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	466				862	460
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				95	85
cM capacity (veh/h)	1095				321	602

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	389	466	105
Volume Left	14	0	17
Volume Right	0	13	88
cSH	1095	1700	718
Volume to Capacity	0.01	0.27	0.15
Queue Length 95th (ft)	1	0	13
Control Delay (s)	0.4	0.0	12.8
Lane LOS	A		B
Approach Delay (s)	0.4	0.0	12.8
Approach LOS			B

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	38.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	8	10	102	12	29	78
Future Volume (Veh/h)	8	10	102	12	29	78
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	11	111	13	32	85
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	266	118			124	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	266	118			124	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			98	
cM capacity (veh/h)	707	934			1463	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	20	124	117
Volume Left	9	0	32
Volume Right	11	13	0
cSH	816	1700	1463
Volume to Capacity	0.02	0.07	0.02
Queue Length 95th (ft)	2	0	2
Control Delay (s)	9.5	0.0	2.2
Lane LOS	A		A
Approach Delay (s)	9.5	0.0	2.2
Approach LOS	A		

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	22.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	11	15	66	6	1
Future Volume (Veh/h)	7	11	15	66	6	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	12	16	72	7	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	88				80	52
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	88				80	52
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				99	100
cM capacity (veh/h)	1508				917	1016

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	20	88	8
Volume Left	8	0	7
Volume Right	0	72	1
cSH	1508	1700	929
Volume to Capacity	0.01	0.05	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	3.0	0.0	8.9
Lane LOS	A		A
Approach Delay (s)	3.0	0.0	8.9
Approach LOS			A

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	16.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	456	16	60	577	18	2	0	26	39	0	51
Future Volume (Veh/h)	18	456	16	60	577	18	2	0	26	39	0	51
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	496	17	65	627	20	2	0	28	42	0	55
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (ft)					620							
pX, platoon unblocked	0.85						0.85	0.85		0.85	0.85	0.85
vC, conflicting volume	647			513			1356	1322	504	1321	1310	627
vC1, stage 1 conf vol							544	544		757	757	
vC2, stage 2 conf vol							812	777		564	553	
vCu, unblocked vol	491			513			1330	1289	504	1288	1275	467
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			94			99	100	95	85	100	89
cM capacity (veh/h)	907			1052			257	303	567	289	306	504

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	20	513	65	627	20	30	97
Volume Left	20	0	65	0	0	2	42
Volume Right	0	17	0	0	20	28	55
cSH	907	1700	1052	1700	1700	525	381
Volume to Capacity	0.02	0.30	0.06	0.37	0.01	0.06	0.25
Queue Length 95th (ft)	2	0	5	0	0	5	25
Control Delay (s)	9.1	0.0	8.6	0.0	0.0	12.3	17.6
Lane LOS	A		A			B	C
Approach Delay (s)	0.3		0.8			12.3	17.6
Approach LOS						B	C

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	678	53	0	26
Future Vol, veh/h	0	0	678	53	0	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	-	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	737	58	0	28

Major/Minor	Major2		Minor2	
Conflicting Flow All	-	0	-	398
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	514
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	514
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	SB
HCM Control Delay, s	0	12.4
HCM LOS		B

Minor Lane/Major Mvmt	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	514
HCM Lane V/C Ratio	-	-	0.055
HCM Control Delay (s)	-	-	12.4
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	153	0	0	10	0	841	20	0	941	6
Future Volume (Veh/h)	0	0	153	0	0	10	0	841	20	0	941	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	166	0	0	11	0	914	22	0	1023	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											523	
pX, platoon unblocked	0.83	0.83	0.83	0.83	0.83		0.83					
vC, conflicting volume	1494	1962	515	1602	1955	468	1030			936		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1178	1744	0	1309	1735	468	616			936		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	81	100	100	98	100			100		
cM capacity (veh/h)	118	71	896	79	72	542	793			727		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	166	11	609	327	682	348
Volume Left	0	0	0	0	0	0
Volume Right	166	11	0	22	0	7
cSH	896	542	1700	1700	1700	1700
Volume to Capacity	0.19	0.02	0.36	0.19	0.40	0.20
Queue Length 95th (ft)	17	2	0	0	0	0
Control Delay (s)	9.9	11.8	0.0	0.0	0.0	0.0
Lane LOS	A	B				
Approach Delay (s)	9.9	11.8	0.0		0.0	
Approach LOS	A	B				

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	516	5	43	628	27	50
Future Volume (Veh/h)	516	5	43	628	27	50
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	561	5	47	683	29	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)				479		
pX, platoon unblocked					0.81	
vC, conflicting volume			566		1340	564
vC1, stage 1 conf vol					564	
vC2, stage 2 conf vol					777	
vCu, unblocked vol			566		1302	564
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			95		92	90
cM capacity (veh/h)			1006		353	525

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	566	47	683	83
Volume Left	0	47	0	29
Volume Right	5	0	0	54
cSH	1700	1006	1700	449
Volume to Capacity	0.33	0.05	0.40	0.18
Queue Length 95th (ft)	0	4	0	17
Control Delay (s)	0.0	8.8	0.0	14.8
Lane LOS		A		B
Approach Delay (s)	0.0	0.6		14.8
Approach LOS				B

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	8	16	895	989	5
Future Volume (Veh/h)	0	8	16	895	989	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	9	17	973	1075	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				755		
pX, platoon unblocked	0.82					
vC, conflicting volume	1598	540	1080			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1288	540	1080			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	97			
cM capacity (veh/h)	124	486	641			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	9	17	486	486	717	363
Volume Left	0	17	0	0	0	0
Volume Right	9	0	0	0	0	5
cSH	486	641	1700	1700	1700	1700
Volume to Capacity	0.02	0.03	0.29	0.29	0.42	0.21
Queue Length 95th (ft)	1	2	0	0	0	0
Control Delay (s)	12.5	10.8	0.0	0.0	0.0	0.0
Lane LOS	B	B				
Approach Delay (s)	12.5	0.2			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	37.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1	2	8	0	2	6	27	7	0	12	1
Future Volume (Veh/h)	0	1	2	8	0	2	6	27	7	0	12	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	2	9	0	2	7	29	8	0	13	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	62	64	14	63	61	33	14			37		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	62	64	14	63	61	33	14			37		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	99	100	100	100			100		
cM capacity (veh/h)	927	823	1067	926	826	1041	1604			1574		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	3	11	44	14
Volume Left	0	9	7	0
Volume Right	2	2	8	1
cSH	971	945	1604	1574
Volume to Capacity	0.00	0.01	0.00	0.00
Queue Length 95th (ft)	0	1	0	0
Control Delay (s)	8.7	8.9	1.2	0.0
Lane LOS	A	A	A	
Approach Delay (s)	8.7	8.9	1.2	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	21.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	304	26	18	676	10	10	2	3	7	0	10
Future Volume (Veh/h)	30	304	26	18	676	10	10	2	3	7	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	330	28	20	735	11	11	2	3	8	0	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	746			358			828	1196	124	960	1204	373
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	746			358			828	1196	124	960	1204	373
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			98			96	99	100	96	100	98
cM capacity (veh/h)	858			1197			248	175	904	200	173	624

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	33	132	132	94	20	490	256	16	19
Volume Left	33	0	0	0	20	0	0	11	8
Volume Right	0	0	0	28	0	0	11	3	11
cSH	858	1700	1700	1700	1197	1700	1700	270	329
Volume to Capacity	0.04	0.08	0.08	0.06	0.02	0.29	0.15	0.06	0.06
Queue Length 95th (ft)	3	0	0	0	1	0	0	5	5
Control Delay (s)	9.4	0.0	0.0	0.0	8.1	0.0	0.0	19.1	16.6
Lane LOS	A				A			C	C
Approach Delay (s)	0.8				0.2			19.1	16.6
Approach LOS								C	C

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	34.9%	ICU Level of Service	A
Analysis Period (min)	15		

2035 No Build PM Peak Hour LOS Worksheets

HCM Signalized Intersection Capacity Analysis
1: Barranca Ave & Bennett Ave

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	57	22	283	97	31	208
Future Volume (vph)	57	22	283	97	31	208
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5			4.5
Lane Util. Factor	0.97	1.00	0.95			0.95
Frt	1.00	0.85	0.96			1.00
Flt Protected	0.95	1.00	1.00			0.99
Satd. Flow (prot)	3433	1583	3404			3516
Flt Permitted	0.95	1.00	1.00			0.89
Satd. Flow (perm)	3433	1583	3404			3149
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	62	24	308	105	34	226
RTOR Reduction (vph)	0	21	42	0	0	0
Lane Group Flow (vph)	62	3	371	0	0	260
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	3.5	3.5	18.8			18.8
Effective Green, g (s)	3.5	3.5	18.8			18.8
Actuated g/C Ratio	0.11	0.11	0.60			0.60
Clearance Time (s)	4.5	4.5	4.5			4.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	383	177	2044			1891
v/s Ratio Prot	c0.02		c0.11			
v/s Ratio Perm		0.00				0.08
v/c Ratio	0.16	0.02	0.18			0.14
Uniform Delay, d1	12.6	12.4	2.8			2.7
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.2	0.0	0.0			0.0
Delay (s)	12.8	12.4	2.8			2.8
Level of Service	B	B	A			A
Approach Delay (s)	12.7		2.8			2.8
Approach LOS	B		A			A

Intersection Summary			
HCM 2000 Control Delay	3.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.18		
Actuated Cycle Length (s)	31.3	Sum of lost time (s)	9.0
Intersection Capacity Utilization	33.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	560	187	143	478	28	119	219	187	19	175	64
Future Volume (vph)	115	560	187	143	478	28	119	219	187	19	175	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.99		1.00	0.93		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3406		1770	3510		1770	3295		1770	3396	
Flt Permitted	0.43	1.00		0.27	1.00		0.59	1.00		0.50	1.00	
Satd. Flow (perm)	795	3406		506	3510		1101	3295		924	3396	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	609	203	155	520	30	129	238	203	21	190	70
RTOR Reduction (vph)	0	70	0	0	9	0	0	122	0	0	42	0
Lane Group Flow (vph)	125	742	0	155	541	0	129	319	0	21	218	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.8	19.8		19.8	19.8		19.0	19.0		19.0	19.0	
Effective Green, g (s)	19.8	19.8		19.8	19.8		19.0	19.0		19.0	19.0	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.40	0.40		0.40	0.40	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	329	1410		209	1453		437	1309		367	1349	
v/s Ratio Prot		0.22			0.15			0.10			0.06	
v/s Ratio Perm	0.16			c0.31			c0.12			0.02		
v/c Ratio	0.38	0.53		0.74	0.37		0.30	0.24		0.06	0.16	
Uniform Delay, d1	9.7	10.5		11.8	9.7		9.8	9.6		8.9	9.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.4		13.2	0.2		1.7	0.4		0.3	0.3	
Delay (s)	10.5	10.8		25.1	9.9		11.5	10.0		9.2	9.5	
Level of Service	B	B		C	A		B	B		A	A	
Approach Delay (s)		10.8			13.2			10.4			9.5	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	11.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	47.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	500	100	276	322	85	93	529	289	77	338	58
Future Volume (vph)	94	500	100	276	322	85	93	529	289	77	338	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3450		1770	3429		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3450		1770	3429		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	102	543	109	300	350	92	101	575	314	84	367	63
RTOR Reduction (vph)	0	21	0	0	28	0	0	0	232	0	0	47
Lane Group Flow (vph)	102	631	0	300	414	0	101	575	82	84	367	16
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	7.3	18.0		16.0	26.7		5.7	20.2	20.2	4.9	19.4	19.4
Effective Green, g (s)	7.3	18.0		16.0	26.7		5.7	20.2	20.2	4.9	19.4	19.4
Actuated g/C Ratio	0.09	0.23		0.21	0.35		0.07	0.26	0.26	0.06	0.25	0.25
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	167	805		367	1187		130	927	414	112	890	398
v/s Ratio Prot	0.06	c0.18		c0.17	0.12		c0.06	c0.16		0.05	0.10	
v/s Ratio Perm									0.05			0.01
v/c Ratio	0.61	0.78		0.82	0.35		0.78	0.62	0.20	0.75	0.41	0.04
Uniform Delay, d1	33.5	27.7		29.2	18.7		35.1	25.1	22.1	35.5	24.1	21.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.5	5.0		13.2	0.2		24.7	3.1	1.1	24.2	1.4	0.2
Delay (s)	40.0	32.8		42.3	18.9		59.8	28.2	23.2	59.7	25.5	22.0
Level of Service	D	C		D	B		E	C	C	E	C	C
Approach Delay (s)		33.7			28.4			29.8			30.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	77.1	Sum of lost time (s)	18.0
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	104	98	150	73	57	148
Future Volume (Veh/h)	104	98	150	73	57	148
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	113	107	163	79	62	161
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						1253
pX, platoon unblocked						
vC, conflicting volume	488	202			242	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	488	202			242	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	78	87			95	
cM capacity (veh/h)	514	838			1324	

Direction, Lane #	NW 1	NE 1	SW 1
Volume Total	220	242	223
Volume Left	113	0	62
Volume Right	107	79	0
cSH	633	1700	1324
Volume to Capacity	0.35	0.14	0.05
Queue Length 95th (ft)	39	0	4
Control Delay (s)	13.7	0.0	2.5
Lane LOS	B		A
Approach Delay (s)	13.7	0.0	2.5
Approach LOS	B		

Intersection Summary			
Average Delay	5.2		
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	1152	16	24	815	78	3	24	10	56	41	121
Future Volume (vph)	45	1152	16	24	815	78	3	24	10	56	41	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.96			0.93	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1770	3532		1770	3493			1787			1701	
Flt Permitted	0.95	1.00		0.95	1.00			0.98			0.92	
Satd. Flow (perm)	1770	3532		1770	3493			1759			1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	1252	17	26	886	85	3	26	11	61	45	132
RTOR Reduction (vph)	0	2	0	0	11	0	0	7	0	0	74	0
Lane Group Flow (vph)	49	1267	0	26	960	0	0	33	0	0	164	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	3.1	24.5		2.1	23.5			19.0			19.0	
Effective Green, g (s)	3.1	24.5		2.1	23.5			19.0			19.0	
Actuated g/C Ratio	0.05	0.42		0.04	0.40			0.32			0.32	
Clearance Time (s)	4.0	4.5		4.0	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	93	1476		63	1400			570			513	
v/s Ratio Prot	c0.03	c0.36		0.01	0.27							
v/s Ratio Perm								0.02			c0.10	
v/c Ratio	0.53	0.86		0.41	0.69			0.06			0.32	
Uniform Delay, d1	27.0	15.5		27.6	14.5			13.6			14.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	5.3	5.2		4.3	1.4			0.2			1.6	
Delay (s)	32.3	20.7		32.0	15.9			13.8			16.6	
Level of Service	C	C		C	B			B			B	
Approach Delay (s)		21.1			16.3			13.8			16.6	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	58.6	Sum of lost time (s)	13.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	646	59	35	517	76	84	72	37	47	76	91
Future Volume (vph)	85	646	59	35	517	76	84	72	37	47	76	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.97			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1770	3495		1770	3471			1776			1737	
Flt Permitted	0.34	1.00		0.26	1.00			0.80			0.91	
Satd. Flow (perm)	631	3495		493	3471			1443			1591	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	702	64	38	562	83	91	78	40	51	83	99
RTOR Reduction (vph)	0	13	0	0	23	0	0	12	0	0	39	0
Lane Group Flow (vph)	92	753	0	38	622	0	0	197	0	0	194	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.5	18.5		18.5	18.5			23.7			23.7	
Effective Green, g (s)	18.5	18.5		18.5	18.5			23.7			23.7	
Actuated g/C Ratio	0.36	0.36		0.36	0.36			0.46			0.46	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	227	1262		178	1254			667			736	
v/s Ratio Prot		c0.22			0.18							
v/s Ratio Perm	0.15			0.08				c0.14			0.12	
v/c Ratio	0.41	0.60		0.21	0.50			0.29			0.26	
Uniform Delay, d1	12.2	13.3		11.3	12.7			8.6			8.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.2	0.8		0.6	0.3			1.1			0.9	
Delay (s)	13.4	14.1		11.9	13.0			9.7			9.3	
Level of Service	B	B		B	B			A			A	
Approach Delay (s)		14.0			13.0			9.7			9.3	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	51.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	76	0	19	141	189	63
Future Volume (Veh/h)	76	0	19	141	189	63
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	83	0	21	153	205	68
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1274		
pX, platoon unblocked						
vC, conflicting volume	434	239	273			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	434	239	273			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	100	98			
cM capacity (veh/h)	570	800	1290			

Direction, Lane #	SE 1	NE 1	SW 1
Volume Total	83	174	273
Volume Left	83	21	0
Volume Right	0	0	68
cSH	570	1290	1700
Volume to Capacity	0.15	0.02	0.16
Queue Length 95th (ft)	13	1	0
Control Delay (s)	12.4	1.1	0.0
Lane LOS	B	A	
Approach Delay (s)	12.4	1.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	522	159	177	438	69	147	189	89	66	196	75
Future Volume (vph)	70	522	159	177	438	69	147	189	89	66	196	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3415		1770	3467		1770	1863	1583	1770	1863	1583
Flt Permitted	0.40	1.00		0.18	1.00		0.52	1.00	1.00	0.62	1.00	1.00
Satd. Flow (perm)	749	3415		342	3467		978	1863	1583	1162	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	76	567	173	192	476	75	160	205	97	72	213	82
RTOR Reduction (vph)	0	41	0	0	17	0	0	0	66	0	0	57
Lane Group Flow (vph)	76	699	0	192	534	0	160	205	31	72	213	25
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	23.0	18.7		29.2	21.8		28.4	22.9	22.9	25.4	21.4	21.4
Effective Green, g (s)	23.0	18.7		29.2	21.8		28.4	22.9	22.9	25.4	21.4	21.4
Actuated g/C Ratio	0.32	0.26		0.41	0.31		0.40	0.32	0.32	0.36	0.30	0.30
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	304	899		289	1064		452	600	510	449	561	477
v/s Ratio Prot	0.02	c0.20		c0.07	0.15		c0.03	0.11		0.01	c0.11	
v/s Ratio Perm	0.07			0.20			0.11		0.02	0.05		0.02
v/c Ratio	0.25	0.78		0.66	0.50		0.35	0.34	0.06	0.16	0.38	0.05
Uniform Delay, d1	17.0	24.2		15.3	20.1		14.2	18.3	16.6	15.3	19.6	17.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	4.3		5.7	0.4		0.5	1.5	0.2	0.2	2.0	0.2
Delay (s)	17.4	28.5		21.0	20.5		14.6	19.9	16.9	15.4	21.5	17.8
Level of Service	B	C		C	C		B	B	B	B	C	B
Approach Delay (s)		27.5			20.6			17.4			19.5	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	71.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Sign Control		Stop			Stop			Stop		Stop		
Traffic Volume (vph)	56	52	157	29	31	35	20	408	38	49	427	3
Future Volume (vph)	56	52	157	29	31	35	20	408	38	49	427	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	61	57	171	32	34	38	22	443	41	53	464	3

Direction, Lane #	EB 1	WB 1	SB 1	SB 2	NW 1	NW 2
Volume Total (vph)	289	104	244	263	285	235
Volume Left (vph)	61	32	22	0	53	0
Volume Right (vph)	171	38	0	41	0	3
Hadj (s)	-0.28	-0.12	0.08	-0.08	0.13	0.03
Departure Headway (s)	6.4	7.1	6.8	6.7	6.9	6.8
Degree Utilization, x	0.51	0.21	0.46	0.49	0.54	0.44
Capacity (veh/h)	522	442	506	519	501	514
Control Delay (s)	15.9	12.0	14.4	14.7	16.6	13.8
Approach Delay (s)	15.9	12.0	14.6		15.3	
Approach LOS	C	B	B		C	

Intersection Summary			
Delay	14.9		
Level of Service	B		
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	982	0	219	637	111	105	469	370	230	468	56
Future Volume (vph)	56	982	0	219	637	111	105	469	370	230	468	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539		1770	3539	1583	1770	3539	1583	1770	3482	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539		1770	3539	1583	1770	3539	1583	1770	3482	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	61	1067	0	238	692	121	114	510	402	250	509	61
RTOR Reduction (vph)	0	0	0	0	0	75	0	0	82	0	10	0
Lane Group Flow (vph)	61	1067	0	238	692	46	114	510	320	250	560	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	6.6	27.5		13.4	34.3	34.3	8.7	18.9	32.3	13.1	23.3	
Effective Green, g (s)	6.6	27.5		13.4	34.3	34.3	8.7	18.9	32.3	13.1	23.3	
Actuated g/C Ratio	0.07	0.30		0.15	0.38	0.38	0.10	0.21	0.36	0.14	0.26	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	128	1070		260	1335	597	169	735	562	255	892	
v/s Ratio Prot	0.03	c0.30		c0.13	0.20		0.06	0.14	0.08	c0.14	c0.16	
v/s Ratio Perm						0.03			0.12			
v/c Ratio	0.48	1.00		0.92	0.52	0.08	0.67	0.69	0.57	0.98	0.63	
Uniform Delay, d1	40.5	31.7		38.2	21.9	18.1	39.7	33.3	23.7	38.8	30.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.8	26.6		33.9	0.3	0.1	10.2	5.3	1.3	50.7	3.3	
Delay (s)	43.3	58.3		72.1	22.2	18.2	49.9	38.7	25.0	89.4	33.3	
Level of Service	D	E		E	C	B	D	D	C	F	C	
Approach Delay (s)		57.5			33.1			34.6			50.4	
Approach LOS		E			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	43.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	90.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	9	8	15	9	1	21	13	82	30	22	69	0
Future Volume (vph)	9	8	15	9	1	21	13	82	30	22	69	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	9	16	10	1	23	14	89	33	24	75	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	35	34	136	99
Volume Left (vph)	10	10	14	24
Volume Right (vph)	16	23	33	0
Hadj (s)	-0.18	-0.31	-0.09	0.08
Departure Headway (s)	4.3	4.1	4.1	4.3
Degree Utilization, x	0.04	0.04	0.15	0.12
Capacity (veh/h)	795	808	860	823
Control Delay (s)	7.5	7.3	7.8	7.8
Approach Delay (s)	7.5	7.3	7.8	7.8
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.7		
Level of Service	A		
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	1399	42	34	881	51	21	24	50	57	26	69
Future Volume (vph)	94	1399	42	34	881	51	21	24	50	57	26	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		0.91	0.91			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.93			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1770	3524		1610	3362			1712			1716	
Flt Permitted	0.95	1.00		0.95	0.95			0.92			0.87	
Satd. Flow (perm)	1770	3524		1610	3197			1601			1515	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	102	1521	46	37	958	55	23	26	54	62	28	75
RTOR Reduction (vph)	0	2	0	0	4	0	0	42	0	0	34	0
Lane Group Flow (vph)	102	1565	0	33	1013	0	0	61	0	0	131	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	7.2	54.9		3.7	55.1			19.7			19.7	
Effective Green, g (s)	7.2	54.9		3.7	55.1			19.7			19.7	
Actuated g/C Ratio	0.08	0.60		0.04	0.60			0.21			0.21	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	138	2107		64	1925			343			325	
v/s Ratio Prot	c0.06	c0.44		0.02	0.02							
v/s Ratio Perm					0.29			0.04			c0.09	
v/c Ratio	0.74	0.74		0.52	0.53			0.18			0.40	
Uniform Delay, d1	41.4	13.3		43.2	10.7			29.4			31.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	18.6	1.5		6.9	0.3			1.1			3.7	
Delay (s)	60.0	14.8		50.0	11.0			30.6			34.7	
Level of Service	E	B		D	B			C			C	
Approach Delay (s)		17.6			12.2			30.6			34.7	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	91.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	15		

c   Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	15	9	5	6	3	19	118	8	17	124	5
Future Volume (Veh/h)	15	15	9	5	6	3	19	118	8	17	124	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	16	10	5	7	3	21	128	9	18	135	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								564				
pX, platoon unblocked												
vC, conflicting volume	354	352	138	366	350	132	140			137		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	354	352	138	366	350	132	140			137		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	97	99	99	99	100	99			99		
cM capacity (veh/h)	581	557	911	559	558	917	1443			1447		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	42	15	158	158
Volume Left	16	5	21	18
Volume Right	10	3	9	5
cSH	625	606	1443	1447
Volume to Capacity	0.07	0.02	0.01	0.01
Queue Length 95th (ft)	5	2	1	1
Control Delay (s)	11.2	11.1	1.1	0.9
Lane LOS	B	B	A	A
Approach Delay (s)	11.2	11.1	1.1	0.9
Approach LOS	B	B		

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	20.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	1459	10	36	854	63	3	3	8	65	6	48
Future Volume (vph)	76	1459	10	36	854	63	3	3	8	65	6	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.92			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.97	
Satd. Flow (prot)	1770	3536		1770	3503			1695			1715	
Flt Permitted	0.95	1.00		0.95	1.00			0.96			0.84	
Satd. Flow (perm)	1770	3536		1770	3503			1646			1485	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	83	1586	11	39	928	68	3	3	9	71	7	52
RTOR Reduction (vph)	0	1	0	0	7	0	0	6	0	0	34	0
Lane Group Flow (vph)	83	1596	0	39	989	0	0	9	0	0	96	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	6.5	32.9		2.9	29.3			19.0			19.0	
Effective Green, g (s)	6.5	32.9		2.9	29.3			19.0			19.0	
Actuated g/C Ratio	0.10	0.48		0.04	0.43			0.28			0.28	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	168	1703		75	1502			457			413	
v/s Ratio Prot	c0.05	c0.45		0.02	0.28							
v/s Ratio Perm								0.01			c0.06	
v/c Ratio	0.49	0.94		0.52	0.66			0.02			0.23	
Uniform Delay, d1	29.3	16.7		32.0	15.5			17.9			19.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.3	10.3		6.4	1.1			0.1			1.3	
Delay (s)	31.6	27.0		38.4	16.6			18.0			20.3	
Level of Service	C	C		D	B			B			C	
Approach Delay (s)		27.3			17.4			18.0			20.3	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	68.3	Sum of lost time (s)	13.5
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Volume (veh/h)	2	24	13	8	2	2	7	148	6	8	98	5
Future Volume (Veh/h)	2	24	13	8	2	2	7	148	6	8	98	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	26	14	9	2	2	8	161	7	9	107	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								560				
pX, platoon unblocked												
vC, conflicting volume	311	312	110	335	310	164	112			168		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	311	312	110	335	310	164	112			168		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	96	99	98	100	100	99			99		
cM capacity (veh/h)	633	596	944	584	597	880	1478			1410		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	42	13	176	121
Volume Left	2	9	8	9
Volume Right	14	2	7	5
cSH	682	618	1478	1410
Volume to Capacity	0.06	0.02	0.01	0.01
Queue Length 95th (ft)	5	2	0	0
Control Delay (s)	10.6	11.0	0.4	0.6
Lane LOS	B	B	A	A
Approach Delay (s)	10.6	11.0	0.4	0.6
Approach LOS	B	B		

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	20.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	1367	34	33	837	68	43	17	22	50	15	51
Future Volume (vph)	76	1367	34	33	837	68	43	17	22	50	15	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.96			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.98	
Satd. Flow (prot)	1770	3526		1770	3499			1749			1715	
Flt Permitted	0.95	1.00		0.95	1.00			0.82			0.85	
Satd. Flow (perm)	1770	3526		1770	3499			1468			1492	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	83	1486	37	36	910	74	47	18	24	54	16	55
RTOR Reduction (vph)	0	3	0	0	9	0	0	17	0	0	40	0
Lane Group Flow (vph)	83	1520	0	36	975	0	0	72	0	0	85	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	6.5	33.5		1.9	28.9			19.0			19.0	
Effective Green, g (s)	6.5	33.5		1.9	28.9			19.0			19.0	
Actuated g/C Ratio	0.10	0.49		0.03	0.43			0.28			0.28	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	169	1739		49	1489			410			417	
v/s Ratio Prot	c0.05	c0.43		0.02	0.28							
v/s Ratio Perm								0.05			c0.06	
v/c Ratio	0.49	0.87		0.73	0.66			0.17			0.20	
Uniform Delay, d1	29.1	15.3		32.7	15.5			18.5			18.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.2	5.2		43.4	1.0			0.9			1.1	
Delay (s)	31.4	20.5		76.2	16.6			19.4			19.8	
Level of Service	C	C		E	B			B			B	
Approach Delay (s)		21.1			18.7			19.4			19.8	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	67.9	Sum of lost time (s)	13.5
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	6	27	8	5	10	15	330	14	8	360	3
Future Volume (Veh/h)	3	6	27	8	5	10	15	330	14	8	360	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	7	29	9	5	11	16	359	15	9	391	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								542				
pX, platoon unblocked												
vC, conflicting volume	636	816	197	644	810	187	394			374		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	636	816	197	644	810	187	394			374		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	98	96	97	98	99	99			99		
cM capacity (veh/h)	348	303	811	333	306	823	1161			1181		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	39	25	196	194	204	198
Volume Left	3	9	16	0	9	0
Volume Right	29	11	0	15	0	3
cSH	578	441	1161	1700	1181	1700
Volume to Capacity	0.07	0.06	0.01	0.11	0.01	0.12
Queue Length 95th (ft)	5	4	1	0	1	0
Control Delay (s)	11.7	13.7	0.8	0.0	0.4	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	11.7	13.7	0.4		0.2	
Approach LOS	B	B				

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	156	1165	771	209	295	103
Future Volume (vph)	156	1165	771	209	295	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.95	0.95		0.97	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3426		3433	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3426		3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	170	1266	838	227	321	112
RTOR Reduction (vph)	0	0	41	0	0	76
Lane Group Flow (vph)	170	1266	1025	0	321	36
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	7.5	31.5	19.5		19.5	19.5
Effective Green, g (s)	7.5	31.5	19.5		19.5	19.5
Actuated g/C Ratio	0.12	0.52	0.32		0.32	0.32
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	221	1857	1113		1115	514
v/s Ratio Prot	0.10	c0.36	c0.30		c0.09	
v/s Ratio Perm						0.02
v/c Ratio	0.77	0.68	0.92		0.29	0.07
Uniform Delay, d1	25.4	10.5	19.5		15.1	14.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	14.8	1.0	12.2		0.7	0.3
Delay (s)	40.2	11.6	31.7		15.7	14.3
Level of Service	D	B	C		B	B
Approach Delay (s)		15.0	31.7		15.3	
Approach LOS		B	C		B	

Intersection Summary			
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	448	518	1048	457	645	1161
Future Volume (vph)	448	518	1048	457	645	1161
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	0.97	1.00	0.91		0.97	0.95
Frt	1.00	0.85	0.95		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3090	1425	4368		3090	3185
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3090	1425	4368		3090	3185
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	487	563	1139	497	701	1262
RTOR Reduction (vph)	0	353	87	0	0	0
Lane Group Flow (vph)	487	211	1549	0	701	1262
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	17.9	17.9	34.5		22.5	61.5
Effective Green, g (s)	17.9	17.9	34.5		22.5	61.5
Actuated g/C Ratio	0.20	0.20	0.39		0.25	0.70
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	625	288	1704		786	2215
v/s Ratio Prot	c0.16		c0.35		c0.23	0.40
v/s Ratio Perm		0.15				
v/c Ratio	0.78	0.73	0.91		0.89	0.57
Uniform Delay, d1	33.4	33.0	25.5		31.8	6.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.1	9.2	8.7		14.5	1.1
Delay (s)	39.5	42.2	34.2		46.3	7.9
Level of Service	D	D	C		D	A
Approach Delay (s)	40.9		34.2			21.6
Approach LOS	D		C			C

Intersection Summary			
HCM 2000 Control Delay	30.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	88.4	Sum of lost time (s)	13.5
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	351	96	49	157	64	64
Future Volume (Veh/h)	351	96	49	157	64	64
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	382	104	53	171	70	70
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						1
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			486		711	434
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			486		711	434
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		82	89
cM capacity (veh/h)			1077		380	622

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	486	224	140
Volume Left	0	53	70
Volume Right	104	0	70
cSH	1700	1077	760
Volume to Capacity	0.29	0.05	0.18
Queue Length 95th (ft)	0	4	17
Control Delay (s)	0.0	2.4	14.1
Lane LOS		A	B
Approach Delay (s)	0.0	2.4	14.1
Approach LOS			B

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	373	63	36	166	8	29	16	47	3	12	7
Future Volume (vph)	5	373	63	36	166	8	29	16	47	3	12	7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	405	68	39	180	9	32	17	51	3	13	8

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	478	219	9	49	51	24
Volume Left (vph)	5	39	0	32	0	3
Volume Right (vph)	68	0	9	0	51	8
Hadj (s)	-0.05	0.12	-0.67	0.36	-0.67	-0.14
Departure Headway (s)	5.1	5.5	4.7	6.7	5.7	6.4
Degree Utilization, x	0.68	0.33	0.01	0.09	0.08	0.04
Capacity (veh/h)	478	627	734	487	567	491
Control Delay (s)	18.5	10.0	6.5	9.2	8.0	9.7
Approach Delay (s)	18.5	9.9		8.6		9.7
Approach LOS	C	A		A		A

Intersection Summary			
Delay	14.7		
Level of Service	B		
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
22: Lone Hill Ave & Glendora Marketplace

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	624	1	182	7	0	22	113	835	0	3	714	721
Future Volume (vph)	624	1	182	7	0	22	113	835	0	3	714	721
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	0.95	0.95	0.88		1.00		0.97	0.91		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.90		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1686	2787		1653		3433	5085		1770	3539	1583
Flt Permitted	0.74	0.70	1.00		1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1303	1245	2787		1674		3433	5085		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	678	1	198	8	0	24	123	908	0	3	776	784
RTOR Reduction (vph)	0	0	125	0	31	0	0	0	0	0	0	492
Lane Group Flow (vph)	339	340	73	0	1	0	123	908	0	3	776	292
Turn Type	pm+pt	NA	Perm	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8								6
Actuated Green, G (s)	24.2	24.2	24.2		1.9		3.7	27.5		0.8	24.6	24.6
Effective Green, g (s)	24.2	24.2	24.2		1.9		3.7	27.5		0.8	24.6	24.6
Actuated g/C Ratio	0.37	0.37	0.37		0.03		0.06	0.42		0.01	0.37	0.37
Clearance Time (s)	4.5	4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	579	575	1021		48		192	2118		21	1319	590
v/s Ratio Prot	0.16	c0.16					c0.04	c0.18		0.00	c0.22	
v/s Ratio Perm	0.06	c0.06	0.03		0.00							0.18
v/c Ratio	0.59	0.59	0.07		0.02		0.64	0.43		0.14	0.59	0.50
Uniform Delay, d1	16.4	16.9	13.6		31.1		30.5	13.7		32.3	16.6	15.9
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.5	1.6	0.0		0.2		7.1	0.6		3.1	1.9	3.0
Delay (s)	17.9	18.5	13.6		31.3		37.6	14.3		35.4	18.6	18.9
Level of Service	B	B	B		C		D	B		D	B	B
Approach Delay (s)		17.2			31.3			17.1			18.8	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	66.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	22	22	467	490	51
Future Volume (Veh/h)	0	22	22	467	490	51
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	24	24	508	533	55
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1038	287	
pX, platoon unblocked						
vC, conflicting volume	862	294	588			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	862	294	588			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	98			
cM capacity (veh/h)	287	702	983			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	24	193	339	355	233
Volume Left	0	24	0	0	0
Volume Right	24	0	0	0	55
cSH	702	983	1700	1700	1700
Volume to Capacity	0.03	0.02	0.20	0.21	0.14
Queue Length 95th (ft)	3	2	0	0	0
Control Delay (s)	10.3	1.3	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	10.3	0.5		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	119	40	0	712	113	12	899
Future Volume (vph)	119	40	0	712	113	12	899
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5		4.5	4.5
Lane Util. Factor	1.00			0.91		1.00	0.91
Frt	0.97			0.98		1.00	1.00
Flt Protected	0.96			1.00		0.95	1.00
Satd. Flow (prot)	1735			4981		1770	5085
Flt Permitted	0.96			1.00		0.95	1.00
Satd. Flow (perm)	1735			4981		1770	5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	129	43	0	774	123	13	977
RTOR Reduction (vph)	25	0	0	25	0	0	0
Lane Group Flow (vph)	147	0	0	872	0	13	977
Turn Type	Prot		Prot	NA		Prot	NA
Protected Phases	8		5	2		1	6
Permitted Phases							
Actuated Green, G (s)	7.8			27.5		0.9	32.9
Effective Green, g (s)	7.8			27.5		0.9	32.9
Actuated g/C Ratio	0.16			0.55		0.02	0.66
Clearance Time (s)	4.5			4.5		4.5	4.5
Vehicle Extension (s)	3.0			3.0		3.0	3.0
Lane Grp Cap (vph)	272			2756		32	3366
v/s Ratio Prot	c0.08			0.18		0.01	c0.19
v/s Ratio Perm							
v/c Ratio	0.54			0.32		0.41	0.29
Uniform Delay, d1	19.3			6.0		24.1	3.5
Progression Factor	1.00			1.00		1.00	1.00
Incremental Delay, d2	2.1			0.3		8.2	0.2
Delay (s)	21.4			6.3		32.4	3.7
Level of Service	C			A		C	A
Approach Delay (s)	21.4			6.3			4.1
Approach LOS	C			A			A

Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	49.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Existing to No Build			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	772	279	308	452	87	190	709	240	105	870	120
Future Volume (vph)	120	772	279	308	452	87	190	709	240	105	870	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3453		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3453		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	839	303	335	491	95	207	771	261	114	946	130
RTOR Reduction (vph)	0	0	177	0	20	0	0	0	172	0	0	92
Lane Group Flow (vph)	130	839	126	335	566	0	207	771	89	114	946	38
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	8.6	20.0	20.0	8.8	20.2		10.5	27.5	27.5	6.6	23.6	23.6
Effective Green, g (s)	8.6	20.0	20.0	8.8	20.2		10.5	27.5	27.5	6.6	23.6	23.6
Actuated g/C Ratio	0.11	0.25	0.25	0.11	0.25		0.13	0.34	0.34	0.08	0.29	0.29
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	188	874	391	373	862		229	1202	538	144	1032	461
v/s Ratio Prot	0.07	c0.24		c0.10	0.16		c0.12	c0.22		0.06	c0.27	
v/s Ratio Perm			0.08						0.06			0.02
v/c Ratio	0.69	0.96	0.32	0.90	0.66		0.90	0.64	0.16	0.79	0.92	0.08
Uniform Delay, d1	34.9	30.1	24.9	35.6	27.2		34.7	22.5	18.7	36.5	27.7	20.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.5	21.0	0.5	23.3	1.8		34.5	2.6	0.7	25.0	14.0	0.3
Delay (s)	45.3	51.0	25.4	58.9	29.0		69.2	25.2	19.3	61.5	41.7	21.1
Level of Service	D	D	C	E	C		E	C	B	E	D	C
Approach Delay (s)		44.3			39.9			31.3			41.3	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	39.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	80.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	9	11	14	18	6	19	193	11	14	160	3
Future Volume (Veh/h)	8	9	11	14	18	6	19	193	11	14	160	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	10	12	15	20	7	21	210	12	15	174	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											647	
pX, platoon unblocked												
vC, conflicting volume	480	470	176	480	465	216	177			222		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	480	470	176	480	465	216	177			222		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	98	99	97	96	99	98			99		
cM capacity (veh/h)	467	479	868	472	482	824	1399			1347		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	31	42	243	192
Volume Left	9	15	21	15
Volume Right	12	7	12	3
cSH	574	513	1399	1347
Volume to Capacity	0.05	0.08	0.02	0.01
Queue Length 95th (ft)	4	7	1	1
Control Delay (s)	11.6	12.6	0.8	0.7
Lane LOS	B	B	A	A
Approach Delay (s)	11.6	12.6	0.8	0.7
Approach LOS	B	B		

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	25.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	8	36	31	8	22	17	385	14	17	452	2
Future Volume (Veh/h)	8	8	36	31	8	22	17	385	14	17	452	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	9	39	34	9	24	18	418	15	18	491	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											650	
pX, platoon unblocked	0.92	0.92	0.92	0.92	0.92		0.92					
vC, conflicting volume	802	997	492	1033	990	216	493			433		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	737	950	398	990	943	216	400			433		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	96	93	79	96	97	98			98		
cM capacity (veh/h)	257	229	550	162	231	788	1057			1123		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	57	67	227	224	511
Volume Left	9	34	18	0	18
Volume Right	39	24	0	15	2
cSH	393	239	1057	1700	1123
Volume to Capacity	0.15	0.28	0.02	0.13	0.02
Queue Length 95th (ft)	13	28	1	0	1
Control Delay (s)	15.7	25.8	0.8	0.0	0.5
Lane LOS	C	D	A		A
Approach Delay (s)	15.7	25.8	0.4		0.5
Approach LOS	C	D			

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	0	604	19	0	587
Future Volume (Veh/h)	7	0	604	19	0	587
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	0	657	21	0	638
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			None
Median storage veh)			2			
Upstream signal (ft)			430			
pX, platoon unblocked	0.87	0.87			0.87	
vC, conflicting volume	986	339			678	
vC1, stage 1 conf vol	668					
vC2, stage 2 conf vol	319					
vCu, unblocked vol	694	0			341	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	531	947			1061	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	8	438	240	319	319
Volume Left	8	0	0	0	0
Volume Right	0	0	21	0	0
cSH	531	1700	1700	1700	1700
Volume to Capacity	0.02	0.26	0.14	0.19	0.19
Queue Length 95th (ft)	1	0	0	0	0
Control Delay (s)	11.9	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.9	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	27.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Volume (veh/h)	89	5	1	532	472	0
Future Volume (Veh/h)	89	5	1	532	472	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	97	5	1	578	513	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	804	256	513			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	804	256	513			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	70	99	100			
cM capacity (veh/h)	320	743	1049			

Direction, Lane #	WB 1	WB 2	SE 1	SE 2	SE 3	NW 1	NW 2
Volume Total	97	5	1	289	289	256	256
Volume Left	97	0	1	0	0	0	0
Volume Right	0	5	0	0	0	0	0
cSH	320	743	1049	1700	1700	1700	1700
Volume to Capacity	0.30	0.01	0.00	0.17	0.17	0.15	0.15
Queue Length 95th (ft)	31	1	0	0	0	0	0
Control Delay (s)	21.1	9.9	8.4	0.0	0.0	0.0	0.0
Lane LOS	C	A	A				
Approach Delay (s)	20.5		0.0			0.0	
Approach LOS	C						

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	26.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1	0	23	5	3	0	211	41	1	66	0
Future Volume (Veh/h)	0	1	0	23	5	3	0	211	41	1	66	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	0	25	5	3	0	229	45	1	72	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	331	348	72	326	326	252	72			274		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	331	348	72	326	326	252	72			274		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	96	99	100	100			100		
cM capacity (veh/h)	616	575	990	626	592	787	1528			1289		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	1	33	274	73
Volume Left	0	25	0	1
Volume Right	0	3	45	0
cSH	575	632	1700	1289
Volume to Capacity	0.00	0.05	0.16	0.00
Queue Length 95th (ft)	0	4	0	0
Control Delay (s)	11.3	11.0	0.0	0.1
Lane LOS	B	B		A
Approach Delay (s)	11.3	11.0	0.0	0.1
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	28.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	778	43	34	575	28	51
Future Volume (Veh/h)	778	43	34	575	28	51
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	846	47	37	625	30	55
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			893		1568	870
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			893		1568	870
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		74	84
cM capacity (veh/h)			759		116	351

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	893	662	85
Volume Left	0	37	30
Volume Right	47	0	55
cSH	1700	759	205
Volume to Capacity	0.53	0.05	0.42
Queue Length 95th (ft)	0	4	47
Control Delay (s)	0.0	1.3	34.5
Lane LOS		A	D
Approach Delay (s)	0.0	1.3	34.5
Approach LOS			D

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	753	32	8	573	18	19	18	15	10	9	15
Future Volume (Veh/h)	39	753	32	8	573	18	19	18	15	10	9	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	42	818	35	9	623	20	21	20	16	11	10	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	643			853			1592	1580	836	1596	1588	633
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	643			853			1592	1580	836	1596	1588	633
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			99			72	81	96	84	90	97
cM capacity (veh/h)	942			786			74	103	367	67	102	480

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	895	652	57	37
Volume Left	42	9	21	11
Volume Right	35	20	16	16
cSH	942	786	109	125
Volume to Capacity	0.04	0.01	0.52	0.30
Queue Length 95th (ft)	3	1	60	29
Control Delay (s)	1.2	0.3	69.1	45.4
Lane LOS	A	A	F	E
Approach Delay (s)	1.2	0.3	69.1	45.4
Approach LOS			F	E

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	211	577	150	89	313	121	290	651	227	269	428	222
Future Volume (vph)	211	577	150	89	313	121	290	651	227	269	428	222
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.97		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3430		1770	3391		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3430		1770	3391		3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	229	627	163	97	340	132	315	708	247	292	465	241
RTOR Reduction (vph)	0	32	0	0	60	0	0	0	164	0	0	174
Lane Group Flow (vph)	229	758	0	97	412	0	315	708	83	292	465	67
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	6.5	19.2		4.3	17.0		8.5	19.3	19.3	8.3	19.1	19.1
Effective Green, g (s)	6.5	19.2		4.3	17.0		8.5	19.3	19.3	8.3	19.1	19.1
Actuated g/C Ratio	0.09	0.28		0.06	0.25		0.12	0.28	0.28	0.12	0.28	0.28
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	322	953		110	834		422	988	442	412	978	437
v/s Ratio Prot	c0.07	c0.22		0.05	0.12		c0.09	c0.20		0.09	0.13	
v/s Ratio Perm									0.05			0.04
v/c Ratio	0.71	0.79		0.88	0.49		0.75	0.72	0.19	0.71	0.48	0.15
Uniform Delay, d1	30.4	23.1		32.1	22.4		29.3	22.4	18.9	29.2	20.8	18.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.2	4.6		50.6	0.5		7.0	4.5	0.9	5.5	1.7	0.7
Delay (s)	37.6	27.8		82.7	22.8		36.3	26.9	19.9	34.7	22.5	19.6
Level of Service	D	C		F	C		D	C	B	C	C	B
Approach Delay (s)		30.0			33.0			27.9			25.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	69.1	Sum of lost time (s)	18.0
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1287	207	178	898	371	163	0	117	304	126	191
Future Volume (vph)	0	1287	207	178	898	371	163	0	117	304	126	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		4.5	4.5		4.5		4.5	4.5	4.5	4.5
Lane Util. Factor		0.91		1.00	0.91		0.97		1.00	0.95	0.95	1.00
Frt		0.98		1.00	0.96		1.00		0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.98	1.00
Satd. Flow (prot)		4980		1770	4862		3433		1583	1681	1733	1583
Flt Permitted		1.00		0.95	1.00		0.14		1.00	0.95	0.98	1.00
Satd. Flow (perm)		4980		1770	4862		516		1583	1681	1733	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1399	225	193	976	403	177	0	127	330	137	208
RTOR Reduction (vph)	0	22	0	0	74	0	0	0	91	0	0	173
Lane Group Flow (vph)	0	1602	0	193	1305	0	177	0	36	231	236	35
Turn Type		NA		Prot	NA		Perm		Perm	Split	NA	Perm
Protected Phases		4		3	8					6	6	
Permitted Phases							2		2			6
Actuated Green, G (s)		26.5		9.5	40.5		28.0		28.0	16.7	16.7	16.7
Effective Green, g (s)		26.5		9.5	40.5		28.0		28.0	16.7	16.7	16.7
Actuated g/C Ratio		0.27		0.10	0.41		0.28		0.28	0.17	0.17	0.17
Clearance Time (s)		4.5		4.5	4.5		4.5		4.5	4.5	4.5	4.5
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		1337		170	1995		146		449	284	293	267
v/s Ratio Prot		c0.32		c0.11	0.27					c0.14	0.14	
v/s Ratio Perm							c0.34		0.02			0.02
v/c Ratio		1.20		1.14	0.65		1.21		0.08	0.81	0.81	0.13
Uniform Delay, d1		36.1		44.6	23.5		35.4		25.9	39.5	39.4	34.8
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		96.7		110.0	0.8		142.7		0.3	16.1	14.8	0.2
Delay (s)		132.8		154.6	24.2		178.0		26.3	55.6	54.2	35.1
Level of Service		F		F	C		F		C	E	D	D
Approach Delay (s)		132.8			40.2			114.6			48.8	
Approach LOS		F			D			F			D	

Intersection Summary			
HCM 2000 Control Delay	83.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	98.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	444	759	336	191	666	49	395	362	154	87	119	400
Future Volume (vph)	444	759	336	191	666	49	395	362	154	87	119	400
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	4.5
Lane Util. Factor	0.97	0.91		1.00	0.91			0.95		1.00	0.95	1.00
Frt	1.00	0.95		1.00	0.99			0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98		0.95	1.00	1.00
Satd. Flow (prot)	3433	4851		1770	5033			3376		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.58		0.95	1.00	1.00
Satd. Flow (perm)	3433	4851		1770	5033			1997		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	483	825	365	208	724	53	429	393	167	95	129	435
RTOR Reduction (vph)	0	53	0	0	6	0	0	11	0	0	0	333
Lane Group Flow (vph)	483	1137	0	208	771	0	0	978	0	95	129	102
Turn Type	Prot	NA		Prot	NA		Perm	NA		Split	NA	Perm
Protected Phases	7	4		3	8			2		6	6	
Permitted Phases							2					6
Actuated Green, G (s)	22.3	30.6		16.5	24.8			66.6		14.6	14.6	14.6
Effective Green, g (s)	22.3	30.6		16.5	24.8			66.6		14.6	14.6	14.6
Actuated g/C Ratio	0.15	0.21		0.11	0.17			0.46		0.10	0.10	0.10
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	523	1014		199	853			909		176	353	157
v/s Ratio Prot	0.14	c0.23		c0.12	0.15					0.05	0.04	
v/s Ratio Perm								c0.49				c0.06
v/c Ratio	0.92	1.12		1.05	0.90			7.03dl		0.54	0.37	0.65
Uniform Delay, d1	61.2	57.9		64.9	59.6			39.9		62.7	61.5	63.4
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	22.1	67.8		76.2	12.9			52.5		3.2	0.6	8.9
Delay (s)	83.2	125.7		141.1	72.5			92.3		65.8	62.2	72.3
Level of Service	F	F		F	E			F		E	E	E
Approach Delay (s)		113.4			86.9			92.3			69.4	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM 2000 Control Delay	95.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	146.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	62	93	9	72	1	77	1	18	0	6	4
Future Volume (vph)	7	62	93	9	72	1	77	1	18	0	6	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	67	101	10	78	1	84	1	20	0	7	4

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	176	89	105	11
Volume Left (vph)	8	10	84	0
Volume Right (vph)	101	1	20	4
Hadj (s)	-0.30	0.05	0.08	-0.18
Departure Headway (s)	4.0	4.4	4.6	4.4
Degree Utilization, x	0.19	0.11	0.13	0.01
Capacity (veh/h)	875	778	743	750
Control Delay (s)	7.9	7.9	8.3	7.5
Approach Delay (s)	7.9	7.9	8.3	7.5
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.0		
Level of Service	A		
Intersection Capacity Utilization	29.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	23	4	151	20	6	138
Future Volume (Veh/h)	23	4	151	20	6	138
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	4	164	22	7	150
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			749			
pX, platoon unblocked						
vC, conflicting volume	339	175			186	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	339	175			186	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	100			99	
cM capacity (veh/h)	653	868			1388	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	29	186	157
Volume Left	25	0	7
Volume Right	4	22	0
cSH	677	1700	1388
Volume to Capacity	0.04	0.11	0.01
Queue Length 95th (ft)	3	0	0
Control Delay (s)	10.6	0.0	0.4
Lane LOS	B		A
Approach Delay (s)	10.6	0.0	0.4
Approach LOS	B		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	22.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	547	13	61	531	23	26	48	223	88	39	106
Future Volume (vph)	90	547	13	61	531	23	26	48	223	88	39	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.90			0.94	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.98	
Satd. Flow (prot)	1770	3527		1770	3517			1667			1716	
Flt Permitted	0.34	1.00		0.34	1.00			0.96			0.79	
Satd. Flow (perm)	642	3527		632	3517			1614			1376	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	595	14	66	577	25	28	52	242	96	42	115
RTOR Reduction (vph)	0	3	0	0	6	0	0	85	0	0	42	0
Lane Group Flow (vph)	98	606	0	66	596	0	0	237	0	0	211	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.6	15.6		15.6	15.6			25.8			25.8	
Effective Green, g (s)	15.6	15.6		15.6	15.6			25.8			25.8	
Actuated g/C Ratio	0.31	0.31		0.31	0.31			0.51			0.51	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	198	1091		195	1088			826			704	
v/s Ratio Prot		c0.17			0.17							
v/s Ratio Perm	0.15			0.10				0.15			c0.15	
v/c Ratio	0.49	0.56		0.34	0.55			0.29			0.30	
Uniform Delay, d1	14.2	14.5		13.4	14.5			7.0			7.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.9	0.6		1.0	0.6			0.9			1.1	
Delay (s)	16.1	15.1		14.5	15.0			7.9			8.2	
Level of Service	B	B		B	B			A			A	
Approach Delay (s)		15.3			15.0			7.9			8.2	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	50.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	778	126	260	674	20	91	94	329	24	62	11
Future Volume (vph)	55	778	126	260	674	20	91	94	329	24	62	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4979		1770	5063		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.71	1.00	1.00	0.69	1.00	1.00
Satd. Flow (perm)	1770	4979		1770	5063		1329	1863	1583	1287	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	846	137	283	733	22	99	102	358	26	67	12
RTOR Reduction (vph)	0	37	0	0	5	0	0	0	211	0	0	8
Lane Group Flow (vph)	60	946	0	283	750	0	99	102	147	26	67	4
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)	3.7	18.8		10.5	25.6		18.0	18.0	18.0	18.0	18.0	18.0
Effective Green, g (s)	3.7	18.8		10.5	25.6		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.06	0.31		0.17	0.42		0.30	0.30	0.30	0.30	0.30	0.30
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	107	1539		305	2131		393	551	468	381	551	468
v/s Ratio Prot	0.03	c0.19		c0.16	0.15			0.05			0.04	
v/s Ratio Perm							0.07		c0.09	0.02		0.00
v/c Ratio	0.56	0.61		0.93	0.35		0.25	0.19	0.31	0.07	0.12	0.01
Uniform Delay, d1	27.8	17.9		24.8	12.0		16.3	15.9	16.6	15.4	15.6	15.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.6	0.7		32.9	0.1		1.5	0.7	1.7	0.3	0.5	0.0
Delay (s)	34.3	18.6		57.7	12.1		17.8	16.7	18.4	15.7	16.1	15.1
Level of Service	C	B		E	B		B	B	B	B	B	B
Approach Delay (s)		19.6			24.5			18.0			15.9	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	60.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	76	11	2	69	12	5
Future Volume (Veh/h)	76	11	2	69	12	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	83	12	2	75	13	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			95		168	89
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			95		168	89
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	99
cM capacity (veh/h)			1499		821	969

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	95	77	18
Volume Left	0	2	13
Volume Right	12	0	5
cSH	1700	1499	858
Volume to Capacity	0.06	0.00	0.02
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.2	9.3
Lane LOS		A	A
Approach Delay (s)	0.0	0.2	9.3
Approach LOS			A

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	15.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	13	4	2	12	2	9	5	4	4	4	5
Future Volume (Veh/h)	4	13	4	2	12	2	9	5	4	4	4	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	14	4	2	13	2	10	5	4	4	4	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	50	44	6	52	44	7	9			9		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	50	44	6	52	44	7	9			9		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	100	100	98	100	99			100		
cM capacity (veh/h)	931	841	1076	925	840	1075	1611			1611		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	22	17	19	13
Volume Left	4	2	10	4
Volume Right	4	2	4	5
cSH	892	872	1611	1611
Volume to Capacity	0.02	0.02	0.01	0.00
Queue Length 95th (ft)	2	1	0	0
Control Delay (s)	9.1	9.2	3.8	2.2
Lane LOS	A	A	A	A
Approach Delay (s)	9.1	9.2	3.8	2.2
Approach LOS	A	A		

Intersection Summary			
Average Delay	6.5		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	812	23	23	573	15	15	2	35	2	6	12
Future Volume (Veh/h)	17	812	23	23	573	15	15	2	35	2	6	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	883	25	25	623	16	16	2	38	2	7	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)		661										
pX, platoon unblocked				0.90			0.90	0.90	0.90	0.90	0.90	
vC, conflicting volume	639			908			1310	1620	454	1198	1625	320
vC1, stage 1 conf vol							932	932		681	681	
vC2, stage 2 conf vol							378	689		516	944	
vCu, unblocked vol	639			673			1120	1466	168	995	1471	320
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			97			95	99	95	99	98	98
cM capacity (veh/h)	941			821			311	295	761	349	288	676

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	18	589	319	25	415	224	56	22
Volume Left	18	0	0	25	0	0	16	2
Volume Right	0	0	25	0	0	16	38	13
cSH	941	1700	1700	821	1700	1700	517	447
Volume to Capacity	0.02	0.35	0.19	0.03	0.24	0.13	0.11	0.05
Queue Length 95th (ft)	1	0	0	2	0	0	9	4
Control Delay (s)	8.9	0.0	0.0	9.5	0.0	0.0	12.8	13.5
Lane LOS	A			A			B	B
Approach Delay (s)	0.2			0.4			12.8	13.5
Approach LOS							B	B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
33: Cataract Ave & Second St

03/15/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	17	4	10	12	9	9	94	16	5	54	2
Future Volume (Veh/h)	1	17	4	10	12	9	9	94	16	5	54	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	18	4	11	13	10	10	102	17	5	59	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	23			22			94	67	20	130	64	18
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	23			22			94	67	20	130	64	18
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	88	98	99	93	100
cM capacity (veh/h)	1592			1593			835	817	1058	746	821	1061

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	23	34	129	66
Volume Left	1	11	10	5
Volume Right	4	10	17	2
cSH	1592	1593	844	820
Volume to Capacity	0.00	0.01	0.15	0.08
Queue Length 95th (ft)	0	1	13	7
Control Delay (s)	0.3	2.4	10.0	9.8
Lane LOS	A	A	B	A
Approach Delay (s)	0.3	2.4	10.0	9.8
Approach LOS			B	A

Intersection Summary			
Average Delay	8.0		
Intersection Capacity Utilization	20.6%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	37.5
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	51	764	24	44	530	59	20	59	82	12	18	57
Future Vol, veh/h	51	764	24	44	530	59	20	59	82	12	18	57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	55	830	26	48	576	64	22	64	89	13	20	62
Number of Lanes	1	2	0	1	2	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	3	3
HCM Control Delay	55.5	22.5	16	13.4
HCM LOS	F	C	C	B

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	12%	100%	0%	0%	100%	0%	0%	14%
Vol Thru, %	37%	0%	100%	91%	0%	100%	75%	21%
Vol Right, %	51%	0%	0%	9%	0%	0%	25%	66%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	161	51	509	279	44	353	236	87
LT Vol	20	51	0	0	44	0	0	12
Through Vol	59	0	509	255	0	353	177	18
RT Vol	82	0	0	24	0	0	59	57
Lane Flow Rate	175	55	554	303	48	384	256	95
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.389	0.114	1.055	0.572	0.1	0.747	0.486	0.216
Departure Headway (Hd)	8.19	7.373	6.86	6.798	7.685	7.172	6.992	8.409
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	443	489	531	533	469	507	517	429
Service Time	5.89	5.073	4.56	4.498	5.385	4.872	4.692	6.109
HCM Lane V/C Ratio	0.395	0.112	1.043	0.568	0.102	0.757	0.495	0.221
HCM Control Delay	16	11	80.3	18.2	11.2	28.1	16.1	13.4
HCM Lane LOS	C	B	F	C	B	D	C	B
HCM 95th-tile Q	1.8	0.4	16.3	3.6	0.3	6.3	2.6	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (veh/h)	7	26	6	1	28	2	1	67	5	1	37	6
Future Volume (Veh/h)	7	26	6	1	28	2	1	67	5	1	37	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	28	7	1	30	2	1	73	5	1	40	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	140	126	44	144	126	76	47			78		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	140	126	44	144	126	76	47			78		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	96	99	100	96	100	100			100		
cM capacity (veh/h)	803	764	1027	796	763	986	1560			1520		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	43	33	79	48
Volume Left	8	1	1	1
Volume Right	7	2	5	7
cSH	805	775	1560	1520
Volume to Capacity	0.05	0.04	0.00	0.00
Queue Length 95th (ft)	4	3	0	0
Control Delay (s)	9.7	9.9	0.1	0.2
Lane LOS	A	A	A	A
Approach Delay (s)	9.7	9.9	0.1	0.2
Approach LOS	A	A		

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	16.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	73	791	16	17	579	71	12	12	16	21	4	63
Future Volume (vph)	73	791	16	17	579	71	12	12	16	21	4	63
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	79	860	17	18	629	77	13	13	17	23	4	68

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	79	877	18	706	43	95
Volume Left (vph)	79	0	18	0	13	23
Volume Right (vph)	0	17	0	77	17	68
Hadj (s)	0.53	0.02	0.53	-0.04	-0.14	-0.35
Departure Headway (s)	6.2	5.7	6.3	5.7	7.2	6.8
Degree Utilization, x	0.14	1.39	0.03	1.13	0.09	0.18
Capacity (veh/h)	575	634	560	631	481	512
Control Delay (s)	9.0	201.3	8.3	96.7	10.9	11.3
Approach Delay (s)	185.4		94.5		10.9	11.3
Approach LOS	F		F		B	B

Intersection Summary			
Delay	136.0		
Level of Service	F		
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	22	17	6	13	16	18	657	2	15	540	4
Future Volume (Veh/h)	6	22	17	6	13	16	18	657	2	15	540	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	24	18	7	14	17	20	714	2	16	587	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								744				
pX, platoon unblocked	0.80	0.80		0.80	0.80	0.80				0.80		
vC, conflicting volume	1399	1377	589	1404	1378	715	591			716		
vC1, stage 1 conf vol	621	621		755	755							
vC2, stage 2 conf vol	778	756		649	623							
vCu, unblocked vol	1374	1346	589	1380	1348	519	591			520		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	92	96	98	95	96	98			98		
cM capacity (veh/h)	280	309	508	285	311	446	985			837		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	49	38	20	716	16	591
Volume Left	7	7	20	0	16	0
Volume Right	18	17	0	2	0	4
cSH	355	353	985	1700	837	1700
Volume to Capacity	0.14	0.11	0.02	0.42	0.02	0.35
Queue Length 95th (ft)	12	9	2	0	1	0
Control Delay (s)	16.8	16.4	8.7	0.0	9.4	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	16.8	16.4	0.2		0.2	
Approach LOS	C	C				

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	655	48	80	419	138	98	384	147	223	228	112
Future Volume (vph)	98	655	48	80	419	138	98	384	147	223	228	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1793		1770	1863	1583	1770	1771	
Flt Permitted	0.20	1.00	1.00	0.10	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	369	1863	1583	193	1793		1770	1863	1583	1770	1771	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	107	712	52	87	455	150	107	417	160	242	248	122
RTOR Reduction (vph)	0	0	29	0	14	0	0	0	94	0	19	0
Lane Group Flow (vph)	107	712	23	87	591	0	107	417	66	242	351	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			
Actuated Green, G (s)	39.5	39.5	39.5	39.5	39.5		7.0	24.4	24.4	13.5	30.9	
Effective Green, g (s)	39.5	39.5	39.5	39.5	39.5		7.0	24.4	24.4	13.5	30.9	
Actuated g/C Ratio	0.43	0.43	0.43	0.43	0.43		0.08	0.27	0.27	0.15	0.34	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	160	809	687	83	779		136	500	424	262	602	
v/s Ratio Prot		0.38			0.33		0.06	c0.22		c0.14	0.20	
v/s Ratio Perm	0.29		0.01	c0.45					0.04			
v/c Ratio	0.67	0.88	0.03	1.05	0.76		0.79	0.83	0.16	0.92	0.58	
Uniform Delay, d1	20.5	23.5	14.7	25.7	21.7		41.2	31.3	25.4	38.2	24.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.1	11.0	0.0	112.6	4.3		25.2	15.1	0.8	35.6	4.1	
Delay (s)	30.6	34.5	14.8	138.3	26.0		66.4	46.4	26.2	73.8	28.8	
Level of Service	C	C	B	F	C		E	D	C	E	C	
Approach Delay (s)		32.8			40.1			44.8			46.6	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	40.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	90.9	Sum of lost time (s)	13.5
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	244	1120	143	197	881	85	166	271	201	90	229	106
Future Volume (vph)	244	1120	143	197	881	85	166	271	201	90	229	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4999		1770	5018		1770	1863	1583	1770	3371	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	4999		1770	5018		1770	1863	1583	1770	3371	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	265	1217	155	214	958	92	180	295	218	98	249	115
RTOR Reduction (vph)	0	18	0	0	13	0	0	0	154	0	59	0
Lane Group Flow (vph)	265	1354	0	214	1037	0	180	295	64	98	305	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	16.1	26.5		13.0	23.4		11.2	26.5	26.5	6.1	21.4	
Effective Green, g (s)	16.1	26.5		13.0	23.4		11.2	26.5	26.5	6.1	21.4	
Actuated g/C Ratio	0.18	0.29		0.14	0.26		0.12	0.29	0.29	0.07	0.24	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	316	1470		255	1303		220	547	465	119	800	
v/s Ratio Prot	c0.15	c0.27		0.12	0.21		c0.10	c0.16		0.06	0.09	
v/s Ratio Perm									0.04			
v/c Ratio	0.84	0.92		0.84	0.80		0.82	0.54	0.14	0.82	0.38	
Uniform Delay, d1	35.7	30.8		37.5	31.1		38.5	26.7	23.4	41.5	28.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	17.4	9.8		20.8	3.5		20.5	3.8	0.6	34.9	1.4	
Delay (s)	53.1	40.6		58.4	34.6		59.0	30.5	24.0	76.4	30.2	
Level of Service	D	D		E	C		E	C	C	E	C	
Approach Delay (s)		42.6			38.6			35.8			40.0	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.1	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	763	32	60	456	74	115	195	311	111	98	94
Future Volume (vph)	118	763	32	60	456	74	115	195	311	111	98	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.91		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3518		1770	3465		1770	1691		1770	1726	
Flt Permitted	0.37	1.00		0.20	1.00		0.63	1.00		0.33	1.00	
Satd. Flow (perm)	684	3518		373	3465		1168	1691		607	1726	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	128	829	35	65	496	80	125	212	338	121	107	102
RTOR Reduction (vph)	0	5	0	0	22	0	0	29	0	0	51	0
Lane Group Flow (vph)	128	859	0	65	554	0	125	521	0	121	158	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.0	20.0		20.0	20.0		28.6	28.6		28.6	28.6	
Effective Green, g (s)	20.0	20.0		20.0	20.0		28.6	28.6		28.6	28.6	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.50	0.50		0.50	0.50	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	237	1221		129	1203		579	839		301	857	
v/s Ratio Prot		c0.24			0.16			c0.31			0.09	
v/s Ratio Perm	0.19			0.17			0.11			0.20		
v/c Ratio	0.54	0.70		0.50	0.46		0.22	0.62		0.40	0.18	
Uniform Delay, d1	15.1	16.2		14.9	14.6		8.2	10.6		9.1	8.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.5	1.9		3.1	0.3		0.9	3.5		4.0	0.5	
Delay (s)	17.6	18.1		18.0	14.9		9.0	14.0		13.1	8.5	
Level of Service	B	B		B	B		A	B		B	A	
Approach Delay (s)		18.0			15.2			13.1			10.2	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	57.6	Sum of lost time (s)	9.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	222	1141	68	18	862	44	84	57	21	22	62	154
Future Volume (vph)	222	1141	68	18	862	44	84	57	21	22	62	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.98			0.91	
Flt Protected	0.95	1.00		0.95	1.00			0.97			1.00	
Satd. Flow (prot)	1770	5042		1770	5048			1784			1692	
Flt Permitted	0.95	1.00		0.95	1.00			0.69			0.96	
Satd. Flow (perm)	1770	5042		1770	5048			1270			1637	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	241	1240	74	20	937	48	91	62	23	24	67	167
RTOR Reduction (vph)	0	9	0	0	9	0	0	9	0	0	112	0
Lane Group Flow (vph)	241	1305	0	20	976	0	0	167	0	0	146	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	10.2	29.8		1.0	20.6			18.0			18.0	
Effective Green, g (s)	10.2	29.8		1.0	20.6			18.0			18.0	
Actuated g/C Ratio	0.16	0.48		0.02	0.33			0.29			0.29	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	289	2411		28	1669			366			472	
v/s Ratio Prot	c0.14	c0.26		0.01	0.19							
v/s Ratio Perm								c0.13			0.09	
v/c Ratio	0.83	0.54		0.71	0.58			0.46			0.31	
Uniform Delay, d1	25.2	11.4		30.5	17.3			18.1			17.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	18.3	0.2		60.5	0.5			4.0			1.7	
Delay (s)	43.5	11.7		91.0	17.8			22.2			19.0	
Level of Service	D	B		F	B			C			B	
Approach Delay (s)		16.6			19.3			22.2			19.0	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	62.3	Sum of lost time (s)	13.5
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	772	123	33	333	98	52	274	87	130	227	87
Future Volume (vph)	190	772	123	33	333	98	52	274	87	130	227	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3466		1770	3418		1770	3411		1770	3392	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3466		1770	3418		1770	3411		1770	3392	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	207	839	134	36	362	107	57	298	95	141	247	95
RTOR Reduction (vph)	0	16	0	0	34	0	0	36	0	0	47	0
Lane Group Flow (vph)	207	957	0	36	435	0	57	357	0	141	295	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	12.6	27.0		2.8	17.2		3.7	21.2		7.7	25.2	
Effective Green, g (s)	12.6	27.0		2.8	17.2		3.7	21.2		7.7	25.2	
Actuated g/C Ratio	0.16	0.35		0.04	0.22		0.05	0.28		0.10	0.33	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	290	1220		64	766		85	942		177	1114	
v/s Ratio Prot	c0.12	c0.28		0.02	0.13		0.03	c0.10		c0.08	c0.09	
v/s Ratio Perm												
v/c Ratio	0.71	0.78		0.56	0.57		0.67	0.38		0.80	0.26	
Uniform Delay, d1	30.3	22.2		36.3	26.4		35.9	22.4		33.7	18.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.1	3.4		10.8	1.0		18.8	1.2		21.5	0.6	
Delay (s)	38.4	25.6		47.2	27.4		54.7	23.6		55.2	19.5	
Level of Service	D	C		D	C		D	C		E	B	
Approach Delay (s)		27.9			28.8			27.5			29.9	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	76.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	289	872	71	41	696	166	27	41	30	140	49	223
Future Volume (vph)	289	872	71	41	696	166	27	41	30	140	49	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5028		1770	4939		1770	1745		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.72	1.00		0.71	1.00	1.00
Satd. Flow (perm)	1770	5028		1770	4939		1346	1745		1316	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	314	948	77	45	757	180	29	45	33	152	53	242
RTOR Reduction (vph)	0	14	0	0	65	0	0	23	0	0	0	171
Lane Group Flow (vph)	314	1011	0	45	872	0	29	55	0	152	53	71
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		6
Actuated Green, G (s)	10.5	27.6		2.3	19.4		18.0	18.0		18.0	18.0	18.0
Effective Green, g (s)	10.5	27.6		2.3	19.4		18.0	18.0		18.0	18.0	18.0
Actuated g/C Ratio	0.17	0.45		0.04	0.32		0.29	0.29		0.29	0.29	0.29
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	302	2260		66	1560		394	511		385	546	464
v/s Ratio Prot	c0.18	0.20		0.03	c0.18			0.03			0.03	
v/s Ratio Perm							0.02			c0.12		0.04
v/c Ratio	1.04	0.45		0.68	0.56		0.07	0.11		0.39	0.10	0.15
Uniform Delay, d1	25.4	11.6		29.2	17.4		15.7	15.8		17.3	15.8	16.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	62.5	0.1		25.2	0.4		0.4	0.4		3.0	0.4	0.7
Delay (s)	87.9	11.8		54.4	17.9		16.0	16.3		20.4	16.1	16.8
Level of Service	F	B		D	B		B	B		C	B	B
Approach Delay (s)		29.6			19.6			16.2			17.9	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	61.4	Sum of lost time (s)	13.5
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	5	56	10	10	26	15	623	15	15	613	15
Future Volume (Veh/h)	46	5	56	10	10	26	15	623	15	15	613	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	5	61	11	11	28	16	677	16	16	666	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								380				
pX, platoon unblocked	0.77	0.77		0.77	0.77	0.77				0.77		
vC, conflicting volume	1448	1431	674	1478	1431	685	682			693		
vC1, stage 1 conf vol	706	706		717	717							
vC2, stage 2 conf vol	742	725		762	714							
vCu, unblocked vol	1433	1411	674	1472	1411	445	682			455		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	82	98	87	96	96	94	98			98		
cM capacity (veh/h)	276	302	455	256	303	474	911			854		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	116	50	16	693	16	682
Volume Left	50	11	16	0	16	0
Volume Right	61	28	0	16	0	16
cSH	349	361	911	1700	854	1700
Volume to Capacity	0.33	0.14	0.02	0.41	0.02	0.40
Queue Length 95th (ft)	36	12	1	0	1	0
Control Delay (s)	20.3	16.6	9.0	0.0	9.3	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	20.3	16.6	0.2		0.2	
Approach LOS	C	C				

Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	51.9%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	26	15	5	592	414	5
Future Volume (Veh/h)	26	15	5	592	414	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	28	16	5	643	450	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				777	552	
pX, platoon unblocked	0.93	0.90	0.90			
vC, conflicting volume	1106	452	455			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	835	335	338			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	97	100			
cM capacity (veh/h)	314	636	1098			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	44	5	643	455
Volume Left	28	5	0	0
Volume Right	16	0	0	5
cSH	385	1098	1700	1700
Volume to Capacity	0.11	0.00	0.38	0.27
Queue Length 95th (ft)	10	0	0	0
Control Delay (s)	15.6	8.3	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	15.6	0.1		0.0
Approach LOS	C			

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
203: San Dimas Ave & Commercial St

03/15/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	0	15	5	0	10	20	572	10	10	408	10
Future Volume (Veh/h)	15	0	15	5	0	10	20	572	10	10	408	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	0	16	5	0	11	22	622	11	11	443	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								587			742	
pX, platoon unblocked	0.90	0.90	0.94	0.90	0.90	0.87	0.94			0.87		
vC, conflicting volume	1148	1148	448	1152	1148	628	454			633		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	960	960	381	966	960	501	387			508		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	100	97	98	100	98	98			99		
cM capacity (veh/h)	204	224	626	201	224	498	1101			924		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	32	16	22	633	11	454
Volume Left	16	5	22	0	11	0
Volume Right	16	11	0	11	0	11
cSH	307	341	1101	1700	924	1700
Volume to Capacity	0.10	0.05	0.02	0.37	0.01	0.27
Queue Length 95th (ft)	9	4	2	0	1	0
Control Delay (s)	18.1	16.1	8.3	0.0	8.9	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	18.1	16.1	0.3		0.2	
Approach LOS	C	C				

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	3	43	18	6	62	18	562	17	39	338	13
Future Volume (Veh/h)	22	3	43	18	6	62	18	562	17	39	338	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	3	47	20	7	67	20	611	18	42	367	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								1070				
pX, platoon unblocked												
vC, conflicting volume	874	1127	190	976	1125	314	381			629		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	874	1127	190	976	1125	314	381			629		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	98	94	89	96	90	98			96		
cM capacity (veh/h)	204	191	819	183	191	681	1174			949		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	74	94	326	324	226	198
Volume Left	24	20	20	0	42	0
Volume Right	47	67	0	18	0	14
cSH	388	385	1174	1700	949	1700
Volume to Capacity	0.19	0.24	0.02	0.19	0.04	0.12
Queue Length 95th (ft)	17	24	1	0	3	0
Control Delay (s)	16.5	17.4	0.7	0.0	2.0	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	16.5	17.4	0.3		1.1	
Approach LOS	C	C				

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	175	729	10	6	741	267	63	118	72	287	40	91
Future Volume (vph)	175	729	10	6	741	267	63	118	72	287	40	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.5	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00		0.95	
Frt	1.00	1.00		1.00	0.96		1.00	1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1770	5075		1770	4883		1770	1863	1583		3310	
Flt Permitted	0.95	1.00		0.95	1.00		0.31	1.00	1.00		0.72	
Satd. Flow (perm)	1770	5075		1770	4883		583	1863	1583		2482	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	792	11	7	805	290	68	128	78	312	43	99
RTOR Reduction (vph)	0	2	0	0	88	0	0	0	49	0	40	0
Lane Group Flow (vph)	190	801	0	7	1007	0	68	128	29	0	414	0
Turn Type	Prot	NA		Prot	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							2		2	6		
Actuated Green, G (s)	10.2	30.2		1.1	21.1		25.6	25.6	25.6		18.3	
Effective Green, g (s)	10.2	30.2		1.1	21.1		25.6	25.6	25.6		18.3	
Actuated g/C Ratio	0.15	0.44		0.02	0.31		0.37	0.37	0.37		0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.5	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	262	2224		28	1495		264	692	588		659	
v/s Ratio Prot	c0.11	0.16		0.00	c0.21		c0.01	0.07				
v/s Ratio Perm							0.08		0.02		c0.17	
v/c Ratio	0.73	0.36		0.25	0.67		0.26	0.18	0.05		0.63	
Uniform Delay, d1	28.0	12.9		33.5	20.9		14.7	14.6	13.9		22.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	9.6	0.1		4.7	1.2		0.5	0.6	0.2		1.9	
Delay (s)	37.6	13.0		38.1	22.1		15.2	15.2	14.0		24.2	
Level of Service	D	B		D	C		B	B	B		C	
Approach Delay (s)		17.7			22.2			14.9			24.2	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	68.9	Sum of lost time (s)	16.5
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	63	8	10	78	7	10	67	23	5	17	3
Future Volume (Veh/h)	5	63	8	10	78	7	10	67	23	5	17	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	68	9	11	85	8	11	73	25	5	18	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	93			77			206	198	72	255	198	89
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	93			77			206	198	72	255	198	89
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			98	89	97	99	97	100
cM capacity (veh/h)	1501			1522			729	691	990	621	690	969

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	82	104	109	26
Volume Left	5	11	11	5
Volume Right	9	8	25	3
cSH	1501	1522	746	698
Volume to Capacity	0.00	0.01	0.15	0.04
Queue Length 95th (ft)	0	1	13	3
Control Delay (s)	0.5	0.8	10.6	10.4
Lane LOS	A	A	B	B
Approach Delay (s)	0.5	0.8	10.6	10.4
Approach LOS			B	B

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	20.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	8	6	8	10	1	10	110	6	2	22	7
Future Volume (Veh/h)	3	8	6	8	10	1	10	110	6	2	22	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	9	7	9	11	1	11	120	7	2	24	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	184	181	28	189	182	124	32			127		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	184	181	28	189	182	124	32			127		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	99	99	98	100	99			100		
cM capacity (veh/h)	762	707	1047	754	707	927	1580			1459		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	19	21	138	34
Volume Left	3	9	11	2
Volume Right	7	1	7	8
cSH	814	735	1580	1459
Volume to Capacity	0.02	0.03	0.01	0.00
Queue Length 95th (ft)	2	2	1	0
Control Delay (s)	9.5	10.0	0.6	0.4
Lane LOS	A	B	A	A
Approach Delay (s)	9.5	10.0	0.6	0.4
Approach LOS	A	B		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	1143	10	2	857	56	7	2	10	14	0	19
Future Volume (Veh/h)	81	1143	10	2	857	56	7	2	10	14	0	19
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	88	1242	11	2	932	61	8	2	11	15	0	21
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		1243										
pX, platoon unblocked				0.96			0.96	0.96	0.96	0.96	0.96	
vC, conflicting volume	993			1253			1759	2420	420	1568	2396	341
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	993			1116			1643	2332	247	1444	2306	341
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	87			100			85	93	98	80	100	97
cM capacity (veh/h)	692			597			55	30	723	75	32	655

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	88	497	497	259	2	373	373	247	21	36
Volume Left	88	0	0	0	2	0	0	0	8	15
Volume Right	0	0	0	11	0	0	0	61	11	21
cSH	692	1700	1700	1700	597	1700	1700	1700	93	155
Volume to Capacity	0.13	0.29	0.29	0.15	0.00	0.22	0.22	0.15	0.23	0.23
Queue Length 95th (ft)	11	0	0	0	0	0	0	0	20	21
Control Delay (s)	11.0	0.0	0.0	0.0	11.1	0.0	0.0	0.0	54.8	35.1
Lane LOS	B				B				F	E
Approach Delay (s)	0.7				0.0				54.8	35.1
Approach LOS									F	E

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	39.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	27	53	58	17	86	45	136	219	26	17	159	69
Future Volume (vph)	27	53	58	17	86	45	136	219	26	17	159	69
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	58	63	18	93	49	148	238	28	18	173	75

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	150	160	414	266
Volume Left (vph)	29	18	148	18
Volume Right (vph)	63	49	28	75
Hadj (s)	-0.18	-0.13	0.06	-0.12
Departure Headway (s)	5.9	5.9	5.3	5.4
Degree Utilization, x	0.25	0.26	0.61	0.40
Capacity (veh/h)	520	531	642	621
Control Delay (s)	10.8	11.0	16.4	11.9
Approach Delay (s)	10.8	11.0	16.4	11.9
Approach LOS	B	B	C	B

Intersection Summary			
Delay	13.5		
Level of Service	B		
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	38	32	29	266	134	35
Future Volume (Veh/h)	38	32	29	266	134	35
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	41	35	32	289	146	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				259		
pX, platoon unblocked						
vC, conflicting volume	499	146	184			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	499	146	184			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	96	98			
cM capacity (veh/h)	519	901	1391			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	76	32	289	146	38
Volume Left	41	32	0	0	0
Volume Right	35	0	0	0	38
cSH	645	1391	1700	1700	1700
Volume to Capacity	0.12	0.02	0.17	0.09	0.02
Queue Length 95th (ft)	10	2	0	0	0
Control Delay (s)	11.3	7.6	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	11.3	0.8		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	24.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	1079	32	16	871	170	31	25	25	107	23	45
Future Volume (vph)	105	1079	32	16	871	170	31	25	25	107	23	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00		1.00	1.00
Frt	1.00	1.00		1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00		0.96	1.00
Satd. Flow (prot)	1770	5063		1770	4961			1812	1583		1789	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.83	1.00		0.74	1.00
Satd. Flow (perm)	1770	5063		1770	4961			1548	1583		1370	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	114	1173	35	17	947	185	34	27	27	116	25	49
RTOR Reduction (vph)	0	5	0	0	51	0	0	0	18	0	0	33
Lane Group Flow (vph)	114	1203	0	17	1081	0	0	61	9	0	141	16
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)	9.3	25.4		1.0	17.1			20.1	20.1		20.1	20.1
Effective Green, g (s)	9.3	25.4		1.0	17.1			20.1	20.1		20.1	20.1
Actuated g/C Ratio	0.16	0.42		0.02	0.29			0.34	0.34		0.34	0.34
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	274	2143		29	1413			518	530		458	530
v/s Ratio Prot	c0.06	c0.24		0.01	c0.22							
v/s Ratio Perm								0.04	0.01		c0.10	0.01
v/c Ratio	0.42	0.56		0.59	0.76			0.12	0.02		0.31	0.03
Uniform Delay, d1	22.9	13.1		29.3	19.6			13.8	13.3		14.8	13.4
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	1.0	1.1		26.8	4.0			0.5	0.1		1.7	0.1
Delay (s)	23.9	14.2		56.1	23.6			14.3	13.4		16.5	13.5
Level of Service	C	B		E	C			B	B		B	B
Approach Delay (s)		15.0			24.1			14.0			15.8	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	21	48	22	9	47	11	66	343	33	10	133	14
Future Volume (vph)	21	48	22	9	47	11	66	343	33	10	133	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	52	24	10	51	12	72	373	36	11	145	15

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	99	73	481	171
Volume Left (vph)	23	10	72	11
Volume Right (vph)	24	12	36	15
Hadj (s)	-0.06	-0.04	0.02	-0.01
Departure Headway (s)	5.5	5.6	4.6	5.0
Degree Utilization, x	0.15	0.11	0.62	0.24
Capacity (veh/h)	573	558	747	678
Control Delay (s)	9.5	9.4	15.0	9.5
Approach Delay (s)	9.5	9.4	15.0	9.5
Approach LOS	A	A	B	A

Intersection Summary			
Delay	12.7		
Level of Service	B		
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	41	23	32	7	19	8	30	407	10	5	145	22
Future Volume (vph)	41	23	32	7	19	8	30	407	10	5	145	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	45	25	35	8	21	9	33	442	11	5	158	24

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	105	38	486	187
Volume Left (vph)	45	8	33	5
Volume Right (vph)	35	9	11	24
Hadj (s)	-0.08	-0.07	0.03	-0.04
Departure Headway (s)	5.5	5.6	4.6	4.8
Degree Utilization, x	0.16	0.06	0.62	0.25
Capacity (veh/h)	584	550	769	703
Control Delay (s)	9.5	9.0	14.7	9.5
Approach Delay (s)	9.5	9.0	14.7	9.5
Approach LOS	A	A	B	A

Intersection Summary			
Delay	12.6		
Level of Service	B		
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	25	19	433	16	10	162
Future Volume (Veh/h)	25	19	433	16	10	162
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	21	471	17	11	176
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			277			
pX, platoon unblocked	0.85	0.85			0.85	
vC, conflicting volume	678	480			488	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	532	299			309	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	97			99	
cM capacity (veh/h)	427	629			1063	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	48	488	187
Volume Left	27	0	11
Volume Right	21	17	0
cSH	497	1700	1063
Volume to Capacity	0.10	0.29	0.01
Queue Length 95th (ft)	8	0	1
Control Delay (s)	13.0	0.0	0.6
Lane LOS	B		A
Approach Delay (s)	13.0	0.0	0.6
Approach LOS	B		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	33.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	965	192	73	660	37	322	336	141	27	152	41
Future Volume (vph)	53	965	192	73	660	37	322	336	141	27	152	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4959		1770	5045		1770	1863	1583	1770	1803	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.24	1.00	
Satd. Flow (perm)	1770	4959		1770	5045		1770	1863	1583	447	1803	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	58	1049	209	79	717	40	350	365	153	29	165	45
RTOR Reduction (vph)	0	33	0	0	6	0	0	0	93	0	11	0
Lane Group Flow (vph)	58	1225	0	79	751	0	350	365	60	29	199	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8	4		
Actuated Green, G (s)	15.1	29.1		5.5	19.5		20.6	35.4	35.4	18.8	16.8	
Effective Green, g (s)	15.1	29.1		5.5	19.5		20.6	35.4	35.4	18.8	16.8	
Actuated g/C Ratio	0.17	0.32		0.06	0.22		0.23	0.39	0.39	0.21	0.19	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	296	1603		108	1093		405	732	622	122	336	
v/s Ratio Prot	0.03	c0.25		c0.04	0.15		c0.20	0.20		0.01	c0.11	
v/s Ratio Perm									0.04	0.04		
v/c Ratio	0.20	0.76		0.73	0.69		0.86	0.50	0.10	0.24	0.59	
Uniform Delay, d1	32.2	27.4		41.5	32.4		33.4	20.6	17.2	37.1	33.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	3.5		22.3	1.8		17.1	2.4	0.3	1.0	7.4	
Delay (s)	32.6	30.9		63.8	34.3		50.5	23.0	17.5	38.2	40.9	
Level of Service	C	C		E	C		D	C	B	D	D	
Approach Delay (s)		31.0			37.0			33.1			40.6	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	33.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	11	11	6	7	15	30	918	18	11	623	17
Future Volume (Veh/h)	6	11	11	6	7	15	30	918	18	11	623	17
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	12	12	7	8	16	33	998	20	12	677	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)											382	
pX, platoon unblocked	0.78	0.78	0.78	0.78	0.78		0.78					
vC, conflicting volume	1804	1794	686	1802	1793	1008	695			1018		
vC1, stage 1 conf vol	710	710		1074	1074							
vC2, stage 2 conf vol	1094	1084		728	719							
vCu, unblocked vol	1892	1879	451	1889	1878	1008	462			1018		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	95	97	97	96	95	96			98		
cM capacity (veh/h)	190	225	472	205	227	292	852			682		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	31	31	1051	707
Volume Left	7	7	33	12
Volume Right	12	16	20	18
cSH	268	250	852	682
Volume to Capacity	0.12	0.12	0.04	0.02
Queue Length 95th (ft)	10	10	3	1
Control Delay (s)	20.2	21.5	1.2	0.5
Lane LOS	C	C	A	A
Approach Delay (s)	20.2	21.5	1.2	0.5
Approach LOS	C	C		

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	2	16	0	3	10	19	908	10	9	617	10
Future Volume (Veh/h)	13	2	16	0	3	10	19	908	10	9	617	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	2	17	0	3	11	21	987	11	10	671	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								1253			753	
pX, platoon unblocked	0.83	0.83	0.78	0.83	0.83	0.72	0.78			0.72		
vC, conflicting volume	1744	1736	676	1749	1736	992	682			998		
vC1, stage 1 conf vol	696	696		1034	1034							
vC2, stage 2 conf vol	1047	1040		714	702							
vCu, unblocked vol	1200	1191	445	1206	1191	799	452			806		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	99	96	100	99	96	98			98		
cM capacity (veh/h)	209	237	479	227	244	279	865			592		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	33	14	1019	692
Volume Left	14	0	21	10
Volume Right	17	11	11	11
cSH	298	271	865	592
Volume to Capacity	0.11	0.05	0.02	0.02
Queue Length 95th (ft)	9	4	2	1
Control Delay (s)	18.6	19.0	0.7	0.5
Lane LOS	C	C	A	A
Approach Delay (s)	18.6	19.0	0.7	0.5
Approach LOS	C	C		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	2	22	15	0	30	24	881	31	22	597	11
Future Volume (Veh/h)	14	2	22	15	0	30	24	881	31	22	597	11
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	2	24	16	0	33	26	958	34	24	649	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (ft)								1055			951	
pX, platoon unblocked	0.83	0.83	0.79	0.83	0.83	0.72	0.79			0.72		
vC, conflicting volume	1746	1747	655	1738	1719	958	661			992		
vC1, stage 1 conf vol	703	703		1010	1010							
vC2, stage 2 conf vol	1043	1044		728	709							
vCu, unblocked vol	1230	1232	432	1221	1198	751	440			798		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	99	95	93	100	89	97			96		
cM capacity (veh/h)	184	221	493	228	246	297	886			596		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1
Volume Total	41	49	26	958	34	685
Volume Left	15	16	26	0	0	24
Volume Right	24	33	0	0	34	12
cSH	294	270	886	1700	1700	596
Volume to Capacity	0.14	0.18	0.03	0.56	0.02	0.04
Queue Length 95th (ft)	12	16	2	0	0	3
Control Delay (s)	19.2	21.3	9.2	0.0	0.0	1.1
Lane LOS	C	C	A			A
Approach Delay (s)	19.2	21.3	0.2			1.1
Approach LOS	C	C				

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	13	17	921	11	30	613
Future Volume (Veh/h)	13	17	921	11	30	613
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	18	1001	12	33	666
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type			None			None
Median storage veh)						
Upstream signal (ft)			255			
pX, platoon unblocked	0.80	0.80			0.80	
vC, conflicting volume	1406	506			1013	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1008	0			516	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	98			96	
cM capacity (veh/h)	182	868			837	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	32	667	346	33	333	333
Volume Left	14	0	0	33	0	0
Volume Right	18	0	12	0	0	0
cSH	416	1700	1700	837	1700	1700
Volume to Capacity	0.08	0.39	0.20	0.04	0.20	0.20
Queue Length 95th (ft)	6	0	0	3	0	0
Control Delay (s)	16.7	0.0	0.0	9.5	0.0	0.0
Lane LOS	C			A		
Approach Delay (s)	16.7	0.0		0.4		
Approach LOS	C					

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	35.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	177	590	174	141	373	59	170	850	197	112	514	159
Future Volume (vph)	177	590	174	141	373	59	170	850	197	112	514	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.91		1.00	0.91	
Frt	1.00	0.97		1.00	0.98		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3418		1770	3467		1770	4942		1770	4905	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3418		1770	3467		1770	4942		1770	4905	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	192	641	189	153	405	64	185	924	214	122	559	173
RTOR Reduction (vph)	0	34	0	0	15	0	0	47	0	0	70	0
Lane Group Flow (vph)	192	796	0	153	454	0	185	1091	0	122	662	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	11.5	23.8		9.2	21.5		11.0	20.8		8.2	18.0	
Effective Green, g (s)	11.5	23.8		9.2	21.5		11.0	20.8		8.2	18.0	
Actuated g/C Ratio	0.14	0.30		0.11	0.27		0.14	0.26		0.10	0.22	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	254	1016		203	931		243	1284		181	1103	
v/s Ratio Prot	c0.11	c0.23		0.09	0.13		c0.10	c0.22		0.07	0.14	
v/s Ratio Perm												
v/c Ratio	0.76	0.78		0.75	0.49		0.76	0.85		0.67	0.60	
Uniform Delay, d1	32.9	25.7		34.3	24.6		33.2	28.1		34.6	27.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	12.1	6.0		14.6	1.8		13.1	5.4		9.5	0.9	
Delay (s)	45.0	31.8		48.9	26.4		46.4	33.6		44.1	28.7	
Level of Service	D	C		D	C		D	C		D	C	
Approach Delay (s)		34.3			32.0			35.3			30.9	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	33.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	357	40	39	382	117	61	181	37	117	179	143
Future Volume (vph)	81	357	40	39	382	117	61	181	37	117	179	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.96			0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	1.00
Satd. Flow (prot)	1770	1835		1770	1797			1810		1770	1863	1583
Flt Permitted	0.21	1.00		0.33	1.00			0.89		0.46	1.00	1.00
Satd. Flow (perm)	384	1835		607	1797			1635		854	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	88	388	43	42	415	127	66	197	40	127	195	155
RTOR Reduction (vph)	0	7	0	0	19	0	0	10	0	0	0	78
Lane Group Flow (vph)	88	424	0	42	523	0	0	293	0	127	195	77
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	19.4	19.4		19.4	19.4			19.4		27.7	27.7	27.7
Effective Green, g (s)	19.4	19.4		19.4	19.4			19.4		27.7	27.7	27.7
Actuated g/C Ratio	0.35	0.35		0.35	0.35			0.35		0.49	0.49	0.49
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	132	634		209	621			565		483	919	781
v/s Ratio Prot		0.23			c0.29					c0.02	0.10	
v/s Ratio Perm	0.23			0.07				c0.18		0.11		0.05
v/c Ratio	0.67	0.67		0.20	0.84			0.52		0.26	0.21	0.10
Uniform Delay, d1	15.6	15.6		12.9	16.9			14.6		8.8	8.0	7.6
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	12.0	2.7		0.5	10.1			0.8		0.3	0.5	0.3
Delay (s)	27.6	18.3		13.4	27.0			15.4		9.1	8.6	7.8
Level of Service	C	B		B	C			B		A	A	A
Approach Delay (s)		19.9			26.0			15.4			8.4	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	56.1	Sum of lost time (s)	13.5
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	257	847	158	129	648	213	265	669	50	232	369	179
Future Volume (vph)	257	847	158	129	648	213	265	669	50	232	369	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	4965		1770	3539	1583	3433	3503		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	4965		1770	3539	1583	3433	3503		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	279	921	172	140	704	232	288	727	54	252	401	195
RTOR Reduction (vph)	0	30	0	0	0	180	0	6	0	0	0	139
Lane Group Flow (vph)	279	1063	0	140	704	52	288	775	0	252	401	56
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	16.2	26.4		9.6	19.8	19.8	11.2	22.0		14.5	25.3	25.3
Effective Green, g (s)	16.2	26.4		9.6	19.8	19.8	11.2	22.0		14.5	25.3	25.3
Actuated g/C Ratio	0.18	0.30		0.11	0.22	0.22	0.13	0.25		0.16	0.29	0.29
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	324	1481		192	791	354	434	870		290	1011	452
v/s Ratio Prot	c0.16	0.21		0.08	c0.20		0.08	c0.22		c0.14	c0.11	
v/s Ratio Perm						0.03						0.04
v/c Ratio	0.86	0.72		0.73	0.89	0.15	0.66	0.89		0.87	0.40	0.12
Uniform Delay, d1	35.1	27.7		38.2	33.3	27.6	36.9	32.1		36.1	25.5	23.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	20.2	1.7		13.0	12.2	0.2	3.8	13.3		23.0	1.2	0.6
Delay (s)	55.3	29.4		51.2	45.5	27.8	40.7	45.4		59.1	26.6	24.0
Level of Service	E	C		D	D	C	D	D		E	C	C
Approach Delay (s)		34.7			42.4			44.1			35.6	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	88.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	379	72	49	326	129	72	724	118	71	479	98
Future Volume (vph)	163	379	72	49	326	129	72	724	118	71	479	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1765	1504	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.21	1.00	1.00	0.19	1.00	1.00	0.28	1.00	1.00	0.10	1.00	1.00
Satd. Flow (perm)	391	1765	1504	348	1863	1583	526	1863	1583	188	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	177	412	78	53	354	140	78	787	128	77	521	107
RTOR Reduction (vph)	0	1	51	0	0	96	0	0	70	0	0	59
Lane Group Flow (vph)	177	419	19	53	354	44	78	787	58	77	521	48
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	30.3	24.4	24.4	24.3	21.4	21.4	44.1	39.9	39.9	43.5	39.6	39.6
Effective Green, g (s)	30.3	24.4	24.4	24.3	21.4	21.4	44.1	39.9	39.9	43.5	39.6	39.6
Actuated g/C Ratio	0.34	0.27	0.27	0.27	0.24	0.24	0.49	0.45	0.45	0.49	0.44	0.44
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	224	483	411	141	447	380	318	834	708	161	828	703
v/s Ratio Prot	c0.05	c0.24		0.01	0.19		0.01	c0.42		c0.02	0.28	
v/s Ratio Perm	0.22		0.01	0.09		0.03	0.11		0.04	0.21		0.03
v/c Ratio	0.79	0.87	0.05	0.38	0.79	0.11	0.25	0.94	0.08	0.48	0.63	0.07
Uniform Delay, d1	24.3	30.8	23.8	25.4	31.8	26.4	13.5	23.5	14.1	18.9	19.1	14.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	17.1	15.2	0.0	1.7	9.3	0.1	0.4	20.1	0.2	2.2	3.6	0.2
Delay (s)	41.4	46.0	23.8	27.1	41.0	26.6	13.9	43.7	14.3	21.1	22.7	14.4
Level of Service	D	D	C	C	D	C	B	D	B	C	C	B
Approach Delay (s)		42.4			36.0			37.5			21.3	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	34.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	89.1	Sum of lost time (s)	18.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	940	0	6	519	3	187	0	5	2	0	0
Future Volume (Veh/h)	6	940	0	6	519	3	187	0	5	2	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	1022	0	7	564	3	203	0	5	2	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	567			1022			1332	1617	511	1108	1614	282
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	567			1022			1332	1617	511	1108	1614	282
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			0	100	99	99	100	100
cM capacity (veh/h)	1001			675			111	101	508	161	101	715

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	7	511	511	0	7	282	282	3	208	2
Volume Left	7	0	0	0	7	0	0	0	203	2
Volume Right	0	0	0	0	0	0	0	3	5	0
cSH	1001	1700	1700	1700	675	1700	1700	1700	113	161
Volume to Capacity	0.01	0.30	0.30	0.00	0.01	0.17	0.17	0.00	1.84	0.01
Queue Length 95th (ft)	1	0	0	0	1	0	0	0	414	1
Control Delay (s)	8.6	0.0	0.0	0.0	10.4	0.0	0.0	0.0	475.2	27.7
Lane LOS	A				B				F	D
Approach Delay (s)	0.1				0.1				475.2	27.7
Approach LOS									F	D

Intersection Summary			
Average Delay	54.6		
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	218	130	131	48	80	65	57	493	56	101	612	81
Future Volume (vph)	218	130	131	48	80	65	57	493	56	101	612	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	0.99	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1745	1583		1829	1583	1770	3539	1583	1770	4996	
Flt Permitted	0.47	0.91	1.00		0.80	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	837	1614	1583		1483	1583	1770	3539	1583	1770	4996	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	237	141	142	52	87	71	62	536	61	110	665	88
RTOR Reduction (vph)	0	0	88	0	0	59	0	0	41	0	18	0
Lane Group Flow (vph)	182	196	54	0	139	12	62	536	20	110	735	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)	24.3	24.3	24.3		10.9	10.9	3.7	20.8	20.8	5.6	22.7	
Effective Green, g (s)	24.3	24.3	24.3		10.9	10.9	3.7	20.8	20.8	5.6	22.7	
Actuated g/C Ratio	0.38	0.38	0.38		0.17	0.17	0.06	0.32	0.32	0.09	0.35	
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	433	629	599		251	268	102	1146	512	154	1766	
v/s Ratio Prot	c0.06	0.04					0.04	c0.15		c0.06	0.15	
v/s Ratio Perm	0.10	0.07	0.03		c0.09	0.01			0.01			
v/c Ratio	0.42	0.31	0.09		0.55	0.04	0.61	0.47	0.04	0.71	0.42	
Uniform Delay, d1	14.1	14.1	12.8		24.4	22.3	29.5	17.3	14.9	28.5	15.7	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.3	0.1		2.6	0.1	9.8	1.4	0.1	14.5	0.7	
Delay (s)	14.8	14.3	12.9		27.1	22.4	39.4	18.7	15.0	43.1	16.5	
Level of Service	B	B	B		C	C	D	B	B	D	B	
Approach Delay (s)		14.1			25.5			20.3			19.8	
Approach LOS		B			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	19.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	64.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	455	41	30	451	54	36
Future Volume (Veh/h)	455	41	30	451	54	36
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	495	45	33	490	59	39
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None			TWLTL		
Median storage veh)				2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			540		1074	518
vC1, stage 1 conf vol					518	
vC2, stage 2 conf vol					556	
vCu, unblocked vol			540		1074	518
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			97		87	93
cM capacity (veh/h)			1028		451	558

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	540	523	98
Volume Left	0	33	59
Volume Right	45	0	39
cSH	1700	1028	749
Volume to Capacity	0.32	0.03	0.13
Queue Length 95th (ft)	0	2	11
Control Delay (s)	0.0	0.9	13.3
Lane LOS		A	B
Approach Delay (s)	0.0	0.9	13.3
Approach LOS			B

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	831	1	12	458	13	11	18	18	15	11	51
Future Volume (Veh/h)	26	831	1	12	458	13	11	18	18	15	11	51
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	28	903	1	13	498	14	12	20	20	16	12	55
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			2
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	512			904			1240	1498	302	908	1491	256
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	512			904			1240	1498	302	908	1491	256
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			89	83	97	91	90	93
cM capacity (veh/h)	1050			748			108	116	695	188	117	743

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	28	361	361	182	13	332	180	52	83
Volume Left	28	0	0	0	13	0	0	12	16
Volume Right	0	0	0	1	0	0	14	20	55
cSH	1050	1700	1700	1700	748	1700	1700	184	467
Volume to Capacity	0.03	0.21	0.21	0.11	0.02	0.20	0.11	0.28	0.18
Queue Length 95th (ft)	2	0	0	0	1	0	0	28	16
Control Delay (s)	8.5	0.0	0.0	0.0	9.9	0.0	0.0	34.0	17.8
Lane LOS	A				A			D	C
Approach Delay (s)	0.3				0.2			34.0	17.8
Approach LOS								D	C

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	36.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	529	166	118	399	99	213	700	141	72	567	66
Future Volume (vph)	120	529	166	118	399	99	213	700	141	72	567	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.32	1.00	1.00	0.17	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	599	1863	1583	315	1863	1583	1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	575	180	128	434	108	232	761	153	78	616	72
RTOR Reduction (vph)	0	0	110	0	0	67	0	0	91	0	0	52
Lane Group Flow (vph)	130	575	70	128	434	41	232	761	62	78	616	20
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	25.1	25.1	25.1	25.1	25.1	25.1	10.8	26.0	26.0	3.8	19.0	19.0
Effective Green, g (s)	25.1	25.1	25.1	25.1	25.1	25.1	10.8	26.0	26.0	3.8	19.0	19.0
Actuated g/C Ratio	0.38	0.38	0.38	0.38	0.38	0.38	0.16	0.39	0.39	0.06	0.28	0.28
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	224	698	593	118	698	593	285	1375	615	100	1005	449
v/s Ratio Prot		0.31			0.23		c0.13	c0.22		0.04	0.17	
v/s Ratio Perm	0.22		0.04	c0.41		0.03			0.04			0.01
v/c Ratio	0.58	0.82	0.12	1.08	0.62	0.07	0.81	0.55	0.10	0.78	0.61	0.05
Uniform Delay, d1	16.7	18.9	13.7	20.9	17.0	13.4	27.1	15.9	13.0	31.1	20.8	17.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.8	7.8	0.1	107.4	1.7	0.0	16.1	1.6	0.3	31.6	2.8	0.2
Delay (s)	20.5	26.7	13.8	128.3	18.8	13.5	43.2	17.5	13.3	62.7	23.6	17.6
Level of Service	C	C	B	F	B	B	D	B	B	E	C	B
Approach Delay (s)		23.2			38.8			22.2			27.0	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	66.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	43	18	1040	896	12
Future Volume (Veh/h)	0	43	18	1040	896	12
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	47	20	1130	974	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					1028	
pX, platoon unblocked	0.89	0.89	0.89			
vC, conflicting volume	1586	494	987			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1417	194	747			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	94	97			
cM capacity (veh/h)	111	728	766			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	47	20	565	565	649	338
Volume Left	0	20	0	0	0	0
Volume Right	47	0	0	0	0	13
cSH	728	766	1700	1700	1700	1700
Volume to Capacity	0.06	0.03	0.33	0.33	0.38	0.20
Queue Length 95th (ft)	5	2	0	0	0	0
Control Delay (s)	10.3	9.8	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	10.3	0.2			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR2
Lane Configurations												
Traffic Volume (vph)	126	989	59	109	370	153	122	746	149	214	658	47
Future Volume (vph)	126	989	59	109	370	153	122	746	149	214	658	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.76		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.85		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5042		1770	3610		1770	3451		1770	3504	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5042		1770	3610		1770	3451		1770	3504	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	137	1075	64	118	402	166	133	811	162	233	715	51
RTOR Reduction (vph)	0	9	0	0	108	0	0	24	0	0	88	0
Lane Group Flow (vph)	137	1130	0	118	460	0	133	949	0	233	678	0
Turn Type	Prot	NA		Prot	Perm		Prot	NA		Prot	NA	
Protected Phases	7	4		3			5	2		1	6	
Permitted Phases					8							
Actuated Green, G (s)	6.0	17.0		5.0	16.0		6.4	22.8		10.0	26.4	
Effective Green, g (s)	6.0	17.0		5.0	16.0		6.4	22.8		10.0	26.4	
Actuated g/C Ratio	0.08	0.24		0.07	0.23		0.09	0.32		0.14	0.37	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	150	1210		125	815		160	1111		250	1306	
v/s Ratio Prot	c0.08	c0.22		0.07			0.08	c0.28		c0.13	c0.19	
v/s Ratio Perm					0.13							
v/c Ratio	0.91	0.93		0.94	0.56		0.83	0.85		0.93	0.52	
Uniform Delay, d1	32.1	26.3		32.8	24.3		31.7	22.4		30.1	17.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	48.3	13.0		62.8	0.9		29.2	8.4		38.7	1.5	
Delay (s)	80.5	39.3		95.6	25.2		60.8	30.9		68.8	18.7	
Level of Service	F	D		F	C		E	C		E	B	
Approach Delay (s)		43.7						34.5			30.4	
Approach LOS		D						C			C	

Intersection Summary			
HCM 2000 Control Delay	36.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	70.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	199	282	184	80	152	120	125	995	113	87	767	65
Future Volume (vph)	199	282	184	80	152	120	125	995	113	87	767	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.64	1.00	1.00	0.39	1.00	1.00	0.30	1.00	1.00	0.21	1.00	1.00
Satd. Flow (perm)	1195	1863	1583	734	1863	1583	567	3539	1583	397	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	216	307	200	87	165	130	136	1082	123	95	834	71
RTOR Reduction (vph)	0	0	117	0	0	64	0	0	49	0	0	29
Lane Group Flow (vph)	216	307	83	87	165	66	136	1082	74	95	834	42
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	14.9	14.9	14.9	14.9	14.9	14.9	34.1	34.1	34.1	34.1	34.1	34.1
Effective Green, g (s)	14.9	14.9	14.9	14.9	14.9	14.9	34.1	34.1	34.1	34.1	34.1	34.1
Actuated g/C Ratio	0.26	0.26	0.26	0.26	0.26	0.26	0.60	0.60	0.60	0.60	0.60	0.60
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	312	486	413	191	486	413	339	2117	947	237	2117	947
v/s Ratio Prot		0.16			0.09			c0.31			0.24	
v/s Ratio Perm	c0.18		0.05	0.12		0.04	0.24		0.05	0.24		0.03
v/c Ratio	0.69	0.63	0.20	0.46	0.34	0.16	0.40	0.51	0.08	0.40	0.39	0.04
Uniform Delay, d1	19.0	18.6	16.4	17.6	17.1	16.2	6.1	6.6	4.8	6.1	6.0	4.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.5	2.7	0.2	1.7	0.4	0.2	3.5	0.9	0.2	5.0	0.6	0.1
Delay (s)	25.5	21.3	16.7	19.4	17.5	16.4	9.6	7.5	5.0	11.0	6.6	4.8
Level of Service	C	C	B	B	B	B	A	A	A	B	A	A
Approach Delay (s)		21.3			17.5			7.5			6.9	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	57.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (veh/h)	28	39	1207	15	31	1108	
Future Volume (Veh/h)	28	39	1207	15	31	1108	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	30	42	1312	16	34	1204	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh)							
Upstream signal (ft)			916				
pX, platoon unblocked	0.77	0.77			0.77		
vC, conflicting volume	1990	664			1328		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1689	0			829		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	51	95			94		
cM capacity (veh/h)	61	835			615		

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	30	42	875	453	34	602	602
Volume Left	30	0	0	0	34	0	0
Volume Right	0	42	0	16	0	0	0
cSH	61	835	1700	1700	615	1700	1700
Volume to Capacity	0.49	0.05	0.51	0.27	0.06	0.35	0.35
Queue Length 95th (ft)	48	4	0	0	4	0	0
Control Delay (s)	110.1	9.5	0.0	0.0	11.2	0.0	0.0
Lane LOS	F	A			B		
Approach Delay (s)	51.4		0.0		0.3		
Approach LOS	F						

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	350	781	97	220	490	132	181	774	119	183	868	165
Future Volume (vph)	350	781	97	220	490	132	181	774	119	183	868	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.98		1.00	0.97		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5001		1770	4924		1770	3469		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	5001		1770	4924		1770	3469		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	380	849	105	239	533	143	197	841	129	199	943	179
RTOR Reduction (vph)	0	17	0	0	55	0	0	13	0	0	0	84
Lane Group Flow (vph)	380	937	0	239	621	0	197	957	0	199	943	95
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	20.0	20.3		14.9	15.2		11.0	27.0		11.0	27.0	27.0
Effective Green, g (s)	20.0	20.3		14.9	15.2		11.0	27.0		11.0	27.0	27.0
Actuated g/C Ratio	0.22	0.23		0.17	0.17		0.12	0.30		0.12	0.30	0.30
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	396	1138		295	839		218	1050		218	1071	479
v/s Ratio Prot	c0.21	0.19		c0.14	0.13		0.11	c0.28		c0.11	0.27	
v/s Ratio Perm												0.06
v/c Ratio	0.96	0.82		0.81	0.74		0.90	0.91		0.91	0.88	0.20
Uniform Delay, d1	34.2	32.7		35.8	35.1		38.6	29.9		38.6	29.6	23.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	34.4	4.9		15.4	3.5		35.7	13.2		37.7	10.4	0.9
Delay (s)	68.6	37.7		51.1	38.7		74.3	43.2		76.4	39.9	24.0
Level of Service	E	D		D	D		E	D		E	D	C
Approach Delay (s)		46.5			41.9			48.4			43.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	45.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	89.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	6	33	85	21	78	38	808	73	55	587	40
Future Volume (vph)	25	6	33	85	21	78	38	808	73	55	587	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.93			0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1701			1716		1770	3539	1583	1770	3539	1583
Flt Permitted		0.87			0.83		0.41	1.00	1.00	0.30	1.00	1.00
Satd. Flow (perm)		1507			1459		758	3539	1583	563	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	7	36	92	23	85	41	878	79	60	638	43
RTOR Reduction (vph)	0	29	0	0	53	0	0	0	27	0	0	14
Lane Group Flow (vph)	0	41	0	0	147	0	41	878	52	60	638	29
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		10.5			10.5		36.4	36.4	36.4	36.4	36.4	36.4
Effective Green, g (s)		10.5			10.5		36.4	36.4	36.4	36.4	36.4	36.4
Actuated g/C Ratio		0.19			0.19		0.66	0.66	0.66	0.66	0.66	0.66
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		288			279		502	2346	1049	373	2346	1049
v/s Ratio Prot								c0.25			0.18	
v/s Ratio Perm		0.03			c0.10		0.05		0.03	0.11		0.02
v/c Ratio		0.14			0.53		0.08	0.37	0.05	0.16	0.27	0.03
Uniform Delay, d1		18.5			20.0		3.3	4.1	3.2	3.5	3.8	3.2
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.2			1.8		0.3	0.5	0.1	0.9	0.3	0.0
Delay (s)		18.7			21.8		3.6	4.6	3.3	4.4	4.1	3.2
Level of Service		B			C		A	A	A	A	A	A
Approach Delay (s)		18.7			21.8			4.5			4.1	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	54.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	83	473	476	29	22	43
Future Volume (Veh/h)	83	473	476	29	22	43
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	90	514	517	32	24	47
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	549				1227	533
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	549				1227	533
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				87	91
cM capacity (veh/h)	1021				180	547

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	604	549	71
Volume Left	90	0	24
Volume Right	0	32	47
cSH	1021	1700	531
Volume to Capacity	0.09	0.32	0.13
Queue Length 95th (ft)	7	0	11
Control Delay (s)	2.3	0.0	17.6
Lane LOS	A		C
Approach Delay (s)	2.3	0.0	17.6
Approach LOS			C

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	25	48	68	10	16	91
Future Volume (Veh/h)	25	48	68	10	16	91
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	52	74	11	17	99
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	212	80			85	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	212	80			85	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	95			99	
cM capacity (veh/h)	767	981			1512	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	79	85	116
Volume Left	27	0	17
Volume Right	52	11	0
cSH	896	1700	1512
Volume to Capacity	0.09	0.05	0.01
Queue Length 95th (ft)	7	0	1
Control Delay (s)	9.4	0.0	1.2
Lane LOS	A		A
Approach Delay (s)	9.4	0.0	1.2
Approach LOS	A		

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	23.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	6	6	15	54	6
Future Volume (Veh/h)	0	6	6	15	54	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	7	7	16	59	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	23				22	15
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	23				22	15
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				94	99
cM capacity (veh/h)	1592				995	1065

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	7	23	66
Volume Left	0	0	59
Volume Right	0	16	7
cSH	1592	1700	1002
Volume to Capacity	0.00	0.01	0.07
Queue Length 95th (ft)	0	0	5
Control Delay (s)	0.0	0.0	8.8
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.8
Approach LOS			A

Intersection Summary			
Average Delay	6.1		
Intersection Capacity Utilization	13.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	733	7	19	486	26	14	0	59	17	0	17
Future Volume (Veh/h)	27	733	7	19	486	26	14	0	59	17	0	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	797	8	21	528	28	15	0	64	18	0	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (ft)					644							
pX, platoon unblocked	0.90						0.90	0.90		0.90	0.90	0.90
vC, conflicting volume	556			805			1447	1457	801	1489	1433	528
vC1, stage 1 conf vol							859	859		570	570	
vC2, stage 2 conf vol							588	598		919	863	
vCu, unblocked vol	446			805			1441	1452	801	1488	1425	415
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			97			95	100	83	92	100	97
cM capacity (veh/h)	998			819			279	294	384	220	292	571

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	29	805	21	528	28	79	36
Volume Left	29	0	21	0	0	15	18
Volume Right	0	8	0	0	28	64	18
cSH	998	1700	819	1700	1700	359	318
Volume to Capacity	0.03	0.47	0.03	0.31	0.02	0.22	0.11
Queue Length 95th (ft)	2	0	2	0	0	21	9
Control Delay (s)	8.7	0.0	9.5	0.0	0.0	17.9	17.8
Lane LOS	A		A			C	C
Approach Delay (s)	0.3		0.3			17.9	17.8
Approach LOS						C	C

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	507	32	0	29
Future Vol, veh/h	0	0	507	32	0	29
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	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	551	35	0	32

Major/Minor	Major2		Minor2	
Conflicting Flow All	-	0	-	293
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	600
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	600
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	SB
HCM Control Delay, s	0	11.3
HCM LOS		B

Minor Lane/Major Mvmt	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	600
HCM Lane V/C Ratio	-	-	0.053
HCM Control Delay (s)	-	-	11.3
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	78	0	0	24	0	1039	1	0	830	21
Future Volume (Veh/h)	0	0	78	0	0	24	0	1039	1	0	830	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	85	0	0	26	0	1129	1	0	902	23
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											551	
pX, platoon unblocked	0.86	0.86	0.86	0.86	0.86		0.86					
vC, conflicting volume	1504	2044	462	1666	2054	565	925			1130		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1257	1886	44	1446	1899	565	583			1130		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	90	100	100	94	100			100		
cM capacity (veh/h)	103	60	872	72	59	468	848			614		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	85	26	753	377	601	324
Volume Left	0	0	0	0	0	0
Volume Right	85	26	0	1	0	23
cSH	872	468	1700	1700	1700	1700
Volume to Capacity	0.10	0.06	0.44	0.22	0.35	0.19
Queue Length 95th (ft)	8	4	0	0	0	0
Control Delay (s)	9.6	13.1	0.0	0.0	0.0	0.0
Lane LOS	A	B				
Approach Delay (s)	9.6	13.1	0.0		0.0	
Approach LOS	A	B				

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	38.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	788	21	164	514	17	27
Future Volume (Veh/h)	788	21	164	514	17	27
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	857	23	178	559	18	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)				503		
pX, platoon unblocked					0.85	
vC, conflicting volume			880		1784	868
vC1, stage 1 conf vol					868	
vC2, stage 2 conf vol					915	
vCu, unblocked vol			880		1832	868
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			77		92	92
cM capacity (veh/h)			768		233	352

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	880	178	559	47
Volume Left	0	178	0	18
Volume Right	23	0	0	29
cSH	1700	768	1700	294
Volume to Capacity	0.52	0.23	0.33	0.16
Queue Length 95th (ft)	0	22	0	14
Control Delay (s)	0.0	11.1	0.0	19.5
Lane LOS		B		C
Approach Delay (s)	0.0	2.7		19.5
Approach LOS				C

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	26	23	1002	893	5
Future Volume (Veh/h)	0	26	23	1002	893	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	28	25	1089	971	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				739		
pX, platoon unblocked	0.79					
vC, conflicting volume	1568	488	976			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1177	488	976			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	95	96			
cM capacity (veh/h)	139	526	703			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	28	25	544	544	647	329
Volume Left	0	25	0	0	0	0
Volume Right	28	0	0	0	0	5
cSH	526	703	1700	1700	1700	1700
Volume to Capacity	0.05	0.04	0.32	0.32	0.38	0.19
Queue Length 95th (ft)	4	3	0	0	0	0
Control Delay (s)	12.2	10.3	0.0	0.0	0.0	0.0
Lane LOS	B	B				
Approach Delay (s)	12.2	0.2			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	9	11	7	1	5	0	15	10	1	11	1
Future Volume (Veh/h)	0	9	11	7	1	5	0	15	10	1	11	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	10	12	8	1	5	0	16	11	1	12	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	42	42	12	53	36	22	13			27		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	42	42	12	53	36	22	13			27		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	99	99	100	100	100			100		
cM capacity (veh/h)	956	850	1068	926	855	1056	1606			1587		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	22	14	27	14
Volume Left	0	8	0	1
Volume Right	12	5	11	1
cSH	956	963	1606	1587
Volume to Capacity	0.02	0.01	0.00	0.00
Queue Length 95th (ft)	2	1	0	0
Control Delay (s)	8.9	8.8	0.0	0.5
Lane LOS	A	A		A
Approach Delay (s)	8.9	8.8	0.0	0.5
Approach LOS	A	A		

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	17.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	1150	19	20	505	11	23	0	23	18	0	28
Future Volume (Veh/h)	17	1150	19	20	505	11	23	0	23	18	0	28
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	1250	21	22	549	12	25	0	25	20	0	30
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	561			1271			1645	1902	427	1077	1906	280
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	561			1271			1645	1902	427	1077	1906	280
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			96			58	100	96	87	100	96
cM capacity (veh/h)	1006			542			60	64	576	159	64	717

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	18	500	500	271	22	366	195	50	50
Volume Left	18	0	0	0	22	0	0	25	20
Volume Right	0	0	0	21	0	0	12	25	30
cSH	1006	1700	1700	1700	542	1700	1700	109	298
Volume to Capacity	0.02	0.29	0.29	0.16	0.04	0.22	0.11	0.46	0.17
Queue Length 95th (ft)	1	0	0	0	3	0	0	50	15
Control Delay (s)	8.6	0.0	0.0	0.0	11.9	0.0	0.0	63.6	19.5
Lane LOS	A				B			F	C
Approach Delay (s)	0.1				0.4			63.6	19.5
Approach LOS								F	C

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

2035 Phase 1 AM Peak Hour LOS Worksheets

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	330	72	180	191	65	399
Future Volume (vph)	330	72	180	191	65	399
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5			4.5
Lane Util. Factor	0.97	1.00	0.95			0.95
Frt	1.00	0.85	0.92			1.00
Flt Protected	0.95	1.00	1.00			0.99
Satd. Flow (prot)	3433	1583	3266			3515
Flt Permitted	0.95	1.00	1.00			0.85
Satd. Flow (perm)	3433	1583	3266			3011
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	359	78	196	208	71	434
RTOR Reduction (vph)	0	55	125	0	0	0
Lane Group Flow (vph)	359	23	279	0	0	505
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	8.7	8.7	11.7			11.7
Effective Green, g (s)	8.7	8.7	11.7			11.7
Actuated g/C Ratio	0.30	0.30	0.40			0.40
Clearance Time (s)	4.5	4.5	4.5			4.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	1015	468	1299			1198
v/s Ratio Prot	c0.10		0.09			
v/s Ratio Perm		0.01				c0.17
v/c Ratio	0.35	0.05	0.21			0.42
Uniform Delay, d1	8.1	7.4	5.8			6.4
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.2	0.0	0.1			0.2
Delay (s)	8.4	7.4	5.9			6.6
Level of Service	A	A	A			A
Approach Delay (s)	8.2		5.9			6.6
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	29.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	209	172	118	627	34	171	297	138	135	436	169
Future Volume (vph)	80	209	172	118	627	34	171	297	138	135	436	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.93		1.00	0.99		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3299		1770	3512		1770	3371		1770	3391	
Flt Permitted	0.25	1.00		0.48	1.00		0.38	1.00		0.48	1.00	
Satd. Flow (perm)	463	3299		898	3512		703	3371		896	3391	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	227	187	128	682	37	186	323	150	147	474	184
RTOR Reduction (vph)	0	129	0	0	7	0	0	70	0	0	35	0
Lane Group Flow (vph)	87	285	0	128	712	0	186	403	0	147	623	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.6	17.6		17.6	17.6		30.6	30.6		30.6	30.6	
Effective Green, g (s)	17.6	17.6		17.6	17.6		30.6	30.6		30.6	30.6	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.53	0.53		0.53	0.53	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	142	1015		276	1080		376	1803		479	1814	
v/s Ratio Prot		0.09			c0.20			0.12			0.18	
v/s Ratio Perm	0.19			0.14			c0.26			0.16		
v/c Ratio	0.61	0.28		0.46	0.66		0.49	0.22		0.31	0.34	
Uniform Delay, d1	16.9	15.0		16.0	17.2		8.4	7.0		7.4	7.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.6	0.2		1.2	1.5		4.6	0.3		1.7	0.5	
Delay (s)	24.5	15.2		17.2	18.7		13.0	7.3		9.1	8.1	
Level of Service	C	B		B	B		B	A		A	A	
Approach Delay (s)		16.8			18.4			8.9			8.3	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	57.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	358	100	266	541	107	134	603	235	105	476	103
Future Volume (vph)	66	358	100	266	541	107	134	603	235	105	476	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3423		1770	3452		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3423		1770	3452		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	389	109	289	588	116	146	655	255	114	517	112
RTOR Reduction (vph)	0	32	0	0	20	0	0	0	183	0	0	83
Lane Group Flow (vph)	72	466	0	289	684	0	146	655	72	114	517	29
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	6.5	16.3		15.2	25.0		8.4	22.1	22.1	6.4	20.1	20.1
Effective Green, g (s)	6.5	16.3		15.2	25.0		8.4	22.1	22.1	6.4	20.1	20.1
Actuated g/C Ratio	0.08	0.21		0.19	0.32		0.11	0.28	0.28	0.08	0.26	0.26
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	147	715		344	1106		190	1002	448	145	911	407
v/s Ratio Prot	0.04	0.14		c0.16	c0.20		c0.08	c0.19		0.06	0.15	
v/s Ratio Perm									0.05			0.02
v/c Ratio	0.49	0.65		0.84	0.62		0.77	0.65	0.16	0.79	0.57	0.07
Uniform Delay, d1	34.2	28.2		30.2	22.5		33.9	24.6	21.0	35.1	25.2	21.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.6	2.1		16.6	1.0		16.9	3.3	0.8	23.9	2.6	0.3
Delay (s)	36.7	30.4		46.8	23.5		50.7	27.9	21.8	59.0	27.7	22.2
Level of Service	D	C		D	C		D	C	C	E	C	C
Approach Delay (s)		31.2			30.3			29.6			31.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	133	57	117	32	29	235
Future Volume (Veh/h)	133	57	117	32	29	235
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	145	62	127	35	32	255
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						1253
pX, platoon unblocked						
vC, conflicting volume	464	144			162	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	464	144			162	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	73	93			98	
cM capacity (veh/h)	544	903			1417	

Direction, Lane #	NW 1	NE 1	SW 1
Volume Total	207	162	287
Volume Left	145	0	32
Volume Right	62	35	0
cSH	618	1700	1417
Volume to Capacity	0.34	0.10	0.02
Queue Length 95th (ft)	37	0	2
Control Delay (s)	13.7	0.0	1.0
Lane LOS	B		A
Approach Delay (s)	13.7	0.0	1.0
Approach LOS	B		

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	504	10	10	1342	152	9	57	11	21	32	52
Future Volume (vph)	46	504	10	10	1342	152	9	57	11	21	32	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.98			0.98			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	3529		1770	3485			1816			1721	
Flt Permitted	0.95	1.00		0.95	1.00			0.97			0.94	
Satd. Flow (perm)	1770	3529		1770	3485			1769			1634	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	548	11	11	1459	165	10	62	12	23	35	57
RTOR Reduction (vph)	0	2	0	0	10	0	0	7	0	0	42	0
Lane Group Flow (vph)	50	557	0	11	1614	0	0	77	0	0	73	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	3.2	43.6		1.0	41.4			19.7			19.7	
Effective Green, g (s)	3.2	43.6		1.0	41.4			19.7			19.7	
Actuated g/C Ratio	0.04	0.56		0.01	0.54			0.25			0.25	
Clearance Time (s)	4.0	4.5		4.0	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	73	1990		22	1866			450			416	
v/s Ratio Prot	c0.03	0.16		0.01	c0.46							
v/s Ratio Perm								0.04			c0.04	
v/c Ratio	0.68	0.28		0.50	0.86			0.17			0.17	
Uniform Delay, d1	36.6	8.7		37.9	15.5			22.4			22.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	23.4	0.1		16.8	4.5			0.8			0.9	
Delay (s)	59.9	8.8		54.7	20.0			23.3			23.4	
Level of Service	E	A		D	B			C			C	
Approach Delay (s)		13.0			20.2			23.3			23.4	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	77.3	Sum of lost time (s)	13.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	346	101	71	813	76	60	104	32	34	110	69
Future Volume (vph)	23	346	101	71	813	76	60	104	32	34	110	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.97		1.00	0.99			0.98			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1770	3419		1770	3494			1794			1767	
Flt Permitted	0.19	1.00		0.46	1.00			0.86			0.93	
Satd. Flow (perm)	345	3419		849	3494			1560			1664	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	376	110	77	884	83	65	113	35	37	120	75
RTOR Reduction (vph)	0	49	0	0	13	0	0	11	0	0	27	0
Lane Group Flow (vph)	25	437	0	77	954	0	0	202	0	0	205	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	22.4	22.4		22.4	22.4			23.7			23.7	
Effective Green, g (s)	22.4	22.4		22.4	22.4			23.7			23.7	
Actuated g/C Ratio	0.41	0.41		0.41	0.41			0.43			0.43	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	140	1389		345	1420			670			715	
v/s Ratio Prot		0.13			c0.27							
v/s Ratio Perm	0.07			0.09				c0.13			0.12	
v/c Ratio	0.18	0.31		0.22	0.67			0.30			0.29	
Uniform Delay, d1	10.5	11.1		10.7	13.3			10.3			10.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.6	0.1		0.3	1.3			1.2			1.0	
Delay (s)	11.1	11.3		11.0	14.6			11.4			11.2	
Level of Service	B	B		B	B			B			B	
Approach Delay (s)		11.2			14.3			11.4			11.2	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	55.1	Sum of lost time (s)	9.0
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	63	16	34	88	284	100
Future Volume (Veh/h)	63	16	34	88	284	100
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	68	17	37	96	309	109
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1274		
pX, platoon unblocked						
vC, conflicting volume	534	364	418			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	534	364	418			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	98	97			
cM capacity (veh/h)	491	681	1141			

Direction, Lane #	SE 1	NE 1	SW 1
Volume Total	85	133	418
Volume Left	68	37	0
Volume Right	17	0	109
cSH	520	1141	1700
Volume to Capacity	0.16	0.03	0.25
Queue Length 95th (ft)	15	3	0
Control Delay (s)	13.3	2.5	0.0
Lane LOS	B	A	
Approach Delay (s)	13.3	2.5	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	332	72	158	695	60	186	183	34	57	194	63
Future Volume (vph)	27	332	72	158	695	60	186	183	34	57	194	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3445		1770	3497		1770	1863	1583	1770	1863	1583
Flt Permitted	0.24	1.00		0.32	1.00		0.48	1.00	1.00	0.63	1.00	1.00
Satd. Flow (perm)	441	3445		591	3497		903	1863	1583	1179	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	361	78	172	755	65	202	199	37	62	211	68
RTOR Reduction (vph)	0	27	0	0	9	0	0	0	24	0	0	47
Lane Group Flow (vph)	29	412	0	172	811	0	202	199	13	62	211	21
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	18.8	16.9		28.5	22.1		31.1	24.6	24.6	23.9	21.0	21.0
Effective Green, g (s)	18.8	16.9		28.5	22.1		31.1	24.6	24.6	23.9	21.0	21.0
Actuated g/C Ratio	0.27	0.24		0.41	0.32		0.45	0.35	0.35	0.34	0.30	0.30
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	155	837		362	1111		485	659	560	430	562	478
v/s Ratio Prot	0.01	0.12		c0.05	c0.23		c0.04	0.11		0.01	0.11	
v/s Ratio Perm	0.05			0.15			c0.15		0.01	0.04		0.01
v/c Ratio	0.19	0.49		0.48	0.73		0.42	0.30	0.02	0.14	0.38	0.04
Uniform Delay, d1	19.0	22.6		13.9	21.1		12.2	16.2	14.6	15.5	19.1	17.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.5		1.0	2.5		0.6	1.2	0.1	0.2	1.9	0.2
Delay (s)	19.6	23.1		14.9	23.6		12.8	17.4	14.7	15.7	21.0	17.3
Level of Service	B	C		B	C		B	B	B	B	C	B
Approach Delay (s)		22.9			22.1			15.1			19.3	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	69.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Sign Control		Stop			Stop			Stop		Stop		
Traffic Volume (vph)	30	23	86	26	61	44	30	309	33	59	440	3
Future Volume (vph)	30	23	86	26	61	44	30	309	33	59	440	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	25	93	28	66	48	33	336	36	64	478	3

Direction, Lane #	EB 1	WB 1	SB 1	SB 2	NW 1	NW 2
Volume Total (vph)	151	142	201	204	303	242
Volume Left (vph)	33	28	33	0	64	0
Volume Right (vph)	93	48	0	36	0	3
Hadj (s)	-0.29	-0.13	0.12	-0.09	0.14	0.03
Departure Headway (s)	6.2	6.3	6.4	6.2	6.2	6.1
Degree Utilization, x	0.26	0.25	0.36	0.35	0.52	0.41
Capacity (veh/h)	527	511	539	558	556	573
Control Delay (s)	11.3	11.4	11.6	11.2	14.5	12.0
Approach Delay (s)	11.3	11.4	11.4		13.4	
Approach LOS	B	B	B		B	

Intersection Summary			
Delay	12.3		
Level of Service	B		
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	492	11	260	1173	270	135	575	363	104	345	44
Future Volume (vph)	36	492	11	260	1173	270	135	575	363	104	345	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3479	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3479	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	535	12	283	1275	293	147	625	395	113	375	48
RTOR Reduction (vph)	0	0	9	0	0	134	0	0	46	0	12	0
Lane Group Flow (vph)	39	535	3	283	1275	159	147	625	349	113	411	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	2.9	19.0	19.0	15.3	31.4	31.4	7.6	20.1	35.4	6.5	19.0	
Effective Green, g (s)	2.9	19.0	19.0	15.3	31.4	31.4	7.6	20.1	35.4	6.5	19.0	
Actuated g/C Ratio	0.04	0.24	0.24	0.19	0.40	0.40	0.10	0.25	0.45	0.08	0.24	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	65	852	381	343	1408	629	170	901	800	145	837	
v/s Ratio Prot	0.02	0.15		c0.16	c0.36		c0.08	c0.18	0.08	0.06	0.12	
v/s Ratio Perm			0.00			0.10			0.14			
v/c Ratio	0.60	0.63	0.01	0.83	0.91	0.25	0.86	0.69	0.44	0.78	0.49	
Uniform Delay, d1	37.4	26.8	22.8	30.5	22.4	15.9	35.1	26.6	14.9	35.5	25.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	14.0	1.5	0.0	14.8	8.6	0.2	33.8	4.4	0.4	22.8	2.1	
Delay (s)	51.5	28.2	22.8	45.3	30.9	16.1	68.9	31.0	15.3	58.3	27.8	
Level of Service	D	C	C	D	C	B	E	C	B	E	C	
Approach Delay (s)		29.7			30.8			30.5			34.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	31.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	78.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	5	13	39	10	29	7	77	15	8	110	5
Future Volume (vph)	5	5	13	39	10	29	7	77	15	8	110	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	14	42	11	32	8	84	16	9	120	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	24	85	108	134
Volume Left (vph)	5	42	8	9
Volume Right (vph)	14	32	16	5
Hadj (s)	-0.27	-0.09	-0.04	0.03
Departure Headway (s)	4.3	4.4	4.3	4.3
Degree Utilization, x	0.03	0.10	0.13	0.16
Capacity (veh/h)	789	769	813	804
Control Delay (s)	7.4	7.9	7.9	8.1
Approach Delay (s)	7.4	7.9	7.9	8.1
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.9		
Level of Service	A		
Intersection Capacity Utilization	24.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	869	27	83	1583	24	47	22	57	45	24	93
Future Volume (vph)	115	869	27	83	1583	24	47	22	57	45	24	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		0.91	0.91			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.94			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1770	3523		1610	3382			1717			1695	
Flt Permitted	0.95	1.00		0.95	0.95			0.65			0.80	
Satd. Flow (perm)	1770	3523		1610	3213			1135			1370	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	945	29	90	1721	26	51	24	62	49	26	101
RTOR Reduction (vph)	0	1	0	0	1	0	0	20	0	0	33	0
Lane Group Flow (vph)	125	973	0	81	1755	0	0	117	0	0	143	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	11.5	102.6		12.4	115.9			21.5			21.5	
Effective Green, g (s)	11.5	102.6		12.4	115.9			21.5			21.5	
Actuated g/C Ratio	0.08	0.68		0.08	0.77			0.14			0.14	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	135	2409		133	2496			162			196	
v/s Ratio Prot	c0.07	0.28		0.05	0.06							
v/s Ratio Perm					c0.49			0.10			c0.10	
v/c Ratio	0.93	0.40		0.61	0.70			0.72			0.73	
Uniform Delay, d1	68.8	10.3		66.5	8.5			61.4			61.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	54.9	0.1		7.7	0.9			24.4			21.3	
Delay (s)	123.7	10.5		74.1	9.4			85.8			82.8	
Level of Service	F	B		E	A			F			F	
Approach Delay (s)		23.3			12.3			85.8			82.8	
Approach LOS		C			B			F			F	

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	91.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	13	17	4	6	5	9	73	3	9	124	6
Future Volume (Veh/h)	2	13	17	4	6	5	9	73	3	9	124	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	14	18	4	7	5	10	79	3	10	135	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								564				
pX, platoon unblocked												
vC, conflicting volume	268	260	138	284	262	80	142			82		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	268	260	138	284	262	80	142			82		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	98	99	99	99	99			99		
cM capacity (veh/h)	669	635	910	637	634	980	1441			1515		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	34	16	92	152
Volume Left	2	4	10	10
Volume Right	18	5	3	7
cSH	759	714	1441	1515
Volume to Capacity	0.04	0.02	0.01	0.01
Queue Length 95th (ft)	4	2	1	0
Control Delay (s)	10.0	10.2	0.9	0.5
Lane LOS	A	B	A	A
Approach Delay (s)	10.0	10.2	0.9	0.5
Approach LOS	A	B		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	18.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	856	7	18	1664	40	11	3	6	86	1	70
Future Volume (vph)	46	856	7	18	1664	40	11	3	6	86	1	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.96			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.97	
Satd. Flow (prot)	1770	3535		1770	3527			1735			1704	
Flt Permitted	0.95	1.00		0.95	1.00			0.86			0.82	
Satd. Flow (perm)	1770	3535		1770	3527			1526			1437	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	930	8	20	1809	43	12	3	7	93	1	76
RTOR Reduction (vph)	0	1	0	0	2	0	0	5	0	0	36	0
Lane Group Flow (vph)	50	937	0	20	1850	0	0	17	0	0	134	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	3.0	44.8		1.9	43.7			18.6			18.6	
Effective Green, g (s)	3.0	44.8		1.9	43.7			18.6			18.6	
Actuated g/C Ratio	0.04	0.57		0.02	0.55			0.24			0.24	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	67	2009		42	1955			360			339	
v/s Ratio Prot	c0.03	0.27		0.01	c0.52							
v/s Ratio Perm								0.01			c0.09	
v/c Ratio	0.75	0.47		0.48	0.95			0.05			0.40	
Uniform Delay, d1	37.5	10.0		38.0	16.5			23.2			25.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	35.8	0.2		8.3	10.3			0.2			3.4	
Delay (s)	73.4	10.2		46.2	26.8			23.5			28.8	
Level of Service	E	B		D	C			C			C	
Approach Delay (s)		13.4			27.0			23.5			28.8	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	78.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	23	9	8	11	0	1	99	2	7	119	0
Future Volume (Veh/h)	1	23	9	8	11	0	1	99	2	7	119	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	25	10	9	12	0	1	108	2	8	129	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								560				
pX, platoon unblocked												
vC, conflicting volume	262	257	129	278	256	109	129			110		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	262	257	129	278	256	109	129			110		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	96	99	99	98	100	100			99		
cM capacity (veh/h)	678	643	921	644	644	945	1457			1480		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	36	21	111	137
Volume Left	1	9	1	8
Volume Right	10	0	2	0
cSH	703	644	1457	1480
Volume to Capacity	0.05	0.03	0.00	0.01
Queue Length 95th (ft)	4	3	0	0
Control Delay (s)	10.4	10.8	0.1	0.5
Lane LOS	B	B	A	A
Approach Delay (s)	10.4	10.8	0.1	0.5
Approach LOS	B	B		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	22.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	821	24	23	1621	36	26	5	13	62	7	67
Future Volume (vph)	52	821	24	23	1621	36	26	5	13	62	7	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.96			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.98	
Satd. Flow (prot)	1770	3524		1770	3528			1736			1700	
Flt Permitted	0.95	1.00		0.95	1.00			0.81			0.85	
Satd. Flow (perm)	1770	3524		1770	3528			1451			1474	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	892	26	25	1762	39	28	5	14	67	8	73
RTOR Reduction (vph)	0	2	0	0	2	0	0	11	0	0	43	0
Lane Group Flow (vph)	57	916	0	25	1799	0	0	36	0	0	105	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	3.0	44.5		2.1	43.6			18.8			18.8	
Effective Green, g (s)	3.0	44.5		2.1	43.6			18.8			18.8	
Actuated g/C Ratio	0.04	0.56		0.03	0.55			0.24			0.24	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	67	1987		47	1949			345			351	
v/s Ratio Prot	c0.03	0.26		0.01	c0.51							
v/s Ratio Perm								0.03			c0.07	
v/c Ratio	0.85	0.46		0.53	0.92			0.11			0.30	
Uniform Delay, d1	37.7	10.1		37.9	16.1			23.5			24.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	61.0	0.2		11.1	7.9			0.6			2.2	
Delay (s)	98.7	10.3		49.0	24.0			24.1			26.8	
Level of Service	F	B		D	C			C			C	
Approach Delay (s)		15.5			24.3			24.1			26.8	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	78.9	Sum of lost time (s)	13.5
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	5	28	12	25	10	9	323	3	7	565	2
Future Volume (Veh/h)	13	5	28	12	25	10	9	323	3	7	565	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	5	30	13	27	11	10	351	3	8	614	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								542				
pX, platoon unblocked												
vC, conflicting volume	851	1005	308	728	1004	177	616			354		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	851	1005	308	728	1004	177	616			354		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	98	96	96	89	99	99			99		
cM capacity (veh/h)	225	236	688	289	236	835	960			1201		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	49	51	186	178	315	309
Volume Left	14	13	10	0	8	0
Volume Right	30	11	0	3	0	2
cSH	386	296	960	1700	1201	1700
Volume to Capacity	0.13	0.17	0.01	0.10	0.01	0.18
Queue Length 95th (ft)	11	15	1	0	1	0
Control Delay (s)	15.7	19.7	0.6	0.0	0.3	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	15.7	19.7	0.3		0.1	
Approach LOS	C	C				

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	31.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	124	821	1388	185	384	189
Future Volume (vph)	124	821	1388	185	384	189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.95	0.95		0.97	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3477		3433	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3477		3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	135	892	1509	201	417	205
RTOR Reduction (vph)	0	0	11	0	0	156
Lane Group Flow (vph)	135	892	1699	0	417	49
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	9.2	61.0	47.3		19.5	19.5
Effective Green, g (s)	9.2	61.0	47.3		19.5	19.5
Actuated g/C Ratio	0.10	0.68	0.53		0.22	0.22
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	181	2412	1837		747	344
v/s Ratio Prot	c0.08	0.25	c0.49		c0.12	
v/s Ratio Perm						0.03
v/c Ratio	0.75	0.37	0.92		0.56	0.14
Uniform Delay, d1	39.0	6.1	19.5		31.2	28.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	15.3	0.1	8.4		3.0	0.9
Delay (s)	54.4	6.2	27.9		34.2	29.1
Level of Service	D	A	C		C	C
Approach Delay (s)		12.5	27.9		32.5	
Approach LOS		B	C		C	

Intersection Summary			
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	89.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	353	402	551	213	720	974
Future Volume (vph)	353	402	551	213	720	974
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	0.97	1.00	0.91		0.97	0.95
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3090	1425	4385		3090	3185
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3090	1425	4385		3090	3185
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	384	437	599	232	783	1059
RTOR Reduction (vph)	0	346	98	0	0	0
Lane Group Flow (vph)	384	91	733	0	783	1059
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	13.7	13.7	18.1		20.5	43.1
Effective Green, g (s)	13.7	13.7	18.1		20.5	43.1
Actuated g/C Ratio	0.21	0.21	0.28		0.31	0.66
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	643	296	1206		962	2086
v/s Ratio Prot	c0.12		c0.17		c0.25	0.33
v/s Ratio Perm		0.06				
v/c Ratio	0.60	0.31	0.61		0.81	0.51
Uniform Delay, d1	23.6	22.0	20.8		20.9	5.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.5	0.6	2.3		7.5	0.9
Delay (s)	25.1	22.6	23.0		28.4	6.8
Level of Service	C	C	C		C	A
Approach Delay (s)	23.8		23.0			16.0
Approach LOS	C		C			B

Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	65.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	206	93	202	463	36	109
Future Volume (Veh/h)	206	93	202	463	36	109
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	224	101	220	503	39	118
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						1
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			325		1218	274
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			325		1218	274
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			82		76	85
cM capacity (veh/h)			1235		164	764

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	325	723	157
Volume Left	0	220	39
Volume Right	101	0	118
cSH	1700	1235	660
Volume to Capacity	0.19	0.18	0.24
Queue Length 95th (ft)	0	16	23
Control Delay (s)	0.0	4.1	16.3
Lane LOS		A	C
Approach Delay (s)	0.0	4.1	16.3
Approach LOS			C

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	9	284	41	86	492	1	128	8	36	7	11	9
Future Volume (vph)	9	284	41	86	492	1	128	8	36	7	11	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	309	45	93	535	1	139	9	39	8	12	10

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	364	628	1	148	39	30
Volume Left (vph)	10	93	0	139	0	8
Volume Right (vph)	45	0	1	0	39	10
Hadj (s)	-0.03	0.11	-0.67	0.50	-0.67	-0.11
Departure Headway (s)	6.2	6.0	5.2	7.7	6.6	7.7
Degree Utilization, x	0.63	1.04	0.00	0.32	0.07	0.06
Capacity (veh/h)	565	599	680	451	526	429
Control Delay (s)	19.2	70.9	7.0	13.1	8.9	11.2
Approach Delay (s)	19.2	70.8		12.2		11.2
Approach LOS	C	F		B		B

Intersection Summary			
Delay	44.8		
Level of Service	E		
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	225	2	82	6	0	2	47	501	6	38	799	395
Future Volume (vph)	225	2	82	6	0	2	47	501	6	38	799	395
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	0.95	0.95	0.88		1.00		0.97	0.91		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.97		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.96		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1687	2787		1739		3433	5076		1770	3539	1583
Flt Permitted	0.75	0.73	1.00		1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1330	1300	2787		1807		3433	5076		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	245	2	89	7	0	2	51	545	7	41	868	429
RTOR Reduction (vph)	0	0	68	0	9	0	0	1	0	0	0	224
Lane Group Flow (vph)	122	125	21	0	0	0	51	551	0	41	868	205
Turn Type	pm+pt	NA	Perm	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8								6
Actuated Green, G (s)	12.0	12.0	12.0		0.9		1.7	24.4		2.1	24.8	24.8
Effective Green, g (s)	12.0	12.0	12.0		0.9		1.7	24.4		2.1	24.8	24.8
Actuated g/C Ratio	0.23	0.23	0.23		0.02		0.03	0.47		0.04	0.48	0.48
Clearance Time (s)	4.5	4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	351	349	643		31		112	2381		71	1687	754
v/s Ratio Prot	0.04	c0.05					0.01	0.11		c0.02	c0.25	
v/s Ratio Perm	0.04	c0.04	0.01		0.00							0.13
v/c Ratio	0.35	0.36	0.03		0.01		0.46	0.23		0.58	0.51	0.27
Uniform Delay, d1	16.9	16.8	15.5		25.1		24.7	8.2		24.5	9.4	8.2
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	0.6	0.0		0.1		2.9	0.2		10.9	1.1	0.9
Delay (s)	17.5	17.4	15.5		25.2		27.6	8.4		35.4	10.6	9.1
Level of Service	B	B	B		C		C	A		D	B	A
Approach Delay (s)		17.0			25.2			10.1			10.8	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	52.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	34	13	467	758	17
Future Volume (Veh/h)	0	34	13	467	758	17
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	37	14	508	824	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1038	287	
pX, platoon unblocked	0.97	0.97	0.97			
vC, conflicting volume	1115	421	842			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1050	333	768			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	94	98			
cM capacity (veh/h)	211	641	814			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	37	183	339	549	293
Volume Left	0	14	0	0	0
Volume Right	37	0	0	0	18
cSH	641	814	1700	1700	1700
Volume to Capacity	0.06	0.02	0.20	0.32	0.17
Queue Length 95th (ft)	5	1	0	0	0
Control Delay (s)	11.0	0.9	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	11.0	0.3		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	31.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	43	60	0	901	78	16	732
Future Volume (vph)	43	60	0	901	78	16	732
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5		4.5	4.5
Lane Util. Factor	1.00			0.91		1.00	0.91
Frt	0.92			0.99		1.00	1.00
Flt Protected	0.98			1.00		0.95	1.00
Satd. Flow (prot)	1682			5024		1770	5085
Flt Permitted	0.98			1.00		0.95	1.00
Satd. Flow (perm)	1682			5024		1770	5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	47	65	0	979	85	17	796
RTOR Reduction (vph)	58	0	0	11	0	0	0
Lane Group Flow (vph)	54	0	0	1053	0	17	796
Turn Type	Prot		Prot	NA		Prot	NA
Protected Phases	8		5	2		1	6
Permitted Phases							
Actuated Green, G (s)	5.9			31.1		1.0	36.6
Effective Green, g (s)	5.9			31.1		1.0	36.6
Actuated g/C Ratio	0.11			0.60		0.02	0.71
Clearance Time (s)	4.5			4.5		4.5	4.5
Vehicle Extension (s)	3.0			3.0		3.0	3.0
Lane Grp Cap (vph)	192			3033		34	3613
v/s Ratio Prot	c0.03			c0.21		0.01	c0.16
v/s Ratio Perm							
v/c Ratio	0.28			0.35		0.50	0.22
Uniform Delay, d1	20.9			5.1		25.0	2.6
Progression Factor	1.00			1.00		1.00	1.00
Incremental Delay, d2	0.8			0.3		11.1	0.1
Delay (s)	21.7			5.4		36.1	2.7
Level of Service	C			A		D	A
Approach Delay (s)	21.7			5.4			3.4
Approach LOS	C			A			A

Intersection Summary			
HCM 2000 Control Delay	5.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	51.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	32.7%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Existing to No Build			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	324	155	238	855	118	209	847	229	69	702	84
Future Volume (vph)	84	324	155	238	855	118	209	847	229	69	702	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3475		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3475		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	352	168	259	929	128	227	921	249	75	763	91
RTOR Reduction (vph)	0	0	129	0	13	0	0	0	158	0	0	66
Lane Group Flow (vph)	91	352	39	259	1044	0	227	921	91	75	763	25
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	4.1	18.8	18.8	10.1	24.8		11.5	29.1	29.1	4.0	21.6	21.6
Effective Green, g (s)	4.1	18.8	18.8	10.1	24.8		11.5	29.1	29.1	4.0	21.6	21.6
Actuated g/C Ratio	0.05	0.24	0.24	0.13	0.31		0.14	0.36	0.36	0.05	0.27	0.27
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	90	831	372	433	1077		254	1287	575	88	955	427
v/s Ratio Prot	c0.05	0.10		0.08	c0.30		c0.13	0.26		0.04	c0.22	
v/s Ratio Perm			0.02						0.06			0.02
v/c Ratio	1.01	0.42	0.11	0.60	0.97		0.89	0.72	0.16	0.85	0.80	0.06
Uniform Delay, d1	38.0	26.0	24.0	33.0	27.2		33.6	21.9	17.2	37.7	27.2	21.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	97.9	0.3	0.1	2.2	20.1		30.1	3.4	0.6	50.8	7.0	0.3
Delay (s)	135.9	26.3	24.1	35.3	47.3		63.8	25.3	17.8	88.5	34.1	21.9
Level of Service	F	C	C	D	D		E	C	B	F	C	C
Approach Delay (s)		42.1			45.0			30.2			37.3	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	38.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (veh/h)	9	3	15	6	7	8	10	160	8	7	258	3
Future Volume (Veh/h)	9	3	15	6	7	8	10	160	8	7	258	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	3	16	7	8	9	11	174	9	8	280	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											647	
pX, platoon unblocked												
vC, conflicting volume	511	502	282	516	500	178	283			183		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	511	502	282	516	500	178	283			183		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	99	98	98	98	99	99			99		
cM capacity (veh/h)	457	464	757	453	466	864	1279			1392		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	29	24	194	291
Volume Left	10	7	11	8
Volume Right	16	9	9	3
cSH	586	558	1279	1392
Volume to Capacity	0.05	0.04	0.01	0.01
Queue Length 95th (ft)	4	3	1	0
Control Delay (s)	11.5	11.7	0.5	0.3
Lane LOS	B	B	A	A
Approach Delay (s)	11.5	11.7	0.5	0.3
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	25.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	11	16	7	20	20	450	5	6	396	5
Future Volume (Veh/h)	5	5	11	16	7	20	20	450	5	6	396	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	12	17	8	22	22	489	5	7	430	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											650	
pX, platoon unblocked	0.91	0.91	0.91	0.91	0.91		0.91					
vC, conflicting volume	761	984	432	996	984	247	435			494		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	687	933	325	946	933	247	328			494		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	98	98	91	97	97	98			99		
cM capacity (veh/h)	281	234	609	186	234	753	1116			1066		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	22	47	266	250	442
Volume Left	5	17	22	0	7
Volume Right	12	22	0	5	5
cSH	374	303	1116	1700	1066
Volume to Capacity	0.06	0.15	0.02	0.15	0.01
Queue Length 95th (ft)	5	14	2	0	0
Control Delay (s)	15.2	19.0	0.9	0.0	0.2
Lane LOS	C	C	A		A
Approach Delay (s)	15.2	19.0	0.4		0.2
Approach LOS	C	C			

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	22	13	469	10	0	407
Future Volume (Veh/h)	22	13	469	10	0	407
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	14	510	11	0	442
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			None
Median storage veh)			2			
Upstream signal (ft)			430			
pX, platoon unblocked						
vC, conflicting volume	736	260			521	
vC1, stage 1 conf vol	516					
vC2, stage 2 conf vol	221					
vCu, unblocked vol	736	260			521	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	98			100	
cM capacity (veh/h)	523	738			1041	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	38	340	181	221	221
Volume Left	24	0	0	0	0
Volume Right	14	0	11	0	0
cSH	586	1700	1700	1700	1700
Volume to Capacity	0.06	0.20	0.11	0.13	0.13
Queue Length 95th (ft)	5	0	0	0	0
Control Delay (s)	11.6	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.6	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	23.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Volume (veh/h)	127	10	3	315	313	0
Future Volume (Veh/h)	127	10	3	315	313	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	138	11	3	342	340	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	517	170	340			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	517	170	340			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	72	99	100			
cM capacity (veh/h)	487	844	1216			

Direction, Lane #	WB 1	WB 2	SE 1	SE 2	SE 3	NW 1	NW 2
Volume Total	138	11	3	171	171	170	170
Volume Left	138	0	3	0	0	0	0
Volume Right	0	11	0	0	0	0	0
cSH	487	844	1216	1700	1700	1700	1700
Volume to Capacity	0.28	0.01	0.00	0.10	0.10	0.10	0.10
Queue Length 95th (ft)	29	1	0	0	0	0	0
Control Delay (s)	15.3	9.3	8.0	0.0	0.0	0.0	0.0
Lane LOS	C	A	A				
Approach Delay (s)	14.9		0.1			0.0	
Approach LOS	B						

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	22.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	1	0	37	8	3	0	127	14	5	90	2
Future Volume (Veh/h)	2	1	0	37	8	3	0	127	14	5	90	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	1	0	40	9	3	0	138	15	5	98	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	262	262	99	255	256	146	100			153		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	262	262	99	255	256	146	100			153		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	94	99	100	100			100		
cM capacity (veh/h)	679	641	957	695	646	902	1493			1428		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	3	52	153	105
Volume Left	2	40	0	5
Volume Right	0	3	15	2
cSH	666	695	1700	1428
Volume to Capacity	0.00	0.07	0.09	0.00
Queue Length 95th (ft)	0	6	0	0
Control Delay (s)	10.4	10.6	0.0	0.4
Lane LOS	B	B		A
Approach Delay (s)	10.4	10.6	0.0	0.4
Approach LOS	B	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	19.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	551	47	69	795	40	93
Future Volume (Veh/h)	551	47	69	795	40	93
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	599	51	75	864	43	101
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				647		
pX, platoon unblocked					0.55	
vC, conflicting volume			650		1638	624
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			650		1754	624
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			92		9	79
cM capacity (veh/h)			936		47	485

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	650	939	144
Volume Left	0	75	43
Volume Right	51	0	101
cSH	1700	936	128
Volume to Capacity	0.38	0.08	1.12
Queue Length 95th (ft)	0	7	210
Control Delay (s)	0.0	2.1	182.5
Lane LOS		A	F
Approach Delay (s)	0.0	2.1	182.5
Approach LOS			F

Intersection Summary			
Average Delay	16.3		
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	596	16	20	809	15	25	27	28	6	23	35
Future Volume (vph)	30	596	16	20	809	15	25	27	28	6	23	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			1.00			0.95			0.93	
Flt Protected		1.00			1.00			0.98			1.00	
Satd. Flow (prot)		1852			1856			1748			1718	
Flt Permitted		0.94			0.98			0.88			0.96	
Satd. Flow (perm)		1752			1822			1555			1663	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	648	17	22	879	16	27	29	30	7	25	38
RTOR Reduction (vph)	0	1	0	0	1	0	0	25	0	0	32	0
Lane Group Flow (vph)	0	697	0	0	916	0	0	61	0	0	38	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		30.2			30.2			7.7			7.7	
Effective Green, g (s)		30.2			30.2			7.7			7.7	
Actuated g/C Ratio		0.64			0.64			0.16			0.16	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1128			1173			255			273	
v/s Ratio Prot												
v/s Ratio Perm		0.40			c0.50			c0.04			0.02	
v/c Ratio		0.62			0.78			0.24			0.14	
Uniform Delay, d1		4.9			6.0			17.1			16.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.0			3.5			0.5			0.2	
Delay (s)		6.0			9.4			17.5			17.0	
Level of Service		A			A			B			B	
Approach Delay (s)		6.0			9.4			17.5			17.0	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	46.9	Sum of lost time (s)	9.0
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	179	147	143	437	68	143	297	103	120	487	314
Future Volume (vph)	168	179	147	143	437	68	143	297	103	120	487	314
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.93		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3300		1770	3468		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3300		1770	3468		3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	183	195	160	155	475	74	155	323	112	130	529	341
RTOR Reduction (vph)	0	125	0	0	18	0	0	0	78	0	0	239
Lane Group Flow (vph)	183	230	0	155	531	0	155	323	34	130	529	102
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	7.7	14.2		9.0	15.5		4.2	19.8	19.8	3.8	19.4	19.4
Effective Green, g (s)	7.7	14.2		9.0	15.5		4.2	19.8	19.8	3.8	19.4	19.4
Actuated g/C Ratio	0.12	0.22		0.14	0.24		0.06	0.31	0.31	0.06	0.30	0.30
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	407	723		245	829		222	1081	483	201	1059	473
v/s Ratio Prot	0.05	0.07		c0.09	c0.15		c0.05	0.09		0.04	c0.15	
v/s Ratio Perm									0.02			0.06
v/c Ratio	0.45	0.32		0.63	0.64		0.70	0.30	0.07	0.65	0.50	0.22
Uniform Delay, d1	26.6	21.2		26.3	22.1		29.7	17.2	16.0	29.8	18.7	17.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.3		5.2	1.7		9.2	0.7	0.3	7.0	1.7	1.0
Delay (s)	27.4	21.5		31.6	23.8		38.9	17.9	16.3	36.8	20.4	18.0
Level of Service	C	C		C	C		D	B	B	D	C	B
Approach Delay (s)		23.5			25.5			23.1			21.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	64.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	875	41	172	833	367	17	0	19	175	62	210
Future Volume (vph)	0	875	41	172	833	367	17	0	19	175	62	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		4.5	4.5		4.5		4.5	4.5	4.5	4.5
Lane Util. Factor		0.91		1.00	0.91		0.97		1.00	0.95	0.95	1.00
Frt		0.99		1.00	0.95		1.00		0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.98	1.00
Satd. Flow (prot)		5051		1770	4852		3433		1583	1681	1728	1583
Flt Permitted		1.00		0.95	1.00		0.22		1.00	0.95	0.98	1.00
Satd. Flow (perm)		5051		1770	4852		777		1583	1681	1728	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	951	45	187	905	399	18	0	21	190	67	228
RTOR Reduction (vph)	0	6	0	0	95	0	0	0	16	0	0	192
Lane Group Flow (vph)	0	990	0	187	1209	0	18	0	5	127	130	36
Turn Type		NA		Prot	NA		Perm		Perm	Split	NA	Perm
Protected Phases		4		3	8					6	6	
Permitted Phases							2		2			6
Actuated Green, G (s)		17.8		7.5	29.8		18.6		18.6	11.6	11.6	11.6
Effective Green, g (s)		17.8		7.5	29.8		18.6		18.6	11.6	11.6	11.6
Actuated g/C Ratio		0.24		0.10	0.41		0.25		0.25	0.16	0.16	0.16
Clearance Time (s)		4.5		4.5	4.5		4.5		4.5	4.5	4.5	4.5
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		1223		180	1967		196		400	265	272	249
v/s Ratio Prot		c0.20		c0.11	0.25					c0.08	0.08	
v/s Ratio Perm							c0.02		0.00			0.02
v/c Ratio		0.81		1.04	0.61		0.09		0.01	0.48	0.48	0.14
Uniform Delay, d1		26.3		33.0	17.3		21.0		20.6	28.2	28.2	26.7
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		4.1		77.7	0.6		0.9		0.1	1.4	1.3	0.3
Delay (s)		30.3		110.7	17.9		21.9		20.6	29.6	29.5	26.9
Level of Service		C		F	B		C		C	C	C	C
Approach Delay (s)		30.3			29.5			21.2			28.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	73.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	159	330	463	198	674	41	643	195	188	126	121	292
Future Volume (vph)	159	330	463	198	674	41	643	195	188	126	121	292
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	0.97	0.95	1.00	1.00	0.91		1.00	1.00		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	5041		1770	1726		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	5041		1770	1726		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	173	359	503	215	733	45	699	212	204	137	132	317
RTOR Reduction (vph)	0	0	425	0	6	0	0	30	0	0	0	163
Lane Group Flow (vph)	173	359	78	215	772	0	699	386	0	137	132	154
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4									6
Actuated Green, G (s)	8.0	16.3	16.3	13.8	22.1		42.5	42.5		14.2	14.2	14.2
Effective Green, g (s)	8.0	16.3	16.3	13.8	22.1		42.5	42.5		14.2	14.2	14.2
Actuated g/C Ratio	0.08	0.16	0.16	0.13	0.21		0.41	0.41		0.14	0.14	0.14
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	262	550	246	233	1063		717	699		239	479	214
v/s Ratio Prot	0.05	0.10		c0.12	c0.15		c0.40	0.22		0.08	0.04	
v/s Ratio Perm			0.05									c0.10
v/c Ratio	0.66	0.65	0.32	0.92	0.73		0.97	0.55		0.57	0.28	0.72
Uniform Delay, d1	47.1	41.6	39.3	45.0	38.5		30.6	23.9		42.5	40.7	43.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.1	2.8	0.7	38.3	2.5		28.0	3.1		3.3	0.3	10.9
Delay (s)	53.2	44.4	40.1	83.3	41.0		58.6	27.0		45.8	41.0	54.3
Level of Service	D	D	D	F	D		E	C		D	D	D
Approach Delay (s)		43.8			50.2			46.8			49.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	47.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	104.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	45	65	22	56	1	42	42	12	0	4	2
Future Volume (vph)	0	45	65	22	56	1	42	42	12	0	4	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	49	71	24	61	1	46	46	13	0	4	2

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	120	86	105	6
Volume Left (vph)	0	24	46	0
Volume Right (vph)	71	1	13	2
Hadj (s)	-0.32	0.08	0.05	-0.17
Departure Headway (s)	3.9	4.4	4.4	4.3
Degree Utilization, x	0.13	0.10	0.13	0.01
Capacity (veh/h)	884	798	778	779
Control Delay (s)	7.5	7.9	8.0	7.3
Approach Delay (s)	7.5	7.9	8.0	7.3
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.8		
Level of Service	A		
Intersection Capacity Utilization	29.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
27: Eucla Ave & Second St

03/15/2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	11	1	62	8	9	141
Future Volume (Veh/h)	11	1	62	8	9	141
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	1	67	9	10	153
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			749			
pX, platoon unblocked						
vC, conflicting volume	244	72			76	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	244	72			76	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			99	
cM capacity (veh/h)	739	991			1523	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	13	76	163
Volume Left	12	0	10
Volume Right	1	9	0
cSH	754	1700	1523
Volume to Capacity	0.02	0.04	0.01
Queue Length 95th (ft)	1	0	0
Control Delay (s)	9.9	0.0	0.5
Lane LOS	A		A
Approach Delay (s)	9.9	0.0	0.5
Approach LOS	A		

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	24.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	340	16	75	410	11	14	18	23	16	60	79
Future Volume (vph)	36	340	16	75	410	11	14	18	23	16	60	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.94			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	3516		1770	3525			1736			1725	
Flt Permitted	0.45	1.00		0.52	1.00			0.94			0.98	
Satd. Flow (perm)	845	3516		974	3525			1651			1698	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	370	17	82	446	12	15	20	25	17	65	86
RTOR Reduction (vph)	0	7	0	0	4	0	0	11	0	0	39	0
Lane Group Flow (vph)	39	380	0	82	454	0	0	49	0	0	129	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.1	12.1		12.1	12.1			25.6			25.6	
Effective Green, g (s)	12.1	12.1		12.1	12.1			25.6			25.6	
Actuated g/C Ratio	0.26	0.26		0.26	0.26			0.55			0.55	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	218	910		252	913			905			930	
v/s Ratio Prot		0.11			c0.13							
v/s Ratio Perm	0.05			0.08				0.03			c0.08	
v/c Ratio	0.18	0.42		0.33	0.50			0.05			0.14	
Uniform Delay, d1	13.4	14.4		14.0	14.7			4.9			5.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.4	0.3		0.8	0.4			0.1			0.3	
Delay (s)	13.8	14.7		14.8	15.1			5.0			5.5	
Level of Service	B	B		B	B			A			A	
Approach Delay (s)		14.6			15.1			5.0			5.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	46.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	491	91	340	762	12	16	43	187	26	117	5
Future Volume (vph)	1	491	91	340	762	12	16	43	187	26	117	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4966		1770	5074		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.68	1.00	1.00	0.73	1.00	1.00
Satd. Flow (perm)	1770	4966		1770	5074		1258	1863	1583	1353	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	534	99	370	828	13	17	47	203	28	127	5
RTOR Reduction (vph)	0	38	0	0	2	0	0	0	147	0	0	4
Lane Group Flow (vph)	1	595	0	370	839	0	17	47	56	28	127	1
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)	0.9	17.5		17.0	33.6		18.2	18.2	18.2	18.2	18.2	18.2
Effective Green, g (s)	0.9	17.5		17.0	33.6		18.2	18.2	18.2	18.2	18.2	18.2
Actuated g/C Ratio	0.01	0.26		0.26	0.51		0.27	0.27	0.27	0.27	0.27	0.27
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	24	1312		454	2575		345	512	435	371	512	435
v/s Ratio Prot	0.00	c0.12		c0.21	0.17			0.03			c0.07	
v/s Ratio Perm							0.01		0.04	0.02		0.00
v/c Ratio	0.04	0.45		0.81	0.33		0.05	0.09	0.13	0.08	0.25	0.00
Uniform Delay, d1	32.2	20.4		23.1	9.6		17.6	17.9	18.0	17.8	18.7	17.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.3		10.8	0.1		0.3	0.4	0.6	0.4	1.2	0.0
Delay (s)	32.9	20.6		33.9	9.7		17.9	18.2	18.6	18.2	19.8	17.4
Level of Service	C	C		C	A		B	B	B	B	B	B
Approach Delay (s)		20.6			17.1			18.5			19.5	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	66.2	Sum of lost time (s)	13.5
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	51	6	10	66	12	4
Future Volume (Veh/h)	51	6	10	66	12	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	55	7	11	72	13	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			62		152	58
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			62		152	58
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		98	100
cM capacity (veh/h)			1541		833	1007

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	62	83	17
Volume Left	0	11	13
Volume Right	7	0	4
cSH	1700	1541	869
Volume to Capacity	0.04	0.01	0.02
Queue Length 95th (ft)	0	1	1
Control Delay (s)	0.0	1.0	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	1.0	9.2
Approach LOS			A

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	20.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	16	5	4	14	2	2	2	0	6	1	5
Future Volume (Veh/h)	0	16	5	4	14	2	2	2	0	6	1	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	17	5	4	15	2	2	2	0	7	1	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	33	24	4	37	26	2	6			2		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	33	24	4	37	26	2	6			2		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	100	100	98	100	100			100		
cM capacity (veh/h)	955	865	1080	945	862	1082	1615			1620		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	22	21	4	13
Volume Left	0	4	2	7
Volume Right	5	2	0	5
cSH	906	895	1615	1620
Volume to Capacity	0.02	0.02	0.00	0.00
Queue Length 95th (ft)	2	2	0	0
Control Delay (s)	9.1	9.1	3.6	3.9
Lane LOS	A	A	A	A
Approach Delay (s)	9.1	9.1	3.6	3.9
Approach LOS	A	A		

Intersection Summary			
Average Delay	7.6		
Intersection Capacity Utilization	14.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	297	11	33	535	0	7	0	37	0	0	1
Future Volume (Veh/h)	0	297	11	33	535	0	7	0	37	0	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	323	12	36	582	0	8	0	40	0	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)		661			663							
pX, platoon unblocked	1.00						1.00	1.00		1.00	1.00	1.00
vC, conflicting volume	582			335			693	983	168	856	989	291
vC1, stage 1 conf vol							329	329		654	654	
vC2, stage 2 conf vol							364	654		202	335	
vCu, unblocked vol	581			335			692	982	168	855	988	290
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			98	100	95	100	100	100
cM capacity (veh/h)	989			1221			515	407	847	385	402	707

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	0	215	120	36	388	194	48	1
Volume Left	0	0	0	36	0	0	8	0
Volume Right	0	0	12	0	0	0	40	1
cSH	1700	1700	1700	1221	1700	1700	765	707
Volume to Capacity	0.00	0.13	0.07	0.03	0.23	0.11	0.06	0.00
Queue Length 95th (ft)	0	0	0	2	0	0	5	0
Control Delay (s)	0.0	0.0	0.0	8.0	0.0	0.0	10.0	10.1
Lane LOS				A			B	B
Approach Delay (s)	0.0			0.5			10.0	10.1
Approach LOS							B	B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	37.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	18	5	17	10	1	10	54	15	8	67	0
Future Volume (Veh/h)	4	18	5	17	10	1	10	54	15	8	67	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	20	5	18	11	1	11	59	16	9	73	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	12			25			114	78	22	124	80	12
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	12			25			114	78	22	124	80	12
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	93	98	99	91	100
cM capacity (veh/h)	1607			1589			794	801	1054	783	799	1069

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	29	30	86	82
Volume Left	4	18	11	9
Volume Right	5	1	16	0
cSH	1607	1589	837	797
Volume to Capacity	0.00	0.01	0.10	0.10
Queue Length 95th (ft)	0	1	9	9
Control Delay (s)	1.0	4.4	9.8	10.0
Lane LOS	A	A	A	B
Approach Delay (s)	1.0	4.4	9.8	10.0
Approach LOS			A	B

Intersection Summary			
Average Delay	8.0		
Intersection Capacity Utilization	17.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	281	10	97	515	10	13	49	36	12	48	33
Future Volume (vph)	13	281	10	97	515	10	13	49	36	12	48	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.95			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	3521		1770	3529			1759			1762	
Flt Permitted	0.95	1.00		0.95	1.00			0.95			0.95	
Satd. Flow (perm)	1770	3521		1770	3529			1675			1679	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	305	11	105	560	11	14	53	39	13	52	36
RTOR Reduction (vph)	0	4	0	0	2	0	0	31	0	0	29	0
Lane Group Flow (vph)	14	312	0	105	569	0	0	75	0	0	72	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	0.7	11.5		4.2	15.0			7.5			7.5	
Effective Green, g (s)	0.7	11.5		4.2	15.0			7.5			7.5	
Actuated g/C Ratio	0.02	0.31		0.11	0.41			0.20			0.20	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	33	1103		202	1442			342			343	
v/s Ratio Prot	0.01	0.09		c0.06	c0.16							
v/s Ratio Perm								c0.04			0.04	
v/c Ratio	0.42	0.28		0.52	0.39			0.22			0.21	
Uniform Delay, d1	17.8	9.5		15.3	7.6			12.2			12.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	8.6	0.1		2.3	0.2			0.3			0.3	
Delay (s)	26.4	9.6		17.6	7.8			12.5			12.4	
Level of Service	C	A		B	A			B			B	
Approach Delay (s)		10.3			9.3			12.5			12.4	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	36.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	37.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (veh/h)	6	37	2	6	16	8	0	21	12	0	20	6
Future Volume (Veh/h)	6	37	2	6	16	8	0	21	12	0	20	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	40	2	7	17	9	0	23	13	0	22	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	72	62	26	77	58	30	29			36		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	72	62	26	77	58	30	29			36		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	95	100	99	98	99	100			100		
cM capacity (veh/h)	896	829	1050	877	832	1045	1584			1575		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	49	33	36	29
Volume Left	7	7	0	0
Volume Right	2	9	13	7
cSH	846	892	1584	1575
Volume to Capacity	0.06	0.04	0.00	0.00
Queue Length 95th (ft)	5	3	0	0
Control Delay (s)	9.5	9.2	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	9.5	9.2	0.0	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	5.2		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	18	328	11	11	641	12	5	2	15	8	2	36
Future Volume (vph)	18	328	11	11	641	12	5	2	15	8	2	36
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	357	12	12	697	13	5	2	16	9	2	39

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	20	369	12	710	23	50
Volume Left (vph)	20	0	12	0	5	9
Volume Right (vph)	0	12	0	13	16	39
Hadj (s)	0.53	0.01	0.53	0.02	-0.34	-0.40
Departure Headway (s)	5.8	5.3	5.6	5.1	6.2	6.1
Degree Utilization, x	0.03	0.55	0.02	1.01	0.04	0.08
Capacity (veh/h)	609	669	622	699	540	553
Control Delay (s)	7.8	13.3	7.5	57.2	9.5	9.6
Approach Delay (s)	13.0		56.3		9.5	9.6
Approach LOS	B		F		A	A

Intersection Summary			
Delay	39.2		
Level of Service	E		
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	10	7	1	8	14	7	388	4	8	521	12
Future Volume (Veh/h)	7	10	7	1	8	14	7	388	4	8	521	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	11	8	1	9	15	8	422	4	9	566	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (ft)								744				
pX, platoon unblocked												
vC, conflicting volume	1048	1032	572	1038	1037	424	579			426		
vC1, stage 1 conf vol	590	590		440	440							
vC2, stage 2 conf vol	458	442		598	597							
vCu, unblocked vol	1048	1032	572	1038	1037	424	579			426		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	97	98	100	98	98	99			99		
cM capacity (veh/h)	399	414	519	395	410	630	995			1133		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	27	25	8	426	9	579
Volume Left	8	1	8	0	9	0
Volume Right	8	15	0	4	0	13
cSH	435	518	995	1700	1133	1700
Volume to Capacity	0.06	0.05	0.01	0.25	0.01	0.34
Queue Length 95th (ft)	5	4	1	0	1	0
Control Delay (s)	13.8	12.3	8.6	0.0	8.2	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	13.8	12.3	0.2		0.1	
Approach LOS	B	B				

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	39.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	227	68	94	453	79	61	233	60	128	306	106
Future Volume (vph)	43	227	68	94	453	79	61	233	60	128	306	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1821		1770	3431		1770	1791	
Flt Permitted	0.20	1.00	1.00	0.55	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	380	1863	1583	1027	1821		1770	3431		1770	1791	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	47	247	74	102	492	86	66	253	65	139	333	115
RTOR Reduction (vph)	0	0	49	0	11	0	0	37	0	0	20	0
Lane Group Flow (vph)	47	247	25	102	567	0	66	281	0	139	428	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	19.6	19.6	19.6	19.6	19.6		2.9	20.9		5.0	23.0	
Effective Green, g (s)	19.6	19.6	19.6	19.6	19.6		2.9	20.9		5.0	23.0	
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33		0.05	0.35		0.08	0.39	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	126	618	525	341	604		87	1215		150	698	
v/s Ratio Prot		0.13			c0.31		0.04	0.08		c0.08	c0.24	
v/s Ratio Perm	0.12		0.02	0.10								
v/c Ratio	0.37	0.40	0.05	0.30	0.94		0.76	0.23		0.93	0.61	
Uniform Delay, d1	15.0	15.2	13.4	14.6	19.1		27.7	13.4		26.8	14.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	0.4	0.0	0.5	22.5		30.9	0.4		51.6	4.0	
Delay (s)	16.9	15.6	13.4	15.1	41.6		58.6	13.8		78.4	18.4	
Level of Service	B	B	B	B	D		E	B		E	B	
Approach Delay (s)		15.3			37.6			21.5			32.6	
Approach LOS		B			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	834	63	186	1325	68	142	215	267	201	151	85
Future Volume (vph)	80	834	63	186	1325	68	142	215	267	201	151	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5032		1770	5048		1770	1863	1583	1770	3348	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	5032		1770	5048		1770	1863	1583	1770	3348	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	907	68	202	1440	74	154	234	290	218	164	92
RTOR Reduction (vph)	0	10	0	0	7	0	0	0	170	0	67	0
Lane Group Flow (vph)	87	965	0	202	1507	0	154	234	120	218	189	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	4.4	20.2		10.5	26.3		9.6	20.3	20.3	11.4	22.1	
Effective Green, g (s)	4.4	20.2		10.5	26.3		9.6	20.3	20.3	11.4	22.1	
Actuated g/C Ratio	0.05	0.25		0.13	0.33		0.12	0.25	0.25	0.14	0.27	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	96	1264		231	1651		211	470	399	250	920	
v/s Ratio Prot	0.05	0.19		c0.11	c0.30		0.09	c0.13		c0.12	0.06	
v/s Ratio Perm									0.08			
v/c Ratio	0.91	0.76		0.87	0.91		0.73	0.50	0.30	0.87	0.21	
Uniform Delay, d1	37.8	27.9		34.3	26.0		34.1	25.7	24.3	33.8	22.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	61.8	2.8		28.6	8.1		11.9	3.7	1.9	26.6	0.5	
Delay (s)	99.6	30.7		62.9	34.1		46.1	29.4	26.2	60.4	22.9	
Level of Service	F	C		E	C		D	C	C	E	C	
Approach Delay (s)		36.3			37.5			31.8			40.1	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	36.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	80.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	239	56	111	638	56	44	111	62	67	117	106
Future Volume (vph)	48	239	56	111	638	56	44	111	62	67	117	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3438		1770	3496		1770	1763		1770	1730	
Flt Permitted	0.27	1.00		0.56	1.00		0.61	1.00		0.64	1.00	
Satd. Flow (perm)	496	3438		1038	3496		1133	1763		1191	1730	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	52	260	61	121	693	61	48	121	67	73	127	115
RTOR Reduction (vph)	0	39	0	0	13	0	0	30	0	0	48	0
Lane Group Flow (vph)	52	282	0	121	741	0	48	158	0	73	194	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.5	18.5		18.5	18.5		24.7	24.7		24.7	24.7	
Effective Green, g (s)	18.5	18.5		18.5	18.5		24.7	24.7		24.7	24.7	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.47	0.47		0.47	0.47	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	175	1218		367	1239		536	834		563	818	
v/s Ratio Prot		0.08			c0.21			0.09			c0.11	
v/s Ratio Perm	0.10			0.12			0.04			0.06		
v/c Ratio	0.30	0.23		0.33	0.60		0.09	0.19		0.13	0.24	
Uniform Delay, d1	12.2	11.8		12.3	13.8		7.6	8.0		7.7	8.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.1		0.5	0.8		0.3	0.5		0.5	0.7	
Delay (s)	13.1	11.9		12.8	14.6		7.9	8.5		8.2	8.8	
Level of Service	B	B		B	B		A	A		A	A	
Approach Delay (s)		12.1			14.3			8.3			8.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	52.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	164	739	44	20	1350	35	97	30	26	33	18	204
Future Volume (vph)	164	739	44	20	1350	35	97	30	26	33	18	204
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.98			0.89	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.99	
Satd. Flow (prot)	1770	5042		1770	5066			1765			1651	
Flt Permitted	0.95	1.00		0.95	1.00			0.64			0.95	
Satd. Flow (perm)	1770	5042		1770	5066			1168			1573	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	178	803	48	22	1467	38	105	33	28	36	20	222
RTOR Reduction (vph)	0	9	0	0	4	0	0	12	0	0	151	0
Lane Group Flow (vph)	178	842	0	22	1501	0	0	154	0	0	127	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	7.5	28.8		1.0	22.3			20.3			20.3	
Effective Green, g (s)	7.5	28.8		1.0	22.3			20.3			20.3	
Actuated g/C Ratio	0.12	0.45		0.02	0.35			0.32			0.32	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	208	2283		27	1776			372			502	
v/s Ratio Prot	c0.10	0.17		0.01	c0.30							
v/s Ratio Perm								c0.13			0.08	
v/c Ratio	0.86	0.37		0.81	0.85			0.41			0.25	
Uniform Delay, d1	27.5	11.4		31.2	19.1			17.0			16.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	27.4	0.1		95.3	3.9			3.4			1.2	
Delay (s)	54.9	11.5		126.5	23.0			20.3			17.2	
Level of Service	D	B		F	C			C			B	
Approach Delay (s)		19.0			24.4			20.3			17.2	
Approach LOS		B			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	63.6	Sum of lost time (s)	13.5
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	241	57	60	399	106	88	244	199	172	184	132
Future Volume (vph)	72	241	57	60	399	106	88	244	199	172	184	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.97		1.00	0.93		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3438		1770	3428		1770	3301		1770	3318	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3438		1770	3428		1770	3301		1770	3318	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	262	62	65	434	115	96	265	216	187	200	143
RTOR Reduction (vph)	0	30	0	0	35	0	0	151	0	0	94	0
Lane Group Flow (vph)	78	294	0	65	514	0	96	330	0	187	249	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.2	17.0		2.8	15.6		6.6	20.4		9.3	23.1	
Effective Green, g (s)	4.2	17.0		2.8	15.6		6.6	20.4		9.3	23.1	
Actuated g/C Ratio	0.06	0.25		0.04	0.23		0.10	0.30		0.14	0.34	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	110	865		73	792		173	997		243	1135	
v/s Ratio Prot	c0.04	0.09		0.04	c0.15		0.05	c0.10		c0.11	c0.08	
v/s Ratio Perm												
v/c Ratio	0.71	0.34		0.89	0.65		0.55	0.33		0.77	0.22	
Uniform Delay, d1	31.1	20.7		32.2	23.5		29.0	18.3		28.1	15.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	18.8	0.2		68.9	1.8		3.8	0.9		13.6	0.4	
Delay (s)	49.9	20.9		101.1	25.3		32.9	19.2		41.7	16.2	
Level of Service	D	C		F	C		C	B		D	B	
Approach Delay (s)		26.5			33.3			21.4			25.2	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	67.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	233	498	18	25	1077	124	41	51	68	130	33	268
Future Volume (vph)	233	498	18	25	1077	124	41	51	68	130	33	268
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5058		1770	5085	1583	1770	1702		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.73	1.00		0.67	1.00	1.00
Satd. Flow (perm)	1770	5058		1770	5085	1583	1367	1702		1256	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	253	541	20	27	1171	135	45	55	74	141	36	291
RTOR Reduction (vph)	0	6	0	0	0	90	0	53	0	0	0	196
Lane Group Flow (vph)	253	555	0	27	1171	45	45	76	0	141	36	95
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		6
Actuated Green, G (s)	10.3	28.9		2.0	20.6	20.6	18.0	18.0		18.0	18.0	18.0
Effective Green, g (s)	10.3	28.9		2.0	20.6	20.6	18.0	18.0		18.0	18.0	18.0
Actuated g/C Ratio	0.17	0.46		0.03	0.33	0.33	0.29	0.29		0.29	0.29	0.29
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	292	2342		56	1678	522	394	490		362	537	456
v/s Ratio Prot	c0.14	0.11		0.02	c0.23			0.04			0.02	
v/s Ratio Perm						0.03	0.03			c0.11		0.06
v/c Ratio	0.87	0.24		0.48	0.70	0.09	0.11	0.16		0.39	0.07	0.21
Uniform Delay, d1	25.4	10.1		29.7	18.2	14.4	16.3	16.5		17.8	16.1	16.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	22.6	0.1		6.4	1.3	0.1	0.6	0.7		3.1	0.2	1.0
Delay (s)	47.9	10.2		36.1	19.5	14.5	16.9	17.2		20.9	16.3	17.8
Level of Service	D	B		D	B	B	B	B		C	B	B
Approach Delay (s)		21.9			19.3			17.1			18.7	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	62.4	Sum of lost time (s)	13.5
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	10	49	17	8	39	30	299	9	52	537	10
Future Volume (Veh/h)	16	10	49	17	8	39	30	299	9	52	537	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	11	53	18	9	42	33	325	10	57	584	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								1070				
pX, platoon unblocked												
vC, conflicting volume	978	1104	298	860	1105	168	595			335		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	978	1104	298	860	1105	168	595			335		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	90	94	92	91	95	95	97			95		
cM capacity (veh/h)	176	193	699	207	193	847	977			1221		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	81	69	196	172	349	303
Volume Left	17	18	33	0	57	0
Volume Right	53	42	0	10	0	11
cSH	353	377	977	1700	1221	1700
Volume to Capacity	0.23	0.18	0.03	0.10	0.05	0.18
Queue Length 95th (ft)	22	17	3	0	4	0
Control Delay (s)	18.2	16.7	1.8	0.0	1.7	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	18.2	16.7	0.9		0.9	
Approach LOS	C	C				

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	41.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	502	34	35	973	341	30	32	15	342	98	176
Future Volume (vph)	101	502	34	35	973	341	30	32	15	342	98	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	1.00	1.00	1.00		0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85		0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1770	5037		1770	5085	1583	1770	1863	1583		3296	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.21	1.00	1.00		0.79	
Satd. Flow (perm)	1770	5037		1770	5085	1583	390	1863	1583		2673	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	110	546	37	38	1058	371	33	35	16	372	107	191
RTOR Reduction (vph)	0	10	0	0	0	248	0	0	10	0	65	0
Lane Group Flow (vph)	110	573	0	38	1058	123	33	35	6	0	605	0
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8	2		2	6		
Actuated Green, G (s)	5.2	24.7		2.0	21.5	21.5	26.2	26.2	26.2		19.8	
Effective Green, g (s)	5.2	24.7		2.0	21.5	21.5	26.2	26.2	26.2		19.8	
Actuated g/C Ratio	0.08	0.38		0.03	0.33	0.33	0.40	0.40	0.40		0.31	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	141	1917		54	1684	524	197	752	639		815	
v/s Ratio Prot	c0.06	c0.11		0.02	c0.21		c0.00	0.02				
v/s Ratio Perm						0.08	0.06		0.00		c0.23	
v/c Ratio	0.78	0.30		0.70	0.63	0.23	0.17	0.05	0.01		0.74	
Uniform Delay, d1	29.3	14.0		31.2	18.3	15.7	12.8	11.8	11.6		20.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2	23.8	0.1		34.1	0.7	0.2	0.4	0.1	0.0		3.7	
Delay (s)	53.1	14.1		65.2	19.1	16.0	13.2	11.9	11.6		23.9	
Level of Service	D	B		E	B	B	B	B	B		C	
Approach Delay (s)		20.3			19.5			12.4			23.9	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	64.9	Sum of lost time (s)	16.5
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	79	9	3	61	2	15	52	11	0	48	10
Future Volume (Veh/h)	3	79	9	3	61	2	15	52	11	0	48	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	86	10	3	66	2	16	57	12	0	52	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	68			96			207	171	91	210	175	67
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	68			96			207	171	91	210	175	67
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			98	92	99	100	93	99
cM capacity (veh/h)	1533			1498			699	719	967	691	716	997

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	99	71	85	63
Volume Left	3	3	16	0
Volume Right	10	2	12	11
cSH	1533	1498	742	753
Volume to Capacity	0.00	0.00	0.11	0.08
Queue Length 95th (ft)	0	0	10	7
Control Delay (s)	0.2	0.3	10.5	10.2
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	0.3	10.5	10.2
Approach LOS			B	B

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	23.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	2	23	8	1	2	1	65	2	3	53	5
Future Volume (Veh/h)	3	2	23	8	1	2	1	65	2	3	53	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	2	25	9	1	2	1	71	2	3	58	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								269				
pX, platoon unblocked												
vC, conflicting volume	143	142	60	166	143	72	63			73		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	143	142	60	166	143	72	63			73		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	98	99	100	100	100			100		
cM capacity (veh/h)	822	748	1005	775	746	990	1540			1527		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	30	12	74	66
Volume Left	3	9	1	3
Volume Right	25	2	2	5
cSH	961	801	1540	1527
Volume to Capacity	0.03	0.01	0.00	0.00
Queue Length 95th (ft)	2	1	0	0
Control Delay (s)	8.9	9.6	0.1	0.3
Lane LOS	A	A	A	A
Approach Delay (s)	8.9	9.6	0.1	0.3
Approach LOS	A	A		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	14.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	793	5	8	1325	26	7	6	12	53	2	25
Future Volume (vph)	32	793	5	8	1325	26	7	6	12	53	2	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		1.00			1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.94			0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.97	
Satd. Flow (prot)	1770	5081		1770	5085	1583		1721			1727	
Flt Permitted	0.17	1.00		0.30	1.00	1.00		0.94			0.83	
Satd. Flow (perm)	308	5081		552	5085	1583		1649			1483	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	862	5	9	1440	28	8	7	13	58	2	27
RTOR Reduction (vph)	0	1	0	0	0	15	0	8	0	0	17	0
Lane Group Flow (vph)	35	866	0	9	1440	13	0	20	0	0	70	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	24.2	24.2		24.2	24.2	24.2		18.7			18.7	
Effective Green, g (s)	24.2	24.2		24.2	24.2	24.2		18.7			18.7	
Actuated g/C Ratio	0.47	0.47		0.47	0.47	0.47		0.36			0.36	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	143	2369		257	2371	738		594			534	
v/s Ratio Prot		0.17			c0.28							
v/s Ratio Perm	0.11			0.02		0.01		0.01			c0.05	
v/c Ratio	0.24	0.37		0.04	0.61	0.02		0.03			0.13	
Uniform Delay, d1	8.3	8.9		7.5	10.3	7.5		10.7			11.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.9	0.1		0.1	0.4	0.0		0.1			0.5	
Delay (s)	9.2	9.0		7.6	10.8	7.5		10.9			11.6	
Level of Service	A	A		A	B	A		B			B	
Approach Delay (s)		9.0			10.7			10.9			11.6	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	51.9	Sum of lost time (s)	9.0
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	14	54	19	9	106	30	67	102	11	19	219	48
Future Volume (vph)	14	54	19	9	106	30	67	102	11	19	219	48
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	59	21	10	115	33	73	111	12	21	238	52

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	95	158	196	311
Volume Left (vph)	15	10	73	21
Volume Right (vph)	21	33	12	52
Hadj (s)	-0.07	-0.08	0.07	-0.05
Departure Headway (s)	5.4	5.3	5.1	4.8
Degree Utilization, x	0.14	0.23	0.28	0.42
Capacity (veh/h)	595	620	663	709
Control Delay (s)	9.3	9.8	10.0	11.2
Approach Delay (s)	9.3	9.8	10.0	11.2
Approach LOS	A	A	B	B

Intersection Summary			
Delay	10.4		
Level of Service	B		
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	66	28	168	211	9
Future Volume (Veh/h)	3	66	28	168	211	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	72	30	183	229	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				259		
pX, platoon unblocked						
vC, conflicting volume	472	229	239			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	472	229	239			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	91	98			
cM capacity (veh/h)	538	810	1328			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	75	30	183	229	10
Volume Left	3	30	0	0	0
Volume Right	72	0	0	0	10
cSH	794	1328	1700	1700	1700
Volume to Capacity	0.09	0.02	0.11	0.13	0.01
Queue Length 95th (ft)	8	2	0	0	0
Control Delay (s)	10.0	7.8	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	10.0	1.1		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	28.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	749	28	14	1259	94	57	27	15	176	39	47
Future Volume (vph)	55	749	28	14	1259	94	57	27	15	176	39	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00		0.96	1.00
Satd. Flow (prot)	1770	5058		1770	5085	1583		1801	1583		1789	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.57	1.00		0.70	1.00
Satd. Flow (perm)	1770	5058		1770	5085	1583		1068	1583		1310	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	814	30	15	1368	102	62	29	16	191	42	51
RTOR Reduction (vph)	0	4	0	0	0	45	0	0	12	0	0	39
Lane Group Flow (vph)	60	840	0	15	1368	57	0	91	4	0	233	12
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2		2	6		6
Actuated Green, G (s)	7.6	60.4		2.6	55.4	55.4		23.5	23.5		23.5	23.5
Effective Green, g (s)	7.6	60.4		2.6	55.4	55.4		23.5	23.5		23.5	23.5
Actuated g/C Ratio	0.08	0.60		0.03	0.55	0.55		0.24	0.24		0.24	0.24
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	134	3055		46	2817	876		250	372		307	372
v/s Ratio Prot	c0.03	0.17		0.01	c0.27							
v/s Ratio Perm						0.04		0.09	0.00		c0.18	0.01
v/c Ratio	0.45	0.28		0.33	0.49	0.07		0.36	0.01		0.76	0.03
Uniform Delay, d1	44.2	9.4		47.8	13.6	10.3		32.0	29.3		35.6	29.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	2.4	0.2		4.1	0.6	0.1		4.1	0.0		16.1	0.2
Delay (s)	46.6	9.6		51.9	14.2	10.5		36.1	29.4		51.7	29.6
Level of Service	D	A		D	B	B		D	C		D	C
Approach Delay (s)		12.1			14.3			35.1			47.7	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	11	19	43	28	74	24	66	174	7	9	271	8
Future Volume (vph)	11	19	43	28	74	24	66	174	7	9	271	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	21	47	30	80	26	72	189	8	10	295	9

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	80	136	269	314
Volume Left (vph)	12	30	72	10
Volume Right (vph)	47	26	8	9
Hadj (s)	-0.29	-0.04	0.07	0.02
Departure Headway (s)	5.3	5.5	5.0	4.9
Degree Utilization, x	0.12	0.21	0.37	0.43
Capacity (veh/h)	588	590	686	701
Control Delay (s)	9.0	9.9	11.0	11.5
Approach Delay (s)	9.0	9.9	11.0	11.5
Approach LOS	A	A	B	B

Intersection Summary			
Delay	10.8		
Level of Service	B		
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	10	53	10	34	13	47	220	5	1	335	17
Future Volume (vph)	7	10	53	10	34	13	47	220	5	1	335	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	11	58	11	37	14	51	239	5	1	364	18

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	77	62	295	383
Volume Left (vph)	8	11	51	1
Volume Right (vph)	58	14	5	18
Hadj (s)	-0.40	-0.07	0.06	0.01
Departure Headway (s)	5.2	5.6	4.8	4.7
Degree Utilization, x	0.11	0.10	0.39	0.50
Capacity (veh/h)	599	560	721	746
Control Delay (s)	8.9	9.2	10.9	12.1
Approach Delay (s)	8.9	9.2	10.9	12.1
Approach LOS	A	A	B	B

Intersection Summary			
Delay	11.1		
Level of Service	B		
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	41	14	253	16	26	368
Future Volume (Veh/h)	41	14	253	16	26	368
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	45	15	275	17	28	400
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			277			
pX, platoon unblocked	0.96	0.96			0.96	
vC, conflicting volume	740	146			292	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	634	13			166	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	88	99			98	
cM capacity (veh/h)	385	1016			1347	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	60	183	109	428
Volume Left	45	0	0	28
Volume Right	15	0	17	0
cSH	456	1700	1700	1347
Volume to Capacity	0.13	0.11	0.06	0.02
Queue Length 95th (ft)	11	0	0	2
Control Delay (s)	14.1	0.0	0.0	0.7
Lane LOS	B			A
Approach Delay (s)	14.1	0.0		0.7
Approach LOS	B			

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	41.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	688	233	144	1127	55	214	220	41	171	169	45
Future Volume (vph)	15	688	233	144	1127	55	214	220	41	171	169	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	0.97	0.95	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4892		1770	5085	1583	3433	3539	1583	1770	1804	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.60	1.00	
Satd. Flow (perm)	1770	4892		1770	5085	1583	3433	3539	1583	1124	1804	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	748	253	157	1225	60	233	239	45	186	184	49
RTOR Reduction (vph)	0	69	0	0	0	30	0	0	36	0	13	0
Lane Group Flow (vph)	16	932	0	157	1225	30	233	239	9	186	220	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8	4		
Actuated Green, G (s)	1.5	29.6		11.5	39.6	39.6	6.2	15.8	15.8	19.8	14.7	
Effective Green, g (s)	1.5	29.6		11.5	39.6	39.6	6.2	15.8	15.8	19.8	14.7	
Actuated g/C Ratio	0.02	0.37		0.14	0.50	0.50	0.08	0.20	0.20	0.25	0.18	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	33	1810		254	2517	783	266	698	312	319	331	
v/s Ratio Prot	0.01	0.19		c0.09	c0.24		c0.07	0.07		0.04	c0.12	
v/s Ratio Perm						0.02			0.01	0.11		
v/c Ratio	0.48	0.52		0.62	0.49	0.04	0.88	0.34	0.03	0.58	0.66	
Uniform Delay, d1	38.9	19.6		32.2	13.4	10.4	36.5	27.6	25.9	25.5	30.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.8	1.1		4.4	0.1	0.0	25.9	1.3	0.2	2.7	10.1	
Delay (s)	49.7	20.7		36.6	13.6	10.4	62.4	29.0	26.1	28.2	40.5	
Level of Service	D	C		D	B	B	E	C	C	C	D	
Approach Delay (s)		21.1			16.0			43.8			35.0	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
56: White Avenue & Third Street

03/15/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1	45	8	5	19	59	530	3	2	757	33
Future Volume (Veh/h)	0	1	45	8	5	19	59	530	3	2	757	33
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	49	9	5	21	64	576	3	2	823	36
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)											382	
pX, platoon unblocked	0.68	0.68	0.68	0.68	0.68		0.68					
vC, conflicting volume	1574	1552	841	1600	1568	578	859			579		
vC1, stage 1 conf vol	845	845		706	706							
vC2, stage 2 conf vol	729	707		894	863							
vCu, unblocked vol	1609	1577	529	1647	1601	578	556			579		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	87	95	98	96	91			100		
cM capacity (veh/h)	248	265	373	189	232	516	689			995		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	50	35	643	861
Volume Left	0	9	64	2
Volume Right	49	21	3	36
cSH	370	318	689	995
Volume to Capacity	0.14	0.11	0.09	0.00
Queue Length 95th (ft)	12	9	8	0
Control Delay (s)	16.2	17.7	2.4	0.1
Lane LOS	C	C	A	A
Approach Delay (s)	16.2	17.7	2.4	0.1
Approach LOS	C	C		

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	1	15	7	0	18	27	544	2	11	790	14
Future Volume (Veh/h)	2	1	15	7	0	18	27	544	2	11	790	14
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	1	16	8	0	20	29	591	2	12	859	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								1253			753	
pX, platoon unblocked	0.76	0.76	0.71	0.76	0.76	0.90	0.71			0.90		
vC, conflicting volume	1560	1542	866	1557	1548	592	874			593		
vC1, stage 1 conf vol	890	890		650	650							
vC2, stage 2 conf vol	670	651		907	898							
vCu, unblocked vol	1296	1271	611	1292	1280	496	622			497		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	95	97	100	96	96			99		
cM capacity (veh/h)	263	278	352	240	261	519	684			965		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	19	28	622	886
Volume Left	2	8	29	12
Volume Right	16	20	2	15
cSH	335	390	684	965
Volume to Capacity	0.06	0.07	0.04	0.01
Queue Length 95th (ft)	4	6	3	1
Control Delay (s)	16.4	15.0	1.1	0.3
Lane LOS	C	B	A	A
Approach Delay (s)	16.4	15.0	1.1	0.3
Approach LOS	C	B		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2	10	13	3	38	34	551	26	39	764	10
Future Volume (Veh/h)	0	2	10	13	3	38	34	551	26	39	764	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2	11	14	3	41	37	599	28	42	830	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (ft)								1055			951	
pX, platoon unblocked	0.78	0.78	0.72	0.78	0.78	0.89	0.72			0.89		
vC, conflicting volume	1635	1620	836	1604	1598	599	841			627		
vC1, stage 1 conf vol	920	920		673	673							
vC2, stage 2 conf vol	716	701		932	925							
vCu, unblocked vol	1346	1327	578	1307	1298	484	586			516		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	97	94	99	92	95			95		
cM capacity (veh/h)	230	252	372	221	239	517	713			931		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1
Volume Total	13	58	37	599	28	883
Volume Left	0	14	37	0	0	42
Volume Right	11	41	0	0	28	11
cSH	346	373	713	1700	1700	931
Volume to Capacity	0.04	0.16	0.05	0.35	0.02	0.05
Queue Length 95th (ft)	3	14	4	0	0	4
Control Delay (s)	15.8	16.4	10.3	0.0	0.0	1.2
Lane LOS	C	C	B			A
Approach Delay (s)	15.8	16.4	0.6			1.2
Approach LOS	C	C				

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	89.2%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	21	25	557	9	25	758
Future Volume (Veh/h)	21	25	557	9	25	758
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	27	605	10	27	824
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			255			
pX, platoon unblocked	0.92	0.92			0.92	
vC, conflicting volume	1076	308			615	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	912	78			412	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	97			97	
cM capacity (veh/h)	245	891			1054	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	23	27	403	212	27	412	412
Volume Left	23	0	0	0	27	0	0
Volume Right	0	27	0	10	0	0	0
cSH	245	891	1700	1700	1054	1700	1700
Volume to Capacity	0.09	0.03	0.24	0.12	0.03	0.24	0.24
Queue Length 95th (ft)	8	2	0	0	2	0	0
Control Delay (s)	21.2	9.2	0.0	0.0	8.5	0.0	0.0
Lane LOS	C	A			A		
Approach Delay (s)	14.7		0.0		0.3		
Approach LOS	B						

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	31.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	289	334	85	106	439	233	52	413	174	90	1070	186
Future Volume (vph)	289	334	85	106	439	233	52	413	174	90	1070	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.97		1.00	0.95		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3432		1770	3355		1770	5085	1583	1770	4972	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433	3432		1770	3355		1770	5085	1583	1770	4972	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	314	363	92	115	477	253	57	449	189	98	1163	202
RTOR Reduction (vph)	0	31	0	0	101	0	0	0	148	0	34	0
Lane Group Flow (vph)	314	424	0	115	629	0	57	449	41	98	1331	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases									4			
Actuated Green, G (s)	8.4	21.1		6.1	18.8		3.1	15.3	15.3	9.5	21.7	
Effective Green, g (s)	8.4	21.1		6.1	18.8		3.1	15.3	15.3	9.5	21.7	
Actuated g/C Ratio	0.12	0.30		0.09	0.27		0.04	0.22	0.22	0.14	0.31	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	411	1034		154	901		78	1111	345	240	1541	
v/s Ratio Prot	c0.09	0.12		0.06	c0.19		c0.03	0.09		0.06	c0.27	
v/s Ratio Perm									0.03			
v/c Ratio	0.76	0.41		0.75	0.70		0.73	0.40	0.12	0.41	0.86	
Uniform Delay, d1	29.8	19.5		31.2	23.0		33.0	23.4	21.9	27.7	22.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.2	1.2		17.8	4.5		29.3	0.2	0.2	1.1	5.3	
Delay (s)	38.1	20.7		49.0	27.5		62.4	23.7	22.1	28.8	28.1	
Level of Service	D	C		D	C		E	C	C	C	C	
Approach Delay (s)		27.8			30.4			26.4			28.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	276	42	42	450	85	36	95	18	106	187	148
Future Volume (vph)	84	276	42	42	450	85	36	95	18	106	187	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.98			0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	1.00
Satd. Flow (prot)	1770	1826		1770	1819			1810		1770	1863	1583
Flt Permitted	0.20	1.00		0.43	1.00			0.90		0.59	1.00	1.00
Satd. Flow (perm)	371	1826		803	1819			1647		1099	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	300	46	46	489	92	39	103	20	115	203	161
RTOR Reduction (vph)	0	9	0	0	12	0	0	9	0	0	0	81
Lane Group Flow (vph)	91	337	0	46	569	0	0	153	0	115	203	80
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	20.1	20.1		20.1	20.1			20.2		28.6	28.6	28.6
Effective Green, g (s)	20.1	20.1		20.1	20.1			20.2		28.6	28.6	28.6
Actuated g/C Ratio	0.35	0.35		0.35	0.35			0.35		0.50	0.50	0.50
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	129	636		279	633			576		590	923	784
v/s Ratio Prot		0.18			c0.31					0.01	c0.11	
v/s Ratio Perm	0.25			0.06				c0.09		0.08		0.05
v/c Ratio	0.71	0.53		0.16	0.90			0.27		0.19	0.22	0.10
Uniform Delay, d1	16.2	15.0		13.0	17.8			13.4		8.2	8.2	7.7
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	16.1	0.8		0.3	15.6			0.2		0.2	0.5	0.3
Delay (s)	32.3	15.8		13.3	33.4			13.7		8.4	8.8	8.0
Level of Service	C	B		B	C			B		A	A	A
Approach Delay (s)		19.3			31.9			13.7			8.4	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	57.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	331	70	80	618	206	122	336	24	213	539	226
Future Volume (vph)	144	331	70	80	618	206	122	336	24	213	539	226
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	4952		1770	3539	1583	3433	3504		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	4952		1770	3539	1583	3433	3504		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	157	360	76	87	672	224	133	365	26	232	586	246
RTOR Reduction (vph)	0	39	0	0	0	169	0	7	0	0	0	159
Lane Group Flow (vph)	157	397	0	87	672	55	133	384	0	232	586	87
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	10.3	22.4		7.2	19.3	19.3	5.7	20.2		13.4	27.9	27.9
Effective Green, g (s)	10.3	22.4		7.2	19.3	19.3	5.7	20.2		13.4	27.9	27.9
Actuated g/C Ratio	0.13	0.28		0.09	0.24	0.24	0.07	0.26		0.17	0.35	0.35
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	230	1400		160	862	385	247	893		299	1246	557
v/s Ratio Prot	c0.09	c0.08		0.05	c0.19		0.04	0.11		c0.13	c0.17	
v/s Ratio Perm						0.03						0.05
v/c Ratio	0.68	0.28		0.54	0.78	0.14	0.54	0.43		0.78	0.47	0.16
Uniform Delay, d1	32.9	22.1		34.4	28.0	23.5	35.5	24.7		31.5	19.9	17.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	8.1	0.1		3.7	4.5	0.2	2.3	1.5		11.9	1.3	0.6
Delay (s)	41.0	22.3		38.2	32.5	23.6	37.7	26.2		43.4	21.2	18.2
Level of Service	D	C		D	C	C	D	C		D	C	B
Approach Delay (s)		27.2			31.0			29.1			25.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	79.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	250	76	109	457	85	80	376	56	75	549	100
Future Volume (vph)	36	250	76	109	457	85	80	376	56	75	549	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.18	1.00	1.00	0.39	1.00	1.00	0.19	1.00	1.00	0.36	1.00	1.00
Satd. Flow (perm)	328	1863	1583	720	1863	1583	360	1863	1583	679	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	272	83	118	497	92	87	409	61	82	597	109
RTOR Reduction (vph)	0	0	61	0	0	65	0	0	36	0	0	64
Lane Group Flow (vph)	39	272	22	118	497	27	87	409	25	82	597	45
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	25.4	22.7	22.7	29.6	24.8	24.8	38.6	34.8	34.8	39.6	35.3	35.3
Effective Green, g (s)	25.4	22.7	22.7	29.6	24.8	24.8	38.6	34.8	34.8	39.6	35.3	35.3
Actuated g/C Ratio	0.30	0.27	0.27	0.35	0.29	0.29	0.46	0.41	0.41	0.47	0.42	0.42
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	144	499	424	311	546	464	227	766	651	373	777	660
v/s Ratio Prot	0.01	0.15		c0.02	c0.27		c0.02	0.22		0.01	c0.32	
v/s Ratio Perm	0.07		0.01	0.11		0.02	0.16		0.02	0.09		0.03
v/c Ratio	0.27	0.55	0.05	0.38	0.91	0.06	0.38	0.53	0.04	0.22	0.77	0.07
Uniform Delay, d1	22.8	26.5	23.0	19.6	28.8	21.5	15.7	18.8	14.9	13.3	21.1	14.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	1.2	0.1	0.8	19.4	0.1	1.1	2.7	0.1	0.3	7.2	0.2
Delay (s)	23.8	27.7	23.0	20.4	48.2	21.6	16.7	21.4	15.0	13.6	28.3	15.0
Level of Service	C	C	C	C	D	C	B	C	B	B	C	B
Approach Delay (s)		26.4			40.1			20.0			25.0	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	84.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	451	0	1	648	7	281	0	6	6	1	0
Future Volume (vph)	3	451	0	1	648	7	281	0	6	6	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00			1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.95			0.96	
Satd. Flow (prot)	1770	3539		1770	3539	1583		1771			1785	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.73			0.76	
Satd. Flow (perm)	1770	3539		1770	3539	1583		1347			1425	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	490	0	1	704	8	305	0	7	7	1	0
RTOR Reduction (vph)	0	0	0	0	0	5	0	76	0	0	0	0
Lane Group Flow (vph)	3	490	0	1	704	3	0	236	0	0	8	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4			8	2			6		
Actuated Green, G (s)	0.6	13.4		0.6	13.4	13.4		12.0			12.0	
Effective Green, g (s)	0.6	13.4		0.6	13.4	13.4		12.0			12.0	
Actuated g/C Ratio	0.02	0.34		0.02	0.34	0.34		0.30			0.30	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	26	1200		26	1200	537		409			432	
v/s Ratio Prot	c0.00	0.14		0.00	c0.20							
v/s Ratio Perm						0.00		c0.18			0.01	
v/c Ratio	0.12	0.41		0.04	0.59	0.01		0.58			0.02	
Uniform Delay, d1	19.2	10.0		19.2	10.8	8.6		11.6			9.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	2.0	0.2		0.6	0.7	0.0		2.0			0.0	
Delay (s)	21.2	10.2		19.8	11.5	8.6		13.6			9.6	
Level of Service	C	B		B	B	A		B			A	
Approach Delay (s)		10.3			11.5			13.6			9.6	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	39.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	75	59	67	159	63	86	423	100	7	513	132
Future Volume (vph)	50	75	59	67	159	63	86	423	100	7	513	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1765	1583		1836	1583	1770	3539	1583	1770	4930	
Flt Permitted	0.34	0.99	1.00		0.87	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	594	1747	1583		1622	1583	1770	3539	1583	1770	4930	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	82	64	73	173	68	93	460	109	8	558	143
RTOR Reduction (vph)	0	0	43	0	0	54	0	0	60	0	45	0
Lane Group Flow (vph)	49	87	21	0	246	14	93	460	49	8	656	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)	20.6	20.6	20.6		13.4	13.4	5.7	29.0	29.0	0.8	24.1	
Effective Green, g (s)	20.6	20.6	20.6		13.4	13.4	5.7	29.0	29.0	0.8	24.1	
Actuated g/C Ratio	0.32	0.32	0.32		0.21	0.21	0.09	0.45	0.45	0.01	0.38	
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	237	563	510		340	331	157	1606	718	22	1859	
v/s Ratio Prot	0.01	c0.01					c0.05	0.13		0.00	c0.13	
v/s Ratio Perm	0.06	0.04	0.01		c0.15	0.01			0.03			
v/c Ratio	0.21	0.15	0.04		0.72	0.04	0.59	0.29	0.07	0.36	0.35	
Uniform Delay, d1	15.6	15.4	14.9		23.5	20.1	28.0	11.0	9.8	31.3	14.3	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	0.1	0.0		7.4	0.1	5.9	0.4	0.2	9.9	0.5	
Delay (s)	16.1	15.6	14.9		31.0	20.2	33.9	11.4	10.0	41.2	14.8	
Level of Service	B	B	B		C	C	C	B	B	D	B	
Approach Delay (s)		15.5			28.6			14.3			15.1	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	63.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

2035 Phase 1 PM Peak Hour LOS Worksheets

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	56	22	293	99	31	203
Future Volume (vph)	56	22	293	99	31	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5			4.5
Lane Util. Factor	0.97	1.00	0.95			0.95
Frt	1.00	0.85	0.96			1.00
Flt Protected	0.95	1.00	1.00			0.99
Satd. Flow (prot)	3433	1583	3405			3516
Flt Permitted	0.95	1.00	1.00			0.89
Satd. Flow (perm)	3433	1583	3405			3141
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	61	24	318	108	34	221
RTOR Reduction (vph)	0	21	43	0	0	0
Lane Group Flow (vph)	61	3	383	0	0	255
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	3.5	3.5	18.9			18.9
Effective Green, g (s)	3.5	3.5	18.9			18.9
Actuated g/C Ratio	0.11	0.11	0.60			0.60
Clearance Time (s)	4.5	4.5	4.5			4.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	382	176	2049			1890
v/s Ratio Prot	c0.02		c0.11			
v/s Ratio Perm		0.00				0.08
v/c Ratio	0.16	0.02	0.19			0.13
Uniform Delay, d1	12.6	12.4	2.8			2.7
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.2	0.0	0.0			0.0
Delay (s)	12.8	12.5	2.8			2.7
Level of Service	B	B	A			A
Approach Delay (s)	12.7		2.8			2.7
Approach LOS	B		A			A

Intersection Summary			
HCM 2000 Control Delay	3.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.18		
Actuated Cycle Length (s)	31.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	548	182	150	500	49	117	214	182	18	171	63
Future Volume (vph)	113	548	182	150	500	49	117	214	182	18	171	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.99		1.00	0.93		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3407		1770	3492		1770	3295		1770	3397	
Flt Permitted	0.40	1.00		0.28	1.00		0.59	1.00		0.50	1.00	
Satd. Flow (perm)	739	3407		524	3492		1107	3295		933	3397	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	123	596	198	163	543	53	127	233	198	20	186	68
RTOR Reduction (vph)	0	69	0	0	16	0	0	119	0	0	41	0
Lane Group Flow (vph)	123	725	0	163	580	0	127	312	0	20	213	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.9	19.9		19.9	19.9		19.0	19.0		19.0	19.0	
Effective Green, g (s)	19.9	19.9		19.9	19.9		19.0	19.0		19.0	19.0	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.40	0.40		0.40	0.40	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	307	1415		217	1450		439	1306		370	1347	
v/s Ratio Prot		0.21			0.17			0.09			0.06	
v/s Ratio Perm	0.17			c0.31			c0.11			0.02		
v/c Ratio	0.40	0.51		0.75	0.40		0.29	0.24		0.05	0.16	
Uniform Delay, d1	9.8	10.4		11.9	9.8		9.8	9.6		8.9	9.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.3		13.6	0.2		1.7	0.4		0.3	0.3	
Delay (s)	10.7	10.7		25.5	10.0		11.5	10.1		9.2	9.6	
Level of Service	B	B		C	A		B	B		A	A	
Approach Delay (s)		10.7			13.3			10.4			9.5	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	47.9	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	489	99	278	379	86	92	518	283	76	331	57
Future Volume (vph)	93	489	99	278	379	86	92	518	283	76	331	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3450		1770	3441		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3450		1770	3441		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	532	108	302	412	93	100	563	308	83	360	62
RTOR Reduction (vph)	0	21	0	0	23	0	0	0	228	0	0	46
Lane Group Flow (vph)	101	619	0	302	482	0	100	563	80	83	360	16
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	7.2	18.0		16.0	26.8		5.5	20.1	20.1	4.9	19.5	19.5
Effective Green, g (s)	7.2	18.0		16.0	26.8		5.5	20.1	20.1	4.9	19.5	19.5
Actuated g/C Ratio	0.09	0.23		0.21	0.35		0.07	0.26	0.26	0.06	0.25	0.25
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	165	806		367	1197		126	923	413	112	896	400
v/s Ratio Prot	0.06	c0.18		c0.17	0.14		c0.06	c0.16		0.05	0.10	
v/s Ratio Perm									0.05			0.01
v/c Ratio	0.61	0.77		0.82	0.40		0.79	0.61	0.19	0.74	0.40	0.04
Uniform Delay, d1	33.6	27.6		29.1	19.0		35.2	25.0	22.1	35.4	23.9	21.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.6	4.4		13.8	0.2		28.1	3.0	1.1	22.9	1.3	0.2
Delay (s)	40.1	32.0		43.0	19.3		63.3	28.0	23.2	58.3	25.2	21.9
Level of Service	D	C		D	B		E	C	C	E	C	C
Approach Delay (s)		33.1			28.1			30.1			30.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	102	96	239	104	56	144
Future Volume (Veh/h)	102	96	239	104	56	144
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	111	104	260	113	61	157
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						1253
pX, platoon unblocked						
vC, conflicting volume	596	316			373	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	596	316			373	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	75	86			95	
cM capacity (veh/h)	443	724			1185	

Direction, Lane #	NW 1	NE 1	SW 1
Volume Total	215	373	218
Volume Left	111	0	61
Volume Right	104	113	0
cSH	545	1700	1185
Volume to Capacity	0.39	0.22	0.05
Queue Length 95th (ft)	47	0	4
Control Delay (s)	15.8	0.0	2.6
Lane LOS	C		A
Approach Delay (s)	15.8	0.0	2.6
Approach LOS	C		

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	1126	16	24	796	77	3	24	10	73	53	158
Future Volume (vph)	45	1126	16	24	796	77	3	24	10	73	53	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.96			0.92	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1770	3532		1770	3492			1787			1701	
Flt Permitted	0.95	1.00		0.95	1.00			0.98			0.91	
Satd. Flow (perm)	1770	3532		1770	3492			1753			1573	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	1224	17	26	865	84	3	26	11	79	58	172
RTOR Reduction (vph)	0	2	0	0	11	0	0	7	0	0	74	0
Lane Group Flow (vph)	49	1239	0	26	938	0	0	33	0	0	235	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	3.1	24.2		2.1	23.2			19.1			19.1	
Effective Green, g (s)	3.1	24.2		2.1	23.2			19.1			19.1	
Actuated g/C Ratio	0.05	0.41		0.04	0.40			0.33			0.33	
Clearance Time (s)	4.0	4.5		4.0	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	93	1463		63	1387			573			514	
v/s Ratio Prot	c0.03	c0.35		0.01	0.27							
v/s Ratio Perm								0.02			c0.15	
v/c Ratio	0.53	0.85		0.41	0.68			0.06			0.46	
Uniform Delay, d1	26.9	15.4		27.5	14.5			13.5			15.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	5.3	4.7		4.3	1.3			0.2			2.9	
Delay (s)	32.2	20.2		31.9	15.8			13.7			18.5	
Level of Service	C	C		C	B			B			B	
Approach Delay (s)		20.6			16.3			13.7			18.5	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	58.4	Sum of lost time (s)	13.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	632	58	34	505	74	157	78	47	46	74	89
Future Volume (vph)	84	632	58	34	505	74	157	78	47	46	74	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.98			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.99	
Satd. Flow (prot)	1770	3495		1770	3472			1772			1736	
Flt Permitted	0.33	1.00		0.25	1.00			0.73			0.89	
Satd. Flow (perm)	611	3495		467	3472			1334			1559	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	687	63	37	549	80	171	85	51	50	80	97
RTOR Reduction (vph)	0	13	0	0	21	0	0	11	0	0	41	0
Lane Group Flow (vph)	91	737	0	37	608	0	0	296	0	0	186	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.3	18.3		18.3	18.3			27.7			27.7	
Effective Green, g (s)	18.3	18.3		18.3	18.3			27.7			27.7	
Actuated g/C Ratio	0.33	0.33		0.33	0.33			0.50			0.50	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	203	1162		155	1155			671			785	
v/s Ratio Prot		c0.21			0.18							
v/s Ratio Perm	0.15			0.08				c0.22			0.12	
v/c Ratio	0.45	0.63		0.24	0.53			0.44			0.24	
Uniform Delay, d1	14.4	15.5		13.3	14.8			8.7			7.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.6	1.1		0.8	0.4			2.1			0.7	
Delay (s)	16.0	16.7		14.1	15.3			10.8			8.4	
Level of Service	B	B		B	B			B			A	
Approach Delay (s)		16.6			15.2			10.8			8.4	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	74	0	18	266	184	62
Future Volume (Veh/h)	74	0	18	266	184	62
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	80	0	20	289	200	67
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1274		
pX, platoon unblocked						
vC, conflicting volume	562	234	267			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	562	234	267			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	83	100	98			
cM capacity (veh/h)	480	806	1297			

Direction, Lane #	SE 1	NE 1	SW 1
Volume Total	80	309	267
Volume Left	80	20	0
Volume Right	0	0	67
cSH	480	1297	1700
Volume to Capacity	0.17	0.02	0.16
Queue Length 95th (ft)	15	1	0
Control Delay (s)	14.0	0.6	0.0
Lane LOS	B	A	
Approach Delay (s)	14.0	0.6	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	511	155	173	428	68	151	195	91	65	191	73
Future Volume (vph)	69	511	155	173	428	68	151	195	91	65	191	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3416		1770	3466		1770	1863	1583	1770	1863	1583
Flt Permitted	0.41	1.00		0.19	1.00		0.53	1.00	1.00	0.61	1.00	1.00
Satd. Flow (perm)	767	3416		347	3466		993	1863	1583	1144	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	75	555	168	188	465	74	164	212	99	71	208	79
RTOR Reduction (vph)	0	41	0	0	18	0	0	0	67	0	0	55
Lane Group Flow (vph)	75	682	0	188	521	0	164	212	32	71	208	24
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	22.7	18.4		28.9	21.5		28.4	22.9	22.9	25.4	21.4	21.4
Effective Green, g (s)	22.7	18.4		28.9	21.5		28.4	22.9	22.9	25.4	21.4	21.4
Actuated g/C Ratio	0.32	0.26		0.41	0.30		0.40	0.32	0.32	0.36	0.30	0.30
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	307	889		290	1054		459	603	512	446	563	479
v/s Ratio Prot	0.01	c0.20		c0.07	0.15		c0.03	0.11		0.01	0.11	
v/s Ratio Perm	0.06			0.20			c0.12		0.02	0.05		0.02
v/c Ratio	0.24	0.77		0.65	0.49		0.36	0.35	0.06	0.16	0.37	0.05
Uniform Delay, d1	17.0	24.2		15.3	20.1		14.0	18.2	16.5	15.1	19.4	17.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	4.0		4.9	0.4		0.5	1.6	0.2	0.2	1.9	0.2
Delay (s)	17.5	28.2		20.2	20.5		14.5	19.8	16.7	15.3	21.2	17.6
Level of Service	B	C		C	C		B	B	B	B	C	B
Approach Delay (s)		27.2			20.4			17.4			19.3	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	70.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Sign Control		Stop			Stop			Stop		Stop		
Traffic Volume (vph)	76	54	162	29	31	34	19	399	38	48	417	3
Future Volume (vph)	76	54	162	29	31	34	19	399	38	48	417	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	83	59	176	32	34	37	21	434	41	52	453	3

Direction, Lane #	EB 1	WB 1	SB 1	SB 2	NW 1	NW 2
Volume Total (vph)	318	103	238	258	279	230
Volume Left (vph)	83	32	21	0	52	0
Volume Right (vph)	176	37	0	41	0	3
Hadj (s)	-0.25	-0.12	0.08	-0.08	0.13	0.02
Departure Headway (s)	6.4	7.2	7.0	6.8	7.0	6.9
Degree Utilization, x	0.57	0.21	0.46	0.49	0.54	0.44
Capacity (veh/h)	524	425	498	510	492	505
Control Delay (s)	17.5	12.1	14.6	14.9	16.7	13.9
Approach Delay (s)	17.5	12.1	14.7		15.5	
Approach LOS	C	B	B		C	

Intersection Summary			
Delay	15.4		
Level of Service	C		
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	960	0	214	622	109	103	458	361	332	489	58
Future Volume (vph)	55	960	0	214	622	109	103	458	361	332	489	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539		1770	3539	1583	1770	3539	1583	1770	3483	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539		1770	3539	1583	1770	3539	1583	1770	3483	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	1043	0	233	676	118	112	498	392	361	532	63
RTOR Reduction (vph)	0	0	0	0	0	75	0	0	110	0	9	0
Lane Group Flow (vph)	60	1043	0	233	676	43	112	498	282	361	586	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	6.8	29.1		14.4	36.7	36.7	10.9	18.9	33.3	20.5	28.5	
Effective Green, g (s)	6.8	29.1		14.4	36.7	36.7	10.9	18.9	33.3	20.5	28.5	
Actuated g/C Ratio	0.07	0.29		0.14	0.36	0.36	0.11	0.19	0.33	0.20	0.28	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	119	1020		252	1287	575	191	662	522	359	983	
v/s Ratio Prot	0.03	c0.29		c0.13	0.19		0.06	c0.14	0.08	c0.20	0.17	
v/s Ratio Perm						0.03			0.10			
v/c Ratio	0.50	1.02		0.92	0.53	0.07	0.59	0.75	0.54	1.01	0.60	
Uniform Delay, d1	45.4	35.9		42.7	25.2	21.0	42.9	38.8	27.6	40.2	31.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.3	34.0		36.7	0.4	0.1	4.5	7.7	1.1	48.9	2.7	
Delay (s)	48.8	69.9		79.4	25.6	21.0	47.4	46.5	28.7	89.1	33.9	
Level of Service	D	E		E	C	C	D	D	C	F	C	
Approach Delay (s)		68.8			37.3			39.6			54.7	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	50.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	9	8	15	24	1	6	14	92	34	22	68	0
Future Volume (vph)	9	8	15	24	1	6	14	92	34	22	68	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	9	16	26	1	7	15	100	37	24	74	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	35	34	152	98
Volume Left (vph)	10	26	15	24
Volume Right (vph)	16	7	37	0
Hadj (s)	-0.18	0.06	-0.09	0.08
Departure Headway (s)	4.3	4.5	4.1	4.3
Degree Utilization, x	0.04	0.04	0.17	0.12
Capacity (veh/h)	786	737	859	818
Control Delay (s)	7.5	7.8	7.9	7.9
Approach Delay (s)	7.5	7.8	7.9	7.9
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.8		
Level of Service	A		
Intersection Capacity Utilization	20.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	1456	43	33	862	50	21	24	49	56	25	68
Future Volume (vph)	110	1456	43	33	862	50	21	24	49	56	25	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		0.91	0.91			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.93			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1770	3524		1610	3362			1713			1716	
Flt Permitted	0.95	1.00		0.95	0.95			0.93			0.87	
Satd. Flow (perm)	1770	3524		1610	3195			1602			1515	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	1583	47	36	937	54	23	26	53	61	27	74
RTOR Reduction (vph)	0	2	0	0	5	0	0	42	0	0	34	0
Lane Group Flow (vph)	120	1628	0	32	990	0	0	60	0	0	128	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	8.2	55.7		3.2	53.9			19.3			19.3	
Effective Green, g (s)	8.2	55.7		3.2	53.9			19.3			19.3	
Actuated g/C Ratio	0.09	0.61		0.03	0.59			0.21			0.21	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	158	2140		56	1883			337			318	
v/s Ratio Prot	c0.07	c0.46		0.02	0.02							
v/s Ratio Perm					0.29			0.04			c0.08	
v/c Ratio	0.76	0.76		0.57	0.53			0.18			0.40	
Uniform Delay, d1	40.8	13.1		43.6	11.3			29.7			31.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	18.7	1.6		13.3	0.3			1.2			3.8	
Delay (s)	59.5	14.8		56.9	11.5			30.9			35.0	
Level of Service	E	B		E	B			C			C	
Approach Delay (s)		17.8			13.0			30.9			35.0	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	17.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	91.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	91.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	15	9	5	6	3	20	129	9	17	120	5
Future Volume (Veh/h)	15	15	9	5	6	3	20	129	9	17	120	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	16	10	5	7	3	22	140	10	18	130	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								564				
pX, platoon unblocked												
vC, conflicting volume	364	362	132	376	360	145	135			150		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	364	362	132	376	360	145	135			150		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	97	99	99	99	100	98			99		
cM capacity (veh/h)	572	549	917	551	551	902	1449			1431		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	42	15	172	153
Volume Left	16	5	22	18
Volume Right	10	3	10	5
cSH	618	598	1449	1431
Volume to Capacity	0.07	0.03	0.02	0.01
Queue Length 95th (ft)	5	2	1	1
Control Delay (s)	11.3	11.2	1.1	1.0
Lane LOS	B	B	A	A
Approach Delay (s)	11.3	11.2	1.1	1.0
Approach LOS	B	B		

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	21.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	1494	11	36	834	62	3	3	8	64	6	47
Future Volume (vph)	92	1494	11	36	834	62	3	3	8	64	6	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.92			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.97	
Satd. Flow (prot)	1770	3535		1770	3503			1695			1716	
Flt Permitted	0.95	1.00		0.95	1.00			0.96			0.84	
Satd. Flow (perm)	1770	3535		1770	3503			1647			1481	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	100	1624	12	39	907	67	3	3	9	70	7	51
RTOR Reduction (vph)	0	0	0	0	6	0	0	7	0	0	29	0
Lane Group Flow (vph)	100	1636	0	39	968	0	0	8	0	0	99	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	7.4	39.9		3.0	35.5			19.8			19.8	
Effective Green, g (s)	7.4	39.9		3.0	35.5			19.8			19.8	
Actuated g/C Ratio	0.10	0.52		0.04	0.47			0.26			0.26	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	171	1851		69	1631			427			384	
v/s Ratio Prot	c0.06	c0.46		0.02	0.28							
v/s Ratio Perm								0.01			c0.07	
v/c Ratio	0.58	0.88		0.57	0.59			0.02			0.26	
Uniform Delay, d1	32.9	16.1		36.0	15.0			21.0			22.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	5.0	5.4		10.2	0.6			0.1			1.6	
Delay (s)	38.0	21.5		46.1	15.6			21.1			24.0	
Level of Service	D	C		D	B			C			C	
Approach Delay (s)		22.4			16.8			21.1			24.0	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	76.2	Sum of lost time (s)	13.5
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (veh/h)	2	24	13	8	2	2	7	159	6	8	96	5
Future Volume (Veh/h)	2	24	13	8	2	2	7	159	6	8	96	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	26	14	9	2	2	8	173	7	9	104	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								560				
pX, platoon unblocked												
vC, conflicting volume	320	320	106	344	320	176	109			180		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	320	320	106	344	320	176	109			180		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	96	99	98	100	100	99			99		
cM capacity (veh/h)	624	589	948	576	590	867	1481			1396		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	42	13	188	118
Volume Left	2	9	8	9
Volume Right	14	2	7	5
cSH	676	610	1481	1396
Volume to Capacity	0.06	0.02	0.01	0.01
Queue Length 95th (ft)	5	2	0	0
Control Delay (s)	10.7	11.0	0.4	0.6
Lane LOS	B	B	A	A
Approach Delay (s)	10.7	11.0	0.4	0.6
Approach LOS	B	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	21.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	1388	34	32	818	66	42	17	22	49	15	50
Future Volume (vph)	88	1388	34	32	818	66	42	17	22	49	15	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.96			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.98	
Satd. Flow (prot)	1770	3527		1770	3499			1748			1715	
Flt Permitted	0.95	1.00		0.95	1.00			0.82			0.85	
Satd. Flow (perm)	1770	3527		1770	3499			1473			1495	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	1509	37	35	889	72	46	18	24	53	16	54
RTOR Reduction (vph)	0	3	0	0	8	0	0	17	0	0	39	0
Lane Group Flow (vph)	96	1543	0	35	953	0	0	71	0	0	84	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	6.9	33.9		1.9	28.9			19.0			19.0	
Effective Green, g (s)	6.9	33.9		1.9	28.9			19.0			19.0	
Actuated g/C Ratio	0.10	0.50		0.03	0.42			0.28			0.28	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	178	1750		49	1480			409			415	
v/s Ratio Prot	c0.05	c0.44		0.02	0.27							
v/s Ratio Perm								0.05			c0.06	
v/c Ratio	0.54	0.88		0.71	0.64			0.17			0.20	
Uniform Delay, d1	29.2	15.4		32.9	15.6			18.7			18.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	3.1	5.6		39.0	1.0			0.9			1.1	
Delay (s)	32.3	21.0		72.0	16.6			19.6			20.0	
Level of Service	C	C		E	B			B			B	
Approach Delay (s)		21.7			18.5			19.6			20.0	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	68.3	Sum of lost time (s)	13.5
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	6	26	8	5	10	15	336	14	8	353	3
Future Volume (Veh/h)	3	6	26	8	5	10	15	336	14	8	353	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	7	28	9	5	11	16	365	15	9	384	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								542				
pX, platoon unblocked												
vC, conflicting volume	632	816	194	646	810	190	387			380		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	632	816	194	646	810	190	387			380		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	98	97	97	98	99	99			99		
cM capacity (veh/h)	350	304	815	333	306	820	1168			1175		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	38	25	198	198	201	195
Volume Left	3	9	16	0	9	0
Volume Right	28	11	0	15	0	3
cSH	576	440	1168	1700	1175	1700
Volume to Capacity	0.07	0.06	0.01	0.12	0.01	0.11
Queue Length 95th (ft)	5	5	1	0	1	0
Control Delay (s)	11.7	13.7	0.8	0.0	0.4	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	11.7	13.7	0.4		0.2	
Approach LOS	B	B				

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	30.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	167	1167	754	204	289	101
Future Volume (vph)	167	1167	754	204	289	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.95	0.95		0.97	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3426		3433	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3426		3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	182	1268	820	222	314	110
RTOR Reduction (vph)	0	0	41	0	0	72
Lane Group Flow (vph)	182	1268	1001	0	314	38
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	7.5	30.5	18.5		20.5	20.5
Effective Green, g (s)	7.5	30.5	18.5		20.5	20.5
Actuated g/C Ratio	0.12	0.51	0.31		0.34	0.34
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	221	1798	1056		1172	540
v/s Ratio Prot	0.10	c0.36	c0.29		c0.09	
v/s Ratio Perm						0.02
v/c Ratio	0.82	0.71	0.95		0.27	0.07
Uniform Delay, d1	25.6	11.3	20.3		14.3	13.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	21.3	1.3	16.5		0.6	0.2
Delay (s)	46.9	12.6	36.8		14.9	13.6
Level of Service	D	B	D		B	B
Approach Delay (s)		16.9	36.8		14.5	
Approach LOS		B	D		B	

Intersection Summary			
HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	438	507	1026	447	630	1136
Future Volume (vph)	438	507	1026	447	630	1136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	0.97	1.00	0.91		0.97	0.95
Frt	1.00	0.85	0.95		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3090	1425	4368		3090	3185
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3090	1425	4368		3090	3185
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	476	551	1115	486	685	1235
RTOR Reduction (vph)	0	340	86	0	0	0
Lane Group Flow (vph)	476	211	1515	0	685	1235
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	17.8	17.8	35.5		21.5	61.5
Effective Green, g (s)	17.8	17.8	35.5		21.5	61.5
Actuated g/C Ratio	0.20	0.20	0.40		0.24	0.70
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	622	287	1756		752	2218
v/s Ratio Prot	c0.15		c0.35		c0.22	0.39
v/s Ratio Perm		0.15				
v/c Ratio	0.77	0.73	0.86		0.91	0.56
Uniform Delay, d1	33.3	33.0	24.2		32.5	6.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.6	9.4	5.9		17.1	1.0
Delay (s)	38.9	42.4	30.0		49.6	7.7
Level of Service	D	D	C		D	A
Approach Delay (s)	40.8		30.0			22.6
Approach LOS	D		C			C

Intersection Summary			
HCM 2000 Control Delay	29.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	88.3	Sum of lost time (s)	13.5
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	344	94	48	153	63	63
Future Volume (Veh/h)	344	94	48	153	63	63
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	374	102	52	166	68	68
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						1
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			476		695	425
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			476		695	425
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		83	89
cM capacity (veh/h)			1086		389	629

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	476	218	136
Volume Left	0	52	68
Volume Right	102	0	68
cSH	1700	1086	777
Volume to Capacity	0.28	0.05	0.17
Queue Length 95th (ft)	0	4	16
Control Delay (s)	0.0	2.4	13.8
Lane LOS		A	B
Approach Delay (s)	0.0	2.4	13.8
Approach LOS			B

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	366	62	36	162	8	29	16	46	3	11	7
Future Volume (vph)	5	366	62	36	162	8	29	16	46	3	11	7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	398	67	39	176	9	32	17	50	3	12	8

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	470	215	9	49	50	23
Volume Left (vph)	5	39	0	32	0	3
Volume Right (vph)	67	0	9	0	50	8
Hadj (s)	-0.05	0.12	-0.67	0.36	-0.67	-0.15
Departure Headway (s)	5.1	5.5	4.7	6.7	5.6	6.3
Degree Utilization, x	0.67	0.33	0.01	0.09	0.08	0.04
Capacity (veh/h)	684	636	738	490	571	495
Control Delay (s)	17.9	9.9	6.5	9.1	7.9	9.6
Approach Delay (s)	17.9	9.8		8.5		9.6
Approach LOS	C	A		A		A

Intersection Summary			
Delay	14.3		
Level of Service	B		
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	633	1	178	7	0	22	111	816	0	3	698	705
Future Volume (vph)	633	1	178	7	0	22	111	816	0	3	698	705
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	0.95	0.95	0.88		1.00		0.97	0.91		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.90		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1686	2787		1653		3433	5085		1770	3539	1583
Flt Permitted	0.74	0.70	1.00		1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1303	1245	2787		1674		3433	5085		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	688	1	193	8	0	24	121	887	0	3	759	766
RTOR Reduction (vph)	0	0	122	0	31	0	0	0	0	0	0	482
Lane Group Flow (vph)	344	345	71	0	1	0	121	887	0	3	759	284
Turn Type	pm+pt	NA	Perm	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8								6
Actuated Green, G (s)	24.5	24.5	24.5		1.9		3.7	27.5		0.8	24.6	24.6
Effective Green, g (s)	24.5	24.5	24.5		1.9		3.7	27.5		0.8	24.6	24.6
Actuated g/C Ratio	0.37	0.37	0.37		0.03		0.06	0.41		0.01	0.37	0.37
Clearance Time (s)	4.5	4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	584	580	1029		47		191	2109		21	1313	587
v/s Ratio Prot	0.16	c0.16					c0.04	c0.17		0.00	c0.21	
v/s Ratio Perm	0.06	c0.06	0.03		0.00							0.18
v/c Ratio	0.59	0.59	0.07		0.02		0.63	0.42		0.14	0.58	0.48
Uniform Delay, d1	16.4	16.9	13.5		31.3		30.6	13.8		32.4	16.7	16.0
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.5	1.6	0.0		0.2		6.7	0.6		3.1	1.9	2.8
Delay (s)	17.9	18.5	13.6		31.5		37.3	14.4		35.5	18.6	18.8
Level of Service	B	B	B		C		D	B		D	B	B
Approach Delay (s)		17.2			31.5			17.1			18.7	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	66.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	22	39	474	490	51
Future Volume (Veh/h)	0	22	39	474	490	51
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	24	42	515	533	55
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1038	287	
pX, platoon unblocked						
vC, conflicting volume	902	294	588			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	902	294	588			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	96			
cM capacity (veh/h)	265	702	983			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	24	214	343	355	233
Volume Left	0	42	0	0	0
Volume Right	24	0	0	0	55
cSH	702	983	1700	1700	1700
Volume to Capacity	0.03	0.04	0.20	0.21	0.14
Queue Length 95th (ft)	3	3	0	0	0
Control Delay (s)	10.3	2.1	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	10.3	0.8		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	36.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	117	40	0	696	111	22	879
Future Volume (vph)	117	40	0	696	111	22	879
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5		4.5	4.5
Lane Util. Factor	1.00			0.91		1.00	0.91
Frt	0.97			0.98		1.00	1.00
Flt Protected	0.96			1.00		0.95	1.00
Satd. Flow (prot)	1734			4980		1770	5085
Flt Permitted	0.96			1.00		0.95	1.00
Satd. Flow (perm)	1734			4980		1770	5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	127	43	0	757	121	24	955
RTOR Reduction (vph)	25	0	0	25	0	0	0
Lane Group Flow (vph)	145	0	0	853	0	24	955
Turn Type	Prot		Prot	NA		Prot	NA
Protected Phases	8		5	2		1	6
Permitted Phases							
Actuated Green, G (s)	7.7			27.3		0.9	32.7
Effective Green, g (s)	7.7			27.3		0.9	32.7
Actuated g/C Ratio	0.16			0.55		0.02	0.66
Clearance Time (s)	4.5			4.5		4.5	4.5
Vehicle Extension (s)	3.0			3.0		3.0	3.0
Lane Grp Cap (vph)	270			2752		32	3365
v/s Ratio Prot	c0.08			c0.17		0.01	c0.19
v/s Ratio Perm							
v/c Ratio	0.54			0.31		0.75	0.28
Uniform Delay, d1	19.2			6.0		24.1	3.5
Progression Factor	1.00			1.00		1.00	1.00
Incremental Delay, d2	2.0			0.3		65.2	0.2
Delay (s)	21.2			6.3		89.3	3.7
Level of Service	C			A		F	A
Approach Delay (s)	21.2			6.3			5.8
Approach LOS	C			A			A

Intersection Summary			
HCM 2000 Control Delay	7.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	49.4	Sum of lost time (s)	13.5
Intersection Capacity Utilization	34.7%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Existing to No Build			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	756	273	302	482	85	186	694	235	70	851	118
Future Volume (vph)	118	756	273	302	482	85	186	694	235	70	851	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3460		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3460		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	128	822	297	328	524	92	202	754	255	76	925	128
RTOR Reduction (vph)	0	0	144	0	18	0	0	0	161	0	0	90
Lane Group Flow (vph)	128	822	153	328	598	0	202	754	94	76	925	38
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	8.5	19.6	19.6	8.6	19.7		10.5	29.7	29.7	5.0	24.2	24.2
Effective Green, g (s)	8.5	19.6	19.6	8.6	19.7		10.5	29.7	29.7	5.0	24.2	24.2
Actuated g/C Ratio	0.11	0.24	0.24	0.11	0.24		0.13	0.37	0.37	0.06	0.30	0.30
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	185	857	383	364	842		229	1299	581	109	1058	473
v/s Ratio Prot	0.07	c0.23		c0.10	0.17		c0.11	0.21		0.04	c0.26	
v/s Ratio Perm			0.10						0.06			0.02
v/c Ratio	0.69	0.96	0.40	0.90	0.71		0.88	0.58	0.16	0.70	0.87	0.08
Uniform Delay, d1	34.9	30.3	25.7	35.7	28.0		34.6	20.6	17.2	37.2	26.9	20.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.6	21.1	0.7	24.4	2.8		30.3	1.9	0.6	17.6	10.0	0.3
Delay (s)	45.6	51.4	26.4	60.2	30.8		64.9	22.5	17.8	54.9	37.0	20.7
Level of Service	D	D	C	E	C		E	C	B	D	D	C
Approach Delay (s)		44.8			41.0			28.6			36.3	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	37.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	80.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	9	11	14	18	6	19	282	11	14	156	3
Future Volume (Veh/h)	8	9	11	14	18	6	19	282	11	14	156	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	10	12	15	20	7	21	307	12	15	170	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											647	
pX, platoon unblocked												
vC, conflicting volume	574	562	172	574	558	313	173			319		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	574	562	172	574	558	313	173			319		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	98	99	96	95	99	99			99		
cM capacity (veh/h)	402	424	872	408	426	727	1404			1241		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	31	42	340	188
Volume Left	9	15	21	15
Volume Right	12	7	12	3
cSH	519	450	1404	1241
Volume to Capacity	0.06	0.09	0.01	0.01
Queue Length 95th (ft)	5	8	1	1
Control Delay (s)	12.4	13.8	0.6	0.7
Lane LOS	B	B	A	A
Approach Delay (s)	12.4	13.8	0.6	0.7
Approach LOS	B	B		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	30.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	8	35	30	8	22	17	399	14	17	440	2
Future Volume (Veh/h)	8	8	35	30	8	22	17	399	14	17	440	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	9	38	33	9	24	18	434	15	18	478	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											650	
pX, platoon unblocked	0.92	0.92	0.92	0.92	0.92		0.92					
vC, conflicting volume	796	1000	479	1035	994	224	480			449		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	737	958	393	996	951	224	394			449		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	96	93	80	96	97	98			98		
cM capacity (veh/h)	259	228	559	162	230	779	1071			1108		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	56	66	235	232	498
Volume Left	9	33	18	0	18
Volume Right	38	24	0	15	2
cSH	394	241	1071	1700	1108
Volume to Capacity	0.14	0.27	0.02	0.14	0.02
Queue Length 95th (ft)	12	27	1	0	1
Control Delay (s)	15.6	25.5	0.8	0.0	0.5
Lane LOS	C	D	A		A
Approach Delay (s)	15.6	25.5	0.4		0.5
Approach LOS	C	D			

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	0	590	19	1	611
Future Volume (Veh/h)	7	0	590	19	1	611
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	0	641	21	1	664
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			None
Median storage veh)			2			
Upstream signal (ft)			430			
pX, platoon unblocked	0.87	0.87			0.87	
vC, conflicting volume	986	331			662	
vC1, stage 1 conf vol	652					
vC2, stage 2 conf vol	334					
vCu, unblocked vol	692	0			321	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	535	946			1078	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	8	427	235	222	443
Volume Left	8	0	0	1	0
Volume Right	0	0	21	0	0
cSH	535	1700	1700	1078	1700
Volume to Capacity	0.01	0.25	0.14	0.00	0.26
Queue Length 95th (ft)	1	0	0	0	0
Control Delay (s)	11.8	0.0	0.0	0.0	0.0
Lane LOS	B			A	
Approach Delay (s)	11.8	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	27.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Volume (veh/h)	88	5	1	521	491	0
Future Volume (Veh/h)	88	5	1	521	491	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	96	5	1	566	534	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	819	267	534			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	819	267	534			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	69	99	100			
cM capacity (veh/h)	313	731	1030			

Direction, Lane #	WB 1	WB 2	SE 1	SE 2	SE 3	NW 1	NW 2
Volume Total	96	5	1	283	283	267	267
Volume Left	96	0	1	0	0	0	0
Volume Right	0	5	0	0	0	0	0
cSH	313	731	1030	1700	1700	1700	1700
Volume to Capacity	0.31	0.01	0.00	0.17	0.17	0.16	0.16
Queue Length 95th (ft)	32	1	0	0	0	0	0
Control Delay (s)	21.5	10.0	8.5	0.0	0.0	0.0	0.0
Lane LOS	C	A	A				
Approach Delay (s)	20.9		0.0			0.0	
Approach LOS	C						

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	25.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1	0	23	5	3	0	206	53	1	65	0
Future Volume (Veh/h)	0	1	0	23	5	3	0	206	53	1	65	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	0	25	5	3	0	224	58	1	71	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	332	355	71	326	326	253	71			282		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	332	355	71	326	326	253	71			282		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	96	99	100	100			100		
cM capacity (veh/h)	615	570	991	625	592	786	1529			1280		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	1	33	282	72
Volume Left	0	25	0	1
Volume Right	0	3	58	0
cSH	570	632	1700	1280
Volume to Capacity	0.00	0.05	0.17	0.00
Queue Length 95th (ft)	0	4	0	0
Control Delay (s)	11.3	11.0	0.0	0.1
Lane LOS	B	B		A
Approach Delay (s)	11.3	11.0	0.0	0.1
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	29.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	761	42	33	563	28	50
Future Volume (Veh/h)	761	42	33	563	28	50
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	827	46	36	612	30	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				647		
pX, platoon unblocked					0.81	
vC, conflicting volume			873		1534	850
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			873		1542	850
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		69	85
cM capacity (veh/h)			773		98	360

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	873	648	84
Volume Left	0	36	30
Volume Right	46	0	54
cSH	1700	773	185
Volume to Capacity	0.51	0.05	0.46
Queue Length 95th (ft)	0	4	54
Control Delay (s)	0.0	1.2	39.8
Lane LOS		A	E
Approach Delay (s)	0.0	1.2	39.8
Approach LOS			E

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	737	31	8	561	18	19	18	15	10	9	15
Future Volume (vph)	38	737	31	8	561	18	19	18	15	10	9	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			1.00			0.96			0.94	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		1849			1854			1760			1728	
Flt Permitted		0.96			0.99			0.87			0.89	
Satd. Flow (perm)		1776			1834			1555			1568	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	801	34	9	610	20	21	20	16	11	10	16
RTOR Reduction (vph)	0	2	0	0	1	0	0	14	0	0	14	0
Lane Group Flow (vph)	0	874	0	0	638	0	0	43	0	0	23	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		27.8			27.8			6.8			6.8	
Effective Green, g (s)		27.8			27.8			6.8			6.8	
Actuated g/C Ratio		0.64			0.64			0.16			0.16	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1132			1169			242			244	
v/s Ratio Prot												
v/s Ratio Perm		c0.49			0.35			c0.03			0.01	
v/c Ratio		0.77			0.55			0.18			0.10	
Uniform Delay, d1		5.6			4.4			16.0			15.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		3.3			0.5			0.4			0.2	
Delay (s)		9.0			4.9			16.3			15.9	
Level of Service		A			A			B			B	
Approach Delay (s)		9.0			4.9			16.3			15.9	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	7.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	43.6	Sum of lost time (s)	9.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	211	577	150	89	313	121	290	651	227	269	428	222
Future Volume (vph)	211	577	150	89	313	121	290	651	227	269	428	222
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.97		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3430		1770	3391		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3430		1770	3391		3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	229	627	163	97	340	132	315	708	247	292	465	241
RTOR Reduction (vph)	0	32	0	0	60	0	0	0	164	0	0	174
Lane Group Flow (vph)	229	758	0	97	412	0	315	708	83	292	465	67
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	6.5	19.2		4.3	17.0		8.5	19.3	19.3	8.3	19.1	19.1
Effective Green, g (s)	6.5	19.2		4.3	17.0		8.5	19.3	19.3	8.3	19.1	19.1
Actuated g/C Ratio	0.09	0.28		0.06	0.25		0.12	0.28	0.28	0.12	0.28	0.28
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	322	953		110	834		422	988	442	412	978	437
v/s Ratio Prot	c0.07	c0.22		0.05	0.12		c0.09	c0.20		0.09	0.13	
v/s Ratio Perm									0.05			0.04
v/c Ratio	0.71	0.79		0.88	0.49		0.75	0.72	0.19	0.71	0.48	0.15
Uniform Delay, d1	30.4	23.1		32.1	22.4		29.3	22.4	18.9	29.2	20.8	18.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.2	4.6		50.6	0.5		7.0	4.5	0.9	5.5	1.7	0.7
Delay (s)	37.6	27.8		82.7	22.8		36.3	26.9	19.9	34.7	22.5	19.6
Level of Service	D	C		F	C		D	C	B	C	C	B
Approach Delay (s)		30.0			33.0			27.9			25.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	69.1	Sum of lost time (s)	18.0
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1253	202	179	906	374	159	0	114	295	122	186
Future Volume (vph)	0	1253	202	179	906	374	159	0	114	295	122	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		4.5	4.5		4.5		4.5	4.5	4.5	4.5
Lane Util. Factor		0.91		1.00	0.91		0.97		1.00	0.95	0.95	1.00
Frt		0.98		1.00	0.96		1.00		0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.98	1.00
Satd. Flow (prot)		4979		1770	4862		3433		1583	1681	1733	1583
Flt Permitted		1.00		0.95	1.00		0.14		1.00	0.95	0.98	1.00
Satd. Flow (perm)		4979		1770	4862		516		1583	1681	1733	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1362	220	195	985	407	173	0	124	321	133	202
RTOR Reduction (vph)	0	22	0	0	74	0	0	0	89	0	0	168
Lane Group Flow (vph)	0	1560	0	195	1318	0	173	0	35	225	229	34
Turn Type		NA		Prot	NA		Perm		Perm	Split	NA	Perm
Protected Phases		4		3	8					6	6	
Permitted Phases							2		2			6
Actuated Green, G (s)		26.5		9.5	40.5		28.0		28.0	16.6	16.6	16.6
Effective Green, g (s)		26.5		9.5	40.5		28.0		28.0	16.6	16.6	16.6
Actuated g/C Ratio		0.27		0.10	0.41		0.28		0.28	0.17	0.17	0.17
Clearance Time (s)		4.5		4.5	4.5		4.5		4.5	4.5	4.5	4.5
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		1338		170	1997		146		449	283	291	266
v/s Ratio Prot		c0.31		c0.11	0.27					c0.13	0.13	
v/s Ratio Perm							c0.34		0.02			0.02
v/c Ratio		1.17		1.15	0.66		1.18		0.08	0.80	0.79	0.13
Uniform Delay, d1		36.0		44.5	23.5		35.3		25.9	39.4	39.3	34.8
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		83.2		114.1	0.8		132.7		0.3	14.2	13.1	0.2
Delay (s)		119.2		158.6	24.3		168.0		26.2	53.6	52.4	35.1
Level of Service		F		F	C		F		C	D	D	D
Approach Delay (s)		119.2			40.8			108.8			47.5	
Approach LOS		F			D			F			D	

Intersection Summary			
HCM 2000 Control Delay	76.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	431	739	327	233	699	59	385	352	149	84	116	389
Future Volume (vph)	431	739	327	233	699	59	385	352	149	84	116	389
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	4.5
Lane Util. Factor	0.97	0.91		1.00	0.91			0.95		1.00	0.95	1.00
Frt	1.00	0.95		1.00	0.99			0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98		0.95	1.00	1.00
Satd. Flow (prot)	3433	4851		1770	5026			3377		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.58		0.95	1.00	1.00
Satd. Flow (perm)	3433	4851		1770	5026			2007		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	468	803	355	253	760	64	418	383	162	91	126	423
RTOR Reduction (vph)	0	57	0	0	7	0	0	12	0	0	0	328
Lane Group Flow (vph)	468	1101	0	253	817	0	0	951	0	91	126	95
Turn Type	Prot	NA		Prot	NA		Perm	NA		Split	NA	Perm
Protected Phases	7	4		3	8			2		6	6	
Permitted Phases							2					6
Actuated Green, G (s)	20.3	27.6		17.5	24.8			59.1		13.8	13.8	13.8
Effective Green, g (s)	20.3	27.6		17.5	24.8			59.1		13.8	13.8	13.8
Actuated g/C Ratio	0.15	0.20		0.13	0.18			0.43		0.10	0.10	0.10
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	512	984		227	916			872		179	359	160
v/s Ratio Prot	0.14	c0.23		c0.14	0.16					0.05	0.04	
v/s Ratio Perm								c0.47				c0.06
v/c Ratio	0.91	1.12		1.11	0.89			6.33dl		0.51	0.35	0.59
Uniform Delay, d1	57.0	54.2		59.2	54.3			38.5		57.9	56.9	58.4
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	20.8	67.4		93.9	11.0			58.2		2.3	0.6	5.8
Delay (s)	77.8	121.6		153.1	65.3			96.7		60.2	57.5	64.2
Level of Service	E	F		F	E			F		E	E	E
Approach Delay (s)		109.0			85.9			96.7			62.3	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM 2000 Control Delay	93.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	136.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	61	90	8	69	1	81	1	19	0	6	4
Future Volume (vph)	7	61	90	8	69	1	81	1	19	0	6	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	66	98	9	75	1	88	1	21	0	7	4

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	172	85	110	11
Volume Left (vph)	8	9	88	0
Volume Right (vph)	98	1	21	4
Hadj (s)	-0.30	0.05	0.08	-0.18
Departure Headway (s)	4.0	4.4	4.5	4.4
Degree Utilization, x	0.19	0.10	0.14	0.01
Capacity (veh/h)	872	776	747	752
Control Delay (s)	7.9	7.9	8.3	7.5
Approach Delay (s)	7.9	7.9	8.3	7.5
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.0		
Level of Service	A		
Intersection Capacity Utilization	29.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	26	4	160	20	6	134
Future Volume (Veh/h)	26	4	160	20	6	134
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	28	4	174	22	7	146
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			749			
pX, platoon unblocked						
vC, conflicting volume	345	185			196	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	345	185			196	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	100			99	
cM capacity (veh/h)	648	857			1377	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	32	196	153
Volume Left	28	0	7
Volume Right	4	22	0
cSH	669	1700	1377
Volume to Capacity	0.05	0.12	0.01
Queue Length 95th (ft)	4	0	0
Control Delay (s)	10.7	0.0	0.4
Lane LOS	B		A
Approach Delay (s)	10.7	0.0	0.4
Approach LOS	B		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	21.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	533	13	61	527	23	26	47	223	85	38	103
Future Volume (vph)	87	533	13	61	527	23	26	47	223	85	38	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.90			0.94	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.98	
Satd. Flow (prot)	1770	3527		1770	3517			1666			1716	
Flt Permitted	0.35	1.00		0.35	1.00			0.96			0.79	
Satd. Flow (perm)	646	3527		653	3517			1614			1384	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	95	579	14	66	573	25	28	51	242	92	41	112
RTOR Reduction (vph)	0	3	0	0	6	0	0	89	0	0	43	0
Lane Group Flow (vph)	95	590	0	66	592	0	0	232	0	0	202	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.4	15.4		15.4	15.4			25.7			25.7	
Effective Green, g (s)	15.4	15.4		15.4	15.4			25.7			25.7	
Actuated g/C Ratio	0.31	0.31		0.31	0.31			0.51			0.51	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	198	1084		200	1081			827			709	
v/s Ratio Prot		0.17			c0.17							
v/s Ratio Perm	0.15			0.10				0.14			c0.15	
v/c Ratio	0.48	0.54		0.33	0.55			0.28			0.29	
Uniform Delay, d1	14.1	14.4		13.4	14.4			6.9			7.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.8	0.6		1.0	0.6			0.8			1.0	
Delay (s)	15.9	15.0		14.3	15.0			7.8			8.0	
Level of Service	B	B		B	B			A			A	
Approach Delay (s)		15.1			15.0			7.8			8.0	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	50.1	Sum of lost time (s)	9.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	757	122	264	765	26	88	91	320	24	61	11
Future Volume (vph)	54	757	122	264	765	26	88	91	320	24	61	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4979		1770	5060		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.71	1.00	1.00	0.69	1.00	1.00
Satd. Flow (perm)	1770	4979		1770	5060		1330	1863	1583	1291	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	823	133	287	832	28	96	99	348	26	66	12
RTOR Reduction (vph)	0	37	0	0	5	0	0	0	212	0	0	8
Lane Group Flow (vph)	59	919	0	287	855	0	96	99	136	26	66	4
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)	3.7	18.7		10.5	25.5		18.0	18.0	18.0	18.0	18.0	18.0
Effective Green, g (s)	3.7	18.7		10.5	25.5		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.06	0.31		0.17	0.42		0.30	0.30	0.30	0.30	0.30	0.30
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	107	1533		306	2125		394	552	469	382	552	469
v/s Ratio Prot	0.03	c0.18		c0.16	0.17			0.05			0.04	
v/s Ratio Perm							0.07		c0.09	0.02		0.00
v/c Ratio	0.55	0.60		0.94	0.40		0.24	0.18	0.29	0.07	0.12	0.01
Uniform Delay, d1	27.7	17.8		24.8	12.3		16.2	15.9	16.4	15.3	15.6	15.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.0	0.6		35.0	0.1		1.5	0.7	1.6	0.3	0.4	0.0
Delay (s)	33.7	18.5		59.8	12.4		17.7	16.6	18.0	15.7	16.0	15.1
Level of Service	C	B		E	B		B	B	B	B	B	B
Approach Delay (s)		19.3			24.3			17.7			15.8	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	60.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	73	11	2	68	15	6
Future Volume (Veh/h)	73	11	2	68	15	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	79	12	2	74	16	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			91		163	85
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			91		163	85
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	99
cM capacity (veh/h)			1504		827	974

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	91	76	23
Volume Left	0	2	16
Volume Right	12	0	7
cSH	1700	1504	867
Volume to Capacity	0.05	0.00	0.03
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.2	9.3
Lane LOS		A	A
Approach Delay (s)	0.0	0.2	9.3
Approach LOS			A

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	15.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	13	4	6	16	6	8	5	4	4	4	5
Future Volume (Veh/h)	4	13	4	6	16	6	8	5	4	4	4	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	14	4	7	17	7	9	5	4	4	4	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	55	42	6	50	42	7	9			9		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	55	42	6	50	42	7	9			9		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	100	99	98	99	99			100		
cM capacity (veh/h)	917	844	1076	928	843	1075	1611			1611		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	22	31	18	13
Volume Left	4	7	9	4
Volume Right	4	7	4	5
cSH	892	906	1611	1611
Volume to Capacity	0.02	0.03	0.01	0.00
Queue Length 95th (ft)	2	3	0	0
Control Delay (s)	9.1	9.1	3.6	2.2
Lane LOS	A	A	A	A
Approach Delay (s)	9.1	9.1	3.6	2.2
Approach LOS	A	A		

Intersection Summary			
Average Delay	6.9		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	791	23	32	568	20	14	2	35	2	6	12
Future Volume (Veh/h)	17	791	23	32	568	20	14	2	35	2	6	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	860	25	35	617	22	15	2	38	2	7	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)		661			663							
pX, platoon unblocked	0.98			0.91			0.92	0.92	0.91	0.92	0.92	0.98
vC, conflicting volume	639			885			1304	1618	442	1203	1619	320
vC1, stage 1 conf vol							908	908		698	698	
vC2, stage 2 conf vol							395	709		505	921	
vCu, unblocked vol	589			667			1049	1391	179	939	1393	263
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			96			95	99	95	99	98	98
cM capacity (veh/h)	962			833			320	301	755	355	291	720

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	18	573	312	35	411	228	55	22
Volume Left	18	0	0	35	0	0	15	2
Volume Right	0	0	25	0	0	22	38	13
cSH	962	1700	1700	833	1700	1700	530	461
Volume to Capacity	0.02	0.34	0.18	0.04	0.24	0.13	0.10	0.05
Queue Length 95th (ft)	1	0	0	3	0	0	9	4
Control Delay (s)	8.8	0.0	0.0	9.5	0.0	0.0	12.6	13.2
Lane LOS	A			A			B	B
Approach Delay (s)	0.2			0.5			12.6	13.2
Approach LOS							B	B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	17	4	19	30	17	8	91	16	5	51	2
Future Volume (Veh/h)	1	17	4	19	30	17	8	91	16	5	51	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	18	4	21	33	18	9	99	17	5	55	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	51			22			136	115	20	172	108	42
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	51			22			136	115	20	172	108	42
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	87	98	99	93	100
cM capacity (veh/h)	1555			1593			780	764	1058	693	771	1029

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	23	72	125	62
Volume Left	1	21	9	5
Volume Right	4	18	17	2
cSH	1555	1593	796	771
Volume to Capacity	0.00	0.01	0.16	0.08
Queue Length 95th (ft)	0	1	14	7
Control Delay (s)	0.3	2.2	10.4	10.1
Lane LOS	A	A	B	B
Approach Delay (s)	0.3	2.2	10.4	10.1
Approach LOS			B	B

Intersection Summary			
Average Delay	7.4		
Intersection Capacity Utilization	24.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	744	24	49	541	65	19	56	79	12	18	56
Future Volume (vph)	50	744	24	49	541	65	19	56	79	12	18	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.98			0.93			0.91	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	3523		1770	3482			1723			1688	
Flt Permitted	0.95	1.00		0.95	1.00			0.95			0.94	
Satd. Flow (perm)	1770	3523		1770	3482			1646			1593	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	809	26	53	588	71	21	61	86	13	20	61
RTOR Reduction (vph)	0	4	0	0	14	0	0	68	0	0	48	0
Lane Group Flow (vph)	54	831	0	53	645	0	0	100	0	0	46	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	1.8	16.4		1.8	16.4			8.3			8.3	
Effective Green, g (s)	1.8	16.4		1.8	16.4			8.3			8.3	
Actuated g/C Ratio	0.05	0.41		0.05	0.41			0.21			0.21	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	79	1444		79	1427			341			330	
v/s Ratio Prot	c0.03	c0.24		0.03	0.19							
v/s Ratio Perm								c0.06			0.03	
v/c Ratio	0.68	0.58		0.67	0.45			0.29			0.14	
Uniform Delay, d1	18.8	9.1		18.8	8.5			13.4			12.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	21.7	0.6		20.1	0.2			0.5			0.2	
Delay (s)	40.5	9.7		38.9	8.8			13.9			13.1	
Level of Service	D	A		D	A			B			B	
Approach Delay (s)		11.5			11.0			13.9			13.1	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Volume (veh/h)	7	25	6	4	46	7	1	66	5	1	36	6
Future Volume (Veh/h)	7	25	6	4	46	7	1	66	5	1	36	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	27	7	4	50	8	1	72	5	1	39	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	154	124	42	142	124	74	46			77		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	154	124	42	142	124	74	46			77		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	96	99	99	93	99	100			100		
cM capacity (veh/h)	765	766	1028	800	765	987	1562			1522		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	42	62	78	47
Volume Left	8	4	1	1
Volume Right	7	8	5	7
cSH	800	790	1562	1522
Volume to Capacity	0.05	0.08	0.00	0.00
Queue Length 95th (ft)	4	6	0	0
Control Delay (s)	9.8	9.9	0.1	0.2
Lane LOS	A	A	A	A
Approach Delay (s)	9.8	9.9	0.1	0.2
Approach LOS	A	A		

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	14.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	72	770	16	18	603	77	12	12	16	20	4	62
Future Volume (vph)	72	770	16	18	603	77	12	12	16	20	4	62
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	78	837	17	20	655	84	13	13	17	22	4	67

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	78	854	20	739	43	93
Volume Left (vph)	78	0	20	0	13	22
Volume Right (vph)	0	17	0	84	17	67
Hadj (s)	0.53	0.02	0.53	-0.05	-0.14	-0.35
Departure Headway (s)	6.2	5.7	6.3	5.7	7.2	6.8
Degree Utilization, x	0.13	1.35	0.04	1.18	0.09	0.18
Capacity (veh/h)	575	635	561	635	482	512
Control Delay (s)	9.0	185.2	8.3	114.7	10.9	11.3
Approach Delay (s)	170.5		111.9		10.9	11.3
Approach LOS	F		F		B	B

Intersection Summary			
Delay	134.3		
Level of Service	F		
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	21	17	6	13	16	43	651	2	14	526	4
Future Volume (Veh/h)	6	21	17	6	13	16	43	651	2	14	526	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	23	18	7	14	17	47	708	2	15	572	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								744				
pX, platoon unblocked	0.81	0.81		0.81	0.81	0.81				0.81		
vC, conflicting volume	1430	1408	574	1434	1409	709	576			710		
vC1, stage 1 conf vol	604	604		803	803							
vC2, stage 2 conf vol	826	804		632	606							
vCu, unblocked vol	1414	1387	574	1419	1388	527	576			528		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	92	97	97	95	96	95			98		
cM capacity (veh/h)	261	292	518	265	290	448	997			845		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	48	38	47	710	15	576
Volume Left	7	7	47	0	15	0
Volume Right	18	17	0	2	0	4
cSH	342	337	997	1700	845	1700
Volume to Capacity	0.14	0.11	0.05	0.42	0.02	0.34
Queue Length 95th (ft)	12	9	4	0	1	0
Control Delay (s)	17.2	17.0	8.8	0.0	9.3	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	17.2	17.0	0.5		0.2	
Approach LOS	C	C				

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	637	47	79	408	134	160	411	133	217	222	109
Future Volume (vph)	94	637	47	79	408	134	160	411	133	217	222	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.96		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1793		1770	3409		1770	1771	
Flt Permitted	0.20	1.00	1.00	0.12	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	374	1863	1583	231	1793		1770	3409		1770	1771	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	102	692	51	86	443	146	174	447	145	236	241	118
RTOR Reduction (vph)	0	0	30	0	15	0	0	39	0	0	22	0
Lane Group Flow (vph)	102	692	21	86	574	0	174	553	0	236	337	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	32.3	32.3	32.3	32.3	32.3		9.4	19.8		12.2	22.6	
Effective Green, g (s)	32.3	32.3	32.3	32.3	32.3		9.4	19.8		12.2	22.6	
Actuated g/C Ratio	0.42	0.42	0.42	0.42	0.42		0.12	0.25		0.16	0.29	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	155	773	657	95	744		213	867		277	514	
v/s Ratio Prot		0.37			0.32		0.10	0.16		c0.13	c0.19	
v/s Ratio Perm	0.27		0.01	c0.37								
v/c Ratio	0.66	0.90	0.03	0.91	0.77		0.82	0.64		0.85	0.66	
Uniform Delay, d1	18.3	21.2	13.5	21.3	19.6		33.4	25.8		31.9	24.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.7	12.9	0.0	62.0	5.0		20.9	3.6		21.5	6.4	
Delay (s)	28.0	34.1	13.5	83.3	24.5		54.3	29.4		53.4	30.6	
Level of Service	C	C	B	F	C		D	C		D	C	
Approach Delay (s)		32.1			32.0			35.0			39.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	34.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	77.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	238	1091	139	222	991	101	161	263	196	87	223	103
Future Volume (vph)	238	1091	139	222	991	101	161	263	196	87	223	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4999		1770	5015		1770	1863	1583	1770	3371	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	4999		1770	5015		1770	1863	1583	1770	3371	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	259	1186	151	241	1077	110	175	286	213	95	242	112
RTOR Reduction (vph)	0	18	0	0	14	0	0	0	153	0	59	0
Lane Group Flow (vph)	259	1319	0	241	1173	0	175	286	60	95	295	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	15.0	25.5		14.7	25.2		11.1	25.5	25.5	6.1	20.5	
Effective Green, g (s)	15.0	25.5		14.7	25.2		11.1	25.5	25.5	6.1	20.5	
Actuated g/C Ratio	0.17	0.28		0.16	0.28		0.12	0.28	0.28	0.07	0.23	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	295	1419		289	1407		218	529	449	120	769	
v/s Ratio Prot	c0.15	c0.26		0.14	0.23		c0.10	c0.15		0.05	0.09	
v/s Ratio Perm									0.04			
v/c Ratio	0.88	0.93		0.83	0.83		0.80	0.54	0.13	0.79	0.38	
Uniform Delay, d1	36.5	31.3		36.4	30.3		38.3	27.2	23.9	41.2	29.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	24.1	10.9		18.3	4.4		18.8	3.9	0.6	29.0	1.4	
Delay (s)	60.7	42.2		54.7	34.8		57.1	31.1	24.6	70.2	30.7	
Level of Service	E	D		D	C		E	C	C	E	C	
Approach Delay (s)		45.2			38.1			35.8			39.1	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	40.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	89.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	743	31	57	443	73	118	201	339	108	94	91
Future Volume (vph)	115	743	31	57	443	73	118	201	339	108	94	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.91		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3518		1770	3464		1770	1687		1770	1725	
Flt Permitted	0.37	1.00		0.21	1.00		0.63	1.00		0.31	1.00	
Satd. Flow (perm)	692	3518		384	3464		1177	1687		569	1725	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	808	34	62	482	79	128	218	368	117	102	99
RTOR Reduction (vph)	0	5	0	0	23	0	0	26	0	0	48	0
Lane Group Flow (vph)	125	837	0	62	538	0	128	560	0	117	153	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.4	19.4		19.4	19.4		29.6	29.6		29.6	29.6	
Effective Green, g (s)	19.4	19.4		19.4	19.4		29.6	29.6		29.6	29.6	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	231	1176		128	1158		600	860		290	880	
v/s Ratio Prot		c0.24			0.16			c0.33			0.09	
v/s Ratio Perm	0.18			0.16			0.11			0.21		
v/c Ratio	0.54	0.71		0.48	0.46		0.21	0.65		0.40	0.17	
Uniform Delay, d1	15.7	16.9		15.3	15.2		7.8	10.4		8.8	7.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.6	2.1		2.9	0.3		0.8	3.8		4.1	0.4	
Delay (s)	18.3	18.9		18.2	15.5		8.6	14.2		12.9	8.1	
Level of Service	B	B		B	B		A	B		B	A	
Approach Delay (s)		18.8			15.8			13.2			9.8	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	58.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	270	1146	84	18	839	43	81	56	20	21	61	149
Future Volume (vph)	270	1146	84	18	839	43	81	56	20	21	61	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.98			0.91	
Flt Protected	0.95	1.00		0.95	1.00			0.97			1.00	
Satd. Flow (prot)	1770	5033		1770	5048			1784			1693	
Flt Permitted	0.95	1.00		0.95	1.00			0.71			0.96	
Satd. Flow (perm)	1770	5033		1770	5048			1294			1640	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	293	1246	91	20	912	47	88	61	22	23	66	162
RTOR Reduction (vph)	0	11	0	0	9	0	0	9	0	0	111	0
Lane Group Flow (vph)	293	1326	0	20	950	0	0	162	0	0	140	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	10.5	30.1		1.0	20.6			18.0			18.0	
Effective Green, g (s)	10.5	30.1		1.0	20.6			18.0			18.0	
Actuated g/C Ratio	0.17	0.48		0.02	0.33			0.29			0.29	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	296	2420		28	1661			372			471	
v/s Ratio Prot	c0.17	c0.26		0.01	0.19							
v/s Ratio Perm								c0.13			0.09	
v/c Ratio	0.99	0.55		0.71	0.57			0.43			0.30	
Uniform Delay, d1	26.0	11.5		30.7	17.4			18.2			17.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	49.0	0.3		60.5	0.5			3.7			1.6	
Delay (s)	75.0	11.7		91.2	17.8			21.8			19.0	
Level of Service	E	B		F	B			C			B	
Approach Delay (s)		23.1			19.3			21.8			19.0	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	62.6	Sum of lost time (s)	13.5
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	191	777	124	32	324	94	51	266	84	127	221	84
Future Volume (vph)	191	777	124	32	324	94	51	266	84	127	221	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3466		1770	3420		1770	3412		1770	3393	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3466		1770	3420		1770	3412		1770	3393	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	208	845	135	35	352	102	55	289	91	138	240	91
RTOR Reduction (vph)	0	16	0	0	33	0	0	35	0	0	46	0
Lane Group Flow (vph)	208	964	0	35	421	0	55	345	0	138	285	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	12.6	26.9		2.8	17.1		3.7	21.3		7.7	25.3	
Effective Green, g (s)	12.6	26.9		2.8	17.1		3.7	21.3		7.7	25.3	
Actuated g/C Ratio	0.16	0.35		0.04	0.22		0.05	0.28		0.10	0.33	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	290	1215		64	762		85	947		177	1119	
v/s Ratio Prot	c0.12	c0.28		0.02	0.12		0.03	c0.10		c0.08	c0.08	
v/s Ratio Perm												
v/c Ratio	0.72	0.79		0.55	0.55		0.65	0.36		0.78	0.25	
Uniform Delay, d1	30.4	22.4		36.3	26.4		35.9	22.3		33.7	18.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.2	3.7		9.2	0.9		15.7	1.1		19.2	0.5	
Delay (s)	38.6	26.1		45.5	27.3		51.5	23.3		52.9	19.3	
Level of Service	D	C		D	C		D	C		D	B	
Approach Delay (s)		28.2			28.6			26.9			29.2	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	76.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	290	873	71	41	677	161	26	41	30	136	48	223
Future Volume (vph)	290	873	71	41	677	161	26	41	30	136	48	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5028		1770	5085	1583	1770	1745		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.72	1.00		0.71	1.00	1.00
Satd. Flow (perm)	1770	5028		1770	5085	1583	1347	1745		1316	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	315	949	77	45	736	175	28	45	33	148	52	242
RTOR Reduction (vph)	0	14	0	0	0	122	0	23	0	0	0	170
Lane Group Flow (vph)	315	1012	0	45	736	53	28	55	0	148	52	72
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		6
Actuated Green, G (s)	10.5	26.5		2.2	18.2	18.2	18.0	18.0		18.0	18.0	18.0
Effective Green, g (s)	10.5	26.5		2.2	18.2	18.2	18.0	18.0		18.0	18.0	18.0
Actuated g/C Ratio	0.17	0.44		0.04	0.30	0.30	0.30	0.30		0.30	0.30	0.30
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	308	2213		64	1537	478	402	521		393	557	473
v/s Ratio Prot	c0.18	c0.20		0.03	0.14			0.03			0.03	
v/s Ratio Perm						0.03	0.02			c0.11		0.05
v/c Ratio	1.02	0.46		0.70	0.48	0.11	0.07	0.11		0.38	0.09	0.15
Uniform Delay, d1	24.9	11.8		28.7	17.1	15.2	15.1	15.3		16.7	15.2	15.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	57.2	0.2		29.5	0.2	0.1	0.3	0.4		2.7	0.3	0.7
Delay (s)	82.1	12.0		58.1	17.4	15.3	15.4	15.7		19.4	15.5	16.2
Level of Service	F	B		E	B	B	B	B		B	B	B
Approach Delay (s)		28.4			18.9			15.6			17.2	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	23.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	60.2	Sum of lost time (s)	13.5
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	5	55	10	10	25	15	607	15	15	597	15
Future Volume (Veh/h)	45	5	55	10	10	25	15	607	15	15	597	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	49	5	60	11	11	27	16	660	16	16	649	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								380				
pX, platoon unblocked	0.89	0.89		0.89	0.89	0.89				0.89		
vC, conflicting volume	1084	1397	657	1444	1397	338	665			676		
vC1, stage 1 conf vol	689	689		700	700							
vC2, stage 2 conf vol	394	708		744	697							
vCu, unblocked vol	846	1198	657	1251	1198	8	665			388		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	87	99	85	96	97	97	98			98		
cM capacity (veh/h)	372	353	407	261	349	953	920			1038		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	114	49	16	440	236	16	665
Volume Left	49	11	16	0	0	16	0
Volume Right	60	27	0	0	16	0	16
cSH	389	480	920	1700	1700	1038	1700
Volume to Capacity	0.29	0.10	0.02	0.26	0.14	0.02	0.39
Queue Length 95th (ft)	30	8	1	0	0	1	0
Control Delay (s)	18.0	13.3	9.0	0.0	0.0	8.5	0.0
Lane LOS	C	B	A			A	
Approach Delay (s)	18.0	13.3	0.2			0.2	
Approach LOS	C	B					

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	25	15	5	577	403	5
Future Volume (vph)	25	15	5	577	403	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5	4.5	4.5	
Lane Util. Factor	1.00		1.00	0.95	1.00	
Frt	0.95		1.00	1.00	1.00	
Flt Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1715		1770	3539	1860	
Flt Permitted	0.97		0.42	1.00	1.00	
Satd. Flow (perm)	1715		774	3539	1860	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	16	5	627	438	5
RTOR Reduction (vph)	15	0	0	0	0	0
Lane Group Flow (vph)	28	0	5	627	443	0
Turn Type	Prot		pm+pt	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	2.2		30.7	30.7	25.5	
Effective Green, g (s)	2.2		30.7	30.7	25.5	
Actuated g/C Ratio	0.05		0.73	0.73	0.61	
Clearance Time (s)	4.5		4.5	4.5	4.5	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	90		583	2593	1131	
v/s Ratio Prot	c0.02		0.00	c0.18	c0.24	
v/s Ratio Perm			0.01			
v/c Ratio	0.31		0.01	0.24	0.39	
Uniform Delay, d1	19.1		1.8	1.8	4.2	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	2.0		0.0	0.0	0.2	
Delay (s)	21.1		1.9	1.9	4.4	
Level of Service	C		A	A	A	
Approach Delay (s)	21.1			1.9	4.4	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	41.9	Sum of lost time (s)	13.5
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	0	15	5	0	10	20	557	10	10	398	10
Future Volume (vph)	15	0	15	5	0	10	20	557	10	10	398	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	1.00	
Frt		0.93			0.91		1.00	1.00		1.00	1.00	
Flt Protected		0.98			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1695			1664		1770	3530		1770	1856	
Flt Permitted		0.98			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1695			1690		1770	3530		1770	1856	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	0	16	5	0	11	22	605	11	11	433	11
RTOR Reduction (vph)	0	32	0	0	16	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	0	0	0	0	0	22	615	0	11	443	0
Turn Type	Split	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	4	4			8		5	2		1	6	
Permitted Phases				8								
Actuated Green, G (s)		0.7			0.7		0.7	27.3		0.7	27.3	
Effective Green, g (s)		0.7			0.7		0.7	27.3		0.7	27.3	
Actuated g/C Ratio		0.01			0.01		0.01	0.58		0.01	0.58	
Clearance Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		25			24		26	2033		26	1068	
v/s Ratio Prot		c0.00					c0.01	0.17		0.01	c0.24	
v/s Ratio Perm					c0.00							
v/c Ratio		0.02			0.01		0.85	0.30		0.42	0.41	
Uniform Delay, d1		23.0			23.0		23.3	5.2		23.1	5.6	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			0.2		109.6	0.1		10.7	0.3	
Delay (s)		23.3			23.2		132.9	5.2		33.9	5.9	
Level of Service		C			C		F	A		C	A	
Approach Delay (s)		23.3			23.2			9.6			6.5	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	47.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	3	43	19	6	64	18	568	17	39	336	13
Future Volume (Veh/h)	22	3	43	19	6	64	18	568	17	39	336	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	3	47	21	7	70	20	617	18	42	365	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								1070				
pX, platoon unblocked												
vC, conflicting volume	878	1131	190	981	1129	318	379			635		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	878	1131	190	981	1129	318	379			635		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	98	94	88	96	90	98			96		
cM capacity (veh/h)	201	190	820	181	190	678	1176			944		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	74	98	328	326	224	196
Volume Left	24	21	20	0	42	0
Volume Right	47	70	0	18	0	14
cSH	385	383	1176	1700	944	1700
Volume to Capacity	0.19	0.26	0.02	0.19	0.04	0.12
Queue Length 95th (ft)	18	25	1	0	3	0
Control Delay (s)	16.6	17.6	0.7	0.0	2.0	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	16.6	17.6	0.3		1.1	
Approach LOS	C	C				

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	174	724	10	6	754	273	63	117	72	285	40	91
Future Volume (vph)	174	724	10	6	754	273	63	117	72	285	40	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	1.00	1.00	1.00		0.95	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1770	5075		1770	5085	1583	1770	1863	1583		3309	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.32	1.00	1.00		0.73	
Satd. Flow (perm)	1770	5075		1770	5085	1583	595	1863	1583		2483	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	189	787	11	7	820	297	68	127	78	310	43	99
RTOR Reduction (vph)	0	2	0	0	0	210	0	0	48	0	41	0
Lane Group Flow (vph)	189	796	0	7	820	87	68	127	30	0	411	0
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8	2		2	6		
Actuated Green, G (s)	10.1	28.9		1.1	19.9	19.9	25.6	25.6	25.6		18.4	
Effective Green, g (s)	10.1	28.9		1.1	19.9	19.9	25.6	25.6	25.6		18.4	
Actuated g/C Ratio	0.15	0.43		0.02	0.29	0.29	0.38	0.38	0.38		0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	264	2169		28	1496	466	272	705	599		675	
v/s Ratio Prot	c0.11	0.16		0.00	c0.16		0.01	c0.07				
v/s Ratio Perm						0.06	0.08		0.02		c0.17	
v/c Ratio	0.72	0.37		0.25	0.55	0.19	0.25	0.18	0.05		0.61	
Uniform Delay, d1	27.4	13.1		32.8	20.1	17.8	14.1	14.0	13.3		21.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2	8.9	0.1		4.7	0.4	0.2	0.5	0.6	0.2		1.6	
Delay (s)	36.3	13.2		37.5	20.5	18.0	14.6	14.6	13.5		23.0	
Level of Service	D	B		D	C	B	B	B	B		C	
Approach Delay (s)		17.7			19.9			14.2			23.0	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	67.6	Sum of lost time (s)	16.5
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (veh/h)	5	63	8	12	94	8	11	71	24	5	17	3
Future Volume (Veh/h)	5	63	8	12	94	8	11	71	24	5	17	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	68	9	13	102	9	12	77	26	5	18	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	111			77			227	220	72	280	220	106
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	111			77			227	220	72	280	220	106
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			98	89	97	99	97	100
cM capacity (veh/h)	1479			1522			705	671	990	592	671	948

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	82	124	115	26
Volume Left	5	13	12	5
Volume Right	9	9	26	3
cSH	1479	1522	727	676
Volume to Capacity	0.00	0.01	0.16	0.04
Queue Length 95th (ft)	0	1	14	3
Control Delay (s)	0.5	0.8	10.9	10.5
Lane LOS	A	A	B	B
Approach Delay (s)	0.5	0.8	10.9	10.5
Approach LOS			B	B

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	22.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	8	6	8	10	1	10	114	22	2	22	7
Future Volume (Veh/h)	3	8	6	8	10	1	10	114	22	2	22	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	9	7	9	11	1	11	124	24	2	24	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								269				
pX, platoon unblocked												
vC, conflicting volume	196	202	28	202	194	136	32			148		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	196	202	28	202	194	136	32			148		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	99	99	98	100	99			100		
cM capacity (veh/h)	748	688	1047	740	695	913	1580			1434		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	19	21	159	34
Volume Left	3	9	11	2
Volume Right	7	1	24	8
cSH	799	722	1580	1434
Volume to Capacity	0.02	0.03	0.01	0.00
Queue Length 95th (ft)	2	2	1	0
Control Delay (s)	9.6	10.1	0.6	0.5
Lane LOS	A	B	A	A
Approach Delay (s)	9.6	10.1	0.6	0.5
Approach LOS	A	B		

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	20.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	1135	10	8	877	76	7	2	10	14	0	19
Future Volume (vph)	81	1135	10	8	877	76	7	2	10	14	0	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		1.00			1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.93			0.92	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.98	
Satd. Flow (prot)	1770	5079		1770	5085	1583		1699			1681	
Flt Permitted	0.29	1.00		0.23	1.00	1.00		0.88			0.86	
Satd. Flow (perm)	537	5079		421	5085	1583		1517			1481	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	88	1234	11	9	953	83	8	2	11	15	0	21
RTOR Reduction (vph)	0	1	0	0	0	38	0	9	0	0	22	0
Lane Group Flow (vph)	88	1244	0	9	953	45	0	12	0	0	14	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	17.7	17.7		17.7	17.7	17.7		6.2			6.2	
Effective Green, g (s)	17.7	17.7		17.7	17.7	17.7		6.2			6.2	
Actuated g/C Ratio	0.54	0.54		0.54	0.54	0.54		0.19			0.19	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	288	2732		226	2735	851		285			279	
v/s Ratio Prot		c0.24			0.19							
v/s Ratio Perm	0.16			0.02		0.03		0.01			c0.01	
v/c Ratio	0.31	0.46		0.04	0.35	0.05		0.04			0.05	
Uniform Delay, d1	4.2	4.7		3.6	4.3	3.6		10.9			10.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.6	0.1		0.1	0.1	0.0		0.1			0.1	
Delay (s)	4.8	4.8		3.7	4.4	3.6		11.0			11.0	
Level of Service	A	A		A	A	A		B			B	
Approach Delay (s)		4.8			4.3			11.0			11.0	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	4.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	32.9	Sum of lost time (s)	9.0
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	27	52	58	18	105	47	135	269	26	17	158	68
Future Volume (vph)	27	52	58	18	105	47	135	269	26	17	158	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	57	63	20	114	51	147	292	28	18	172	74

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	149	185	467	264
Volume Left (vph)	29	20	147	18
Volume Right (vph)	63	51	28	74
Hadj (s)	-0.18	-0.11	0.06	-0.12
Departure Headway (s)	6.2	6.2	5.5	5.6
Degree Utilization, x	0.26	0.32	0.71	0.41
Capacity (veh/h)	492	500	632	580
Control Delay (s)	11.3	12.0	20.7	12.5
Approach Delay (s)	11.3	12.0	20.7	12.5
Approach LOS	B	B	C	B

Intersection Summary			
Delay	15.8		
Level of Service	C		
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	38	32	79	316	133	35
Future Volume (Veh/h)	38	32	79	316	133	35
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	41	35	86	343	145	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				259		
pX, platoon unblocked						
vC, conflicting volume	660	145	183			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	660	145	183			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	96	94			
cM capacity (veh/h)	402	902	1392			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	76	86	343	145	38
Volume Left	41	86	0	0	0
Volume Right	35	0	0	0	38
cSH	539	1392	1700	1700	1700
Volume to Capacity	0.14	0.06	0.20	0.09	0.02
Queue Length 95th (ft)	12	5	0	0	0
Control Delay (s)	12.8	7.8	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	12.8	1.6		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	27.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	1079	32	16	916	271	31	25	25	107	23	44
Future Volume (vph)	105	1079	32	16	916	271	31	25	25	107	23	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00		0.96	1.00
Satd. Flow (prot)	1770	5063		1770	5085	1583		1812	1583		1789	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.83	1.00		0.74	1.00
Satd. Flow (perm)	1770	5063		1770	5085	1583		1549	1583		1371	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	114	1173	35	17	996	295	34	27	27	116	25	48
RTOR Reduction (vph)	0	5	0	0	0	215	0	0	18	0	0	32
Lane Group Flow (vph)	114	1203	0	17	996	80	0	61	9	0	141	16
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2		2	6		6
Actuated Green, G (s)	9.9	25.2		1.0	16.3	16.3		20.3	20.3		20.3	20.3
Effective Green, g (s)	9.9	25.2		1.0	16.3	16.3		20.3	20.3		20.3	20.3
Actuated g/C Ratio	0.17	0.42		0.02	0.27	0.27		0.34	0.34		0.34	0.34
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	292	2126		29	1381	430		524	535		463	535
v/s Ratio Prot	c0.06	c0.24		0.01	c0.20							
v/s Ratio Perm						0.05		0.04	0.01		c0.10	0.01
v/c Ratio	0.39	0.57		0.59	0.72	0.19		0.12	0.02		0.30	0.03
Uniform Delay, d1	22.4	13.2		29.3	19.8	16.8		13.7	13.2		14.6	13.3
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.9	1.1		26.8	3.3	1.0		0.5	0.1		1.7	0.1
Delay (s)	23.2	14.3		56.1	23.1	17.7		14.1	13.3		16.3	13.4
Level of Service	C	B		E	C	B		B	B		B	B
Approach Delay (s)		15.1			22.3			13.9			15.6	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	20	48	22	9	47	11	91	208	38	10	132	14
Future Volume (vph)	20	48	22	9	47	11	91	208	38	10	132	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	52	24	10	51	12	99	226	41	11	143	15

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	98	73	366	169
Volume Left (vph)	22	10	99	11
Volume Right (vph)	24	12	41	15
Hadj (s)	-0.07	-0.04	0.02	-0.01
Departure Headway (s)	5.2	5.3	4.6	4.8
Degree Utilization, x	0.14	0.11	0.47	0.23
Capacity (veh/h)	616	603	757	706
Control Delay (s)	9.1	8.9	11.6	9.2
Approach Delay (s)	9.1	8.9	11.6	9.2
Approach LOS	A	A	B	A

Intersection Summary			
Delay	10.4		
Level of Service	B		
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	41	23	32	7	19	8	49	481	17	5	144	22
Future Volume (vph)	41	23	32	7	19	8	49	481	17	5	144	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	45	25	35	8	21	9	53	523	18	5	157	24

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	105	38	594	186
Volume Left (vph)	45	8	53	5
Volume Right (vph)	35	9	18	24
Hadj (s)	-0.08	-0.07	0.03	-0.04
Departure Headway (s)	5.8	5.9	4.6	5.0
Degree Utilization, x	0.17	0.06	0.76	0.26
Capacity (veh/h)	564	537	764	679
Control Delay (s)	9.9	9.3	20.7	9.8
Approach Delay (s)	9.9	9.3	20.7	9.8
Approach LOS	A	A	C	A

Intersection Summary			
Delay	16.8		
Level of Service	C		
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	25	19	533	41	10	161
Future Volume (Veh/h)	25	19	533	41	10	161
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	21	579	45	11	175
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			277			
pX, platoon unblocked	0.93	0.93			0.93	
vC, conflicting volume	798	312			624	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	627	102			439	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	98			99	
cM capacity (veh/h)	382	865			1037	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	48	386	238	186
Volume Left	27	0	0	11
Volume Right	21	0	45	0
cSH	505	1700	1700	1037
Volume to Capacity	0.10	0.23	0.14	0.01
Queue Length 95th (ft)	8	0	0	1
Control Delay (s)	12.9	0.0	0.0	0.6
Lane LOS	B			A
Approach Delay (s)	12.9	0.0		0.6
Approach LOS	B			

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	26.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	958	191	73	809	165	320	334	140	27	151	41
Future Volume (vph)	52	958	191	73	809	165	320	334	140	27	151	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	0.97	0.95	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4958		1770	5085	1583	3433	3539	1583	1770	1803	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.54	1.00	
Satd. Flow (perm)	1770	4958		1770	5085	1583	3433	3539	1583	997	1803	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	1041	208	79	879	179	348	363	152	29	164	45
RTOR Reduction (vph)	0	37	0	0	0	114	0	0	104	0	12	0
Lane Group Flow (vph)	57	1212	0	79	879	65	348	363	48	29	197	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8	4		
Actuated Green, G (s)	5.6	26.9		7.9	29.2	29.2	9.5	25.2	25.2	19.7	17.7	
Effective Green, g (s)	5.6	26.9		7.9	29.2	29.2	9.5	25.2	25.2	19.7	17.7	
Actuated g/C Ratio	0.07	0.34		0.10	0.36	0.36	0.12	0.31	0.31	0.25	0.22	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	123	1667		174	1856	577	407	1114	498	264	398	
v/s Ratio Prot	0.03	c0.24		0.04	c0.17		c0.10	0.10		0.00	c0.11	
v/s Ratio Perm						0.04			0.03	0.02		
v/c Ratio	0.46	0.73		0.45	0.47	0.11	0.86	0.33	0.10	0.11	0.49	
Uniform Delay, d1	35.8	23.3		34.0	19.5	16.8	34.6	20.9	19.4	23.1	27.2	
Progression Factor	1.00	1.00		1.33	1.45	3.80	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.7	2.8		1.7	0.2	0.1	15.9	0.8	0.4	0.2	4.3	
Delay (s)	38.5	26.1		47.0	28.4	63.9	50.5	21.7	19.7	23.3	31.6	
Level of Service	D	C		D	C	E	D	C	B	C	C	
Approach Delay (s)		26.7			35.3			33.0			30.6	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	11	11	6	7	15	46	963	28	11	618	17
Future Volume (Veh/h)	6	11	11	6	7	15	46	963	28	11	618	17
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	12	12	7	8	16	50	1047	30	12	672	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)											382	
pX, platoon unblocked	0.78	0.78	0.78	0.78	0.78		0.78					
vC, conflicting volume	1887	1882	681	1885	1876	1062	690			1077		
vC1, stage 1 conf vol	705	705		1162	1162							
vC2, stage 2 conf vol	1182	1177		723	714							
vCu, unblocked vol	1995	1988	453	1992	1980	1062	465			1077		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	94	97	96	96	94	94			98		
cM capacity (veh/h)	167	204	475	183	206	272	858			647		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	31	31	1127	702
Volume Left	7	7	50	12
Volume Right	12	16	30	18
cSH	246	228	858	647
Volume to Capacity	0.13	0.14	0.06	0.02
Queue Length 95th (ft)	11	12	5	1
Control Delay (s)	21.7	23.2	1.9	0.5
Lane LOS	C	C	A	A
Approach Delay (s)	21.7	23.2	1.9	0.5
Approach LOS	C	C		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	87.6%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (veh/h)	13	28	16	0	3	10	19	978	10	9	613	10
Future Volume (Veh/h)	13	28	16	0	3	10	19	978	10	9	613	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	30	17	0	3	11	21	1063	11	10	666	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								1253			753	
pX, platoon unblocked	0.84	0.84	0.79	0.84	0.84	0.73	0.79			0.73		
vC, conflicting volume	1814	1808	672	1834	1808	1068	677			1074		
vC1, stage 1 conf vol	692	692		1110	1110							
vC2, stage 2 conf vol	1123	1116		724	697							
vCu, unblocked vol	1305	1297	448	1328	1297	909	455			917		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	86	96	100	99	95	98			98		
cM capacity (veh/h)	182	213	481	196	221	243	871			543		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	61	14	1095	687
Volume Left	14	0	21	10
Volume Right	17	11	11	11
cSH	241	238	871	543
Volume to Capacity	0.25	0.06	0.02	0.02
Queue Length 95th (ft)	24	5	2	1
Control Delay (s)	24.9	21.1	0.8	0.5
Lane LOS	C	C	A	A
Approach Delay (s)	24.9	21.1	0.8	0.5
Approach LOS	C	C		

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	28	21	15	0	30	24	953	31	22	592	11
Future Volume (Veh/h)	22	28	21	15	0	30	24	953	31	22	592	11
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	30	23	16	0	33	26	1036	34	24	643	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (ft)								1055			951	
pX, platoon unblocked	0.83	0.83	0.80	0.83	0.83	0.73	0.80			0.73		
vC, conflicting volume	1818	1819	649	1823	1791	1036	655			1070		
vC1, stage 1 conf vol	697	697		1088	1088							
vC2, stage 2 conf vol	1121	1122		735	703							
vCu, unblocked vol	1339	1340	435	1345	1306	865	443			911		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	85	85	95	92	100	87	97			96		
cM capacity (veh/h)	155	197	496	196	223	258	893			546		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1
Volume Total	77	49	26	1036	34	679
Volume Left	24	16	26	0	0	24
Volume Right	23	33	0	0	34	12
cSH	218	234	893	1700	1700	546
Volume to Capacity	0.35	0.21	0.03	0.61	0.02	0.04
Queue Length 95th (ft)	38	19	2	0	0	3
Control Delay (s)	30.3	24.4	9.2	0.0	0.0	1.2
Lane LOS	D	C	A			A
Approach Delay (s)	30.3	24.4	0.2			1.2
Approach LOS	D	C				

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	61.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	13	17	993	27	30	608
Future Volume (Veh/h)	13	17	993	27	30	608
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	18	1079	29	33	661
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type			None			None
Median storage veh)						
Upstream signal (ft)			255			
pX, platoon unblocked	0.80	0.80			0.80	
vC, conflicting volume	1490	554			1108	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1107	0			628	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	98			96	
cM capacity (veh/h)	156	865			758	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	32	719	389	33	330	330
Volume Left	14	0	0	33	0	0
Volume Right	18	0	29	0	0	0
cSH	356	1700	1700	758	1700	1700
Volume to Capacity	0.09	0.42	0.23	0.04	0.19	0.19
Queue Length 95th (ft)	7	0	0	3	0	0
Control Delay (s)	18.5	0.0	0.0	10.0	0.0	0.0
Lane LOS	C			A		
Approach Delay (s)	18.5	0.0		0.5		
Approach LOS	C					

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	176	585	173	140	369	59	226	957	257	111	510	158
Future Volume (vph)	176	585	173	140	369	59	226	957	257	111	510	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3418		1770	3466		1770	5085	1583	1770	4905	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433	3418		1770	3466		1770	5085	1583	1770	4905	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	191	636	188	152	401	64	246	1040	279	121	554	172
RTOR Reduction (vph)	0	34	0	0	16	0	0	0	195	0	71	0
Lane Group Flow (vph)	191	790	0	152	449	0	246	1040	84	121	655	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases									4			
Actuated Green, G (s)	8.4	22.6		8.6	22.8		13.1	24.0	24.0	6.8	17.7	
Effective Green, g (s)	8.4	22.6		8.6	22.8		13.1	24.0	24.0	6.8	17.7	
Actuated g/C Ratio	0.11	0.28		0.11	0.29		0.16	0.30	0.30	0.08	0.22	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	360	965		190	987		289	1525	474	150	1085	
v/s Ratio Prot	0.06	c0.23		c0.09	0.13		c0.14	c0.20		0.07	0.13	
v/s Ratio Perm									0.05			
v/c Ratio	0.53	0.82		0.80	0.46		0.85	0.68	0.18	0.81	0.60	
Uniform Delay, d1	33.9	26.8		34.9	23.5		32.5	24.6	20.7	36.0	28.0	
Progression Factor	1.00	1.00		1.00	1.00		1.34	1.04	1.83	1.00	1.00	
Incremental Delay, d2	1.5	7.7		20.9	1.5		18.5	1.1	0.2	26.2	1.0	
Delay (s)	35.4	34.5		55.8	25.0		62.1	26.8	38.0	62.1	29.0	
Level of Service	D	C		E	C		E	C	D	E	C	
Approach Delay (s)		34.7			32.6			34.4			33.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	34.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	355	40	39	380	116	71	211	43	116	178	142
Future Volume (vph)	81	355	40	39	380	116	71	211	43	116	178	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.96			0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	1.00
Satd. Flow (prot)	1770	1835		1770	1797			1810		1770	1863	1583
Flt Permitted	0.21	1.00		0.32	1.00			0.89		0.43	1.00	1.00
Satd. Flow (perm)	390	1835		590	1797			1629		802	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	88	386	43	42	413	126	77	229	47	126	193	154
RTOR Reduction (vph)	0	7	0	0	19	0	0	10	0	0	0	76
Lane Group Flow (vph)	88	422	0	42	520	0	0	343	0	126	193	78
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	19.1	19.1		19.1	19.1			20.4		28.7	28.7	28.7
Effective Green, g (s)	19.1	19.1		19.1	19.1			20.4		28.7	28.7	28.7
Actuated g/C Ratio	0.34	0.34		0.34	0.34			0.36		0.51	0.51	0.51
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	131	617		198	604			585		469	941	799
v/s Ratio Prot		0.23			c0.29					c0.02	0.10	
v/s Ratio Perm	0.23			0.07				c0.21		0.12		0.05
v/c Ratio	0.67	0.68		0.21	0.86			0.59		0.27	0.21	0.10
Uniform Delay, d1	16.2	16.3		13.5	17.6			14.8		8.7	7.8	7.3
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	12.7	3.1		0.5	12.0			1.5		0.3	0.5	0.2
Delay (s)	28.9	19.4		14.0	29.6			16.3		9.0	8.2	7.6
Level of Service	C	B		B	C			B		A	A	A
Approach Delay (s)		21.0			28.5			16.3			8.2	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	56.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	256	841	157	128	643	211	264	664	50	231	367	178
Future Volume (vph)	256	841	157	128	643	211	264	664	50	231	367	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	4965		1770	3539	1583	3433	3502		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	4965		1770	3539	1583	3433	3502		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	278	914	171	139	699	229	287	722	54	251	399	193
RTOR Reduction (vph)	0	34	0	0	0	177	0	7	0	0	0	142
Lane Group Flow (vph)	278	1051	0	139	699	52	287	769	0	251	399	51
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	13.6	22.6		9.2	18.2	18.2	10.8	19.6		12.3	21.1	21.1
Effective Green, g (s)	13.6	22.6		9.2	18.2	18.2	10.8	19.6		12.3	21.1	21.1
Actuated g/C Ratio	0.17	0.28		0.12	0.23	0.23	0.14	0.25		0.15	0.26	0.26
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	302	1407		204	808	361	465	861		273	936	419
v/s Ratio Prot	c0.16	0.21		0.08	c0.20		0.08	c0.22		c0.14	0.11	
v/s Ratio Perm						0.03						0.03
v/c Ratio	0.92	0.75		0.68	0.87	0.14	0.62	0.89		0.92	0.43	0.12
Uniform Delay, d1	32.5	26.0		33.8	29.6	24.5	32.5	29.0		33.2	24.3	22.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	31.8	2.2		9.0	9.6	0.2	2.4	13.6		33.5	1.4	0.6
Delay (s)	64.4	28.2		42.9	39.1	24.7	34.9	42.7		66.7	25.7	22.9
Level of Service	E	C		D	D	C	C	D		E	C	C
Approach Delay (s)		35.5			36.5			40.6			37.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	37.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	79.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	377	72	49	324	128	76	757	123	70	475	98
Future Volume (vph)	163	377	72	49	324	128	76	757	123	70	475	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.19	1.00	1.00	0.22	1.00	1.00	0.29	1.00	1.00	0.10	1.00	1.00
Satd. Flow (perm)	352	1863	1583	419	1863	1583	546	1863	1583	182	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	177	410	78	53	352	139	83	823	134	76	516	107
RTOR Reduction (vph)	0	0	57	0	0	98	0	0	69	0	0	58
Lane Group Flow (vph)	177	410	21	53	352	41	83	823	65	76	516	49
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	30.1	23.9	23.9	23.5	20.6	20.6	45.8	41.4	41.4	44.8	40.9	40.9
Effective Green, g (s)	30.1	23.9	23.9	23.5	20.6	20.6	45.8	41.4	41.4	44.8	40.9	40.9
Actuated g/C Ratio	0.33	0.27	0.27	0.26	0.23	0.23	0.51	0.46	0.46	0.50	0.45	0.45
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	215	494	419	152	425	361	337	856	727	159	845	718
v/s Ratio Prot	c0.06	c0.22		0.01	0.19		0.01	c0.44		c0.02	0.28	
v/s Ratio Perm	0.22		0.01	0.08		0.03	0.11		0.04	0.22		0.03
v/c Ratio	0.82	0.83	0.05	0.35	0.83	0.11	0.25	0.96	0.09	0.48	0.61	0.07
Uniform Delay, d1	24.7	31.2	24.6	26.2	33.1	27.5	13.0	23.6	13.7	19.5	18.6	13.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	21.8	11.1	0.0	1.4	12.5	0.1	0.4	22.7	0.2	2.3	3.3	0.2
Delay (s)	46.5	42.2	24.7	27.6	45.6	27.7	13.3	46.3	14.0	21.7	21.9	14.0
Level of Service	D	D	C	C	D	C	B	D	B	C	C	B
Approach Delay (s)		41.3			39.2			39.5			20.7	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	35.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	90.1	Sum of lost time (s)	18.0
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	1013	0	6	623	3	186	0	5	2	0	0
Future Volume (vph)	6	1013	0	6	623	3	186	0	5	2	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00			1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.95			0.95	
Satd. Flow (prot)	1770	3539		1770	3539	1583		1770			1770	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.73			0.74	
Satd. Flow (perm)	1770	3539		1770	3539	1583		1356			1388	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	1101	0	7	677	3	202	0	5	2	0	0
RTOR Reduction (vph)	0	0	0	0	0	2	0	86	0	0	0	0
Lane Group Flow (vph)	7	1101	0	7	677	1	0	121	0	0	2	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4			8	2			6		
Actuated Green, G (s)	0.7	19.0		0.7	19.0	19.0		9.1			9.1	
Effective Green, g (s)	0.7	19.0		0.7	19.0	19.0		9.1			9.1	
Actuated g/C Ratio	0.02	0.45		0.02	0.45	0.45		0.22			0.22	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	29	1589		29	1589	711		291			298	
v/s Ratio Prot	c0.00	c0.31		0.00	0.19							
v/s Ratio Perm						0.00		c0.09			0.00	
v/c Ratio	0.24	0.69		0.24	0.43	0.00		0.42			0.01	
Uniform Delay, d1	20.5	9.3		20.5	7.9	6.4		14.3			13.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	4.3	1.3		4.3	0.2	0.0		1.0			0.0	
Delay (s)	24.8	10.6		24.8	8.1	6.4		15.3			13.1	
Level of Service	C	B		C	A	A		B			B	
Approach Delay (s)		10.7			8.3			15.3			13.1	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	42.3	Sum of lost time (s)	13.5
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	217	130	131	48	80	65	57	489	56	100	607	81
Future Volume (vph)	217	130	131	48	80	65	57	489	56	100	607	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	0.99	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1745	1583		1829	1583	1770	3539	1583	1770	4996	
Flt Permitted	0.67	0.91	1.00		0.73	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1183	1603	1583		1369	1583	1770	3539	1583	1770	4996	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	236	141	142	52	87	71	62	532	61	109	660	88
RTOR Reduction (vph)	0	0	95	0	0	61	0	0	41	0	17	0
Lane Group Flow (vph)	182	195	47	0	139	10	62	532	20	109	731	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)	19.2	19.2	19.2		8.1	8.1	3.8	19.5	19.5	6.4	22.1	
Effective Green, g (s)	19.2	19.2	19.2		8.1	8.1	3.8	19.5	19.5	6.4	22.1	
Actuated g/C Ratio	0.33	0.33	0.33		0.14	0.14	0.06	0.33	0.33	0.11	0.38	
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	443	541	518		189	218	114	1177	526	193	1884	
v/s Ratio Prot	c0.05	0.04					0.04	c0.15		c0.06	0.15	
v/s Ratio Perm	0.09	0.08	0.03		c0.10	0.01			0.01			
v/c Ratio	0.41	0.36	0.09		0.74	0.05	0.54	0.45	0.04	0.56	0.39	
Uniform Delay, d1	15.7	15.0	13.6		24.2	21.9	26.6	15.4	13.2	24.8	13.3	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	0.4	0.1		13.8	0.1	5.2	1.3	0.1	3.8	0.6	
Delay (s)	16.3	15.4	13.7		38.0	22.0	31.8	16.6	13.4	28.5	13.9	
Level of Service	B	B	B		D	C	C	B	B	C	B	
Approach Delay (s)		15.3			32.6			17.7			15.8	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	58.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

2035 Phase 2 AM Peak Hour LOS Worksheets

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	330	72	180	191	65	399
Future Volume (vph)	330	72	180	191	65	399
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5			4.5
Lane Util. Factor	0.97	1.00	0.95			0.95
Frt	1.00	0.85	0.92			1.00
Flt Protected	0.95	1.00	1.00			0.99
Satd. Flow (prot)	3433	1583	3266			3515
Flt Permitted	0.95	1.00	1.00			0.85
Satd. Flow (perm)	3433	1583	3266			3011
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	359	78	196	208	71	434
RTOR Reduction (vph)	0	55	125	0	0	0
Lane Group Flow (vph)	359	23	279	0	0	505
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	8.7	8.7	11.7			11.7
Effective Green, g (s)	8.7	8.7	11.7			11.7
Actuated g/C Ratio	0.30	0.30	0.40			0.40
Clearance Time (s)	4.5	4.5	4.5			4.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	1015	468	1299			1198
v/s Ratio Prot	c0.10		0.09			
v/s Ratio Perm		0.01				c0.17
v/c Ratio	0.35	0.05	0.21			0.42
Uniform Delay, d1	8.1	7.4	5.8			6.4
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.2	0.0	0.1			0.2
Delay (s)	8.4	7.4	5.9			6.6
Level of Service	A	A	A			A
Approach Delay (s)	8.2		5.9			6.6
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	29.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	208	172	122	628	34	171	297	137	134	437	169
Future Volume (vph)	79	208	172	122	628	34	171	297	137	134	437	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.93		1.00	0.99		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3299		1770	3512		1770	3372		1770	3391	
Flt Permitted	0.25	1.00		0.48	1.00		0.38	1.00		0.48	1.00	
Satd. Flow (perm)	463	3299		899	3512		702	3372		897	3391	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	86	226	187	133	683	37	186	323	149	146	475	184
RTOR Reduction (vph)	0	129	0	0	7	0	0	69	0	0	35	0
Lane Group Flow (vph)	86	284	0	133	713	0	186	403	0	146	624	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.7	17.7		17.7	17.7		30.6	30.6		30.6	30.6	
Effective Green, g (s)	17.7	17.7		17.7	17.7		30.6	30.6		30.6	30.6	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.53	0.53		0.53	0.53	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	143	1019		277	1084		374	1800		479	1810	
v/s Ratio Prot		0.09			c0.20			0.12			0.18	
v/s Ratio Perm	0.19			0.15			c0.27			0.16		
v/c Ratio	0.60	0.28		0.48	0.66		0.50	0.22		0.30	0.34	
Uniform Delay, d1	16.8	15.0		16.1	17.2		8.5	7.1		7.4	7.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.9	0.1		1.3	1.5		4.7	0.3		1.6	0.5	
Delay (s)	23.8	15.1		17.4	18.6		13.1	7.4		9.1	8.1	
Level of Service	C	B		B	B		B	A		A	A	
Approach Delay (s)		16.6			18.4			9.0			8.3	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	57.3	Sum of lost time (s)	9.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	355	100	266	541	107	134	604	235	105	477	103
Future Volume (vph)	66	355	100	266	541	107	134	604	235	105	477	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3422		1770	3452		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3422		1770	3452		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	386	109	289	588	116	146	657	255	114	518	112
RTOR Reduction (vph)	0	33	0	0	20	0	0	0	183	0	0	83
Lane Group Flow (vph)	72	462	0	289	684	0	146	657	72	114	518	29
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	6.5	16.3		15.2	25.0		8.4	22.1	22.1	6.4	20.1	20.1
Effective Green, g (s)	6.5	16.3		15.2	25.0		8.4	22.1	22.1	6.4	20.1	20.1
Actuated g/C Ratio	0.08	0.21		0.19	0.32		0.11	0.28	0.28	0.08	0.26	0.26
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	147	715		344	1106		190	1002	448	145	911	407
v/s Ratio Prot	0.04	0.13		c0.16	c0.20		c0.08	c0.19		0.06	0.15	
v/s Ratio Perm									0.05			0.02
v/c Ratio	0.49	0.65		0.84	0.62		0.77	0.66	0.16	0.79	0.57	0.07
Uniform Delay, d1	34.2	28.2		30.2	22.5		33.9	24.6	21.0	35.1	25.2	21.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.6	2.0		16.6	1.0		16.9	3.3	0.8	23.9	2.6	0.3
Delay (s)	36.7	30.2		46.8	23.5		50.7	27.9	21.8	59.0	27.7	22.2
Level of Service	D	C		D	C		D	C	C	E	C	C
Approach Delay (s)		31.0			30.3			29.6			31.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	132	57	117	32	29	231
Future Volume (Veh/h)	132	57	117	32	29	231
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	143	62	127	35	32	251
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						1253
pX, platoon unblocked						
vC, conflicting volume	460	144			162	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	460	144			162	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	74	93			98	
cM capacity (veh/h)	547	903			1417	

Direction, Lane #	NW 1	NE 1	SW 1
Volume Total	205	162	283
Volume Left	143	0	32
Volume Right	62	35	0
cSH	621	1700	1417
Volume to Capacity	0.33	0.10	0.02
Queue Length 95th (ft)	36	0	2
Control Delay (s)	13.6	0.0	1.0
Lane LOS	B		A
Approach Delay (s)	13.6	0.0	1.0
Approach LOS	B		

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	42.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	504	10	10	1344	150	9	56	11	21	32	52
Future Volume (vph)	46	504	10	10	1344	150	9	56	11	21	32	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.98			0.98			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	3529		1770	3486			1815			1721	
Flt Permitted	0.95	1.00		0.95	1.00			0.97			0.94	
Satd. Flow (perm)	1770	3529		1770	3486			1768			1635	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	548	11	11	1461	163	10	61	12	23	35	57
RTOR Reduction (vph)	0	2	0	0	10	0	0	7	0	0	42	0
Lane Group Flow (vph)	50	557	0	11	1614	0	0	76	0	0	73	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	3.2	43.6		1.0	41.4			19.7			19.7	
Effective Green, g (s)	3.2	43.6		1.0	41.4			19.7			19.7	
Actuated g/C Ratio	0.04	0.56		0.01	0.54			0.25			0.25	
Clearance Time (s)	4.0	4.5		4.0	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	73	1990		22	1867			450			416	
v/s Ratio Prot	c0.03	0.16		0.01	c0.46							
v/s Ratio Perm								0.04			c0.04	
v/c Ratio	0.68	0.28		0.50	0.86			0.17			0.17	
Uniform Delay, d1	36.6	8.7		37.9	15.5			22.4			22.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	23.4	0.1		16.8	4.4			0.8			0.9	
Delay (s)	59.9	8.8		54.7	20.0			23.2			23.4	
Level of Service	E	A		D	B			C			C	
Approach Delay (s)		13.0			20.2			23.2			23.4	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	77.3	Sum of lost time (s)	13.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	346	97	70	813	76	60	104	32	34	110	69
Future Volume (vph)	23	346	97	70	813	76	60	104	32	34	110	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.97		1.00	0.99			0.98			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1770	3423		1770	3494			1794			1767	
Flt Permitted	0.19	1.00		0.46	1.00			0.86			0.93	
Satd. Flow (perm)	345	3423		855	3494			1560			1664	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	376	105	76	884	83	65	113	35	37	120	75
RTOR Reduction (vph)	0	47	0	0	13	0	0	11	0	0	27	0
Lane Group Flow (vph)	25	434	0	76	954	0	0	202	0	0	205	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	22.4	22.4		22.4	22.4			23.7			23.7	
Effective Green, g (s)	22.4	22.4		22.4	22.4			23.7			23.7	
Actuated g/C Ratio	0.41	0.41		0.41	0.41			0.43			0.43	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	140	1391		347	1420			670			715	
v/s Ratio Prot		0.13			c0.27							
v/s Ratio Perm	0.07			0.09				c0.13			0.12	
v/c Ratio	0.18	0.31		0.22	0.67			0.30			0.29	
Uniform Delay, d1	10.5	11.1		10.7	13.3			10.3			10.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.6	0.1		0.3	1.3			1.2			1.0	
Delay (s)	11.1	11.2		11.0	14.6			11.4			11.2	
Level of Service	B	B		B	B			B			B	
Approach Delay (s)		11.2			14.3			11.4			11.2	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	55.1	Sum of lost time (s)	9.0
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	63	16	34	88	277	100
Future Volume (Veh/h)	63	16	34	88	277	100
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	68	17	37	96	301	109
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1274		
pX, platoon unblocked						
vC, conflicting volume	526	356	410			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	526	356	410			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	98	97			
cM capacity (veh/h)	496	688	1149			

Direction, Lane #	SE 1	NE 1	SW 1
Volume Total	85	133	410
Volume Left	68	37	0
Volume Right	17	0	109
cSH	525	1149	1700
Volume to Capacity	0.16	0.03	0.24
Queue Length 95th (ft)	14	2	0
Control Delay (s)	13.2	2.5	0.0
Lane LOS	B	A	
Approach Delay (s)	13.2	2.5	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	41.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	332	72	158	695	60	186	183	34	57	193	63
Future Volume (vph)	27	332	72	158	695	60	186	183	34	57	193	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3445		1770	3497		1770	1863	1583	1770	1863	1583
Flt Permitted	0.24	1.00		0.32	1.00		0.49	1.00	1.00	0.63	1.00	1.00
Satd. Flow (perm)	441	3445		591	3497		906	1863	1583	1179	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	361	78	172	755	65	202	199	37	62	210	68
RTOR Reduction (vph)	0	27	0	0	9	0	0	0	24	0	0	47
Lane Group Flow (vph)	29	412	0	172	811	0	202	199	13	62	210	21
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	18.8	16.9		28.5	22.1		31.1	24.6	24.6	23.9	21.0	21.0
Effective Green, g (s)	18.8	16.9		28.5	22.1		31.1	24.6	24.6	23.9	21.0	21.0
Actuated g/C Ratio	0.27	0.24		0.41	0.32		0.45	0.35	0.35	0.34	0.30	0.30
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	155	837		362	1111		486	659	560	430	562	478
v/s Ratio Prot	0.01	0.12		c0.05	c0.23		c0.04	0.11		0.01	0.11	
v/s Ratio Perm	0.05			0.15			c0.15		0.01	0.04		0.01
v/c Ratio	0.19	0.49		0.48	0.73		0.42	0.30	0.02	0.14	0.37	0.04
Uniform Delay, d1	19.0	22.6		13.9	21.1		12.2	16.2	14.6	15.5	19.1	17.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.5		1.0	2.5		0.6	1.2	0.1	0.2	1.9	0.2
Delay (s)	19.6	23.1		14.9	23.6		12.8	17.4	14.7	15.7	21.0	17.3
Level of Service	B	C		B	C		B	B	B	B	C	B
Approach Delay (s)		22.9			22.1			15.1			19.3	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	69.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Sign Control		Stop			Stop			Stop		Stop		
Traffic Volume (vph)	30	23	86	26	61	44	30	309	31	59	441	3
Future Volume (vph)	30	23	86	26	61	44	30	309	31	59	441	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	25	93	28	66	48	33	336	34	64	479	3

Direction, Lane #	EB 1	WB 1	SB 1	SB 2	NW 1	NW 2
Volume Total (vph)	151	142	201	202	304	243
Volume Left (vph)	33	28	33	0	64	0
Volume Right (vph)	93	48	0	34	0	3
Hadj (s)	-0.29	-0.13	0.12	-0.08	0.14	0.03
Departure Headway (s)	6.2	6.3	6.4	6.2	6.2	6.1
Degree Utilization, x	0.26	0.25	0.36	0.35	0.52	0.41
Capacity (veh/h)	527	511	539	557	556	574
Control Delay (s)	11.3	11.4	11.6	11.2	14.6	12.0
Approach Delay (s)	11.3	11.4	11.4		13.4	
Approach LOS	B	B	B		B	

Intersection Summary			
Delay	12.3		
Level of Service	B		
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	492	11	260	1174	264	135	574	364	104	345	44
Future Volume (vph)	36	492	11	260	1174	264	135	574	364	104	345	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3479	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3479	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	535	12	283	1276	287	147	624	396	113	375	48
RTOR Reduction (vph)	0	0	9	0	0	131	0	0	46	0	12	0
Lane Group Flow (vph)	39	535	3	283	1276	156	147	624	350	113	411	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	2.9	19.0	19.0	15.3	31.4	31.4	7.6	20.1	35.4	6.5	19.0	
Effective Green, g (s)	2.9	19.0	19.0	15.3	31.4	31.4	7.6	20.1	35.4	6.5	19.0	
Actuated g/C Ratio	0.04	0.24	0.24	0.19	0.40	0.40	0.10	0.25	0.45	0.08	0.24	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	65	852	381	343	1408	629	170	901	800	145	837	
v/s Ratio Prot	0.02	0.15		c0.16	c0.36		c0.08	c0.18	0.08	0.06	0.12	
v/s Ratio Perm			0.00			0.10			0.14			
v/c Ratio	0.60	0.63	0.01	0.83	0.91	0.25	0.86	0.69	0.44	0.78	0.49	
Uniform Delay, d1	37.4	26.8	22.8	30.5	22.4	15.9	35.1	26.6	14.9	35.5	25.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	14.0	1.5	0.0	14.8	8.6	0.2	33.8	4.4	0.4	22.8	2.1	
Delay (s)	51.5	28.2	22.8	45.3	31.0	16.1	68.9	31.0	15.3	58.3	27.8	
Level of Service	D	C	C	D	C	B	E	C	B	E	C	
Approach Delay (s)		29.7			30.9			30.4			34.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	31.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	78.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	5	13	39	10	29	7	77	15	8	110	5
Future Volume (vph)	5	5	13	39	10	29	7	77	15	8	110	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	14	42	11	32	8	84	16	9	120	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	24	85	108	134
Volume Left (vph)	5	42	8	9
Volume Right (vph)	14	32	16	5
Hadj (s)	-0.27	-0.09	-0.04	0.03
Departure Headway (s)	4.3	4.4	4.3	4.3
Degree Utilization, x	0.03	0.10	0.13	0.16
Capacity (veh/h)	789	769	813	804
Control Delay (s)	7.4	7.9	7.9	8.1
Approach Delay (s)	7.4	7.9	7.9	8.1
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.9		
Level of Service	A		
Intersection Capacity Utilization	24.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	870	27	81	1581	26	47	22	57	45	24	93
Future Volume (vph)	115	870	27	81	1581	26	47	22	57	45	24	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		0.91	0.91			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.94			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1770	3523		1610	3381			1717			1695	
Flt Permitted	0.95	1.00		0.95	0.95			0.65			0.80	
Satd. Flow (perm)	1770	3523		1610	3213			1135			1370	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	946	29	88	1718	28	51	24	62	49	26	101
RTOR Reduction (vph)	0	1	0	0	1	0	0	20	0	0	33	0
Lane Group Flow (vph)	125	974	0	79	1754	0	0	117	0	0	143	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	11.5	102.8		12.2	115.7			21.5			21.5	
Effective Green, g (s)	11.5	102.8		12.2	115.7			21.5			21.5	
Actuated g/C Ratio	0.08	0.69		0.08	0.77			0.14			0.14	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	135	2414		130	2491			162			196	
v/s Ratio Prot	c0.07	0.28		0.05	0.06							
v/s Ratio Perm					c0.49			0.10			c0.10	
v/c Ratio	0.93	0.40		0.61	0.70			0.72			0.73	
Uniform Delay, d1	68.8	10.3		66.6	8.6			61.4			61.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	54.9	0.1		7.8	0.9			24.4			21.3	
Delay (s)	123.7	10.4		74.4	9.5			85.8			82.8	
Level of Service	F	B		E	A			F			F	
Approach Delay (s)		23.3			12.3			85.8			82.8	
Approach LOS		C			B			F			F	

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	91.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	13	17	4	6	5	9	73	3	9	123	6
Future Volume (Veh/h)	2	13	17	4	6	5	9	73	3	9	123	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	14	18	4	7	5	10	79	3	10	134	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								564				
pX, platoon unblocked												
vC, conflicting volume	266	260	138	283	262	80	141			82		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	266	260	138	283	262	80	141			82		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	98	99	99	99	99			99		
cM capacity (veh/h)	670	636	911	638	635	980	1442			1515		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	34	16	92	151
Volume Left	2	4	10	10
Volume Right	18	5	3	7
cSH	760	714	1442	1515
Volume to Capacity	0.04	0.02	0.01	0.01
Queue Length 95th (ft)	4	2	1	0
Control Delay (s)	10.0	10.2	0.9	0.5
Lane LOS	A	B	A	A
Approach Delay (s)	10.0	10.2	0.9	0.5
Approach LOS	A	B		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	18.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	857	7	18	1662	40	11	3	6	86	1	69
Future Volume (vph)	46	857	7	18	1662	40	11	3	6	86	1	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.96			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.97	
Satd. Flow (prot)	1770	3535		1770	3527			1735			1704	
Flt Permitted	0.95	1.00		0.95	1.00			0.86			0.82	
Satd. Flow (perm)	1770	3535		1770	3527			1527			1436	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	932	8	20	1807	43	12	3	7	93	1	75
RTOR Reduction (vph)	0	1	0	0	2	0	0	5	0	0	36	0
Lane Group Flow (vph)	50	939	0	20	1848	0	0	17	0	0	133	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	3.0	44.8		1.9	43.7			18.6			18.6	
Effective Green, g (s)	3.0	44.8		1.9	43.7			18.6			18.6	
Actuated g/C Ratio	0.04	0.57		0.02	0.55			0.24			0.24	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	67	2009		42	1955			360			338	
v/s Ratio Prot	c0.03	0.27		0.01	c0.52							
v/s Ratio Perm								0.01			c0.09	
v/c Ratio	0.75	0.47		0.48	0.95			0.05			0.39	
Uniform Delay, d1	37.5	10.0		38.0	16.4			23.2			25.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	35.8	0.2		8.3	10.2			0.2			3.4	
Delay (s)	73.4	10.2		46.2	26.6			23.5			28.8	
Level of Service	E	B		D	C			C			C	
Approach Delay (s)		13.4			26.8			23.5			28.8	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	78.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	23	9	8	11	0	1	99	2	7	119	0
Future Volume (Veh/h)	1	23	9	8	11	0	1	99	2	7	119	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	25	10	9	12	0	1	108	2	8	129	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								560				
pX, platoon unblocked												
vC, conflicting volume	262	257	129	278	256	109	129			110		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	262	257	129	278	256	109	129			110		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	96	99	99	98	100	100			99		
cM capacity (veh/h)	678	643	921	644	644	945	1457			1480		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	36	21	111	137
Volume Left	1	9	1	8
Volume Right	10	0	2	0
cSH	703	644	1457	1480
Volume to Capacity	0.05	0.03	0.00	0.01
Queue Length 95th (ft)	4	3	0	0
Control Delay (s)	10.4	10.8	0.1	0.5
Lane LOS	B	B	A	A
Approach Delay (s)	10.4	10.8	0.1	0.5
Approach LOS	B	B		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	22.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	821	24	23	1621	36	26	5	13	62	7	66
Future Volume (vph)	52	821	24	23	1621	36	26	5	13	62	7	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.96			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.98	
Satd. Flow (prot)	1770	3524		1770	3528			1736			1701	
Flt Permitted	0.95	1.00		0.95	1.00			0.81			0.85	
Satd. Flow (perm)	1770	3524		1770	3528			1452			1474	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	892	26	25	1762	39	28	5	14	67	8	72
RTOR Reduction (vph)	0	2	0	0	2	0	0	11	0	0	43	0
Lane Group Flow (vph)	57	916	0	25	1799	0	0	36	0	0	104	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	3.0	44.5		2.1	43.6			18.8			18.8	
Effective Green, g (s)	3.0	44.5		2.1	43.6			18.8			18.8	
Actuated g/C Ratio	0.04	0.56		0.03	0.55			0.24			0.24	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	67	1987		47	1949			345			351	
v/s Ratio Prot	c0.03	0.26		0.01	c0.51							
v/s Ratio Perm								0.03			c0.07	
v/c Ratio	0.85	0.46		0.53	0.92			0.11			0.30	
Uniform Delay, d1	37.7	10.1		37.9	16.1			23.5			24.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	61.0	0.2		11.1	7.9			0.6			2.2	
Delay (s)	98.7	10.3		49.0	24.0			24.1			26.8	
Level of Service	F	B		D	C			C			C	
Approach Delay (s)		15.5			24.3			24.1			26.8	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	78.9	Sum of lost time (s)	13.5
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	5	28	12	25	10	9	323	3	7	565	2
Future Volume (Veh/h)	13	5	28	12	25	10	9	323	3	7	565	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	5	30	13	27	11	10	351	3	8	614	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								542				
pX, platoon unblocked												
vC, conflicting volume	851	1005	308	728	1004	177	616			354		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	851	1005	308	728	1004	177	616			354		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	98	96	96	89	99	99			99		
cM capacity (veh/h)	225	236	688	289	236	835	960			1201		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	49	51	186	178	315	309
Volume Left	14	13	10	0	8	0
Volume Right	30	11	0	3	0	2
cSH	386	296	960	1700	1201	1700
Volume to Capacity	0.13	0.17	0.01	0.10	0.01	0.18
Queue Length 95th (ft)	11	15	1	0	1	0
Control Delay (s)	15.7	19.7	0.6	0.0	0.3	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	15.7	19.7	0.3		0.1	
Approach LOS	C	C				

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	31.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	124	821	1388	185	385	189
Future Volume (vph)	124	821	1388	185	385	189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.95	0.95		0.97	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3477		3433	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3477		3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	135	892	1509	201	418	205
RTOR Reduction (vph)	0	0	11	0	0	156
Lane Group Flow (vph)	135	892	1699	0	418	49
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	9.2	61.0	47.3		19.5	19.5
Effective Green, g (s)	9.2	61.0	47.3		19.5	19.5
Actuated g/C Ratio	0.10	0.68	0.53		0.22	0.22
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	181	2412	1837		747	344
v/s Ratio Prot	c0.08	0.25	c0.49		c0.12	
v/s Ratio Perm						0.03
v/c Ratio	0.75	0.37	0.92		0.56	0.14
Uniform Delay, d1	39.0	6.1	19.5		31.2	28.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	15.3	0.1	8.4		3.0	0.9
Delay (s)	54.4	6.2	27.9		34.2	29.1
Level of Service	D	A	C		C	C
Approach Delay (s)		12.5	27.9		32.5	
Approach LOS		B	C		C	

Intersection Summary			
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	89.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	353	403	551	213	721	975
Future Volume (vph)	353	403	551	213	721	975
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	0.97	1.00	0.91		0.97	0.95
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3090	1425	4385		3090	3185
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3090	1425	4385		3090	3185
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	384	438	599	232	784	1060
RTOR Reduction (vph)	0	347	98	0	0	0
Lane Group Flow (vph)	384	91	733	0	784	1060
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	13.7	13.7	18.1		20.5	43.1
Effective Green, g (s)	13.7	13.7	18.1		20.5	43.1
Actuated g/C Ratio	0.21	0.21	0.28		0.31	0.66
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	643	296	1206		962	2086
v/s Ratio Prot	c0.12		c0.17		c0.25	0.33
v/s Ratio Perm		0.06				
v/c Ratio	0.60	0.31	0.61		0.81	0.51
Uniform Delay, d1	23.6	22.0	20.8		20.9	5.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.5	0.6	2.3		7.6	0.9
Delay (s)	25.1	22.6	23.0		28.5	6.8
Level of Service	C	C	C		C	A
Approach Delay (s)	23.8		23.0			16.0
Approach LOS	C		C			B

Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	65.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	206	93	202	464	36	110
Future Volume (Veh/h)	206	93	202	464	36	110
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	224	101	220	504	39	120
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						1
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			325		1218	274
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			325		1218	274
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			82		76	84
cM capacity (veh/h)			1235		164	764

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	325	724	159
Volume Left	0	220	39
Volume Right	101	0	120
cSH	1700	1235	668
Volume to Capacity	0.19	0.18	0.24
Queue Length 95th (ft)	0	16	23
Control Delay (s)	0.0	4.1	16.3
Lane LOS		A	C
Approach Delay (s)	0.0	4.1	16.3
Approach LOS			C

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
21: Glendora Ave & Sierra Madre Ave

03/15/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	9	284	41	86	492	1	128	8	36	7	11	9
Future Volume (vph)	9	284	41	86	492	1	128	8	36	7	11	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	309	45	93	535	1	139	9	39	8	12	10

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	364	628	1	148	39	30
Volume Left (vph)	10	93	0	139	0	8
Volume Right (vph)	45	0	1	0	39	10
Hadj (s)	-0.03	0.11	-0.67	0.50	-0.67	-0.11
Departure Headway (s)	6.2	6.0	5.2	7.7	6.6	7.7
Degree Utilization, x	0.63	1.04	0.00	0.32	0.07	0.06
Capacity (veh/h)	565	599	680	451	526	429
Control Delay (s)	19.2	70.9	7.0	13.1	8.9	11.2
Approach Delay (s)	19.2	70.8		12.2		11.2
Approach LOS	C	F		B		B

Intersection Summary			
Delay	44.8		
Level of Service	E		
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	225	2	82	6	0	2	47	501	6	38	799	396
Future Volume (vph)	225	2	82	6	0	2	47	501	6	38	799	396
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	0.95	0.95	0.88		1.00		0.97	0.91		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.97		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.96		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1687	2787		1739		3433	5076		1770	3539	1583
Flt Permitted	0.75	0.73	1.00		1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1330	1300	2787		1807		3433	5076		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	245	2	89	7	0	2	51	545	7	41	868	430
RTOR Reduction (vph)	0	0	68	0	9	0	0	1	0	0	0	225
Lane Group Flow (vph)	122	125	21	0	0	0	51	551	0	41	868	205
Turn Type	pm+pt	NA	Perm	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8								6
Actuated Green, G (s)	12.0	12.0	12.0		0.9		1.7	24.4		2.1	24.8	24.8
Effective Green, g (s)	12.0	12.0	12.0		0.9		1.7	24.4		2.1	24.8	24.8
Actuated g/C Ratio	0.23	0.23	0.23		0.02		0.03	0.47		0.04	0.48	0.48
Clearance Time (s)	4.5	4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	351	349	643		31		112	2381		71	1687	754
v/s Ratio Prot	0.04	c0.05					0.01	0.11		c0.02	c0.25	
v/s Ratio Perm	0.04	c0.04	0.01		0.00							0.13
v/c Ratio	0.35	0.36	0.03		0.01		0.46	0.23		0.58	0.51	0.27
Uniform Delay, d1	16.9	16.8	15.5		25.1		24.7	8.2		24.5	9.4	8.2
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	0.6	0.0		0.1		2.9	0.2		10.9	1.1	0.9
Delay (s)	17.5	17.4	15.5		25.2		27.6	8.4		35.4	10.6	9.1
Level of Service	B	B	B		C		C	A		D	B	A
Approach Delay (s)		17.0			25.2			10.1			10.8	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	52.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	34	13	467	756	17
Future Volume (Veh/h)	0	34	13	467	756	17
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	37	14	508	822	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1038	287	
pX, platoon unblocked	0.97	0.97	0.97			
vC, conflicting volume	1113	420	840			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1048	332	766			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	94	98			
cM capacity (veh/h)	212	642	815			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	37	183	339	548	292
Volume Left	0	14	0	0	0
Volume Right	37	0	0	0	18
cSH	642	815	1700	1700	1700
Volume to Capacity	0.06	0.02	0.20	0.32	0.17
Queue Length 95th (ft)	5	1	0	0	0
Control Delay (s)	10.9	0.9	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	10.9	0.3		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	31.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	43	60	0	902	78	16	733
Future Volume (vph)	43	60	0	902	78	16	733
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5		4.5	4.5
Lane Util. Factor	1.00			0.91		1.00	0.91
Frt	0.92			0.99		1.00	1.00
Flt Protected	0.98			1.00		0.95	1.00
Satd. Flow (prot)	1682			5024		1770	5085
Flt Permitted	0.98			1.00		0.95	1.00
Satd. Flow (perm)	1682			5024		1770	5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	47	65	0	980	85	17	797
RTOR Reduction (vph)	58	0	0	11	0	0	0
Lane Group Flow (vph)	54	0	0	1054	0	17	797
Turn Type	Prot		Prot	NA		Prot	NA
Protected Phases	8		5	2		1	6
Permitted Phases							
Actuated Green, G (s)	5.9			31.1		1.0	36.6
Effective Green, g (s)	5.9			31.1		1.0	36.6
Actuated g/C Ratio	0.11			0.60		0.02	0.71
Clearance Time (s)	4.5			4.5		4.5	4.5
Vehicle Extension (s)	3.0			3.0		3.0	3.0
Lane Grp Cap (vph)	192			3033		34	3613
v/s Ratio Prot	c0.03			c0.21		0.01	c0.16
v/s Ratio Perm							
v/c Ratio	0.28			0.35		0.50	0.22
Uniform Delay, d1	20.9			5.1		25.0	2.6
Progression Factor	1.00			1.00		1.00	1.00
Incremental Delay, d2	0.8			0.3		11.1	0.1
Delay (s)	21.7			5.4		36.1	2.7
Level of Service	C			A		D	A
Approach Delay (s)	21.7			5.4			3.4
Approach LOS	C			A			A

Intersection Summary			
HCM 2000 Control Delay	5.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	51.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	32.7%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Existing to No Build			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	324	155	238	855	118	209	848	229	69	703	84
Future Volume (vph)	84	324	155	238	855	118	209	848	229	69	703	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3475		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3475		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	352	168	259	929	128	227	922	249	75	764	91
RTOR Reduction (vph)	0	0	127	0	13	0	0	0	160	0	0	67
Lane Group Flow (vph)	91	352	41	259	1044	0	227	922	89	75	764	24
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	5.2	19.7	19.7	10.2	24.7		11.5	28.9	28.9	4.1	21.5	21.5
Effective Green, g (s)	5.2	19.7	19.7	10.2	24.7		11.5	28.9	28.9	4.1	21.5	21.5
Actuated g/C Ratio	0.06	0.24	0.24	0.13	0.31		0.14	0.36	0.36	0.05	0.27	0.27
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	113	861	385	432	1060		251	1264	565	89	940	420
v/s Ratio Prot	0.05	0.10		c0.08	c0.30		c0.13	c0.26		0.04	0.22	
v/s Ratio Perm			0.03						0.06			0.02
v/c Ratio	0.81	0.41	0.11	0.60	0.98		0.90	0.73	0.16	0.84	0.81	0.06
Uniform Delay, d1	37.4	25.7	23.8	33.4	27.9		34.2	22.6	17.7	38.1	27.8	22.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	32.6	0.3	0.1	2.2	23.8		32.5	3.7	0.6	48.0	7.6	0.3
Delay (s)	70.0	26.0	23.9	35.7	51.7		66.6	26.3	18.3	86.1	35.4	22.4
Level of Service	E	C	C	D	D		E	C	B	F	D	C
Approach Delay (s)		32.0			48.5			31.4			38.2	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	38.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	80.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	3	15	6	7	8	10	160	8	7	254	3
Future Volume (Veh/h)	9	3	15	6	7	8	10	160	8	7	254	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	3	16	7	8	9	11	174	9	8	276	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											647	
pX, platoon unblocked												
vC, conflicting volume	507	498	278	512	496	178	279			183		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	507	498	278	512	496	178	279			183		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	99	98	98	98	99	99			99		
cM capacity (veh/h)	460	467	761	456	469	864	1284			1392		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	29	24	194	287
Volume Left	10	7	11	8
Volume Right	16	9	9	3
cSH	590	560	1284	1392
Volume to Capacity	0.05	0.04	0.01	0.01
Queue Length 95th (ft)	4	3	1	0
Control Delay (s)	11.4	11.7	0.5	0.3
Lane LOS	B	B	A	A
Approach Delay (s)	11.4	11.7	0.5	0.3
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	25.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	11	16	7	20	20	450	5	6	395	5
Future Volume (Veh/h)	5	5	11	16	7	20	20	450	5	6	395	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	12	17	8	22	22	489	5	7	429	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											650	
pX, platoon unblocked	0.91	0.91	0.91	0.91	0.91		0.91					
vC, conflicting volume	760	984	432	996	984	247	434			494		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	686	932	325	945	932	247	328			494		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	98	98	91	97	97	98			99		
cM capacity (veh/h)	281	235	610	186	235	753	1117			1066		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	22	47	266	250	441
Volume Left	5	17	22	0	7
Volume Right	12	22	0	5	5
cSH	374	304	1117	1700	1066
Volume to Capacity	0.06	0.15	0.02	0.15	0.01
Queue Length 95th (ft)	5	13	2	0	0
Control Delay (s)	15.2	19.0	0.9	0.0	0.2
Lane LOS	C	C	A		A
Approach Delay (s)	15.2	19.0	0.4		0.2
Approach LOS	C	C			

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	22	13	469	10	0	408
Future Volume (Veh/h)	22	13	469	10	0	408
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	14	510	11	0	443
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			None
Median storage veh)			2			
Upstream signal (ft)			430			
pX, platoon unblocked						
vC, conflicting volume	737	260			521	
vC1, stage 1 conf vol	516					
vC2, stage 2 conf vol	222					
vCu, unblocked vol	737	260			521	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	98			100	
cM capacity (veh/h)	523	738			1041	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	38	340	181	222	222
Volume Left	24	0	0	0	0
Volume Right	14	0	11	0	0
cSH	586	1700	1700	1700	1700
Volume to Capacity	0.06	0.20	0.11	0.13	0.13
Queue Length 95th (ft)	5	0	0	0	0
Control Delay (s)	11.6	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.6	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	23.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Volume (veh/h)	126	10	3	315	313	0
Future Volume (Veh/h)	126	10	3	315	313	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	137	11	3	342	340	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	517	170	340			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	517	170	340			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	72	99	100			
cM capacity (veh/h)	487	844	1216			

Direction, Lane #	WB 1	WB 2	SE 1	SE 2	SE 3	NW 1	NW 2
Volume Total	137	11	3	171	171	170	170
Volume Left	137	0	3	0	0	0	0
Volume Right	0	11	0	0	0	0	0
cSH	487	844	1216	1700	1700	1700	1700
Volume to Capacity	0.28	0.01	0.00	0.10	0.10	0.10	0.10
Queue Length 95th (ft)	29	1	0	0	0	0	0
Control Delay (s)	15.3	9.3	8.0	0.0	0.0	0.0	0.0
Lane LOS	C	A	A				
Approach Delay (s)	14.8		0.1			0.0	
Approach LOS	B						

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	22.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	1	0	37	8	3	0	127	14	5	90	2
Future Volume (Veh/h)	2	1	0	37	8	3	0	127	14	5	90	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	1	0	40	9	3	0	138	15	5	98	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	262	262	99	255	256	146	100			153		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	262	262	99	255	256	146	100			153		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	94	99	100	100			100		
cM capacity (veh/h)	679	641	957	695	646	902	1493			1428		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	3	52	153	105
Volume Left	2	40	0	5
Volume Right	0	3	15	2
cSH	666	695	1700	1428
Volume to Capacity	0.00	0.07	0.09	0.00
Queue Length 95th (ft)	0	6	0	0
Control Delay (s)	10.4	10.6	0.0	0.4
Lane LOS	B	B		A
Approach Delay (s)	10.4	10.6	0.0	0.4
Approach LOS	B	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	19.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	551	47	69	795	40	93
Future Volume (Veh/h)	551	47	69	795	40	93
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	599	51	75	864	43	101
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				647		
pX, platoon unblocked					0.55	
vC, conflicting volume			650		1638	624
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			650		1754	624
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			92		9	79
cM capacity (veh/h)			936		47	485

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	650	939	144
Volume Left	0	75	43
Volume Right	51	0	101
cSH	1700	936	128
Volume to Capacity	0.38	0.08	1.12
Queue Length 95th (ft)	0	7	210
Control Delay (s)	0.0	2.1	183.0
Lane LOS		A	F
Approach Delay (s)	0.0	2.1	183.0
Approach LOS			F

Intersection Summary			
Average Delay	16.3		
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	597	16	20	810	15	25	27	28	6	23	35
Future Volume (vph)	30	597	16	20	810	15	25	27	28	6	23	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			1.00			0.95			0.93	
Flt Protected		1.00			1.00			0.98			1.00	
Satd. Flow (prot)		1852			1856			1748			1718	
Flt Permitted		0.94			0.98			0.88			0.96	
Satd. Flow (perm)		1752			1822			1555			1663	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	649	17	22	880	16	27	29	30	7	25	38
RTOR Reduction (vph)	0	1	0	0	1	0	0	25	0	0	32	0
Lane Group Flow (vph)	0	698	0	0	917	0	0	61	0	0	38	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		30.2			30.2			7.7			7.7	
Effective Green, g (s)		30.2			30.2			7.7			7.7	
Actuated g/C Ratio		0.64			0.64			0.16			0.16	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1128			1173			255			273	
v/s Ratio Prot												
v/s Ratio Perm		0.40			c0.50			c0.04			0.02	
v/c Ratio		0.62			0.78			0.24			0.14	
Uniform Delay, d1		4.9			6.0			17.1			16.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.0			3.5			0.5			0.2	
Delay (s)		6.0			9.5			17.5			17.0	
Level of Service		A			A			B			B	
Approach Delay (s)		6.0			9.5			17.5			17.0	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	46.9	Sum of lost time (s)	9.0
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	180	148	144	439	69	144	298	104	121	489	315
Future Volume (vph)	169	180	148	144	439	69	144	298	104	121	489	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.93		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3300		1770	3467		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3300		1770	3467		3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	184	196	161	157	477	75	157	324	113	132	532	342
RTOR Reduction (vph)	0	126	0	0	19	0	0	0	78	0	0	240
Lane Group Flow (vph)	184	231	0	157	533	0	157	324	35	132	532	102
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	7.7	14.2		9.0	15.5		4.2	19.8	19.8	3.8	19.4	19.4
Effective Green, g (s)	7.7	14.2		9.0	15.5		4.2	19.8	19.8	3.8	19.4	19.4
Actuated g/C Ratio	0.12	0.22		0.14	0.24		0.06	0.31	0.31	0.06	0.30	0.30
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	407	723		245	829		222	1081	483	201	1059	473
v/s Ratio Prot	0.05	0.07		c0.09	c0.15		c0.05	0.09		0.04	c0.15	
v/s Ratio Perm									0.02			0.06
v/c Ratio	0.45	0.32		0.64	0.64		0.71	0.30	0.07	0.66	0.50	0.22
Uniform Delay, d1	26.6	21.2		26.4	22.2		29.7	17.2	16.0	29.9	18.7	17.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.3		5.6	1.7		9.8	0.7	0.3	7.5	1.7	1.0
Delay (s)	27.4	21.5		32.0	23.9		39.5	17.9	16.3	37.4	20.4	18.1
Level of Service	C	C		C	C		D	B	B	D	C	B
Approach Delay (s)		23.5			25.7			23.3			21.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	64.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	873	41	173	836	368	17	0	19	174	62	210
Future Volume (vph)	0	873	41	173	836	368	17	0	19	174	62	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		4.5	4.5		4.5		4.5	4.5	4.5	4.5
Lane Util. Factor		0.91		1.00	0.91		0.97		1.00	0.95	0.95	1.00
Frt		0.99		1.00	0.95		1.00		0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.98	1.00
Satd. Flow (prot)		5051		1770	4852		3433		1583	1681	1728	1583
Flt Permitted		1.00		0.95	1.00		0.22		1.00	0.95	0.98	1.00
Satd. Flow (perm)		5051		1770	4852		777		1583	1681	1728	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	949	45	188	909	400	18	0	21	189	67	228
RTOR Reduction (vph)	0	6	0	0	95	0	0	0	16	0	0	192
Lane Group Flow (vph)	0	988	0	188	1214	0	18	0	5	127	129	36
Turn Type		NA		Prot	NA		Perm		Perm	Split	NA	Perm
Protected Phases		4		3	8					6	6	
Permitted Phases							2		2			6
Actuated Green, G (s)		17.8		7.5	29.8		18.6		18.6	11.6	11.6	11.6
Effective Green, g (s)		17.8		7.5	29.8		18.6		18.6	11.6	11.6	11.6
Actuated g/C Ratio		0.24		0.10	0.41		0.25		0.25	0.16	0.16	0.16
Clearance Time (s)		4.5		4.5	4.5		4.5		4.5	4.5	4.5	4.5
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		1223		180	1967		196		400	265	272	249
v/s Ratio Prot		c0.20		c0.11	0.25					c0.08	0.07	
v/s Ratio Perm							c0.02		0.00			0.02
v/c Ratio		0.81		1.04	0.62		0.09		0.01	0.48	0.47	0.14
Uniform Delay, d1		26.2		33.0	17.3		21.0		20.6	28.2	28.2	26.7
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		4.0		79.3	0.6		0.9		0.1	1.4	1.3	0.3
Delay (s)		30.3		112.3	17.9		21.9		20.6	29.6	29.5	26.9
Level of Service		C		F	B		C		C	C	C	C
Approach Delay (s)		30.3			29.8			21.2			28.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	73.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	324	463	198	677	41	646	196	184	124	122	293
Future Volume (vph)	160	324	463	198	677	41	646	196	184	124	122	293
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	0.97	0.95	1.00	1.00	0.91		1.00	1.00		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	5041		1770	1727		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	5041		1770	1727		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	352	503	215	736	45	702	213	200	135	133	318
RTOR Reduction (vph)	0	0	425	0	6	0	0	30	0	0	0	163
Lane Group Flow (vph)	174	352	78	215	775	0	702	383	0	135	133	155
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4									6
Actuated Green, G (s)	8.0	16.2	16.2	13.6	21.8		42.7	42.7		14.2	14.2	14.2
Effective Green, g (s)	8.0	16.2	16.2	13.6	21.8		42.7	42.7		14.2	14.2	14.2
Actuated g/C Ratio	0.08	0.15	0.15	0.13	0.21		0.41	0.41		0.14	0.14	0.14
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	262	547	244	229	1049		721	704		240	479	214
v/s Ratio Prot	0.05	0.10		c0.12	c0.15		c0.40	0.22		0.08	0.04	
v/s Ratio Perm			0.05									c0.10
v/c Ratio	0.66	0.64	0.32	0.94	0.74		0.97	0.54		0.56	0.28	0.72
Uniform Delay, d1	47.0	41.5	39.3	45.1	38.8		30.4	23.6		42.3	40.6	43.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.2	2.6	0.8	42.3	2.8		27.7	3.0		3.0	0.3	11.4
Delay (s)	53.3	44.1	40.1	87.4	41.5		58.1	26.6		45.3	41.0	54.8
Level of Service	D	D	D	F	D		E	C		D	D	D
Approach Delay (s)		43.7			51.4			46.4			49.5	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	47.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	104.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	45	64	22	57	1	42	42	12	0	4	2
Future Volume (vph)	0	45	64	22	57	1	42	42	12	0	4	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	49	70	24	62	1	46	46	13	0	4	2

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	119	87	105	6
Volume Left (vph)	0	24	46	0
Volume Right (vph)	70	1	13	2
Hadj (s)	-0.32	0.08	0.05	-0.17
Departure Headway (s)	3.9	4.4	4.4	4.3
Degree Utilization, x	0.13	0.11	0.13	0.01
Capacity (veh/h)	884	799	778	779
Control Delay (s)	7.5	7.9	8.0	7.3
Approach Delay (s)	7.5	7.9	8.0	7.3
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.8		
Level of Service	A		
Intersection Capacity Utilization	29.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	11	1	63	8	8	139
Future Volume (Veh/h)	11	1	63	8	8	139
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	1	68	9	9	151
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			749			
pX, platoon unblocked						
vC, conflicting volume	242	72			77	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	242	72			77	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			99	
cM capacity (veh/h)	742	990			1522	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	13	77	160
Volume Left	12	0	9
Volume Right	1	9	0
cSH	757	1700	1522
Volume to Capacity	0.02	0.05	0.01
Queue Length 95th (ft)	1	0	0
Control Delay (s)	9.8	0.0	0.5
Lane LOS	A		A
Approach Delay (s)	9.8	0.0	0.5
Approach LOS	A		

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	23.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	340	16	76	411	11	14	18	23	16	59	79
Future Volume (vph)	36	340	16	76	411	11	14	18	23	16	59	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.94			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	3516		1770	3525			1736			1724	
Flt Permitted	0.45	1.00		0.52	1.00			0.94			0.98	
Satd. Flow (perm)	844	3516		974	3525			1651			1697	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	370	17	83	447	12	15	20	25	17	64	86
RTOR Reduction (vph)	0	7	0	0	4	0	0	11	0	0	39	0
Lane Group Flow (vph)	39	380	0	83	455	0	0	49	0	0	128	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.1	12.1		12.1	12.1			25.6			25.6	
Effective Green, g (s)	12.1	12.1		12.1	12.1			25.6			25.6	
Actuated g/C Ratio	0.26	0.26		0.26	0.26			0.55			0.55	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	218	910		252	913			905			930	
v/s Ratio Prot		0.11			c0.13							
v/s Ratio Perm	0.05			0.09				0.03			c0.08	
v/c Ratio	0.18	0.42		0.33	0.50			0.05			0.14	
Uniform Delay, d1	13.4	14.4		14.0	14.7			4.9			5.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.4	0.3		0.8	0.4			0.1			0.3	
Delay (s)	13.8	14.7		14.8	15.2			5.0			5.5	
Level of Service	B	B		B	B			A			A	
Approach Delay (s)		14.6			15.1			5.0			5.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	46.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	478	92	341	764	12	16	43	186	25	118	5
Future Volume (vph)	1	478	92	341	764	12	16	43	186	25	118	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4962		1770	5074		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.67	1.00	1.00	0.73	1.00	1.00
Satd. Flow (perm)	1770	4962		1770	5074		1257	1863	1583	1353	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	520	100	371	830	13	17	47	202	27	128	5
RTOR Reduction (vph)	0	41	0	0	2	0	0	0	146	0	0	4
Lane Group Flow (vph)	1	579	0	371	841	0	17	47	56	27	128	1
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)	0.9	17.2		16.9	33.2		18.2	18.2	18.2	18.2	18.2	18.2
Effective Green, g (s)	0.9	17.2		16.9	33.2		18.2	18.2	18.2	18.2	18.2	18.2
Actuated g/C Ratio	0.01	0.26		0.26	0.50		0.28	0.28	0.28	0.28	0.28	0.28
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	24	1297		454	2560		347	515	437	374	515	437
v/s Ratio Prot	0.00	c0.12		c0.21	0.17			0.03			c0.07	
v/s Ratio Perm							0.01		0.04	0.02		0.00
v/c Ratio	0.04	0.45		0.82	0.33		0.05	0.09	0.13	0.07	0.25	0.00
Uniform Delay, d1	32.0	20.3		23.0	9.7		17.5	17.7	17.8	17.6	18.5	17.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.2		10.9	0.1		0.3	0.4	0.6	0.4	1.2	0.0
Delay (s)	32.7	20.6		33.9	9.8		17.7	18.0	18.5	17.9	19.6	17.2
Level of Service	C	C		C	A		B	B	B	B	B	B
Approach Delay (s)		20.6			17.1			18.3			19.3	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	65.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	51	6	9	66	12	4
Future Volume (Veh/h)	51	6	9	66	12	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	55	7	10	72	13	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			62		150	58
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			62		150	58
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		98	100
cM capacity (veh/h)			1541		836	1007

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	62	82	17
Volume Left	0	10	13
Volume Right	7	0	4
cSH	1700	1541	871
Volume to Capacity	0.04	0.01	0.02
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.9	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	0.9	9.2
Approach LOS			A

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	20.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	15	5	4	14	2	2	2	0	5	1	5
Future Volume (Veh/h)	0	15	5	4	14	2	2	2	0	5	1	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	16	5	4	15	2	2	2	0	5	1	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	29	20	4	32	22	2	6			2		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	29	20	4	32	22	2	6			2		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	100	100	98	100	100			100		
cM capacity (veh/h)	962	871	1080	954	868	1082	1615			1620		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	21	21	4	11
Volume Left	0	4	2	5
Volume Right	5	2	0	5
cSH	913	900	1615	1620
Volume to Capacity	0.02	0.02	0.00	0.00
Queue Length 95th (ft)	2	2	0	0
Control Delay (s)	9.0	9.1	3.6	3.3
Lane LOS	A	A	A	A
Approach Delay (s)	9.0	9.1	3.6	3.3
Approach LOS	A	A		

Intersection Summary			
Average Delay	7.6		
Intersection Capacity Utilization	14.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	296	11	33	537	0	7	0	35	0	0	1
Future Volume (Veh/h)	0	296	11	33	537	0	7	0	35	0	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	322	12	36	584	0	8	0	38	0	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)		661			663							
pX, platoon unblocked	1.00						1.00	1.00		1.00	1.00	1.00
vC, conflicting volume	584			334			693	984	167	855	990	292
vC1, stage 1 conf vol							328	328		656	656	
vC2, stage 2 conf vol							365	656		199	334	
vCu, unblocked vol	581			334			690	981	167	852	987	288
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			98	100	96	100	100	100
cM capacity (veh/h)	988			1222			516	407	848	385	402	708

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	0	215	119	36	389	195	46	1
Volume Left	0	0	0	36	0	0	8	0
Volume Right	0	0	12	0	0	0	38	1
cSH	1700	1700	1700	1222	1700	1700	763	708
Volume to Capacity	0.00	0.13	0.07	0.03	0.23	0.11	0.06	0.00
Queue Length 95th (ft)	0	0	0	2	0	0	5	0
Control Delay (s)	0.0	0.0	0.0	8.0	0.0	0.0	10.0	10.1
Lane LOS				A			B	B
Approach Delay (s)	0.0			0.5			10.0	10.1
Approach LOS							B	B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	17	5	17	10	1	10	54	14	7	67	0
Future Volume (Veh/h)	4	17	5	17	10	1	10	54	14	7	67	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	18	5	18	11	1	11	59	15	8	73	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	12			23			112	76	20	120	78	12
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	12			23			112	76	20	120	78	12
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	93	99	99	91	100
cM capacity (veh/h)	1607			1592			796	803	1057	787	801	1069

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	27	30	85	81
Volume Left	4	18	11	8
Volume Right	5	1	15	0
cSH	1607	1592	837	799
Volume to Capacity	0.00	0.01	0.10	0.10
Queue Length 95th (ft)	0	1	8	8
Control Delay (s)	1.1	4.4	9.8	10.0
Lane LOS	A	A	A	B
Approach Delay (s)	1.1	4.4	9.8	10.0
Approach LOS			A	B

Intersection Summary			
Average Delay	8.1		
Intersection Capacity Utilization	17.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	279	10	98	517	10	13	49	35	11	48	33
Future Volume (vph)	13	279	10	98	517	10	13	49	35	11	48	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.95			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	3521		1770	3529			1760			1762	
Flt Permitted	0.95	1.00		0.95	1.00			0.95			0.95	
Satd. Flow (perm)	1770	3521		1770	3529			1675			1686	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	303	11	107	562	11	14	53	38	12	52	36
RTOR Reduction (vph)	0	4	0	0	2	0	0	30	0	0	29	0
Lane Group Flow (vph)	14	310	0	107	571	0	0	75	0	0	71	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	0.7	11.4		4.3	15.0			7.5			7.5	
Effective Green, g (s)	0.7	11.4		4.3	15.0			7.5			7.5	
Actuated g/C Ratio	0.02	0.31		0.12	0.41			0.20			0.20	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	33	1093		207	1442			342			344	
v/s Ratio Prot	0.01	0.09		c0.06	c0.16							
v/s Ratio Perm								c0.04			0.04	
v/c Ratio	0.42	0.28		0.52	0.40			0.22			0.21	
Uniform Delay, d1	17.8	9.6		15.2	7.7			12.2			12.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	8.6	0.1		2.2	0.2			0.3			0.3	
Delay (s)	26.4	9.7		17.4	7.8			12.5			12.4	
Level of Service	C	A		B	A			B			B	
Approach Delay (s)		10.4			9.3			12.5			12.4	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	36.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	37.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	35	2	6	16	8	0	21	11	0	20	6
Future Volume (Veh/h)	6	35	2	6	16	8	0	21	11	0	20	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	38	2	7	17	9	0	23	12	0	22	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	72	60	26	76	58	29	29			35		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	72	60	26	76	58	29	29			35		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	95	100	99	98	99	100			100		
cM capacity (veh/h)	897	830	1050	881	833	1046	1584			1576		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	47	33	35	29
Volume Left	7	7	0	0
Volume Right	2	9	12	7
cSH	847	893	1584	1576
Volume to Capacity	0.06	0.04	0.00	0.00
Queue Length 95th (ft)	4	3	0	0
Control Delay (s)	9.5	9.2	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	9.5	9.2	0.0	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	5.2		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	18	324	11	11	644	12	5	2	14	7	2	36
Future Volume (vph)	18	324	11	11	644	12	5	2	14	7	2	36
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	352	12	12	700	13	5	2	15	8	2	39

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	20	364	12	713	22	49
Volume Left (vph)	20	0	12	0	5	8
Volume Right (vph)	0	12	0	13	15	39
Hadj (s)	0.53	0.01	0.53	0.02	-0.33	-0.41
Departure Headway (s)	5.8	5.3	5.6	5.1	6.2	6.1
Degree Utilization, x	0.03	0.54	0.02	1.01	0.04	0.08
Capacity (veh/h)	610	670	624	701	541	556
Control Delay (s)	7.8	13.1	7.5	57.5	9.5	9.6
Approach Delay (s)	12.8		56.7		9.5	9.6
Approach LOS	B		F		A	A

Intersection Summary			
Delay	39.6		
Level of Service	E		
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	10	7	1	8	14	7	389	4	8	523	12
Future Volume (Veh/h)	7	10	7	1	8	14	7	389	4	8	523	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	11	8	1	9	15	8	423	4	9	568	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								744				
pX, platoon unblocked												
vC, conflicting volume	1051	1036	574	1040	1040	425	581			427		
vC1, stage 1 conf vol	592	592		441	441							
vC2, stage 2 conf vol	458	443		600	599							
vCu, unblocked vol	1051	1036	574	1040	1040	425	581			427		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	97	98	100	98	98	99			99		
cM capacity (veh/h)	398	413	518	394	409	629	993			1132		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	27	25	8	427	9	581
Volume Left	8	1	8	0	9	0
Volume Right	8	15	0	4	0	13
cSH	434	517	993	1700	1132	1700
Volume to Capacity	0.06	0.05	0.01	0.25	0.01	0.34
Queue Length 95th (ft)	5	4	1	0	1	0
Control Delay (s)	13.8	12.3	8.7	0.0	8.2	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	13.8	12.3	0.2		0.1	
Approach LOS	B	B				

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	227	61	94	454	80	61	233	60	129	302	107
Future Volume (vph)	43	227	61	94	454	80	61	233	60	129	302	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1821		1770	3431		1770	1790	
Flt Permitted	0.20	1.00	1.00	0.55	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	369	1863	1583	1030	1821		1770	3431		1770	1790	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	47	247	66	102	493	87	66	253	65	140	328	116
RTOR Reduction (vph)	0	0	44	0	11	0	0	37	0	0	20	0
Lane Group Flow (vph)	47	247	22	102	569	0	66	281	0	140	424	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	20.2	20.2	20.2	20.2	20.2		2.9	20.8		5.0	22.9	
Effective Green, g (s)	20.2	20.2	20.2	20.2	20.2		2.9	20.8		5.0	22.9	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34		0.05	0.35		0.08	0.38	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	125	632	537	349	618		86	1199		148	688	
v/s Ratio Prot		0.13			c0.31		0.04	0.08		c0.08	c0.24	
v/s Ratio Perm	0.13		0.01	0.10								
v/c Ratio	0.38	0.39	0.04	0.29	0.92		0.77	0.23		0.95	0.62	
Uniform Delay, d1	14.9	15.0	13.2	14.4	18.9		28.0	13.7		27.1	14.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	0.4	0.0	0.5	19.3		32.8	0.5		57.3	4.1	
Delay (s)	16.8	15.4	13.2	14.9	38.2		60.8	14.2		84.4	18.9	
Level of Service	B	B	B	B	D		E	B		F	B	
Approach Delay (s)		15.2			34.7			22.2			34.6	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	59.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	820	64	187	1329	68	143	215	263	189	152	86
Future Volume (vph)	81	820	64	187	1329	68	143	215	263	189	152	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5030		1770	5048		1770	1863	1583	1770	3348	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	5030		1770	5048		1770	1863	1583	1770	3348	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	88	891	70	203	1445	74	155	234	286	205	165	93
RTOR Reduction (vph)	0	11	0	0	7	0	0	0	208	0	68	0
Lane Group Flow (vph)	88	950	0	203	1512	0	155	234	78	205	190	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	4.3	19.5		11.5	26.7		9.6	19.5	19.5	11.2	21.1	
Effective Green, g (s)	4.3	19.5		11.5	26.7		9.6	19.5	19.5	11.2	21.1	
Actuated g/C Ratio	0.05	0.24		0.14	0.34		0.12	0.24	0.24	0.14	0.26	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	95	1230		255	1691		213	455	387	248	886	
v/s Ratio Prot	0.05	0.19		c0.11	c0.30		0.09	c0.13		c0.12	0.06	
v/s Ratio Perm									0.05			
v/c Ratio	0.93	0.77		0.80	0.89		0.73	0.51	0.20	0.83	0.21	
Uniform Delay, d1	37.5	28.0		33.0	25.2		33.8	26.0	23.9	33.3	22.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	68.0	3.1		15.7	6.5		11.7	4.1	1.2	19.7	0.6	
Delay (s)	105.6	31.1		48.6	31.7		45.5	30.1	25.1	53.0	23.4	
Level of Service	F	C		D	C		D	C	C	D	C	
Approach Delay (s)		37.4			33.7			31.5			36.5	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	34.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	79.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	239	55	106	641	57	44	112	63	67	116	107
Future Volume (vph)	48	239	55	106	641	57	44	112	63	67	116	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3440		1770	3496		1770	1763		1770	1729	
Flt Permitted	0.26	1.00		0.56	1.00		0.61	1.00		0.64	1.00	
Satd. Flow (perm)	490	3440		1039	3496		1133	1763		1188	1729	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	52	260	60	115	697	62	48	122	68	73	126	116
RTOR Reduction (vph)	0	39	0	0	13	0	0	30	0	0	49	0
Lane Group Flow (vph)	52	281	0	115	746	0	48	160	0	73	193	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.5	18.5		18.5	18.5		24.7	24.7		24.7	24.7	
Effective Green, g (s)	18.5	18.5		18.5	18.5		24.7	24.7		24.7	24.7	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.47	0.47		0.47	0.47	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	173	1219		368	1239		536	834		562	818	
v/s Ratio Prot		0.08			c0.21			0.09			c0.11	
v/s Ratio Perm	0.11			0.11			0.04			0.06		
v/c Ratio	0.30	0.23		0.31	0.60		0.09	0.19		0.13	0.24	
Uniform Delay, d1	12.2	11.8		12.2	13.8		7.6	8.0		7.7	8.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.1		0.5	0.8		0.3	0.5		0.5	0.7	
Delay (s)	13.2	11.9		12.7	14.7		7.9	8.5		8.2	8.8	
Level of Service	B	B		B	B		A	A		A	A	
Approach Delay (s)		12.1			14.4			8.4			8.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	52.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	741	44	20	1349	35	94	30	26	33	18	198
Future Volume (vph)	165	741	44	20	1349	35	94	30	26	33	18	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.98			0.89	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.99	
Satd. Flow (prot)	1770	5042		1770	5066			1764			1652	
Flt Permitted	0.95	1.00		0.95	1.00			0.66			0.95	
Satd. Flow (perm)	1770	5042		1770	5066			1196			1573	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	179	805	48	22	1466	38	102	33	28	36	20	215
RTOR Reduction (vph)	0	9	0	0	4	0	0	13	0	0	146	0
Lane Group Flow (vph)	179	844	0	22	1500	0	0	150	0	0	125	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	7.5	28.8		1.0	22.3			20.3			20.3	
Effective Green, g (s)	7.5	28.8		1.0	22.3			20.3			20.3	
Actuated g/C Ratio	0.12	0.45		0.02	0.35			0.32			0.32	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	208	2283		27	1776			381			502	
v/s Ratio Prot	c0.10	0.17		0.01	c0.30							
v/s Ratio Perm								c0.13			0.08	
v/c Ratio	0.86	0.37		0.81	0.84			0.39			0.25	
Uniform Delay, d1	27.5	11.4		31.2	19.1			16.9			16.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	28.5	0.1		95.3	3.9			3.0			1.2	
Delay (s)	56.0	11.5		126.5	22.9			19.9			17.2	
Level of Service	E	B		F	C			B			B	
Approach Delay (s)		19.3			24.4			19.9			17.2	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	63.6	Sum of lost time (s)	13.5
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	242	58	60	397	107	87	244	199	173	185	131
Future Volume (vph)	72	242	58	60	397	107	87	244	199	173	185	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.97		1.00	0.93		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3437		1770	3427		1770	3301		1770	3319	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3437		1770	3427		1770	3301		1770	3319	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	263	63	65	432	116	95	265	216	188	201	142
RTOR Reduction (vph)	0	30	0	0	36	0	0	151	0	0	93	0
Lane Group Flow (vph)	78	296	0	65	512	0	95	330	0	188	250	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.2	17.0		2.8	15.6		6.6	20.4		9.3	23.1	
Effective Green, g (s)	4.2	17.0		2.8	15.6		6.6	20.4		9.3	23.1	
Actuated g/C Ratio	0.06	0.25		0.04	0.23		0.10	0.30		0.14	0.34	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	110	865		73	792		173	997		243	1135	
v/s Ratio Prot	c0.04	0.09		0.04	c0.15		0.05	c0.10		c0.11	c0.08	
v/s Ratio Perm												
v/c Ratio	0.71	0.34		0.89	0.65		0.55	0.33		0.77	0.22	
Uniform Delay, d1	31.1	20.7		32.2	23.5		29.0	18.3		28.1	15.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	18.8	0.2		68.9	1.8		3.5	0.9		14.2	0.4	
Delay (s)	49.9	20.9		101.1	25.3		32.6	19.2		42.3	16.2	
Level of Service	D	C		F	C		C	B		D	B	
Approach Delay (s)		26.5			33.3			21.4			25.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	67.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	233	500	18	25	1077	125	41	51	68	131	33	268
Future Volume (vph)	233	500	18	25	1077	125	41	51	68	131	33	268
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5058		1770	5085	1583	1770	1702		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.73	1.00		0.67	1.00	1.00
Satd. Flow (perm)	1770	5058		1770	5085	1583	1367	1702		1256	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	253	543	20	27	1171	136	45	55	74	142	36	291
RTOR Reduction (vph)	0	6	0	0	0	91	0	53	0	0	0	196
Lane Group Flow (vph)	253	557	0	27	1171	45	45	76	0	142	36	95
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		6
Actuated Green, G (s)	10.3	28.9		2.0	20.6	20.6	18.0	18.0		18.0	18.0	18.0
Effective Green, g (s)	10.3	28.9		2.0	20.6	20.6	18.0	18.0		18.0	18.0	18.0
Actuated g/C Ratio	0.17	0.46		0.03	0.33	0.33	0.29	0.29		0.29	0.29	0.29
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	292	2342		56	1678	522	394	490		362	537	456
v/s Ratio Prot	c0.14	0.11		0.02	c0.23			0.04			0.02	
v/s Ratio Perm						0.03	0.03			c0.11		0.06
v/c Ratio	0.87	0.24		0.48	0.70	0.09	0.11	0.16		0.39	0.07	0.21
Uniform Delay, d1	25.4	10.1		29.7	18.2	14.4	16.3	16.5		17.8	16.1	16.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	22.6	0.1		6.4	1.3	0.1	0.6	0.7		3.2	0.2	1.0
Delay (s)	47.9	10.2		36.1	19.5	14.5	16.9	17.2		21.0	16.3	17.8
Level of Service	D	B		D	B	B	B	B		C	B	B
Approach Delay (s)		21.9			19.3			17.1			18.7	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	62.4	Sum of lost time (s)	13.5
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	10	49	17	8	39	30	299	9	52	537	10
Future Volume (Veh/h)	16	10	49	17	8	39	30	299	9	52	537	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	11	53	18	9	42	33	325	10	57	584	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								1070				
pX, platoon unblocked												
vC, conflicting volume	978	1104	298	860	1105	168	595			335		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	978	1104	298	860	1105	168	595			335		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	90	94	92	91	95	95	97			95		
cM capacity (veh/h)	176	193	699	207	193	847	977			1221		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	81	69	196	172	349	303
Volume Left	17	18	33	0	57	0
Volume Right	53	42	0	10	0	11
cSH	353	377	977	1700	1221	1700
Volume to Capacity	0.23	0.18	0.03	0.10	0.05	0.18
Queue Length 95th (ft)	22	17	3	0	4	0
Control Delay (s)	18.2	16.7	1.8	0.0	1.7	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	18.2	16.7	0.9		0.9	
Approach LOS	C	C				

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	41.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
45: Arrow Highway & Wheeler Avenue 03/15/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	500	34	35	974	341	30	32	15	341	98	176
Future Volume (vph)	101	500	34	35	974	341	30	32	15	341	98	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	1.00	1.00	1.00		0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85		0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1770	5037		1770	5085	1583	1770	1863	1583		3296	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.20	1.00	1.00		0.79	
Satd. Flow (perm)	1770	5037		1770	5085	1583	380	1863	1583		2674	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	110	543	37	38	1059	371	33	35	16	371	107	191
RTOR Reduction (vph)	0	10	0	0	0	251	0	0	10	0	65	0
Lane Group Flow (vph)	110	570	0	38	1059	120	33	35	6	0	604	0
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8	2		2	6		
Actuated Green, G (s)	6.4	25.4		2.0	21.0	21.0	25.5	25.5	25.5		19.3	
Effective Green, g (s)	6.4	25.4		2.0	21.0	21.0	25.5	25.5	25.5		19.3	
Actuated g/C Ratio	0.10	0.39		0.03	0.32	0.32	0.39	0.39	0.39		0.30	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	174	1971		54	1645	512	185	731	621		795	
v/s Ratio Prot	c0.06	0.11		0.02	c0.21		c0.00	0.02				
v/s Ratio Perm						0.08	0.07		0.00		c0.23	
v/c Ratio	0.63	0.29		0.70	0.64	0.23	0.18	0.05	0.01		0.76	
Uniform Delay, d1	28.1	13.6		31.2	18.8	16.1	13.3	12.2	12.0		20.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2	7.3	0.1		34.1	0.9	0.2	0.5	0.1	0.0		4.2	
Delay (s)	35.4	13.6		65.2	19.6	16.3	13.7	12.3	12.0		24.9	
Level of Service	D	B		E	B	B	B	B	B		C	
Approach Delay (s)		17.1			20.0			12.8			24.9	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	64.9	Sum of lost time (s)	16.5
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	76	8	3	61	2	15	52	11	0	48	10
Future Volume (Veh/h)	3	76	8	3	61	2	15	52	11	0	48	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	83	9	3	66	2	16	57	12	0	52	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	68			92			204	168	88	207	171	67
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	68			92			204	168	88	207	171	67
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			98	92	99	100	93	99
cM capacity (veh/h)	1533			1503			703	722	971	694	719	997

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	95	71	85	63
Volume Left	3	3	16	0
Volume Right	9	2	12	11
cSH	1533	1503	745	756
Volume to Capacity	0.00	0.00	0.11	0.08
Queue Length 95th (ft)	0	0	10	7
Control Delay (s)	0.2	0.3	10.4	10.2
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	0.3	10.4	10.2
Approach LOS			B	B

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	23.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	2	21	7	1	2	1	65	2	3	52	5
Future Volume (Veh/h)	3	2	21	7	1	2	1	65	2	3	52	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	2	23	8	1	2	1	71	2	3	57	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								269				
pX, platoon unblocked												
vC, conflicting volume	142	140	60	164	142	72	62			73		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	142	140	60	164	142	72	62			73		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	98	99	100	100	100			100		
cM capacity (veh/h)	823	749	1006	780	747	990	1541			1527		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	28	11	74	65
Volume Left	3	8	1	3
Volume Right	23	2	2	5
cSH	960	808	1541	1527
Volume to Capacity	0.03	0.01	0.00	0.00
Queue Length 95th (ft)	2	1	0	0
Control Delay (s)	8.9	9.5	0.1	0.4
Lane LOS	A	A	A	A
Approach Delay (s)	8.9	9.5	0.1	0.4
Approach LOS	A	A		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	14.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	790	5	8	1327	26	7	6	11	50	2	25
Future Volume (vph)	32	790	5	8	1327	26	7	6	11	50	2	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		1.00			1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.94			0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.97	
Satd. Flow (prot)	1770	5081		1770	5085	1583		1725			1725	
Flt Permitted	0.19	1.00		0.32	1.00	1.00		0.90			0.79	
Satd. Flow (perm)	358	5081		588	5085	1583		1576			1402	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	859	5	9	1442	28	8	7	12	54	2	27
RTOR Reduction (vph)	0	1	0	0	0	12	0	10	0	0	22	0
Lane Group Flow (vph)	35	863	0	9	1442	16	0	17	0	0	61	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	20.8	20.8		20.8	20.8	20.8		7.4			7.4	
Effective Green, g (s)	20.8	20.8		20.8	20.8	20.8		7.4			7.4	
Actuated g/C Ratio	0.56	0.56		0.56	0.56	0.56		0.20			0.20	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	200	2840		328	2843	885		313			278	
v/s Ratio Prot		0.17			c0.28							
v/s Ratio Perm	0.10			0.02		0.01		0.01			c0.04	
v/c Ratio	0.17	0.30		0.03	0.51	0.02		0.06			0.22	
Uniform Delay, d1	4.0	4.4		3.7	5.0	3.7		12.1			12.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.4	0.1		0.0	0.1	0.0		0.1			0.4	
Delay (s)	4.4	4.4		3.7	5.2	3.7		12.1			12.9	
Level of Service	A	A		A	A	A		B			B	
Approach Delay (s)		4.4			5.2			12.1			12.9	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	5.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	37.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	43.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	14	50	19	9	106	30	67	102	11	19	211	48
Future Volume (vph)	14	50	19	9	106	30	67	102	11	19	211	48
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	54	21	10	115	33	73	111	12	21	229	52

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	90	158	196	302
Volume Left (vph)	15	10	73	21
Volume Right (vph)	21	33	12	52
Hadj (s)	-0.07	-0.08	0.07	-0.06
Departure Headway (s)	5.3	5.2	5.0	4.8
Degree Utilization, x	0.13	0.23	0.27	0.40
Capacity (veh/h)	599	625	668	712
Control Delay (s)	9.1	9.7	9.9	11.0
Approach Delay (s)	9.1	9.7	9.9	11.0
Approach LOS	A	A	A	B

Intersection Summary			
Delay	10.2		
Level of Service	B		
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	58	28	168	203	9
Future Volume (Veh/h)	3	58	28	168	203	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	63	30	183	221	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				259		
pX, platoon unblocked						
vC, conflicting volume	464	221	231			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	464	221	231			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	92	98			
cM capacity (veh/h)	544	819	1337			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	66	30	183	221	10
Volume Left	3	30	0	0	0
Volume Right	63	0	0	0	10
cSH	800	1337	1700	1700	1700
Volume to Capacity	0.08	0.02	0.11	0.13	0.01
Queue Length 95th (ft)	7	2	0	0	0
Control Delay (s)	9.9	7.8	0.0	0.0	0.0
Lane LOS	A	A			
Approach Delay (s)	9.9	1.1		0.0	
Approach LOS	A				

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	742	28	14	1261	94	57	27	15	160	39	47
Future Volume (vph)	55	742	28	14	1261	94	57	27	15	160	39	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00		0.96	1.00
Satd. Flow (prot)	1770	5058		1770	5085	1583		1801	1583		1791	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.74	1.00		0.71	1.00
Satd. Flow (perm)	1770	5058		1770	5085	1583		1371	1583		1316	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	807	30	15	1371	102	62	29	16	174	42	51
RTOR Reduction (vph)	0	6	0	0	0	65	0	0	10	0	0	33
Lane Group Flow (vph)	60	831	0	15	1371	37	0	91	6	0	216	18
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2		2	6		6
Actuated Green, G (s)	5.8	30.2		1.0	25.4	25.4		25.3	25.3		25.3	25.3
Effective Green, g (s)	5.8	30.2		1.0	25.4	25.4		25.3	25.3		25.3	25.3
Actuated g/C Ratio	0.08	0.43		0.01	0.36	0.36		0.36	0.36		0.36	0.36
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	146	2182		25	1845	574		495	572		475	572
v/s Ratio Prot	c0.03	c0.16		0.01	c0.27							
v/s Ratio Perm						0.02		0.07	0.00		c0.16	0.01
v/c Ratio	0.41	0.38		0.60	0.74	0.06		0.18	0.01		0.45	0.03
Uniform Delay, d1	30.5	13.5		34.3	19.5	14.5		15.3	14.3		17.1	14.4
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	1.9	0.5		33.2	2.8	0.2		0.8	0.0		3.1	0.1
Delay (s)	32.4	14.0		67.5	22.2	14.8		16.1	14.4		20.2	14.5
Level of Service	C	B		E	C	B		B	B		C	B
Approach Delay (s)		15.3			22.2			15.8			19.1	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	11	19	39	27	74	24	66	174	7	9	264	8
Future Volume (vph)	11	19	39	27	74	24	66	174	7	9	264	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	21	42	29	80	26	72	189	8	10	287	9

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	75	135	269	306
Volume Left (vph)	12	29	72	10
Volume Right (vph)	42	26	8	9
Hadj (s)	-0.27	-0.04	0.07	0.02
Departure Headway (s)	5.3	5.4	5.0	4.9
Degree Utilization, x	0.11	0.20	0.37	0.41
Capacity (veh/h)	590	595	692	704
Control Delay (s)	9.0	9.8	10.9	11.3
Approach Delay (s)	9.0	9.8	10.9	11.3
Approach LOS	A	A	B	B

Intersection Summary			
Delay	10.7		
Level of Service	B		
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	10	49	9	34	13	47	220	5	1	323	17
Future Volume (vph)	7	10	49	9	34	13	47	220	5	1	323	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	11	53	10	37	14	51	239	5	1	351	18

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	72	61	295	370
Volume Left (vph)	8	10	51	1
Volume Right (vph)	53	14	5	18
Hadj (s)	-0.39	-0.07	0.06	0.01
Departure Headway (s)	5.2	5.5	4.8	4.6
Degree Utilization, x	0.10	0.09	0.39	0.48
Capacity (veh/h)	603	567	727	750
Control Delay (s)	8.8	9.1	10.8	11.8
Approach Delay (s)	8.8	9.1	10.8	11.8
Approach LOS	A	A	B	B

Intersection Summary			
Delay	10.9		
Level of Service	B		
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	37	14	253	16	26	352
Future Volume (Veh/h)	37	14	253	16	26	352
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	40	15	275	17	28	383
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			277			
pX, platoon unblocked	0.96	0.96			0.96	
vC, conflicting volume	722	146			292	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	622	20			173	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	99			98	
cM capacity (veh/h)	393	1008			1342	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	55	183	109	411
Volume Left	40	0	0	28
Volume Right	15	0	17	0
cSH	471	1700	1700	1342
Volume to Capacity	0.12	0.11	0.06	0.02
Queue Length 95th (ft)	10	0	0	2
Control Delay (s)	13.7	0.0	0.0	0.7
Lane LOS	B			A
Approach Delay (s)	13.7	0.0		0.7
Approach LOS	B			

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	665	233	144	1128	55	214	220	41	151	169	45
Future Volume (vph)	15	665	233	144	1128	55	214	220	41	151	169	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	0.97	0.95	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4888		1770	5085	1583	3433	3539	1583	1770	1804	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.60	1.00	
Satd. Flow (perm)	1770	4888		1770	5085	1583	3433	3539	1583	1113	1804	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	723	253	157	1226	60	233	239	45	164	184	49
RTOR Reduction (vph)	0	79	0	0	0	33	0	0	35	0	13	0
Lane Group Flow (vph)	16	897	0	157	1226	27	233	239	10	164	220	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8	4		
Actuated Green, G (s)	3.6	23.9		15.1	35.4	35.4	6.2	18.0	18.0	21.8	16.8	
Effective Green, g (s)	3.6	23.9		15.1	35.4	35.4	6.2	18.0	18.0	21.8	16.8	
Actuated g/C Ratio	0.05	0.30		0.19	0.44	0.44	0.08	0.22	0.22	0.27	0.21	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	79	1460		334	2250	700	266	796	356	344	378	
v/s Ratio Prot	0.01	c0.18		c0.09	c0.24		c0.07	0.07		0.03	c0.12	
v/s Ratio Perm						0.02			0.01	0.10		
v/c Ratio	0.20	0.61		0.47	0.54	0.04	0.88	0.30	0.03	0.48	0.58	
Uniform Delay, d1	36.8	24.1		28.9	16.4	12.6	36.5	25.8	24.2	24.9	28.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.3	1.9		1.0	0.3	0.0	25.9	1.0	0.1	1.0	6.4	
Delay (s)	38.1	26.0		29.9	16.7	12.7	62.4	26.7	24.3	26.0	34.9	
Level of Service	D	C		C	B	B	E	C	C	C	C	
Approach Delay (s)		26.2			17.9			42.6			31.2	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1	41	7	5	19	59	531	3	2	750	33
Future Volume (Veh/h)	0	1	41	7	5	19	59	531	3	2	750	33
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	45	8	5	21	64	577	3	2	815	36
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)											382	
pX, platoon unblocked	0.68	0.68	0.68	0.68	0.68		0.68					
vC, conflicting volume	1567	1545	833	1589	1562	578	851			580		
vC1, stage 1 conf vol	837	837		706	706							
vC2, stage 2 conf vol	730	708		882	855							
vCu, unblocked vol	1598	1566	521	1631	1590	578	548			580		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	88	96	98	96	91			100		
cM capacity (veh/h)	250	267	378	196	234	515	696			994		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	46	34	644	853
Volume Left	0	8	64	2
Volume Right	45	21	3	36
cSH	375	330	696	994
Volume to Capacity	0.12	0.10	0.09	0.00
Queue Length 95th (ft)	10	9	8	0
Control Delay (s)	15.9	17.2	2.4	0.1
Lane LOS	C	C	A	A
Approach Delay (s)	15.9	17.2	2.4	0.1
Approach LOS	C	C		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	1	15	7	0	18	27	545	2	11	778	14
Future Volume (Veh/h)	2	1	15	7	0	18	27	545	2	11	778	14
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	1	16	8	0	20	29	592	2	12	846	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								1253			753	
pX, platoon unblocked	0.76	0.76	0.71	0.76	0.76	0.90	0.71			0.90		
vC, conflicting volume	1548	1530	854	1545	1536	593	861			594		
vC1, stage 1 conf vol	878	878		651	651							
vC2, stage 2 conf vol	671	652		894	885							
vCu, unblocked vol	1281	1256	595	1276	1264	497	606			498		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	96	97	100	96	96			99		
cM capacity (veh/h)	268	282	360	245	266	518	695			964		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	19	28	623	873
Volume Left	2	8	29	12
Volume Right	16	20	2	15
cSH	343	393	695	964
Volume to Capacity	0.06	0.07	0.04	0.01
Queue Length 95th (ft)	4	6	3	1
Control Delay (s)	16.1	14.9	1.1	0.3
Lane LOS	C	B	A	A
Approach Delay (s)	16.1	14.9	1.1	0.3
Approach LOS	C	B		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2	10	13	3	38	34	552	26	39	752	10
Future Volume (Veh/h)	0	2	10	13	3	38	34	552	26	39	752	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2	11	14	3	41	37	600	28	42	817	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (ft)								1055			951	
pX, platoon unblocked	0.78	0.78	0.72	0.78	0.78	0.89	0.72			0.89		
vC, conflicting volume	1623	1608	822	1592	1586	600	828			628		
vC1, stage 1 conf vol	906	906		674	674							
vC2, stage 2 conf vol	716	702		918	912							
vCu, unblocked vol	1331	1312	562	1292	1283	485	570			517		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	97	94	99	92	95			95		
cM capacity (veh/h)	233	255	380	226	244	516	724			930		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1
Volume Total	13	58	37	600	28	870
Volume Left	0	14	37	0	0	42
Volume Right	11	41	0	0	28	11
cSH	353	377	724	1700	1700	930
Volume to Capacity	0.04	0.15	0.05	0.35	0.02	0.05
Queue Length 95th (ft)	3	13	4	0	0	4
Control Delay (s)	15.6	16.3	10.2	0.0	0.0	1.2
Lane LOS	C	C	B			A
Approach Delay (s)	15.6	16.3	0.6			1.2
Approach LOS	C	C				

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	18	25	558	9	25	746
Future Volume (Veh/h)	18	25	558	9	25	746
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	27	607	10	27	811
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type			None			None
Median storage veh)						
Upstream signal (ft)			255			
pX, platoon unblocked	0.92	0.92			0.92	
vC, conflicting volume	1072	308			617	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	907	80			414	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	97			97	
cM capacity (veh/h)	247	889			1052	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	47	405	212	27	406	406
Volume Left	20	0	0	27	0	0
Volume Right	27	0	10	0	0	0
cSH	580	1700	1700	1052	1700	1700
Volume to Capacity	0.08	0.24	0.12	0.03	0.24	0.24
Queue Length 95th (ft)	7	0	0	2	0	0
Control Delay (s)	14.1	0.0	0.0	8.5	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	14.1	0.0		0.3		
Approach LOS	B					

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	283	334	85	106	439	219	52	413	174	90	1054	186
Future Volume (vph)	283	334	85	106	439	219	52	413	174	90	1054	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.97		1.00	0.95		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3432		1770	3363		1770	5085	1583	1770	4971	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433	3432		1770	3363		1770	5085	1583	1770	4971	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	308	363	92	115	477	238	57	449	189	98	1146	202
RTOR Reduction (vph)	0	31	0	0	90	0	0	0	136	0	34	0
Lane Group Flow (vph)	308	424	0	115	625	0	57	449	53	98	1314	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases									4			
Actuated Green, G (s)	8.4	21.3		6.1	19.0		3.1	19.7	19.7	4.9	21.5	
Effective Green, g (s)	8.4	21.3		6.1	19.0		3.1	19.7	19.7	4.9	21.5	
Actuated g/C Ratio	0.12	0.30		0.09	0.27		0.04	0.28	0.28	0.07	0.31	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	411	1044		154	912		78	1431	445	123	1526	
v/s Ratio Prot	c0.09	0.12		0.06	c0.19		0.03	0.09		c0.06	c0.26	
v/s Ratio Perm									0.03			
v/c Ratio	0.75	0.41		0.75	0.68		0.73	0.31	0.12	0.80	0.86	
Uniform Delay, d1	29.8	19.3		31.2	22.8		33.0	19.8	18.7	32.1	22.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.3	1.2		17.8	4.2		29.3	0.1	0.1	29.0	5.2	
Delay (s)	37.1	20.5		49.0	27.0		62.4	19.9	18.8	61.1	28.1	
Level of Service	D	C		D	C		E	B	B	E	C	
Approach Delay (s)		27.2			30.0			23.1			30.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	276	41	41	451	85	36	95	18	106	182	148
Future Volume (vph)	84	276	41	41	451	85	36	95	18	106	182	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.98			0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	1.00
Satd. Flow (prot)	1770	1826		1770	1819			1810		1770	1863	1583
Flt Permitted	0.20	1.00		0.43	1.00			0.90		0.59	1.00	1.00
Satd. Flow (perm)	371	1826		805	1819			1649		1099	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	300	45	45	490	92	39	103	20	115	198	161
RTOR Reduction (vph)	0	9	0	0	12	0	0	9	0	0	0	81
Lane Group Flow (vph)	91	336	0	45	570	0	0	153	0	115	198	80
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	20.1	20.1		20.1	20.1			20.2		28.6	28.6	28.6
Effective Green, g (s)	20.1	20.1		20.1	20.1			20.2		28.6	28.6	28.6
Actuated g/C Ratio	0.35	0.35		0.35	0.35			0.35		0.50	0.50	0.50
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	129	636		280	633			577		590	923	784
v/s Ratio Prot		0.18			c0.31					0.01	c0.11	
v/s Ratio Perm	0.25			0.06				c0.09		0.08		0.05
v/c Ratio	0.71	0.53		0.16	0.90			0.26		0.19	0.21	0.10
Uniform Delay, d1	16.2	15.0		13.0	17.9			13.4		8.2	8.2	7.7
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	16.1	0.8		0.3	16.0			0.2		0.2	0.5	0.3
Delay (s)	32.3	15.8		13.2	33.8			13.7		8.4	8.7	8.0
Level of Service	C	B		B	C			B		A	A	A
Approach Delay (s)		19.3			32.4			13.7			8.4	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	57.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	331	70	80	619	206	122	336	24	213	540	226
Future Volume (vph)	144	331	70	80	619	206	122	336	24	213	540	226
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	4952		1770	3539	1583	3433	3504		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	4952		1770	3539	1583	3433	3504		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	157	360	76	87	673	224	133	365	26	232	587	246
RTOR Reduction (vph)	0	39	0	0	0	169	0	7	0	0	0	159
Lane Group Flow (vph)	157	397	0	87	673	55	133	384	0	232	587	87
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	10.3	22.4		7.2	19.3	19.3	5.7	20.2		13.4	27.9	27.9
Effective Green, g (s)	10.3	22.4		7.2	19.3	19.3	5.7	20.2		13.4	27.9	27.9
Actuated g/C Ratio	0.13	0.28		0.09	0.24	0.24	0.07	0.26		0.17	0.35	0.35
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	230	1400		160	862	385	247	893		299	1246	557
v/s Ratio Prot	c0.09	c0.08		0.05	c0.19		0.04	0.11		c0.13	c0.17	
v/s Ratio Perm						0.03						0.05
v/c Ratio	0.68	0.28		0.54	0.78	0.14	0.54	0.43		0.78	0.47	0.16
Uniform Delay, d1	32.9	22.1		34.4	28.0	23.5	35.5	24.7		31.5	19.9	17.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	8.1	0.1		3.7	4.6	0.2	2.3	1.5		11.9	1.3	0.6
Delay (s)	41.0	22.3		38.2	32.6	23.6	37.7	26.2		43.4	21.2	18.2
Level of Service	D	C		D	C	C	D	C		D	C	B
Approach Delay (s)		27.2			31.1			29.1			25.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	79.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	250	75	108	458	85	80	376	56	75	544	100
Future Volume (vph)	36	250	75	108	458	85	80	376	56	75	544	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.17	1.00	1.00	0.39	1.00	1.00	0.19	1.00	1.00	0.36	1.00	1.00
Satd. Flow (perm)	323	1863	1583	736	1863	1583	357	1863	1583	670	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	272	82	117	498	92	87	409	61	82	591	109
RTOR Reduction (vph)	0	0	59	0	0	65	0	0	36	0	0	64
Lane Group Flow (vph)	39	272	23	117	498	27	87	409	25	82	591	45
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	25.8	23.1	23.1	29.8	25.1	25.1	37.8	34.0	34.0	38.8	34.5	34.5
Effective Green, g (s)	25.8	23.1	23.1	29.8	25.1	25.1	37.8	34.0	34.0	38.8	34.5	34.5
Actuated g/C Ratio	0.31	0.27	0.27	0.35	0.30	0.30	0.45	0.40	0.40	0.46	0.41	0.41
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	145	511	434	318	556	472	224	753	639	365	764	649
v/s Ratio Prot	0.01	0.15		c0.02	c0.27		c0.02	0.22		0.01	c0.32	
v/s Ratio Perm	0.07		0.01	0.11		0.02	0.16		0.02	0.09		0.03
v/c Ratio	0.27	0.53	0.05	0.37	0.90	0.06	0.39	0.54	0.04	0.22	0.77	0.07
Uniform Delay, d1	22.3	25.9	22.4	19.2	28.2	21.1	15.9	19.1	15.2	13.5	21.4	15.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	1.1	0.0	0.7	16.9	0.1	1.1	2.8	0.1	0.3	7.5	0.2
Delay (s)	23.3	27.0	22.5	20.0	45.1	21.1	17.0	21.9	15.3	13.9	28.9	15.3
Level of Service	C	C	C	B	D	C	B	C	B	B	C	B
Approach Delay (s)		25.7			37.8			20.4			25.4	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	84.1	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	436	0	1	636	7	276	0	6	6	1	0
Future Volume (vph)	3	436	0	1	636	7	276	0	6	6	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00			1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.95			0.96	
Satd. Flow (prot)	1770	3539		1770	3539	1583		1771			1785	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.73			0.77	
Satd. Flow (perm)	1770	3539		1770	3539	1583		1348			1425	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	474	0	1	691	8	300	0	7	7	1	0
RTOR Reduction (vph)	0	0	0	0	0	5	0	76	0	0	0	0
Lane Group Flow (vph)	3	474	0	1	691	3	0	231	0	0	8	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4			8	2			6		
Actuated Green, G (s)	0.6	13.3		0.6	13.3	13.3		11.9			11.9	
Effective Green, g (s)	0.6	13.3		0.6	13.3	13.3		11.9			11.9	
Actuated g/C Ratio	0.02	0.34		0.02	0.34	0.34		0.30			0.30	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	27	1197		27	1197	535		408			431	
v/s Ratio Prot	c0.00	0.13		0.00	c0.20							
v/s Ratio Perm						0.00		c0.17			0.01	
v/c Ratio	0.11	0.40		0.04	0.58	0.01		0.57			0.02	
Uniform Delay, d1	19.1	9.9		19.1	10.7	8.6		11.5			9.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	1.8	0.2		0.6	0.7	0.0		1.8			0.0	
Delay (s)	20.9	10.1		19.6	11.4	8.6		13.3			9.6	
Level of Service	C	B		B	B	A		B			A	
Approach Delay (s)		10.2			11.3			13.3			9.6	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	39.3	Sum of lost time (s)	13.5
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	75	59	67	159	63	86	423	100	7	513	132
Future Volume (vph)	50	75	59	67	159	63	86	423	100	7	513	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1765	1583		1836	1583	1770	3539	1583	1770	4930	
Flt Permitted	0.34	0.99	1.00		0.87	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	594	1747	1583		1622	1583	1770	3539	1583	1770	4930	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	82	64	73	173	68	93	460	109	8	558	143
RTOR Reduction (vph)	0	0	43	0	0	54	0	0	60	0	45	0
Lane Group Flow (vph)	49	87	21	0	246	14	93	460	49	8	656	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)	20.6	20.6	20.6		13.4	13.4	5.7	29.0	29.0	0.8	24.1	
Effective Green, g (s)	20.6	20.6	20.6		13.4	13.4	5.7	29.0	29.0	0.8	24.1	
Actuated g/C Ratio	0.32	0.32	0.32		0.21	0.21	0.09	0.45	0.45	0.01	0.38	
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	237	563	510		340	331	157	1606	718	22	1859	
v/s Ratio Prot	0.01	c0.01					c0.05	0.13		0.00	c0.13	
v/s Ratio Perm	0.06	0.04	0.01		c0.15	0.01			0.03			
v/c Ratio	0.21	0.15	0.04		0.72	0.04	0.59	0.29	0.07	0.36	0.35	
Uniform Delay, d1	15.6	15.4	14.9		23.5	20.1	28.0	11.0	9.8	31.3	14.3	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	0.1	0.0		7.4	0.1	5.9	0.4	0.2	9.9	0.5	
Delay (s)	16.1	15.6	14.9		31.0	20.2	33.9	11.4	10.0	41.2	14.8	
Level of Service	B	B	B		C	C	C	B	B	D	B	
Approach Delay (s)		15.5			28.6			14.3			15.1	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	63.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	372	16	17	385	47	31
Future Volume (Veh/h)	372	16	17	385	47	31
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	404	17	18	418	51	34
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None			TWLTL		
Median storage veh)				2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			421		866	412
vC1, stage 1 conf vol					412	
vC2, stage 2 conf vol					454	
vCu, unblocked vol			421		866	412
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		90	95
cM capacity (veh/h)			1138		525	640

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	421	436	85
Volume Left	0	18	51
Volume Right	17	0	34
cSH	1700	1138	875
Volume to Capacity	0.25	0.02	0.10
Queue Length 95th (ft)	0	1	8
Control Delay (s)	0.0	0.5	11.9
Lane LOS		A	B
Approach Delay (s)	0.0	0.5	11.9
Approach LOS			B

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	312	0	0	552	35	0	24	19	18	10	22
Future Volume (Veh/h)	24	312	0	0	552	35	0	24	19	18	10	22
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	339	0	0	600	38	0	26	21	20	11	24
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			2
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		421										
pX, platoon unblocked												
vC, conflicting volume	638			339			696	1029	113	808	1010	319
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	638			339			696	1029	113	808	1010	319
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			100	88	98	92	95	96
cM capacity (veh/h)	942			1217			298	226	918	238	232	677

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	NB 1	SB 1
Volume Total	26	136	136	68	400	238	47	55
Volume Left	26	0	0	0	0	0	0	20
Volume Right	0	0	0	0	0	38	21	24
cSH	942	1700	1700	1700	1700	1700	408	418
Volume to Capacity	0.03	0.08	0.08	0.04	0.24	0.14	0.12	0.13
Queue Length 95th (ft)	2	0	0	0	0	0	10	11
Control Delay (s)	8.9	0.0	0.0	0.0	0.0	0.0	16.7	17.3
Lane LOS	A						C	C
Approach Delay (s)	0.6				0.0		16.7	17.3
Approach LOS							C	C

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	340	177	210	372	63	180	516	168	86	792	122
Future Volume (vph)	88	340	177	210	372	63	180	516	168	86	792	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.32	1.00	1.00	0.37	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	603	1863	1583	684	1863	1583	1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	370	192	228	404	68	196	561	183	93	861	133
RTOR Reduction (vph)	0	0	128	0	0	45	0	0	116	0	0	87
Lane Group Flow (vph)	96	370	64	228	404	23	196	561	67	93	861	46
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	20.0	20.0	20.0	20.0	20.0	20.0	9.5	22.1	22.1	6.2	18.8	18.8
Effective Green, g (s)	20.0	20.0	20.0	20.0	20.0	20.0	9.5	22.1	22.1	6.2	18.8	18.8
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.33	0.16	0.37	0.37	0.10	0.31	0.31
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	200	617	525	226	617	525	278	1297	580	181	1103	493
v/s Ratio Prot		0.20			0.22		c0.11	c0.16		0.05	c0.24	
v/s Ratio Perm	0.16		0.04	c0.33		0.01			0.04			0.03
v/c Ratio	0.48	0.60	0.12	1.01	0.65	0.04	0.71	0.43	0.12	0.51	0.78	0.09
Uniform Delay, d1	16.0	16.8	14.0	20.1	17.2	13.7	24.1	14.4	12.6	25.6	18.9	14.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	1.6	0.1	62.2	2.5	0.0	7.9	1.1	0.4	2.5	5.5	0.4
Delay (s)	17.8	18.4	14.1	82.3	19.7	13.7	32.0	15.4	13.0	28.1	24.4	15.1
Level of Service	B	B	B	F	B	B	C	B	B	C	C	B
Approach Delay (s)		17.1			39.5			18.4			23.6	
Approach LOS		B			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	60.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	20	0	873	1298	0
Future Volume (Veh/h)	0	20	0	873	1298	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	22	0	949	1411	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				564	1000	
pX, platoon unblocked	0.82	0.80	0.80			
vC, conflicting volume	1886	706	1411			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1488	148	1025			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	100			
cM capacity (veh/h)	94	702	542			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	22	0	474	474	941	470
Volume Left	0	0	0	0	0	0
Volume Right	22	0	0	0	0	0
cSH	702	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.00	0.28	0.28	0.55	0.28
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	10.3	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	10.3	0.0			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	45.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR2
Lane Configurations												
Traffic Volume (vph)	68	275	46	127	643	213	224	695	129	179	774	44
Future Volume (vph)	68	275	46	127	643	213	224	695	129	179	774	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.76		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.85		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4976		1770	3610		1770	3456		1770	3511	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	4976		1770	3610		1770	3456		1770	3511	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	74	299	50	138	699	232	243	755	140	195	841	48
RTOR Reduction (vph)	0	34	0	0	103	0	0	21	0	0	95	0
Lane Group Flow (vph)	74	315	0	138	828	0	243	874	0	195	794	0
Turn Type	Prot	NA		Prot	Perm		Prot	NA		Prot	NA	
Protected Phases	7	4		3			5	2		1	6	
Permitted Phases					8							
Actuated Green, G (s)	3.9	15.0		7.0	18.1		9.0	21.4		9.7	22.1	
Effective Green, g (s)	3.9	15.0		7.0	18.1		9.0	21.4		9.7	22.1	
Actuated g/C Ratio	0.06	0.22		0.10	0.26		0.13	0.31		0.14	0.32	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	99	1080		179	945		230	1070		248	1122	
v/s Ratio Prot	0.04	0.06		c0.08			c0.14	c0.25		0.11	0.23	
v/s Ratio Perm					c0.23							
v/c Ratio	0.75	0.29		0.77	0.88		1.06	0.82		0.79	0.71	
Uniform Delay, d1	32.1	22.6		30.3	24.4		30.0	22.0		28.7	20.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	26.1	0.2		18.3	9.1		75.0	6.9		15.1	3.8	
Delay (s)	58.2	22.8		48.6	33.6		105.1	28.9		43.8	24.4	
Level of Service	E	C		D	C		F	C		D	C	
Approach Delay (s)		29.0						45.2			27.9	
Approach LOS		C						D			C	

Intersection Summary			
HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	69.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	146	79	126	225	74	172	863	95	105	980	236
Future Volume (vph)	63	146	79	126	225	74	172	863	95	105	980	236
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.46	1.00	1.00	0.64	1.00	1.00	0.23	1.00	1.00	0.27	1.00	1.00
Satd. Flow (perm)	848	1863	1583	1185	1863	1583	430	3539	1583	511	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	68	159	86	137	245	80	187	938	103	114	1065	257
RTOR Reduction (vph)	0	0	67	0	0	63	0	0	37	0	0	91
Lane Group Flow (vph)	68	159	19	137	245	17	187	938	66	114	1065	166
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	12.5	12.5	12.5	12.5	12.5	12.5	37.2	37.2	37.2	37.2	37.2	37.2
Effective Green, g (s)	12.5	12.5	12.5	12.5	12.5	12.5	37.2	37.2	37.2	37.2	37.2	37.2
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22	0.22	0.64	0.64	0.64	0.64	0.64	0.64
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	183	403	342	256	403	342	277	2281	1020	329	2281	1020
v/s Ratio Prot		0.09			c0.13			0.27			0.30	
v/s Ratio Perm	0.08		0.01	0.12		0.01	c0.44		0.04	0.22		0.10
v/c Ratio	0.37	0.39	0.05	0.54	0.61	0.05	0.68	0.41	0.07	0.35	0.47	0.16
Uniform Delay, d1	19.3	19.4	17.9	20.0	20.4	17.9	6.4	5.0	3.8	4.7	5.2	4.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	0.6	0.1	2.1	2.6	0.1	12.4	0.6	0.1	2.9	0.7	0.3
Delay (s)	20.5	20.0	18.0	22.2	23.0	18.0	18.9	5.5	3.9	7.6	5.9	4.4
Level of Service	C	B	B	C	C	B	B	A	A	A	A	A
Approach Delay (s)		19.6			21.9			7.4			5.8	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	57.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	19	1100	36	40	1189
Future Volume (Veh/h)	0	19	1100	36	40	1189
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	21	1196	39	43	1292
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			916			
pX, platoon unblocked	0.79	0.79			0.79	
vC, conflicting volume	1948	618			1235	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1661	0			755	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			94	
cM capacity (veh/h)	65	852			669	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	0	21	797	438	43	646	646
Volume Left	0	0	0	0	43	0	0
Volume Right	0	21	0	39	0	0	0
cSH	1700	852	1700	1700	669	1700	1700
Volume to Capacity	0.00	0.02	0.47	0.26	0.06	0.38	0.38
Queue Length 95th (ft)	0	2	0	0	5	0	0
Control Delay (s)	0.0	9.3	0.0	0.0	10.7	0.0	0.0
Lane LOS	A	A			B		
Approach Delay (s)	9.3		0.0		0.3		
Approach LOS	A						

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	41.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	380	122	114	826	226	259	758	117	228	988	294
Future Volume (vph)	195	380	122	114	826	226	259	758	117	228	988	294
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.96		1.00	0.97		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	4899		1770	4921		1770	3468		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	4899		1770	4921		1770	3468		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	212	413	133	124	898	246	282	824	127	248	1074	320
RTOR Reduction (vph)	0	63	0	0	55	0	0	14	0	0	0	131
Lane Group Flow (vph)	212	483	0	124	1089	0	282	937	0	248	1074	189
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	12.0	20.5		10.5	19.0		11.0	29.0		14.0	32.0	32.0
Effective Green, g (s)	12.0	20.5		10.5	19.0		11.0	29.0		14.0	32.0	32.0
Actuated g/C Ratio	0.13	0.23		0.12	0.21		0.12	0.32		0.16	0.36	0.36
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	236	1115		206	1038		216	1117		275	1258	562
v/s Ratio Prot	c0.12	0.10		0.07	c0.22		c0.16	0.27		0.14	c0.30	
v/s Ratio Perm												0.12
v/c Ratio	0.90	0.43		0.60	1.05		1.31	0.84		0.90	0.85	0.34
Uniform Delay, d1	38.4	29.8		37.8	35.5		39.5	28.3		37.3	26.8	21.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	32.5	0.3		4.9	41.7		166.8	7.6		30.1	7.5	1.6
Delay (s)	70.9	30.0		42.7	77.2		206.3	35.9		67.4	34.3	22.8
Level of Service	E	C		D	E		F	D		E	C	C
Approach Delay (s)		41.5			73.8			74.9			37.1	
Approach LOS		D			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	56.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	15	69	165	19	58	35	545	87	56	766	19
Future Volume (vph)	27	15	69	165	19	58	35	545	87	56	766	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.92			0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1685			1743		1770	3539	1583	1770	3539	1583
Flt Permitted		0.91			0.76		0.31	1.00	1.00	0.42	1.00	1.00
Satd. Flow (perm)		1553			1374		572	3539	1583	782	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	16	75	179	21	63	38	592	95	61	833	21
RTOR Reduction (vph)	0	56	0	0	21	0	0	0	37	0	0	8
Lane Group Flow (vph)	0	64	0	0	242	0	38	592	58	61	833	13
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		14.4			14.4		35.1	35.1	35.1	35.1	35.1	35.1
Effective Green, g (s)		14.4			14.4		35.1	35.1	35.1	35.1	35.1	35.1
Actuated g/C Ratio		0.25			0.25		0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		388			344		349	2160	966	477	2160	966
v/s Ratio Prot								0.17			c0.24	
v/s Ratio Perm		0.04			c0.18		0.07		0.04	0.08		0.01
v/c Ratio		0.16			0.70		0.11	0.27	0.06	0.13	0.39	0.01
Uniform Delay, d1		16.8			19.6		4.7	5.2	4.5	4.7	5.7	4.4
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.2			6.4		0.6	0.3	0.1	0.6	0.5	0.0
Delay (s)		17.0			26.0		5.3	5.6	4.6	5.3	6.2	4.4
Level of Service		B			C		A	A	A	A	A	A
Approach Delay (s)		17.0			26.0			5.4			6.1	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	57.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	362	419	13	26	80
Future Volume (Veh/h)	13	362	419	13	26	80
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	393	455	14	28	87
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	469				883	462
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	469				883	462
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				91	85
cM capacity (veh/h)	1093				312	600

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	407	469	115
Volume Left	14	0	28
Volume Right	0	14	87
cSH	1093	1700	793
Volume to Capacity	0.01	0.28	0.15
Queue Length 95th (ft)	1	0	13
Control Delay (s)	0.4	0.0	13.4
Lane LOS	A		B
Approach Delay (s)	0.4	0.0	13.4
Approach LOS			B

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	39.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	4	105	11	0	77
Future Volume (Veh/h)	0	4	105	11	0	77
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	4	114	12	0	84
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	204	120			126	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	204	120			126	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	784	931			1460	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	4	126	84
Volume Left	0	0	0
Volume Right	4	12	0
cSH	931	1700	1460
Volume to Capacity	0.00	0.07	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	8.9	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.9	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	16.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	50	493	57	10	1
Future Volume (Veh/h)	7	50	493	57	10	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	54	536	62	11	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	598				637	567
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	598				637	567
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				97	100
cM capacity (veh/h)	979				438	523

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	62	598	12
Volume Left	8	0	11
Volume Right	0	62	1
cSH	979	1700	444
Volume to Capacity	0.01	0.35	0.03
Queue Length 95th (ft)	1	0	2
Control Delay (s)	1.2	0.0	13.3
Lane LOS	A		B
Approach Delay (s)	1.2	0.0	13.3
Approach LOS			B

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	39.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	566	16	59	575	18	2	0	26	38	0	50
Future Volume (Veh/h)	18	566	16	59	575	18	2	0	26	38	0	50
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	615	17	64	625	20	2	0	28	41	0	54
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (ft)					620							
pX, platoon unblocked	0.86						0.86	0.86		0.86	0.86	0.86
vC, conflicting volume	645			632			1470	1436	624	1436	1425	625
vC1, stage 1 conf vol							664	664		753	753	
vC2, stage 2 conf vol							807	773		683	672	
vCu, unblocked vol	506			632			1466	1426	624	1426	1413	483
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			93			99	100	94	84	100	89
cM capacity (veh/h)	911			951			246	288	486	260	283	502

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	20	632	64	625	20	30	95
Volume Left	20	0	64	0	0	2	41
Volume Right	0	17	0	0	20	28	54
cSH	911	1700	951	1700	1700	456	358
Volume to Capacity	0.02	0.37	0.07	0.37	0.01	0.07	0.27
Queue Length 95th (ft)	2	0	5	0	0	5	26
Control Delay (s)	9.0	0.0	9.1	0.0	0.0	13.4	18.6
Lane LOS	A		A			B	C
Approach Delay (s)	0.3		0.8			13.4	18.6
Approach LOS						B	C

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	390	773	140	0	26
Future Vol, veh/h	0	390	773	140	0	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	-	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	424	840	152	0	28

Major/Minor	Major2		Minor2	
Conflicting Flow All	-	0	-	496
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	444
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	444
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	SB
HCM Control Delay, s	0	13.7
HCM LOS		B

Minor Lane/Major Mvmt	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	444
HCM Lane V/C Ratio	-	-	0.064
HCM Control Delay (s)	-	-	13.7
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	153	0	0	10	0	853	20	0	1150	29
Future Volume (Veh/h)	0	0	153	0	0	10	0	853	20	0	1150	29
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	166	0	0	11	0	927	22	0	1250	32
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								1041			523	
pX, platoon unblocked	0.78	0.78	0.78	0.78	0.78		0.78					
vC, conflicting volume	1740	2215	641	1729	2220	474	1282			949		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1384	1993	0	1369	1999	474	795			949		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	80	100	100	98	100			100		
cM capacity (veh/h)	79	47	845	66	46	536	641			719		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	166	11	618	331	833	449
Volume Left	0	0	0	0	0	0
Volume Right	166	11	0	22	0	32
cSH	845	536	1700	1700	1700	1700
Volume to Capacity	0.20	0.02	0.36	0.19	0.49	0.26
Queue Length 95th (ft)	18	2	0	0	0	0
Control Delay (s)	10.3	11.9	0.0	0.0	0.0	0.0
Lane LOS	B	B				
Approach Delay (s)	10.3	11.9	0.0		0.0	
Approach LOS	B	B				

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	552	77	43	626	23	52
Future Volume (Veh/h)	552	77	43	626	23	52
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	600	84	47	680	25	57
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)				479		
pX, platoon unblocked					0.82	
vC, conflicting volume			684		1416	642
vC1, stage 1 conf vol					642	
vC2, stage 2 conf vol					774	
vCu, unblocked vol			684		1398	642
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			95		93	88
cM capacity (veh/h)			909		340	474

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	684	47	680	82
Volume Left	0	47	0	25
Volume Right	84	0	0	57
cSH	1700	909	1700	423
Volume to Capacity	0.40	0.05	0.40	0.19
Queue Length 95th (ft)	0	4	0	18
Control Delay (s)	0.0	9.2	0.0	15.5
Lane LOS		A		C
Approach Delay (s)	0.0	0.6		15.5
Approach LOS				C

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	21	19	102	872	979	257
Future Volume (vph)	21	19	102	872	979	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.94		1.00	1.00	0.97	
Flt Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1698		1770	3539	3429	
Flt Permitted	0.97		0.95	1.00	1.00	
Satd. Flow (perm)	1698		1770	3539	3429	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	21	111	948	1064	279
RTOR Reduction (vph)	20	0	0	0	27	0
Lane Group Flow (vph)	24	0	111	948	1316	0
Turn Type	Prot		Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases						
Actuated Green, G (s)	2.7		4.5	39.2	30.7	
Effective Green, g (s)	2.7		4.5	39.2	30.7	
Actuated g/C Ratio	0.05		0.09	0.79	0.62	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	91		159	2780	2109	
v/s Ratio Prot	c0.01		c0.06	0.27	c0.38	
v/s Ratio Perm						
v/c Ratio	0.27		0.70	0.34	0.62	
Uniform Delay, d1	22.6		22.0	1.6	6.0	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.6		12.6	0.1	0.6	
Delay (s)	24.2		34.6	1.6	6.6	
Level of Service	C		C	A	A	
Approach Delay (s)	24.2			5.1	6.6	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	6.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	49.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1	2	8	0	341	6	104	7	32	12	1
Future Volume (Veh/h)	0	1	2	8	0	341	6	104	7	32	12	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	2	9	0	371	7	113	8	35	13	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	586	218	14	217	215	117	14			121		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	586	218	14	217	215	117	14			121		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	99	100	60	100			98		
cM capacity (veh/h)	249	661	1067	721	664	935	1604			1467		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	3	380	128	49
Volume Left	0	9	7	35
Volume Right	2	371	8	1
cSH	885	929	1604	1467
Volume to Capacity	0.00	0.41	0.00	0.02
Queue Length 95th (ft)	0	50	0	2
Control Delay (s)	9.1	11.5	0.4	5.4
Lane LOS	A	B	A	A
Approach Delay (s)	9.1	11.5	0.4	5.4
Approach LOS	A	B		

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	301	26	18	669	112	10	2	3	21	0	16
Future Volume (vph)	41	301	26	18	669	112	10	2	3	21	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.97			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.97	
Satd. Flow (prot)	1770	5025		1770	3463			1755			1707	
Flt Permitted	0.32	1.00		0.53	1.00			0.81			0.83	
Satd. Flow (perm)	588	5025		990	3463			1479			1464	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	327	28	20	727	122	11	2	3	23	0	17
RTOR Reduction (vph)	0	14	0	0	25	0	0	2	0	0	14	0
Lane Group Flow (vph)	45	341	0	20	824	0	0	14	0	0	26	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.1	14.1		14.1	14.1			6.3			6.3	
Effective Green, g (s)	14.1	14.1		14.1	14.1			6.3			6.3	
Actuated g/C Ratio	0.50	0.50		0.50	0.50			0.22			0.22	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	291	2494		491	1719			328			324	
v/s Ratio Prot		0.07			c0.24							
v/s Ratio Perm	0.08			0.02				0.01			c0.02	
v/c Ratio	0.15	0.14		0.04	0.48			0.04			0.08	
Uniform Delay, d1	3.9	3.9		3.7	4.7			8.7			8.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	0.0		0.0	0.2			0.1			0.1	
Delay (s)	4.1	3.9		3.7	4.9			8.7			8.9	
Level of Service	A	A		A	A			A			A	
Approach Delay (s)		3.9			4.9			8.7			8.9	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	28.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

2035 Phase 2 PM Peak Hour LOS Worksheets

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	56	22	292	99	31	203
Future Volume (vph)	56	22	292	99	31	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5			4.5
Lane Util. Factor	0.97	1.00	0.95			0.95
Frt	1.00	0.85	0.96			1.00
Flt Protected	0.95	1.00	1.00			0.99
Satd. Flow (prot)	3433	1583	3404			3516
Flt Permitted	0.95	1.00	1.00			0.89
Satd. Flow (perm)	3433	1583	3404			3141
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	61	24	317	108	34	221
RTOR Reduction (vph)	0	21	43	0	0	0
Lane Group Flow (vph)	61	3	382	0	0	255
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	3.5	3.5	18.9			18.9
Effective Green, g (s)	3.5	3.5	18.9			18.9
Actuated g/C Ratio	0.11	0.11	0.60			0.60
Clearance Time (s)	4.5	4.5	4.5			4.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	382	176	2048			1890
v/s Ratio Prot	c0.02		c0.11			
v/s Ratio Perm		0.00				0.08
v/c Ratio	0.16	0.02	0.19			0.13
Uniform Delay, d1	12.6	12.4	2.8			2.7
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.2	0.0	0.0			0.0
Delay (s)	12.8	12.5	2.8			2.7
Level of Service	B	B	A			A
Approach Delay (s)	12.7		2.8			2.7
Approach LOS	B		A			A

Intersection Summary			
HCM 2000 Control Delay	3.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.18		
Actuated Cycle Length (s)	31.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	548	182	150	499	48	117	214	182	18	171	63
Future Volume (vph)	113	548	182	150	499	48	117	214	182	18	171	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.99		1.00	0.93		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3407		1770	3493		1770	3295		1770	3397	
Flt Permitted	0.40	1.00		0.28	1.00		0.59	1.00		0.50	1.00	
Satd. Flow (perm)	741	3407		524	3493		1107	3295		933	3397	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	123	596	198	163	542	52	127	233	198	20	186	68
RTOR Reduction (vph)	0	69	0	0	15	0	0	119	0	0	41	0
Lane Group Flow (vph)	123	725	0	163	579	0	127	312	0	20	213	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.9	19.9		19.9	19.9		19.0	19.0		19.0	19.0	
Effective Green, g (s)	19.9	19.9		19.9	19.9		19.0	19.0		19.0	19.0	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.40	0.40		0.40	0.40	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	307	1415		217	1451		439	1306		370	1347	
v/s Ratio Prot		0.21			0.17			0.09			0.06	
v/s Ratio Perm	0.17			c0.31			c0.11			0.02		
v/c Ratio	0.40	0.51		0.75	0.40		0.29	0.24		0.05	0.16	
Uniform Delay, d1	9.8	10.4		11.9	9.8		9.8	9.6		8.9	9.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.3		13.6	0.2		1.7	0.4		0.3	0.3	
Delay (s)	10.7	10.7		25.5	10.0		11.5	10.1		9.2	9.6	
Level of Service	B	B		C	A		B	B		A	A	
Approach Delay (s)		10.7			13.3			10.4			9.5	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	47.9	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	489	99	278	376	86	92	518	283	76	331	57
Future Volume (vph)	93	489	99	278	376	86	92	518	283	76	331	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3450		1770	3441		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3450		1770	3441		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	532	108	302	409	93	100	563	308	83	360	62
RTOR Reduction (vph)	0	21	0	0	23	0	0	0	228	0	0	46
Lane Group Flow (vph)	101	619	0	302	479	0	100	563	80	83	360	16
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	7.2	18.0		16.0	26.8		5.5	20.1	20.1	4.9	19.5	19.5
Effective Green, g (s)	7.2	18.0		16.0	26.8		5.5	20.1	20.1	4.9	19.5	19.5
Actuated g/C Ratio	0.09	0.23		0.21	0.35		0.07	0.26	0.26	0.06	0.25	0.25
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	165	806		367	1197		126	923	413	112	896	400
v/s Ratio Prot	0.06	c0.18		c0.17	0.14		c0.06	c0.16		0.05	0.10	
v/s Ratio Perm									0.05			0.01
v/c Ratio	0.61	0.77		0.82	0.40		0.79	0.61	0.19	0.74	0.40	0.04
Uniform Delay, d1	33.6	27.6		29.1	19.0		35.2	25.0	22.1	35.4	23.9	21.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.6	4.4		13.8	0.2		28.1	3.0	1.1	22.9	1.3	0.2
Delay (s)	40.1	32.0		43.0	19.2		63.3	28.0	23.2	58.3	25.2	21.9
Level of Service	D	C		D	B		E	C	C	E	C	C
Approach Delay (s)		33.1			28.1			30.1			30.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	102	96	235	102	56	144
Future Volume (Veh/h)	102	96	235	102	56	144
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	111	104	255	111	61	157
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						1253
pX, platoon unblocked						
vC, conflicting volume	590	310			366	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	590	310			366	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	75	86			95	
cM capacity (veh/h)	446	730			1193	

Direction, Lane #	NW 1	NE 1	SW 1
Volume Total	215	366	218
Volume Left	111	0	61
Volume Right	104	111	0
cSH	550	1700	1193
Volume to Capacity	0.39	0.22	0.05
Queue Length 95th (ft)	46	0	4
Control Delay (s)	15.7	0.0	2.6
Lane LOS	C		A
Approach Delay (s)	15.7	0.0	2.6
Approach LOS	C		

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	1127	16	24	797	77	3	24	10	73	53	156
Future Volume (vph)	45	1127	16	24	797	77	3	24	10	73	53	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.96			0.93	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1770	3532		1770	3492			1787			1702	
Flt Permitted	0.95	1.00		0.95	1.00			0.98			0.91	
Satd. Flow (perm)	1770	3532		1770	3492			1753			1572	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	1225	17	26	866	84	3	26	11	79	58	170
RTOR Reduction (vph)	0	2	0	0	11	0	0	7	0	0	73	0
Lane Group Flow (vph)	49	1240	0	26	939	0	0	33	0	0	234	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	3.1	24.2		2.1	23.2			19.1			19.1	
Effective Green, g (s)	3.1	24.2		2.1	23.2			19.1			19.1	
Actuated g/C Ratio	0.05	0.41		0.04	0.40			0.33			0.33	
Clearance Time (s)	4.0	4.5		4.0	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	93	1463		63	1387			573			514	
v/s Ratio Prot	c0.03	c0.35		0.01	0.27							
v/s Ratio Perm								0.02			c0.15	
v/c Ratio	0.53	0.85		0.41	0.68			0.06			0.45	
Uniform Delay, d1	26.9	15.4		27.5	14.5			13.5			15.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	5.3	4.8		4.3	1.3			0.2			2.9	
Delay (s)	32.2	20.2		31.9	15.8			13.7			18.4	
Level of Service	C	C		C	B			B			B	
Approach Delay (s)		20.7			16.3			13.7			18.4	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	58.4	Sum of lost time (s)	13.0
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	633	58	34	505	74	154	78	46	46	74	89
Future Volume (vph)	84	633	58	34	505	74	154	78	46	46	74	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.98			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.99	
Satd. Flow (prot)	1770	3495		1770	3472			1772			1736	
Flt Permitted	0.33	1.00		0.25	1.00			0.73			0.89	
Satd. Flow (perm)	611	3495		465	3472			1331			1561	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	688	63	37	549	80	167	85	50	50	80	97
RTOR Reduction (vph)	0	13	0	0	21	0	0	11	0	0	41	0
Lane Group Flow (vph)	91	738	0	37	608	0	0	291	0	0	186	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.3	18.3		18.3	18.3			27.7			27.7	
Effective Green, g (s)	18.3	18.3		18.3	18.3			27.7			27.7	
Actuated g/C Ratio	0.33	0.33		0.33	0.33			0.50			0.50	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	203	1162		154	1155			670			786	
v/s Ratio Prot		c0.21			0.18							
v/s Ratio Perm	0.15			0.08				c0.22			0.12	
v/c Ratio	0.45	0.64		0.24	0.53			0.43			0.24	
Uniform Delay, d1	14.4	15.5		13.3	14.8			8.7			7.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.6	1.1		0.8	0.4			2.0			0.7	
Delay (s)	16.0	16.7		14.1	15.3			10.7			8.4	
Level of Service	B	B		B	B			B			A	
Approach Delay (s)		16.6			15.2			10.7			8.4	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	74	0	18	260	184	62
Future Volume (Veh/h)	74	0	18	260	184	62
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	80	0	20	283	200	67
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1274		
pX, platoon unblocked						
vC, conflicting volume	556	234	267			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	556	234	267			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	83	100	98			
cM capacity (veh/h)	484	806	1297			

Direction, Lane #	SE 1	NE 1	SW 1
Volume Total	80	303	267
Volume Left	80	20	0
Volume Right	0	0	67
cSH	484	1297	1700
Volume to Capacity	0.17	0.02	0.16
Queue Length 95th (ft)	15	1	0
Control Delay (s)	13.9	0.7	0.0
Lane LOS	B	A	
Approach Delay (s)	13.9	0.7	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	39.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	511	155	173	429	68	151	195	91	65	191	73
Future Volume (vph)	69	511	155	173	429	68	151	195	91	65	191	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3416		1770	3466		1770	1863	1583	1770	1863	1583
Flt Permitted	0.41	1.00		0.19	1.00		0.53	1.00	1.00	0.61	1.00	1.00
Satd. Flow (perm)	765	3416		347	3466		993	1863	1583	1144	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	75	555	168	188	466	74	164	212	99	71	208	79
RTOR Reduction (vph)	0	41	0	0	18	0	0	0	67	0	0	55
Lane Group Flow (vph)	75	682	0	188	522	0	164	212	32	71	208	24
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	22.7	18.4		28.9	21.5		28.4	22.9	22.9	25.4	21.4	21.4
Effective Green, g (s)	22.7	18.4		28.9	21.5		28.4	22.9	22.9	25.4	21.4	21.4
Actuated g/C Ratio	0.32	0.26		0.41	0.30		0.40	0.32	0.32	0.36	0.30	0.30
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	306	889		290	1054		459	603	512	446	563	479
v/s Ratio Prot	0.01	c0.20		c0.07	0.15		c0.03	0.11		0.01	0.11	
v/s Ratio Perm	0.06			0.20			c0.12		0.02	0.05		0.02
v/c Ratio	0.25	0.77		0.65	0.50		0.36	0.35	0.06	0.16	0.37	0.05
Uniform Delay, d1	17.0	24.2		15.3	20.2		14.0	18.2	16.5	15.1	19.4	17.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	4.0		4.9	0.4		0.5	1.6	0.2	0.2	1.9	0.2
Delay (s)	17.5	28.2		20.2	20.5		14.5	19.8	16.7	15.3	21.2	17.6
Level of Service	B	C		C	C		B	B	B	B	C	B
Approach Delay (s)		27.2			20.4			17.4			19.3	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	70.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR	NWR2
Lane Configurations												
Sign Control		Stop			Stop			Stop		Stop		
Traffic Volume (vph)	75	54	162	29	31	34	19	400	38	48	418	3
Future Volume (vph)	75	54	162	29	31	34	19	400	38	48	418	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	59	176	32	34	37	21	435	41	52	454	3

Direction, Lane #	EB 1	WB 1	SB 1	SB 2	NW 1	NW 2
Volume Total (vph)	317	103	239	259	279	230
Volume Left (vph)	82	32	21	0	52	0
Volume Right (vph)	176	37	0	41	0	3
Hadj (s)	-0.25	-0.12	0.08	-0.08	0.13	0.02
Departure Headway (s)	6.4	7.2	7.0	6.8	7.0	6.9
Degree Utilization, x	0.56	0.21	0.46	0.49	0.54	0.44
Capacity (veh/h)	524	425	498	510	492	505
Control Delay (s)	17.4	12.1	14.6	14.9	16.7	14.0
Approach Delay (s)	17.4	12.1	14.8		15.5	
Approach LOS	C	B	B		C	

Intersection Summary			
Delay	15.4		
Level of Service	C		
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	961	0	214	623	109	103	458	362	327	488	58
Future Volume (vph)	55	961	0	214	623	109	103	458	362	327	488	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539		1770	3539	1583	1770	3539	1583	1770	3483	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539		1770	3539	1583	1770	3539	1583	1770	3483	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	1045	0	233	677	118	112	498	393	355	530	63
RTOR Reduction (vph)	0	0	0	0	0	75	0	0	110	0	9	0
Lane Group Flow (vph)	60	1045	0	233	677	43	112	498	283	355	584	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	6.8	29.5		14.4	37.1	37.1	10.9	18.9	33.3	20.1	28.1	
Effective Green, g (s)	6.8	29.5		14.4	37.1	37.1	10.9	18.9	33.3	20.1	28.1	
Actuated g/C Ratio	0.07	0.29		0.14	0.37	0.37	0.11	0.19	0.33	0.20	0.28	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	119	1034		252	1301	582	191	662	522	352	969	
v/s Ratio Prot	0.03	c0.30		c0.13	0.19		0.06	c0.14	0.08	c0.20	0.17	
v/s Ratio Perm						0.03			0.10			
v/c Ratio	0.50	1.01		0.92	0.52	0.07	0.59	0.75	0.54	1.01	0.60	
Uniform Delay, d1	45.4	35.7		42.7	24.9	20.7	42.9	38.8	27.6	40.4	31.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.3	30.6		36.7	0.4	0.1	4.5	7.7	1.2	50.1	2.8	
Delay (s)	48.8	66.3		79.4	25.3	20.8	47.4	46.5	28.7	90.5	34.3	
Level of Service	D	E		E	C	C	D	D	C	F	C	
Approach Delay (s)		65.4			37.1			39.6			55.4	
Approach LOS		E			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	49.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	9	8	15	23	1	7	14	91	34	22	68	0
Future Volume (vph)	9	8	15	23	1	7	14	91	34	22	68	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	9	16	25	1	8	15	99	37	24	74	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	35	34	151	98
Volume Left (vph)	10	25	15	24
Volume Right (vph)	16	8	37	0
Hadj (s)	-0.18	0.04	-0.09	0.08
Departure Headway (s)	4.3	4.5	4.1	4.3
Degree Utilization, x	0.04	0.04	0.17	0.12
Capacity (veh/h)	786	741	859	818
Control Delay (s)	7.5	7.7	7.9	7.9
Approach Delay (s)	7.5	7.7	7.9	7.9
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.8		
Level of Service	A		
Intersection Capacity Utilization	19.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	109	1453	43	33	863	50	21	24	49	56	25	68
Future Volume (vph)	109	1453	43	33	863	50	21	24	49	56	25	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		0.91	0.91			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.93			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1770	3524		1610	3362			1713			1716	
Flt Permitted	0.95	1.00		0.95	0.95			0.93			0.87	
Satd. Flow (perm)	1770	3524		1610	3195			1603			1514	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	118	1579	47	36	938	54	23	26	53	61	27	74
RTOR Reduction (vph)	0	2	0	0	5	0	0	42	0	0	34	0
Lane Group Flow (vph)	118	1624	0	32	991	0	0	60	0	0	128	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	8.1	55.8		3.2	54.1			19.2			19.2	
Effective Green, g (s)	8.1	55.8		3.2	54.1			19.2			19.2	
Actuated g/C Ratio	0.09	0.61		0.03	0.59			0.21			0.21	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	156	2144		56	1890			335			316	
v/s Ratio Prot	c0.07	c0.46		0.02	0.02							
v/s Ratio Perm					0.29			0.04			c0.08	
v/c Ratio	0.76	0.76		0.57	0.52			0.18			0.41	
Uniform Delay, d1	40.8	13.0		43.6	11.2			29.8			31.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	18.7	1.6		13.3	0.3			1.2			3.8	
Delay (s)	59.5	14.6		56.9	11.4			30.9			35.1	
Level of Service	E	B		E	B			C			D	
Approach Delay (s)		17.6			12.8			30.9			35.1	
Approach LOS		B			B			C			D	

Intersection Summary			
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	91.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	91.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	15	9	5	6	3	20	129	9	17	120	5
Future Volume (Veh/h)	15	15	9	5	6	3	20	129	9	17	120	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	16	10	5	7	3	22	140	10	18	130	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								564				
pX, platoon unblocked												
vC, conflicting volume	364	362	132	376	360	145	135			150		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	364	362	132	376	360	145	135			150		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	97	99	99	99	100	98			99		
cM capacity (veh/h)	572	549	917	551	551	902	1449			1431		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	42	15	172	153
Volume Left	16	5	22	18
Volume Right	10	3	10	5
cSH	618	598	1449	1431
Volume to Capacity	0.07	0.03	0.02	0.01
Queue Length 95th (ft)	5	2	1	1
Control Delay (s)	11.3	11.2	1.1	1.0
Lane LOS	B	B	A	A
Approach Delay (s)	11.3	11.2	1.1	1.0
Approach LOS	B	B		

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	21.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	1492	11	36	835	62	3	3	8	64	6	47
Future Volume (vph)	91	1492	11	36	835	62	3	3	8	64	6	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.92			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.97	
Satd. Flow (prot)	1770	3535		1770	3503			1695			1716	
Flt Permitted	0.95	1.00		0.95	1.00			0.96			0.84	
Satd. Flow (perm)	1770	3535		1770	3503			1647			1481	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	1622	12	39	908	67	3	3	9	70	7	51
RTOR Reduction (vph)	0	0	0	0	6	0	0	7	0	0	30	0
Lane Group Flow (vph)	99	1634	0	39	969	0	0	8	0	0	98	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	7.3	39.8		3.0	35.5			19.9			19.9	
Effective Green, g (s)	7.3	39.8		3.0	35.5			19.9			19.9	
Actuated g/C Ratio	0.10	0.52		0.04	0.47			0.26			0.26	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	169	1846		69	1631			430			386	
v/s Ratio Prot	c0.06	c0.46		0.02	0.28							
v/s Ratio Perm								0.01			c0.07	
v/c Ratio	0.59	0.88		0.57	0.59			0.02			0.26	
Uniform Delay, d1	33.0	16.2		36.0	15.0			20.9			22.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	5.1	5.5		10.2	0.6			0.1			1.6	
Delay (s)	38.1	21.6		46.1	15.6			21.0			23.9	
Level of Service	D	C		D	B			C			C	
Approach Delay (s)		22.6			16.8			21.0			23.9	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	76.2	Sum of lost time (s)	13.5
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (veh/h)	2	24	13	8	2	2	7	159	6	8	96	5
Future Volume (Veh/h)	2	24	13	8	2	2	7	159	6	8	96	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	26	14	9	2	2	8	173	7	9	104	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								560				
pX, platoon unblocked												
vC, conflicting volume	320	320	106	344	320	176	109			180		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	320	320	106	344	320	176	109			180		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	96	99	98	100	100	99			99		
cM capacity (veh/h)	624	589	948	576	590	867	1481			1396		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	42	13	188	118
Volume Left	2	9	8	9
Volume Right	14	2	7	5
cSH	676	610	1481	1396
Volume to Capacity	0.06	0.02	0.01	0.01
Queue Length 95th (ft)	5	2	0	0
Control Delay (s)	10.7	11.0	0.4	0.6
Lane LOS	B	B	A	A
Approach Delay (s)	10.7	11.0	0.4	0.6
Approach LOS	B	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	21.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	1387	34	32	819	66	42	17	22	49	15	50
Future Volume (vph)	88	1387	34	32	819	66	42	17	22	49	15	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.96			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.98	
Satd. Flow (prot)	1770	3527		1770	3499			1748			1715	
Flt Permitted	0.95	1.00		0.95	1.00			0.82			0.85	
Satd. Flow (perm)	1770	3527		1770	3499			1473			1495	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	1508	37	35	890	72	46	18	24	53	16	54
RTOR Reduction (vph)	0	3	0	0	8	0	0	17	0	0	39	0
Lane Group Flow (vph)	96	1542	0	35	954	0	0	71	0	0	84	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	6.9	33.9		1.9	28.9			19.0			19.0	
Effective Green, g (s)	6.9	33.9		1.9	28.9			19.0			19.0	
Actuated g/C Ratio	0.10	0.50		0.03	0.42			0.28			0.28	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	178	1750		49	1480			409			415	
v/s Ratio Prot	c0.05	c0.44		0.02	0.27							
v/s Ratio Perm								0.05			c0.06	
v/c Ratio	0.54	0.88		0.71	0.64			0.17			0.20	
Uniform Delay, d1	29.2	15.4		32.9	15.6			18.7			18.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	3.1	5.6		39.0	1.0			0.9			1.1	
Delay (s)	32.3	21.0		72.0	16.6			19.6			20.0	
Level of Service	C	C		E	B			B			B	
Approach Delay (s)		21.7			18.5			19.6			20.0	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	68.3	Sum of lost time (s)	13.5
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	6	26	8	5	10	15	336	14	8	353	3
Future Volume (Veh/h)	3	6	26	8	5	10	15	336	14	8	353	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	7	28	9	5	11	16	365	15	9	384	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								542				
pX, platoon unblocked												
vC, conflicting volume	632	816	194	646	810	190	387			380		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	632	816	194	646	810	190	387			380		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	98	97	97	98	99	99			99		
cM capacity (veh/h)	350	304	815	333	306	820	1168			1175		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	38	25	198	198	201	195
Volume Left	3	9	16	0	9	0
Volume Right	28	11	0	15	0	3
cSH	576	440	1168	1700	1175	1700
Volume to Capacity	0.07	0.06	0.01	0.12	0.01	0.11
Queue Length 95th (ft)	5	5	1	0	1	0
Control Delay (s)	11.7	13.7	0.8	0.0	0.4	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	11.7	13.7	0.4		0.2	
Approach LOS	B	B				

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	30.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	167	1167	754	204	289	101
Future Volume (vph)	167	1167	754	204	289	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.95	0.95		0.97	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3426		3433	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3426		3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	182	1268	820	222	314	110
RTOR Reduction (vph)	0	0	41	0	0	72
Lane Group Flow (vph)	182	1268	1001	0	314	38
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	7.5	30.5	18.5		20.5	20.5
Effective Green, g (s)	7.5	30.5	18.5		20.5	20.5
Actuated g/C Ratio	0.12	0.51	0.31		0.34	0.34
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	221	1798	1056		1172	540
v/s Ratio Prot	0.10	c0.36	c0.29		c0.09	
v/s Ratio Perm						0.02
v/c Ratio	0.82	0.71	0.95		0.27	0.07
Uniform Delay, d1	25.6	11.3	20.3		14.3	13.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	21.3	1.3	16.5		0.6	0.2
Delay (s)	46.9	12.6	36.8		14.9	13.6
Level of Service	D	B	D		B	B
Approach Delay (s)		16.9	36.8		14.5	
Approach LOS		B	D		B	

Intersection Summary			
HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	439	507	1027	448	631	1137
Future Volume (vph)	439	507	1027	448	631	1137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	0.97	1.00	0.91		0.97	0.95
Frt	1.00	0.85	0.95		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3090	1425	4368		3090	3185
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3090	1425	4368		3090	3185
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	477	551	1116	487	686	1236
RTOR Reduction (vph)	0	340	86	0	0	0
Lane Group Flow (vph)	477	211	1517	0	686	1236
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	17.8	17.8	35.5		21.5	61.5
Effective Green, g (s)	17.8	17.8	35.5		21.5	61.5
Actuated g/C Ratio	0.20	0.20	0.40		0.24	0.70
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	622	287	1756		752	2218
v/s Ratio Prot	c0.15		c0.35		c0.22	0.39
v/s Ratio Perm		0.15				
v/c Ratio	0.77	0.73	0.86		0.91	0.56
Uniform Delay, d1	33.3	33.0	24.2		32.5	6.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.6	9.4	5.9		17.3	1.0
Delay (s)	38.9	42.4	30.1		49.8	7.7
Level of Service	D	D	C		D	A
Approach Delay (s)	40.8		30.1			22.7
Approach LOS	D		C			C

Intersection Summary			
HCM 2000 Control Delay	29.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	88.3	Sum of lost time (s)	13.5
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	344	94	48	153	63	63
Future Volume (Veh/h)	344	94	48	153	63	63
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	374	102	52	166	68	68
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						1
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			476		695	425
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			476		695	425
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		83	89
cM capacity (veh/h)			1086		389	629

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	476	218	136
Volume Left	0	52	68
Volume Right	102	0	68
cSH	1700	1086	777
Volume to Capacity	0.28	0.05	0.17
Queue Length 95th (ft)	0	4	16
Control Delay (s)	0.0	2.4	13.8
Lane LOS		A	B
Approach Delay (s)	0.0	2.4	13.8
Approach LOS			B

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	366	62	36	162	8	29	16	46	3	11	7
Future Volume (vph)	5	366	62	36	162	8	29	16	46	3	11	7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	398	67	39	176	9	32	17	50	3	12	8

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	470	215	9	49	50	23
Volume Left (vph)	5	39	0	32	0	3
Volume Right (vph)	67	0	9	0	50	8
Hadj (s)	-0.05	0.12	-0.67	0.36	-0.67	-0.15
Departure Headway (s)	5.1	5.5	4.7	6.7	5.6	6.3
Degree Utilization, x	0.67	0.33	0.01	0.09	0.08	0.04
Capacity (veh/h)	684	636	738	490	571	495
Control Delay (s)	17.9	9.9	6.5	9.1	7.9	9.6
Approach Delay (s)	17.9	9.8		8.5		9.6
Approach LOS	C	A		A		A

Intersection Summary			
Delay	14.3		
Level of Service	B		
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	632	1	178	7	0	22	111	817	0	3	699	706
Future Volume (vph)	632	1	178	7	0	22	111	817	0	3	699	706
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	0.95	0.95	0.88		1.00		0.97	0.91		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.90		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1686	2787		1653		3433	5085		1770	3539	1583
Flt Permitted	0.74	0.70	1.00		1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1303	1245	2787		1674		3433	5085		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	687	1	193	8	0	24	121	888	0	3	760	767
RTOR Reduction (vph)	0	0	122	0	31	0	0	0	0	0	0	482
Lane Group Flow (vph)	343	345	71	0	1	0	121	888	0	3	760	285
Turn Type	pm+pt	NA	Perm	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8								6
Actuated Green, G (s)	24.5	24.5	24.5		1.9		3.7	27.5		0.8	24.6	24.6
Effective Green, g (s)	24.5	24.5	24.5		1.9		3.7	27.5		0.8	24.6	24.6
Actuated g/C Ratio	0.37	0.37	0.37		0.03		0.06	0.41		0.01	0.37	0.37
Clearance Time (s)	4.5	4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	584	580	1029		47		191	2109		21	1313	587
v/s Ratio Prot	0.16	c0.16					c0.04	c0.17		0.00	c0.21	
v/s Ratio Perm	0.06	c0.06	0.03		0.00							0.18
v/c Ratio	0.59	0.59	0.07		0.02		0.63	0.42		0.14	0.58	0.48
Uniform Delay, d1	16.3	16.9	13.5		31.3		30.6	13.8		32.4	16.7	16.0
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.5	1.6	0.0		0.2		6.7	0.6		3.1	1.9	2.9
Delay (s)	17.9	18.5	13.6		31.5		37.3	14.4		35.5	18.6	18.8
Level of Service	B	B	B		C		D	B		D	B	B
Approach Delay (s)		17.2			31.5			17.1			18.7	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	66.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	22	39	473	490	51
Future Volume (Veh/h)	0	22	39	473	490	51
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	24	42	514	533	55
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1038	287	
pX, platoon unblocked						
vC, conflicting volume	902	294	588			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	902	294	588			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	96			
cM capacity (veh/h)	266	702	983			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	24	213	343	355	233
Volume Left	0	42	0	0	0
Volume Right	24	0	0	0	55
cSH	702	983	1700	1700	1700
Volume to Capacity	0.03	0.04	0.20	0.21	0.14
Queue Length 95th (ft)	3	3	0	0	0
Control Delay (s)	10.3	2.1	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	10.3	0.8		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	117	40	0	697	111	21	880
Future Volume (vph)	117	40	0	697	111	21	880
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5		4.5	4.5
Lane Util. Factor	1.00			0.91		1.00	0.91
Frt	0.97			0.98		1.00	1.00
Flt Protected	0.96			1.00		0.95	1.00
Satd. Flow (prot)	1734			4980		1770	5085
Flt Permitted	0.96			1.00		0.95	1.00
Satd. Flow (perm)	1734			4980		1770	5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	127	43	0	758	121	23	957
RTOR Reduction (vph)	25	0	0	25	0	0	0
Lane Group Flow (vph)	145	0	0	854	0	23	957
Turn Type	Prot		Prot	NA		Prot	NA
Protected Phases	8		5	2		1	6
Permitted Phases							
Actuated Green, G (s)	7.7			27.4		0.9	32.8
Effective Green, g (s)	7.7			27.4		0.9	32.8
Actuated g/C Ratio	0.16			0.55		0.02	0.66
Clearance Time (s)	4.5			4.5		4.5	4.5
Vehicle Extension (s)	3.0			3.0		3.0	3.0
Lane Grp Cap (vph)	269			2756		32	3369
v/s Ratio Prot	c0.08			0.17		0.01	c0.19
v/s Ratio Perm							
v/c Ratio	0.54			0.31		0.72	0.28
Uniform Delay, d1	19.3			6.0		24.2	3.5
Progression Factor	1.00			1.00		1.00	1.00
Incremental Delay, d2	2.1			0.3		55.4	0.2
Delay (s)	21.3			6.2		79.6	3.7
Level of Service	C			A		E	A
Approach Delay (s)	21.3			6.2			5.5
Approach LOS	C			A			A

Intersection Summary			
HCM 2000 Control Delay	7.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Existing to No Build			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	757	273	302	480	85	186	695	235	70	852	118
Future Volume (vph)	118	757	273	302	480	85	186	695	235	70	852	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3460		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3460		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	128	823	297	328	522	92	202	755	255	76	926	128
RTOR Reduction (vph)	0	0	144	0	18	0	0	0	161	0	0	90
Lane Group Flow (vph)	128	823	153	328	596	0	202	755	94	76	926	38
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	8.5	19.6	19.6	8.6	19.7		10.5	29.7	29.7	5.0	24.2	24.2
Effective Green, g (s)	8.5	19.6	19.6	8.6	19.7		10.5	29.7	29.7	5.0	24.2	24.2
Actuated g/C Ratio	0.11	0.24	0.24	0.11	0.24		0.13	0.37	0.37	0.06	0.30	0.30
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	185	857	383	364	842		229	1299	581	109	1058	473
v/s Ratio Prot	0.07	c0.23		c0.10	0.17		c0.11	0.21		0.04	c0.26	
v/s Ratio Perm			0.10						0.06			0.02
v/c Ratio	0.69	0.96	0.40	0.90	0.71		0.88	0.58	0.16	0.70	0.88	0.08
Uniform Delay, d1	34.9	30.3	25.7	35.7	28.0		34.6	20.6	17.2	37.2	26.9	20.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.6	21.6	0.7	24.4	2.7		30.3	1.9	0.6	17.6	10.1	0.3
Delay (s)	45.6	51.8	26.4	60.2	30.7		64.9	22.5	17.8	54.9	37.0	20.7
Level of Service	D	D	C	E	C		E	C	B	D	D	C
Approach Delay (s)		45.1			41.0			28.6			36.4	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	37.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	80.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Volume (veh/h)	8	9	11	14	18	6	19	278	11	14	156	3
Future Volume (Veh/h)	8	9	11	14	18	6	19	278	11	14	156	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	10	12	15	20	7	21	302	12	15	170	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											647	
pX, platoon unblocked												
vC, conflicting volume	568	558	172	568	553	308	173			314		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	568	558	172	568	553	308	173			314		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	98	99	96	95	99	99			99		
cM capacity (veh/h)	405	427	872	411	429	732	1404			1246		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	31	42	335	188
Volume Left	9	15	21	15
Volume Right	12	7	12	3
cSH	522	453	1404	1246
Volume to Capacity	0.06	0.09	0.01	0.01
Queue Length 95th (ft)	5	8	1	1
Control Delay (s)	12.3	13.8	0.6	0.7
Lane LOS	B	B	A	A
Approach Delay (s)	12.3	13.8	0.6	0.7
Approach LOS	B	B		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	30.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	8	35	30	8	22	17	398	14	17	440	2
Future Volume (Veh/h)	8	8	35	30	8	22	17	398	14	17	440	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	9	38	33	9	24	18	433	15	18	478	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											650	
pX, platoon unblocked	0.92	0.92	0.92	0.92	0.92		0.92					
vC, conflicting volume	796	999	479	1034	992	224	480			448		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	736	957	393	995	950	224	394			448		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	96	93	80	96	97	98			98		
cM capacity (veh/h)	259	229	559	162	231	779	1071			1109		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	56	66	234	232	498
Volume Left	9	33	18	0	18
Volume Right	38	24	0	15	2
cSH	394	241	1071	1700	1109
Volume to Capacity	0.14	0.27	0.02	0.14	0.02
Queue Length 95th (ft)	12	27	1	0	1
Control Delay (s)	15.6	25.5	0.8	0.0	0.5
Lane LOS	C	D	A		A
Approach Delay (s)	15.6	25.5	0.4		0.5
Approach LOS	C	D			

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	0	591	19	1	609
Future Volume (Veh/h)	7	0	591	19	1	609
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	0	642	21	1	662
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			None
Median storage veh)			2			
Upstream signal (ft)			430			
pX, platoon unblocked	0.87	0.87			0.87	
vC, conflicting volume	986	332			663	
vC1, stage 1 conf vol	652					
vC2, stage 2 conf vol	333					
vCu, unblocked vol	692	0			322	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	535	946			1077	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	8	428	235	222	441
Volume Left	8	0	0	1	0
Volume Right	0	0	21	0	0
cSH	535	1700	1700	1077	1700
Volume to Capacity	0.01	0.25	0.14	0.00	0.26
Queue Length 95th (ft)	1	0	0	0	0
Control Delay (s)	11.8	0.0	0.0	0.0	0.0
Lane LOS	B			A	
Approach Delay (s)	11.8	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	27.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Volume (veh/h)	88	5	1	521	490	0
Future Volume (Veh/h)	88	5	1	521	490	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	96	5	1	566	533	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	818	266	533			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	818	266	533			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	69	99	100			
cM capacity (veh/h)	314	732	1031			

Direction, Lane #	WB 1	WB 2	SE 1	SE 2	SE 3	NW 1	NW 2
Volume Total	96	5	1	283	283	266	266
Volume Left	96	0	1	0	0	0	0
Volume Right	0	5	0	0	0	0	0
cSH	314	732	1031	1700	1700	1700	1700
Volume to Capacity	0.31	0.01	0.00	0.17	0.17	0.16	0.16
Queue Length 95th (ft)	32	1	0	0	0	0	0
Control Delay (s)	21.5	10.0	8.5	0.0	0.0	0.0	0.0
Lane LOS	C	A	A				
Approach Delay (s)	20.9		0.0			0.0	
Approach LOS	C						

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	25.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1	0	23	5	3	0	206	53	1	65	0
Future Volume (Veh/h)	0	1	0	23	5	3	0	206	53	1	65	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	0	25	5	3	0	224	58	1	71	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	332	355	71	326	326	253	71			282		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	332	355	71	326	326	253	71			282		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	96	99	100	100			100		
cM capacity (veh/h)	615	570	991	625	592	786	1529			1280		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	1	33	282	72
Volume Left	0	25	0	1
Volume Right	0	3	58	0
cSH	570	632	1700	1280
Volume to Capacity	0.00	0.05	0.17	0.00
Queue Length 95th (ft)	0	4	0	0
Control Delay (s)	11.3	11.0	0.0	0.1
Lane LOS	B	B		A
Approach Delay (s)	11.3	11.0	0.0	0.1
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	29.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	761	42	33	563	28	50
Future Volume (Veh/h)	761	42	33	563	28	50
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	827	46	36	612	30	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				647		
pX, platoon unblocked					0.81	
vC, conflicting volume			873		1534	850
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			873		1542	850
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		69	85
cM capacity (veh/h)			773		98	360

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	873	648	84
Volume Left	0	36	30
Volume Right	46	0	54
cSH	1700	773	185
Volume to Capacity	0.51	0.05	0.45
Queue Length 95th (ft)	0	4	53
Control Delay (s)	0.0	1.2	39.8
Lane LOS		A	E
Approach Delay (s)	0.0	1.2	39.8
Approach LOS			E

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Volume (vph)	38	738	31	8	561	18	19	18	15	10	9	15
Future Volume (vph)	38	738	31	8	561	18	19	18	15	10	9	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			1.00			0.96			0.94	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		1849			1854			1760			1728	
Flt Permitted		0.96			0.99			0.87			0.89	
Satd. Flow (perm)		1776			1834			1555			1568	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	802	34	9	610	20	21	20	16	11	10	16
RTOR Reduction (vph)	0	2	0	0	1	0	0	14	0	0	14	0
Lane Group Flow (vph)	0	875	0	0	638	0	0	43	0	0	23	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		27.9			27.9			6.8			6.8	
Effective Green, g (s)		27.9			27.9			6.8			6.8	
Actuated g/C Ratio		0.64			0.64			0.16			0.16	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1133			1170			241			243	
v/s Ratio Prot												
v/s Ratio Perm		c0.49			0.35			c0.03			0.01	
v/c Ratio		0.77			0.54			0.18			0.10	
Uniform Delay, d1		5.6			4.4			16.0			15.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		3.3			0.5			0.4			0.2	
Delay (s)		9.0			4.9			16.4			16.0	
Level of Service		A			A			B			B	
Approach Delay (s)		9.0			4.9			16.4			16.0	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	7.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	43.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	211	577	150	89	313	121	290	651	227	269	428	222
Future Volume (vph)	211	577	150	89	313	121	290	651	227	269	428	222
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.97		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3430		1770	3391		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3430		1770	3391		3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	229	627	163	97	340	132	315	708	247	292	465	241
RTOR Reduction (vph)	0	32	0	0	60	0	0	0	164	0	0	174
Lane Group Flow (vph)	229	758	0	97	412	0	315	708	83	292	465	67
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	6.5	19.2		4.3	17.0		8.5	19.3	19.3	8.3	19.1	19.1
Effective Green, g (s)	6.5	19.2		4.3	17.0		8.5	19.3	19.3	8.3	19.1	19.1
Actuated g/C Ratio	0.09	0.28		0.06	0.25		0.12	0.28	0.28	0.12	0.28	0.28
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	322	953		110	834		422	988	442	412	978	437
v/s Ratio Prot	c0.07	c0.22		0.05	0.12		c0.09	c0.20		0.09	0.13	
v/s Ratio Perm									0.05			0.04
v/c Ratio	0.71	0.79		0.88	0.49		0.75	0.72	0.19	0.71	0.48	0.15
Uniform Delay, d1	30.4	23.1		32.1	22.4		29.3	22.4	18.9	29.2	20.8	18.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.2	4.6		50.6	0.5		7.0	4.5	0.9	5.5	1.7	0.7
Delay (s)	37.6	27.8		82.7	22.8		36.3	26.9	19.9	34.7	22.5	19.6
Level of Service	D	C		F	C		D	C	B	C	C	B
Approach Delay (s)		30.0			33.0			27.9			25.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	69.1	Sum of lost time (s)	18.0
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1257	203	179	905	373	160	0	115	296	123	187
Future Volume (vph)	0	1257	203	179	905	373	160	0	115	296	123	187
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		4.5	4.5		4.5		4.5	4.5	4.5	4.5
Lane Util. Factor		0.91		1.00	0.91		0.97		1.00	0.95	0.95	1.00
Frt		0.98		1.00	0.96		1.00		0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.98	1.00
Satd. Flow (prot)		4979		1770	4863		3433		1583	1681	1733	1583
Flt Permitted		1.00		0.95	1.00		0.14		1.00	0.95	0.98	1.00
Satd. Flow (perm)		4979		1770	4863		516		1583	1681	1733	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1366	221	195	984	405	174	0	125	322	134	203
RTOR Reduction (vph)	0	22	0	0	74	0	0	0	90	0	0	169
Lane Group Flow (vph)	0	1565	0	195	1315	0	174	0	35	225	231	34
Turn Type		NA		Prot	NA		Perm		Perm	Split	NA	Perm
Protected Phases		4		3	8					6	6	
Permitted Phases							2		2			6
Actuated Green, G (s)		26.5		9.5	40.5		28.0		28.0	16.6	16.6	16.6
Effective Green, g (s)		26.5		9.5	40.5		28.0		28.0	16.6	16.6	16.6
Actuated g/C Ratio		0.27		0.10	0.41		0.28		0.28	0.17	0.17	0.17
Clearance Time (s)		4.5		4.5	4.5		4.5		4.5	4.5	4.5	4.5
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		1338		170	1997		146		449	283	291	266
v/s Ratio Prot		c0.31		c0.11	0.27					c0.13	0.13	
v/s Ratio Perm							c0.34		0.02			0.02
v/c Ratio		1.17		1.15	0.66		1.19		0.08	0.80	0.79	0.13
Uniform Delay, d1		36.0		44.5	23.5		35.3		25.9	39.4	39.4	34.9
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		84.7		114.1	0.8		135.2		0.3	14.2	13.8	0.2
Delay (s)		120.8		158.6	24.3		170.5		26.2	53.6	53.2	35.1
Level of Service		F		F	C		F		C	D	D	D
Approach Delay (s)		120.8			40.8			110.2			47.7	
Approach LOS		F			D			F			D	

Intersection Summary			
HCM 2000 Control Delay	77.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	433	741	328	227	695	58	386	353	150	85	117	390
Future Volume (vph)	433	741	328	227	695	58	386	353	150	85	117	390
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	4.5
Lane Util. Factor	0.97	0.91		1.00	0.91			0.95		1.00	0.95	1.00
Frt	1.00	0.95		1.00	0.99			0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98		0.95	1.00	1.00
Satd. Flow (prot)	3433	4851		1770	5027			3376		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.58		0.95	1.00	1.00
Satd. Flow (perm)	3433	4851		1770	5027			2007		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	471	805	357	247	755	63	420	384	163	92	127	424
RTOR Reduction (vph)	0	57	0	0	7	0	0	12	0	0	0	328
Lane Group Flow (vph)	471	1105	0	247	811	0	0	955	0	92	127	96
Turn Type	Prot	NA		Prot	NA		Perm	NA		Split	NA	Perm
Protected Phases	7	4		3	8			2		6	6	
Permitted Phases							2					6
Actuated Green, G (s)	20.4	27.5		17.5	24.6			59.1		13.9	13.9	13.9
Effective Green, g (s)	20.4	27.5		17.5	24.6			59.1		13.9	13.9	13.9
Actuated g/C Ratio	0.15	0.20		0.13	0.18			0.43		0.10	0.10	0.10
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	514	980		227	909			872		180	361	161
v/s Ratio Prot	0.14	c0.23		c0.14	0.16					0.05	0.04	
v/s Ratio Perm								c0.48				c0.06
v/c Ratio	0.92	1.13		1.09	0.89			6.36dl		0.51	0.35	0.60
Uniform Delay, d1	57.0	54.2		59.2	54.4			38.5		57.8	56.9	58.4
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	21.1	70.7		85.2	11.0			59.9		2.4	0.6	5.9
Delay (s)	78.0	125.0		144.5	65.5			98.3		60.3	57.4	64.2
Level of Service	E	F		F	E			F		E	E	E
Approach Delay (s)		111.4			83.8			98.3			62.3	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM 2000 Control Delay	94.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	136.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	61	91	8	70	1	80	1	19	0	6	4
Future Volume (vph)	7	61	91	8	70	1	80	1	19	0	6	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	66	99	9	76	1	87	1	21	0	7	4

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	173	86	109	11
Volume Left (vph)	8	9	87	0
Volume Right (vph)	99	1	21	4
Hadj (s)	-0.30	0.05	0.08	-0.18
Departure Headway (s)	4.0	4.4	4.6	4.4
Degree Utilization, x	0.19	0.11	0.14	0.01
Capacity (veh/h)	873	777	746	752
Control Delay (s)	7.9	7.9	8.3	7.5
Approach Delay (s)	7.9	7.9	8.3	7.5
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.0		
Level of Service	A		
Intersection Capacity Utilization	29.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	25	4	159	20	6	135
Future Volume (Veh/h)	25	4	159	20	6	135
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	4	173	22	7	147
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			749			
pX, platoon unblocked						
vC, conflicting volume	345	184			195	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	345	184			195	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	100			99	
cM capacity (veh/h)	648	858			1378	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	31	195	154
Volume Left	27	0	7
Volume Right	4	22	0
cSH	669	1700	1378
Volume to Capacity	0.05	0.11	0.01
Queue Length 95th (ft)	4	0	0
Control Delay (s)	10.6	0.0	0.4
Lane LOS	B		A
Approach Delay (s)	10.6	0.0	0.4
Approach LOS	B		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	22.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	535	13	61	528	23	26	47	223	86	38	104
Future Volume (vph)	88	535	13	61	528	23	26	47	223	86	38	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.90			0.94	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.98	
Satd. Flow (prot)	1770	3527		1770	3517			1666			1715	
Flt Permitted	0.35	1.00		0.35	1.00			0.96			0.79	
Satd. Flow (perm)	645	3527		649	3517			1614			1382	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	582	14	66	574	25	28	51	242	93	41	113
RTOR Reduction (vph)	0	3	0	0	6	0	0	88	0	0	43	0
Lane Group Flow (vph)	96	593	0	66	593	0	0	233	0	0	204	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.4	15.4		15.4	15.4			25.7			25.7	
Effective Green, g (s)	15.4	15.4		15.4	15.4			25.7			25.7	
Actuated g/C Ratio	0.31	0.31		0.31	0.31			0.51			0.51	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	198	1084		199	1081			827			708	
v/s Ratio Prot		0.17			c0.17							
v/s Ratio Perm	0.15			0.10				0.14			c0.15	
v/c Ratio	0.48	0.55		0.33	0.55			0.28			0.29	
Uniform Delay, d1	14.1	14.4		13.4	14.5			6.9			7.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.9	0.6		1.0	0.6			0.9			1.0	
Delay (s)	16.0	15.0		14.4	15.0			7.8			8.0	
Level of Service	B	B		B	B			A			A	
Approach Delay (s)		15.1			15.0			7.8			8.0	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	50.1	Sum of lost time (s)	9.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	759	123	263	754	26	89	92	321	24	61	11
Future Volume (vph)	54	759	123	263	754	26	89	92	321	24	61	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4979		1770	5060		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.71	1.00	1.00	0.69	1.00	1.00
Satd. Flow (perm)	1770	4979		1770	5060		1330	1863	1583	1290	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	825	134	286	820	28	97	100	349	26	66	12
RTOR Reduction (vph)	0	37	0	0	5	0	0	0	212	0	0	8
Lane Group Flow (vph)	59	922	0	286	843	0	97	100	137	26	66	4
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)	3.7	18.7		10.5	25.5		18.0	18.0	18.0	18.0	18.0	18.0
Effective Green, g (s)	3.7	18.7		10.5	25.5		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.06	0.31		0.17	0.42		0.30	0.30	0.30	0.30	0.30	0.30
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	107	1533		306	2125		394	552	469	382	552	469
v/s Ratio Prot	0.03	c0.19		c0.16	0.17			0.05			0.04	
v/s Ratio Perm							0.07		c0.09	0.02		0.00
v/c Ratio	0.55	0.60		0.93	0.40		0.25	0.18	0.29	0.07	0.12	0.01
Uniform Delay, d1	27.7	17.8		24.8	12.2		16.2	15.9	16.4	15.3	15.6	15.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.0	0.7		34.4	0.1		1.5	0.7	1.6	0.3	0.4	0.0
Delay (s)	33.7	18.5		59.2	12.4		17.7	16.6	18.0	15.7	16.0	15.1
Level of Service	C	B		E	B		B	B	B	B	B	B
Approach Delay (s)		19.4			24.2			17.7			15.8	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	60.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	74	11	2	68	14	6
Future Volume (Veh/h)	74	11	2	68	14	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	80	12	2	74	15	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			92		164	86
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			92		164	86
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	99
cM capacity (veh/h)			1503		826	973

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	92	76	22
Volume Left	0	2	15
Volume Right	12	0	7
cSH	1700	1503	867
Volume to Capacity	0.05	0.00	0.03
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.2	9.3
Lane LOS		A	A
Approach Delay (s)	0.0	0.2	9.3
Approach LOS			A

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	15.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	13	4	5	15	5	8	5	4	4	4	5
Future Volume (Veh/h)	4	13	4	5	15	5	8	5	4	4	4	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	14	4	5	16	5	9	5	4	4	4	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	52	42	6	50	42	7	9			9		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	52	42	6	50	42	7	9			9		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	100	99	98	100	99			100		
cM capacity (veh/h)	923	844	1076	928	843	1075	1611			1611		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	22	26	18	13
Volume Left	4	5	9	4
Volume Right	4	5	4	5
cSH	893	896	1611	1611
Volume to Capacity	0.02	0.03	0.01	0.00
Queue Length 95th (ft)	2	2	0	0
Control Delay (s)	9.1	9.1	3.6	2.2
Lane LOS	A	A	A	A
Approach Delay (s)	9.1	9.1	3.6	2.2
Approach LOS	A	A		

Intersection Summary			
Average Delay	6.8		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	793	23	31	569	19	14	2	35	2	6	12
Future Volume (Veh/h)	17	793	23	31	569	19	14	2	35	2	6	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	862	25	34	618	21	15	2	38	2	7	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)		661			663							
pX, platoon unblocked	0.98			0.91			0.92	0.92	0.91	0.92	0.92	0.98
vC, conflicting volume	639			887			1304	1618	444	1202	1620	320
vC1, stage 1 conf vol							910	910		696	696	
vC2, stage 2 conf vol							394	707		506	923	
vCu, unblocked vol	589			667			1047	1389	178	936	1392	263
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			96			95	99	95	99	98	98
cM capacity (veh/h)	962			832			320	302	756	356	291	720

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	18	575	312	34	412	227	55	22
Volume Left	18	0	0	34	0	0	15	2
Volume Right	0	0	25	0	0	21	38	13
cSH	962	1700	1700	832	1700	1700	530	461
Volume to Capacity	0.02	0.34	0.18	0.04	0.24	0.13	0.10	0.05
Queue Length 95th (ft)	1	0	0	3	0	0	9	4
Control Delay (s)	8.8	0.0	0.0	9.5	0.0	0.0	12.6	13.2
Lane LOS	A			A			B	B
Approach Delay (s)	0.2			0.5			12.6	13.2
Approach LOS							B	B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	38.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	17	4	18	27	16	8	92	16	5	52	2
Future Volume (Veh/h)	1	17	4	18	27	16	8	92	16	5	52	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	18	4	20	29	17	9	100	17	5	57	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	46			22			130	108	20	166	102	38
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	46			22			130	108	20	166	102	38
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	87	98	99	93	100
cM capacity (veh/h)	1562			1593			786	772	1058	700	778	1035

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	23	66	126	64
Volume Left	1	20	9	5
Volume Right	4	17	17	2
cSH	1562	1593	802	777
Volume to Capacity	0.00	0.01	0.16	0.08
Queue Length 95th (ft)	0	1	14	7
Control Delay (s)	0.3	2.3	10.3	10.0
Lane LOS	A	A	B	B
Approach Delay (s)	0.3	2.3	10.3	10.0
Approach LOS			B	B

Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	24.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	746	24	48	540	65	19	57	80	12	18	56
Future Volume (vph)	50	746	24	48	540	65	19	57	80	12	18	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.98			0.93			0.91	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	3523		1770	3482			1723			1688	
Flt Permitted	0.95	1.00		0.95	1.00			0.95			0.94	
Satd. Flow (perm)	1770	3523		1770	3482			1647			1593	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	811	26	52	587	71	21	62	87	13	20	61
RTOR Reduction (vph)	0	4	0	0	14	0	0	69	0	0	48	0
Lane Group Flow (vph)	54	833	0	52	644	0	0	101	0	0	46	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	1.8	16.4		1.8	16.4			8.3			8.3	
Effective Green, g (s)	1.8	16.4		1.8	16.4			8.3			8.3	
Actuated g/C Ratio	0.05	0.41		0.05	0.41			0.21			0.21	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	79	1444		79	1427			341			330	
v/s Ratio Prot	c0.03	c0.24		0.03	0.18							
v/s Ratio Perm								c0.06			0.03	
v/c Ratio	0.68	0.58		0.66	0.45			0.30			0.14	
Uniform Delay, d1	18.8	9.1		18.8	8.5			13.4			12.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	21.7	0.6		18.1	0.2			0.5			0.2	
Delay (s)	40.5	9.7		36.9	8.8			13.9			13.1	
Level of Service	D	A		D	A			B			B	
Approach Delay (s)		11.6			10.8			13.9			13.1	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (veh/h)	7	25	6	3	43	6	1	66	5	1	36	6
Future Volume (Veh/h)	7	25	6	3	43	6	1	66	5	1	36	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	27	7	3	47	7	1	72	5	1	39	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	152	124	42	142	124	74	46			77		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	152	124	42	142	124	74	46			77		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	96	99	100	94	99	100			100		
cM capacity (veh/h)	771	766	1028	800	765	987	1562			1522		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	42	57	78	47
Volume Left	8	3	1	1
Volume Right	7	7	5	7
cSH	801	789	1562	1522
Volume to Capacity	0.05	0.07	0.00	0.00
Queue Length 95th (ft)	4	6	0	0
Control Delay (s)	9.7	9.9	0.1	0.2
Lane LOS	A	A	A	A
Approach Delay (s)	9.7	9.9	0.1	0.2
Approach LOS	A	A		

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	15.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	72	772	16	18	600	77	12	12	16	20	4	62
Future Volume (vph)	72	772	16	18	600	77	12	12	16	20	4	62
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	78	839	17	20	652	84	13	13	17	22	4	67

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	78	856	20	736	43	93
Volume Left (vph)	78	0	20	0	13	22
Volume Right (vph)	0	17	0	84	17	67
Hadj (s)	0.53	0.02	0.53	-0.05	-0.14	-0.35
Departure Headway (s)	6.2	5.7	6.3	5.7	7.2	6.8
Degree Utilization, x	0.13	1.35	0.04	1.17	0.09	0.18
Capacity (veh/h)	575	635	561	635	482	512
Control Delay (s)	9.0	186.6	8.3	112.9	10.9	11.3
Approach Delay (s)	171.7		110.1		10.9	11.3
Approach LOS	F		F		B	B

Intersection Summary			
Delay	134.3		
Level of Service	F		
Intersection Capacity Utilization	61.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	21	17	6	13	16	40	651	2	14	528	4
Future Volume (Veh/h)	6	21	17	6	13	16	40	651	2	14	528	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	23	18	7	14	17	43	708	2	15	574	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								744				
pX, platoon unblocked	0.81	0.81		0.81	0.81	0.81				0.81		
vC, conflicting volume	1424	1402	576	1428	1403	709	578			710		
vC1, stage 1 conf vol	606	606		795	795							
vC2, stage 2 conf vol	818	796		634	608							
vCu, unblocked vol	1407	1380	576	1412	1381	528	578			529		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	92	97	97	95	96	96			98		
cM capacity (veh/h)	264	295	517	268	294	448	996			845		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	48	38	43	710	15	578
Volume Left	7	7	43	0	15	0
Volume Right	18	17	0	2	0	4
cSH	345	340	996	1700	845	1700
Volume to Capacity	0.14	0.11	0.04	0.42	0.02	0.34
Queue Length 95th (ft)	12	9	3	0	1	0
Control Delay (s)	17.1	16.9	8.8	0.0	9.3	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	17.1	16.9	0.5		0.2	
Approach LOS	C	C				

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	640	47	79	409	135	152	407	135	217	222	110
Future Volume (vph)	95	640	47	79	409	135	152	407	135	217	222	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.96		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1793		1770	3407		1770	1770	
Flt Permitted	0.20	1.00	1.00	0.12	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	369	1863	1583	230	1793		1770	3407		1770	1770	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	696	51	86	445	147	165	442	147	236	241	120
RTOR Reduction (vph)	0	0	30	0	15	0	0	40	0	0	22	0
Lane Group Flow (vph)	103	696	21	86	577	0	165	549	0	236	339	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	32.4	32.4	32.4	32.4	32.4		8.7	19.9		12.2	23.4	
Effective Green, g (s)	32.4	32.4	32.4	32.4	32.4		8.7	19.9		12.2	23.4	
Actuated g/C Ratio	0.42	0.42	0.42	0.42	0.42		0.11	0.26		0.16	0.30	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	153	773	657	95	744		197	869		276	531	
v/s Ratio Prot		0.37			0.32		0.09	0.16		c0.13	c0.19	
v/s Ratio Perm	0.28		0.01	c0.37								
v/c Ratio	0.67	0.90	0.03	0.91	0.78		0.84	0.63		0.86	0.64	
Uniform Delay, d1	18.5	21.3	13.5	21.4	19.7		34.0	25.8		32.0	23.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.1	13.6	0.0	62.0	5.1		25.4	3.5		21.9	5.8	
Delay (s)	29.6	34.9	13.5	83.3	24.7		59.4	29.3		53.9	29.4	
Level of Service	C	C	B	F	C		E	C		D	C	
Approach Delay (s)		32.9			32.2			35.9			39.1	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	34.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	80.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	238	1095	140	219	977	99	162	264	197	88	223	104
Future Volume (vph)	238	1095	140	219	977	99	162	264	197	88	223	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4999		1770	5015		1770	1863	1583	1770	3370	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	4999		1770	5015		1770	1863	1583	1770	3370	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	259	1190	152	238	1062	108	176	287	214	96	242	113
RTOR Reduction (vph)	0	18	0	0	13	0	0	0	151	0	60	0
Lane Group Flow (vph)	259	1324	0	238	1157	0	176	287	63	96	295	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	15.0	25.5		14.0	24.5		11.1	26.4	26.4	6.1	21.4	
Effective Green, g (s)	15.0	25.5		14.0	24.5		11.1	26.4	26.4	6.1	21.4	
Actuated g/C Ratio	0.17	0.28		0.16	0.27		0.12	0.29	0.29	0.07	0.24	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	295	1416		275	1365		218	546	464	119	801	
v/s Ratio Prot	c0.15	c0.26		0.13	0.23		c0.10	c0.15		0.05	0.09	
v/s Ratio Perm									0.04			
v/c Ratio	0.88	0.94		0.87	0.85		0.81	0.53	0.14	0.81	0.37	
Uniform Delay, d1	36.6	31.4		37.1	31.0		38.4	26.6	23.4	41.4	28.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	24.1	11.6		23.5	5.1		19.3	3.6	0.6	31.5	1.3	
Delay (s)	60.8	43.1		60.6	36.1		57.7	30.2	24.0	72.9	30.0	
Level of Service	E	D		E	D		E	C	C	E	C	
Approach Delay (s)		45.9			40.2			35.4			39.1	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	41.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	745	31	58	445	73	117	201	335	109	95	92
Future Volume (vph)	116	745	31	58	445	73	117	201	335	109	95	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.91		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3518		1770	3465		1770	1688		1770	1725	
Flt Permitted	0.37	1.00		0.21	1.00		0.63	1.00		0.31	1.00	
Satd. Flow (perm)	690	3518		384	3465		1174	1688		575	1725	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	126	810	34	63	484	79	127	218	364	118	103	100
RTOR Reduction (vph)	0	5	0	0	23	0	0	26	0	0	49	0
Lane Group Flow (vph)	126	839	0	63	540	0	127	556	0	118	154	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.4	19.4		19.4	19.4		29.6	29.6		29.6	29.6	
Effective Green, g (s)	19.4	19.4		19.4	19.4		29.6	29.6		29.6	29.6	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	230	1176		128	1158		599	861		293	880	
v/s Ratio Prot		c0.24			0.16			c0.33			0.09	
v/s Ratio Perm	0.18			0.16			0.11			0.21		
v/c Ratio	0.55	0.71		0.49	0.47		0.21	0.65		0.40	0.18	
Uniform Delay, d1	15.7	16.9		15.4	15.2		7.8	10.4		8.8	7.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.7	2.1		3.0	0.3		0.8	3.7		4.1	0.4	
Delay (s)	18.4	18.9		18.3	15.5		8.6	14.1		12.8	8.1	
Level of Service	B	B		B	B		A	B		B	A	
Approach Delay (s)		18.9			15.8			13.1			9.8	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	58.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	264	1145	82	18	842	43	82	56	20	21	61	150
Future Volume (vph)	264	1145	82	18	842	43	82	56	20	21	61	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.98			0.91	
Flt Protected	0.95	1.00		0.95	1.00			0.97			1.00	
Satd. Flow (prot)	1770	5034		1770	5048			1784			1692	
Flt Permitted	0.95	1.00		0.95	1.00			0.70			0.96	
Satd. Flow (perm)	1770	5034		1770	5048			1286			1640	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	287	1245	89	20	915	47	89	61	22	23	66	163
RTOR Reduction (vph)	0	11	0	0	9	0	0	9	0	0	112	0
Lane Group Flow (vph)	287	1323	0	20	953	0	0	163	0	0	140	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	10.5	30.1		1.0	20.6			18.0			18.0	
Effective Green, g (s)	10.5	30.1		1.0	20.6			18.0			18.0	
Actuated g/C Ratio	0.17	0.48		0.02	0.33			0.29			0.29	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	296	2420		28	1661			369			471	
v/s Ratio Prot	c0.16	c0.26		0.01	0.19							
v/s Ratio Perm								c0.13			0.09	
v/c Ratio	0.97	0.55		0.71	0.57			0.44			0.30	
Uniform Delay, d1	25.9	11.4		30.7	17.4			18.2			17.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	43.5	0.3		60.5	0.5			3.8			1.6	
Delay (s)	69.4	11.7		91.2	17.9			22.0			19.0	
Level of Service	E	B		F	B			C			B	
Approach Delay (s)		21.9			19.3			22.0			19.0	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	20.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	62.6	Sum of lost time (s)	13.5
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	191	776	124	32	325	95	51	267	85	128	221	85
Future Volume (vph)	191	776	124	32	325	95	51	267	85	128	221	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3466		1770	3419		1770	3411		1770	3392	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3466		1770	3419		1770	3411		1770	3392	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	208	843	135	35	353	103	55	290	92	139	240	92
RTOR Reduction (vph)	0	16	0	0	34	0	0	36	0	0	47	0
Lane Group Flow (vph)	208	962	0	35	422	0	55	346	0	139	285	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	12.6	26.9		2.8	17.1		3.7	21.3		7.7	25.3	
Effective Green, g (s)	12.6	26.9		2.8	17.1		3.7	21.3		7.7	25.3	
Actuated g/C Ratio	0.16	0.35		0.04	0.22		0.05	0.28		0.10	0.33	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	290	1215		64	762		85	947		177	1118	
v/s Ratio Prot	c0.12	c0.28		0.02	0.12		0.03	c0.10		c0.08	c0.08	
v/s Ratio Perm												
v/c Ratio	0.72	0.79		0.55	0.55		0.65	0.37		0.79	0.25	
Uniform Delay, d1	30.4	22.4		36.3	26.4		35.9	22.3		33.7	18.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.2	3.6		9.2	0.9		15.7	1.1		20.1	0.6	
Delay (s)	38.6	26.0		45.5	27.3		51.5	23.4		53.8	19.4	
Level of Service	D	C		D	C		D	C		D	B	
Approach Delay (s)		28.2			28.6			26.9			29.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	76.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	290	873	71	41	679	162	26	41	30	137	48	223
Future Volume (vph)	290	873	71	41	679	162	26	41	30	137	48	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5028		1770	5085	1583	1770	1745		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.72	1.00		0.71	1.00	1.00
Satd. Flow (perm)	1770	5028		1770	5085	1583	1347	1745		1316	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	315	949	77	45	738	176	28	45	33	149	52	242
RTOR Reduction (vph)	0	14	0	0	0	123	0	23	0	0	0	170
Lane Group Flow (vph)	315	1012	0	45	738	53	28	55	0	149	52	72
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		6
Actuated Green, G (s)	10.5	26.5		2.2	18.2	18.2	18.0	18.0		18.0	18.0	18.0
Effective Green, g (s)	10.5	26.5		2.2	18.2	18.2	18.0	18.0		18.0	18.0	18.0
Actuated g/C Ratio	0.17	0.44		0.04	0.30	0.30	0.30	0.30		0.30	0.30	0.30
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	308	2213		64	1537	478	402	521		393	557	473
v/s Ratio Prot	c0.18	c0.20		0.03	0.15			0.03			0.03	
v/s Ratio Perm						0.03	0.02			c0.11		0.05
v/c Ratio	1.02	0.46		0.70	0.48	0.11	0.07	0.11		0.38	0.09	0.15
Uniform Delay, d1	24.9	11.8		28.7	17.1	15.2	15.1	15.3		16.7	15.2	15.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	57.2	0.2		29.5	0.2	0.1	0.3	0.4		2.8	0.3	0.7
Delay (s)	82.1	12.0		58.1	17.4	15.3	15.4	15.7		19.5	15.5	16.2
Level of Service	F	B		E	B	B	B	B		B	B	B
Approach Delay (s)		28.4			18.9			15.6			17.2	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	23.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	60.2	Sum of lost time (s)	13.5
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	5	55	10	10	25	15	609	15	15	599	15
Future Volume (Veh/h)	45	5	55	10	10	25	15	609	15	15	599	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	49	5	60	11	11	27	16	662	16	16	651	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								380				
pX, platoon unblocked	0.89	0.89		0.89	0.89	0.89				0.89		
vC, conflicting volume	1086	1401	659	1448	1401	339	667			678		
vC1, stage 1 conf vol	691	691		702	702							
vC2, stage 2 conf vol	396	710		746	699							
vCu, unblocked vol	853	1205	659	1258	1205	14	667			394		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	87	99	85	96	97	97	98			98		
cM capacity (veh/h)	371	352	406	259	348	947	919			1035		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	114	49	16	441	237	16	667
Volume Left	49	11	16	0	0	16	0
Volume Right	60	27	0	0	16	0	16
cSH	388	478	919	1700	1700	1035	1700
Volume to Capacity	0.29	0.10	0.02	0.26	0.14	0.02	0.39
Queue Length 95th (ft)	30	9	1	0	0	1	0
Control Delay (s)	18.1	13.4	9.0	0.0	0.0	8.5	0.0
Lane LOS	C	B	A			A	
Approach Delay (s)	18.1	13.4	0.2			0.2	
Approach LOS	C	B					

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	25	15	5	579	404	5
Future Volume (vph)	25	15	5	579	404	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5	4.5	4.5	
Lane Util. Factor	1.00		1.00	0.95	1.00	
Frt	0.95		1.00	1.00	1.00	
Flt Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1715		1770	3539	1860	
Flt Permitted	0.97		0.42	1.00	1.00	
Satd. Flow (perm)	1715		773	3539	1860	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	16	5	629	439	5
RTOR Reduction (vph)	15	0	0	0	0	0
Lane Group Flow (vph)	28	0	5	629	444	0
Turn Type	Prot		pm+pt	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	2.2		30.7	30.7	25.5	
Effective Green, g (s)	2.2		30.7	30.7	25.5	
Actuated g/C Ratio	0.05		0.73	0.73	0.61	
Clearance Time (s)	4.5		4.5	4.5	4.5	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	90		583	2593	1131	
v/s Ratio Prot	c0.02		0.00	c0.18	c0.24	
v/s Ratio Perm			0.01			
v/c Ratio	0.31		0.01	0.24	0.39	
Uniform Delay, d1	19.1		1.8	1.8	4.2	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	2.0		0.0	0.0	0.2	
Delay (s)	21.1		1.9	1.9	4.4	
Level of Service	C		A	A	A	
Approach Delay (s)	21.1			1.9	4.4	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	41.9	Sum of lost time (s)	13.5
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	0	15	5	0	10	20	559	10	10	399	10
Future Volume (vph)	15	0	15	5	0	10	20	559	10	10	399	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	1.00	
Frt		0.93			0.91		1.00	1.00		1.00	1.00	
Flt Protected		0.98			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1695			1664		1770	3530		1770	1856	
Flt Permitted		0.98			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1695			1690		1770	3530		1770	1856	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	0	16	5	0	11	22	608	11	11	434	11
RTOR Reduction (vph)	0	32	0	0	16	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	0	0	0	0	0	22	618	0	11	444	0
Turn Type	Split	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	4	4			8		5	2		1	6	
Permitted Phases				8								
Actuated Green, G (s)		0.7			0.7		0.7	27.3		0.7	27.3	
Effective Green, g (s)		0.7			0.7		0.7	27.3		0.7	27.3	
Actuated g/C Ratio		0.01			0.01		0.01	0.58		0.01	0.58	
Clearance Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		25			24		26	2033		26	1068	
v/s Ratio Prot		c0.00					c0.01	0.18		0.01	c0.24	
v/s Ratio Perm					c0.00							
v/c Ratio		0.02			0.01		0.85	0.30		0.42	0.42	
Uniform Delay, d1		23.0			23.0		23.3	5.2		23.1	5.6	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			0.2		109.6	0.1		10.7	0.3	
Delay (s)		23.3			23.2		132.9	5.3		33.9	5.9	
Level of Service		C			C		F	A		C	A	
Approach Delay (s)		23.3			23.2			9.6			6.5	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	47.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	33.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	3	43	19	6	64	18	567	17	39	336	13
Future Volume (Veh/h)	22	3	43	19	6	64	18	567	17	39	336	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	3	47	21	7	70	20	616	18	42	365	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								1070				
pX, platoon unblocked												
vC, conflicting volume	878	1130	190	980	1128	317	379			634		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	878	1130	190	980	1128	317	379			634		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	98	94	88	96	90	98			96		
cM capacity (veh/h)	202	190	820	181	191	679	1176			945		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	74	98	328	326	224	196
Volume Left	24	21	20	0	42	0
Volume Right	47	70	0	18	0	14
cSH	385	383	1176	1700	945	1700
Volume to Capacity	0.19	0.26	0.02	0.19	0.04	0.12
Queue Length 95th (ft)	18	25	1	0	3	0
Control Delay (s)	16.6	17.6	0.7	0.0	2.0	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	16.6	17.6	0.3		1.1	
Approach LOS	C	C				

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	174	725	10	6	752	272	63	117	72	285	40	91
Future Volume (vph)	174	725	10	6	752	272	63	117	72	285	40	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	1.00	1.00	1.00		0.95	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1770	5075		1770	5085	1583	1770	1863	1583		3309	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.32	1.00	1.00		0.73	
Satd. Flow (perm)	1770	5075		1770	5085	1583	595	1863	1583		2483	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	189	788	11	7	817	296	68	127	78	310	43	99
RTOR Reduction (vph)	0	2	0	0	0	209	0	0	48	0	41	0
Lane Group Flow (vph)	189	797	0	7	817	87	68	127	30	0	411	0
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8	2		2	6		
Actuated Green, G (s)	10.1	28.9		1.1	19.9	19.9	25.6	25.6	25.6		18.4	
Effective Green, g (s)	10.1	28.9		1.1	19.9	19.9	25.6	25.6	25.6		18.4	
Actuated g/C Ratio	0.15	0.43		0.02	0.29	0.29	0.38	0.38	0.38		0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	264	2169		28	1496	466	272	705	599		675	
v/s Ratio Prot	c0.11	0.16		0.00	c0.16		0.01	c0.07				
v/s Ratio Perm						0.06	0.08		0.02		c0.17	
v/c Ratio	0.72	0.37		0.25	0.55	0.19	0.25	0.18	0.05		0.61	
Uniform Delay, d1	27.4	13.1		32.8	20.1	17.8	14.1	14.0	13.3		21.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2	8.9	0.1		4.7	0.4	0.2	0.5	0.6	0.2		1.6	
Delay (s)	36.3	13.2		37.5	20.5	18.0	14.6	14.6	13.5		23.0	
Level of Service	D	B		D	C	B	B	B	B		C	
Approach Delay (s)		17.7			19.9			14.2			23.0	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	67.6	Sum of lost time (s)	16.5
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	63	8	12	91	8	11	70	24	5	17	3
Future Volume (Veh/h)	5	63	8	12	91	8	11	70	24	5	17	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	68	9	13	99	9	12	76	26	5	18	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	108			77			224	216	72	276	216	104
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	108			77			224	216	72	276	216	104
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			98	89	97	99	97	100
cM capacity (veh/h)	1483			1522			708	673	990	596	673	951

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	82	121	114	26
Volume Left	5	13	12	5
Volume Right	9	9	26	3
cSH	1483	1522	730	679
Volume to Capacity	0.00	0.01	0.16	0.04
Queue Length 95th (ft)	0	1	14	3
Control Delay (s)	0.5	0.9	10.8	10.5
Lane LOS	A	A	B	B
Approach Delay (s)	0.5	0.9	10.8	10.5
Approach LOS			B	B

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	22.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	8	6	8	10	1	10	113	19	2	22	7
Future Volume (Veh/h)	3	8	6	8	10	1	10	113	19	2	22	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	9	7	9	11	1	11	123	21	2	24	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								269				
pX, platoon unblocked												
vC, conflicting volume	194	198	28	199	192	134	32			144		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	194	198	28	199	192	134	32			144		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	99	99	98	100	99			100		
cM capacity (veh/h)	751	692	1047	742	698	916	1580			1438		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	19	21	155	34
Volume Left	3	9	11	2
Volume Right	7	1	21	8
cSH	802	725	1580	1438
Volume to Capacity	0.02	0.03	0.01	0.00
Queue Length 95th (ft)	2	2	1	0
Control Delay (s)	9.6	10.1	0.6	0.5
Lane LOS	A	B	A	A
Approach Delay (s)	9.6	10.1	0.6	0.5
Approach LOS	A	B		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	20.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	1136	10	7	874	73	7	2	10	14	0	19
Future Volume (vph)	81	1136	10	7	874	73	7	2	10	14	0	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		1.00			1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.93			0.92	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.98	
Satd. Flow (prot)	1770	5079		1770	5085	1583		1699			1681	
Flt Permitted	0.29	1.00		0.23	1.00	1.00		0.88			0.86	
Satd. Flow (perm)	538	5079		421	5085	1583		1517			1481	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	88	1235	11	8	950	79	8	2	11	15	0	21
RTOR Reduction (vph)	0	1	0	0	0	36	0	9	0	0	22	0
Lane Group Flow (vph)	88	1245	0	8	950	43	0	12	0	0	14	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	17.7	17.7		17.7	17.7	17.7		6.2			6.2	
Effective Green, g (s)	17.7	17.7		17.7	17.7	17.7		6.2			6.2	
Actuated g/C Ratio	0.54	0.54		0.54	0.54	0.54		0.19			0.19	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	289	2732		226	2735	851		285			279	
v/s Ratio Prot		c0.25			0.19							
v/s Ratio Perm	0.16			0.02		0.03		0.01			c0.01	
v/c Ratio	0.30	0.46		0.04	0.35	0.05		0.04			0.05	
Uniform Delay, d1	4.2	4.7		3.6	4.3	3.6		10.9			10.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.6	0.1		0.1	0.1	0.0		0.1			0.1	
Delay (s)	4.8	4.8		3.6	4.4	3.6		11.0			11.0	
Level of Service	A	A		A	A	A		B			B	
Approach Delay (s)		4.8			4.3			11.0			11.0	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	4.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	32.9	Sum of lost time (s)	9.0
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	27	52	58	18	102	47	135	262	26	17	158	68
Future Volume (vph)	27	52	58	18	102	47	135	262	26	17	158	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	57	63	20	111	51	147	285	28	18	172	74

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	149	182	460	264
Volume Left (vph)	29	20	147	18
Volume Right (vph)	63	51	28	74
Hadj (s)	-0.18	-0.11	0.06	-0.12
Departure Headway (s)	6.1	6.1	5.5	5.6
Degree Utilization, x	0.25	0.31	0.70	0.41
Capacity (veh/h)	496	502	633	583
Control Delay (s)	11.2	11.8	20.0	12.4
Approach Delay (s)	11.2	11.8	20.0	12.4
Approach LOS	B	B	C	B

Intersection Summary			
Delay	15.5		
Level of Service	C		
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	38	32	72	309	133	35
Future Volume (Veh/h)	38	32	72	309	133	35
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	41	35	78	336	145	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				259		
pX, platoon unblocked						
vC, conflicting volume	637	145	183			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	637	145	183			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	96	94			
cM capacity (veh/h)	417	902	1392			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	76	78	336	145	38
Volume Left	41	78	0	0	0
Volume Right	35	0	0	0	38
cSH	554	1392	1700	1700	1700
Volume to Capacity	0.14	0.06	0.20	0.09	0.02
Queue Length 95th (ft)	12	4	0	0	0
Control Delay (s)	12.5	7.7	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	12.5	1.5		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	27.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	1079	32	16	910	257	31	25	25	107	23	44
Future Volume (vph)	105	1079	32	16	910	257	31	25	25	107	23	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00		0.96	1.00
Satd. Flow (prot)	1770	5063		1770	5085	1583		1812	1583		1789	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.83	1.00		0.74	1.00
Satd. Flow (perm)	1770	5063		1770	5085	1583		1549	1583		1371	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	114	1173	35	17	989	279	34	27	27	116	25	48
RTOR Reduction (vph)	0	5	0	0	0	203	0	0	18	0	0	32
Lane Group Flow (vph)	114	1203	0	17	989	76	0	61	9	0	141	16
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2		2	6		6
Actuated Green, G (s)	9.9	25.2		1.0	16.3	16.3		20.3	20.3		20.3	20.3
Effective Green, g (s)	9.9	25.2		1.0	16.3	16.3		20.3	20.3		20.3	20.3
Actuated g/C Ratio	0.17	0.42		0.02	0.27	0.27		0.34	0.34		0.34	0.34
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	292	2126		29	1381	430		524	535		463	535
v/s Ratio Prot	c0.06	c0.24		0.01	c0.19							
v/s Ratio Perm						0.05		0.04	0.01		c0.10	0.01
v/c Ratio	0.39	0.57		0.59	0.72	0.18		0.12	0.02		0.30	0.03
Uniform Delay, d1	22.4	13.2		29.3	19.8	16.7		13.7	13.2		14.6	13.3
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.9	1.1		26.8	3.2	0.9		0.5	0.1		1.7	0.1
Delay (s)	23.2	14.3		56.1	23.0	17.6		14.1	13.3		16.3	13.4
Level of Service	C	B		E	C	B		B	B		B	B
Approach Delay (s)		15.1			22.2			13.9			15.6	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	20	48	22	9	47	11	87	228	37	10	132	14
Future Volume (vph)	20	48	22	9	47	11	87	228	37	10	132	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	52	24	10	51	12	95	248	40	11	143	15

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	98	73	383	169
Volume Left (vph)	22	10	95	11
Volume Right (vph)	24	12	40	15
Hadj (s)	-0.07	-0.04	0.02	-0.01
Departure Headway (s)	5.3	5.3	4.6	4.8
Degree Utilization, x	0.14	0.11	0.49	0.23
Capacity (veh/h)	610	596	757	702
Control Delay (s)	9.1	9.0	11.9	9.2
Approach Delay (s)	9.1	9.0	11.9	9.2
Approach LOS	A	A	B	A

Intersection Summary			
Delay	10.6		
Level of Service	B		
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	41	23	32	7	19	8	46	470	16	5	144	22
Future Volume (vph)	41	23	32	7	19	8	46	470	16	5	144	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	45	25	35	8	21	9	50	511	17	5	157	24

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	105	38	578	186
Volume Left (vph)	45	8	50	5
Volume Right (vph)	35	9	17	24
Hadj (s)	-0.08	-0.07	0.03	-0.04
Departure Headway (s)	5.7	5.9	4.6	5.0
Degree Utilization, x	0.17	0.06	0.74	0.26
Capacity (veh/h)	565	538	763	682
Control Delay (s)	9.8	9.3	19.5	9.7
Approach Delay (s)	9.8	9.3	19.5	9.7
Approach LOS	A	A	C	A

Intersection Summary			
Delay	16.0		
Level of Service	C		
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	25	19	519	37	10	161
Future Volume (Veh/h)	25	19	519	37	10	161
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	21	564	40	11	175
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			277			
pX, platoon unblocked	0.93	0.93			0.93	
vC, conflicting volume	781	302			604	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	608	92			417	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	98			99	
cM capacity (veh/h)	392	879			1056	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	48	376	228	186
Volume Left	27	0	0	11
Volume Right	21	0	40	0
cSH	518	1700	1700	1056
Volume to Capacity	0.09	0.22	0.13	0.01
Queue Length 95th (ft)	8	0	0	1
Control Delay (s)	12.7	0.0	0.0	0.6
Lane LOS	B			A
Approach Delay (s)	12.7	0.0		0.6
Approach LOS	B			

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	26.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	959	191	73	787	146	320	334	140	27	151	41
Future Volume (vph)	52	959	191	73	787	146	320	334	140	27	151	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	0.97	0.95	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4958		1770	5085	1583	3433	3539	1583	1770	1803	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.47	1.00	
Satd. Flow (perm)	1770	4958		1770	5085	1583	3433	3539	1583	879	1803	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	1042	208	79	855	159	348	363	152	29	164	45
RTOR Reduction (vph)	0	37	0	0	0	111	0	0	104	0	13	0
Lane Group Flow (vph)	57	1213	0	79	855	48	348	363	48	29	196	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8	4		
Actuated Green, G (s)	10.8	26.9		7.9	24.0	24.0	10.2	25.2	25.2	19.0	17.0	
Effective Green, g (s)	10.8	26.9		7.9	24.0	24.0	10.2	25.2	25.2	19.0	17.0	
Actuated g/C Ratio	0.14	0.34		0.10	0.30	0.30	0.13	0.31	0.31	0.24	0.21	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	238	1667		174	1525	474	437	1114	498	231	383	
v/s Ratio Prot	c0.03	c0.24		c0.04	0.17		c0.10	0.10		0.00	c0.11	
v/s Ratio Perm						0.03			0.03	0.03		
v/c Ratio	0.24	0.73		0.45	0.56	0.10	0.80	0.33	0.10	0.13	0.51	
Uniform Delay, d1	30.9	23.3		34.0	23.6	20.2	33.9	20.9	19.4	25.6	27.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	2.8		1.9	0.5	0.1	9.7	0.8	0.4	0.2	4.8	
Delay (s)	31.5	26.1		35.9	24.0	20.3	43.6	21.7	19.7	25.8	32.7	
Level of Service	C	C		D	C	C	D	C	B	C	C	
Approach Delay (s)		26.4			24.4			30.2			31.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	11	11	6	7	15	43	957	26	11	619	17
Future Volume (Veh/h)	6	11	11	6	7	15	43	957	26	11	619	17
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	12	12	7	8	16	47	1040	28	12	673	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)											382	
pX, platoon unblocked	0.78	0.78	0.78	0.78	0.78		0.78					
vC, conflicting volume	1874	1868	682	1872	1863	1054	691			1068		
vC1, stage 1 conf vol	706	706		1148	1148							
vC2, stage 2 conf vol	1168	1162		724	715							
vCu, unblocked vol	1978	1970	454	1975	1964	1054	466			1068		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	94	97	96	96	94	95			98		
cM capacity (veh/h)	171	208	474	187	210	275	857			653		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	31	31	1115	703
Volume Left	7	7	47	12
Volume Right	12	16	28	18
cSH	250	231	857	653
Volume to Capacity	0.12	0.13	0.05	0.02
Queue Length 95th (ft)	10	11	4	1
Control Delay (s)	21.4	22.9	1.7	0.5
Lane LOS	C	C	A	A
Approach Delay (s)	21.4	22.9	1.7	0.5
Approach LOS	C	C		

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	24	16	0	3	10	19	968	10	9	614	10
Future Volume (Veh/h)	13	24	16	0	3	10	19	968	10	9	614	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	26	17	0	3	11	21	1052	11	10	667	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								1253			753	
pX, platoon unblocked	0.83	0.83	0.79	0.83	0.83	0.73	0.79			0.73		
vC, conflicting volume	1804	1798	672	1822	1798	1058	678			1063		
vC1, stage 1 conf vol	692	692		1100	1100							
vC2, stage 2 conf vol	1112	1105		722	698							
vCu, unblocked vol	1292	1284	449	1313	1284	892	456			900		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	88	96	100	99	96	98			98		
cM capacity (veh/h)	186	216	480	200	224	248	870			550		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	57	14	1084	688
Volume Left	14	0	21	10
Volume Right	17	11	11	11
cSH	247	243	870	550
Volume to Capacity	0.23	0.06	0.02	0.02
Queue Length 95th (ft)	22	5	2	1
Control Delay (s)	23.9	20.8	0.8	0.5
Lane LOS	C	C	A	A
Approach Delay (s)	23.9	20.8	0.8	0.5
Approach LOS	C	C		

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	24	21	15	0	30	24	942	31	22	593	11
Future Volume (Veh/h)	21	24	21	15	0	30	24	942	31	22	593	11
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	26	23	16	0	33	26	1024	34	24	645	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (ft)								1055			951	
pX, platoon unblocked	0.83	0.83	0.80	0.83	0.83	0.73	0.80			0.73		
vC, conflicting volume	1808	1809	651	1811	1781	1024	657			1058		
vC1, stage 1 conf vol	699	699		1076	1076							
vC2, stage 2 conf vol	1109	1110		735	705							
vCu, unblocked vol	1325	1326	437	1328	1292	846	444			893		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	86	87	95	92	100	87	97			96		
cM capacity (veh/h)	159	201	495	201	226	264	891			553		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1
Volume Total	72	49	26	1024	34	681
Volume Left	23	16	26	0	0	24
Volume Right	23	33	0	0	34	12
cSH	225	239	891	1700	1700	553
Volume to Capacity	0.32	0.20	0.03	0.60	0.02	0.04
Queue Length 95th (ft)	33	19	2	0	0	3
Control Delay (s)	28.4	23.9	9.2	0.0	0.0	1.2
Lane LOS	D	C	A			A
Approach Delay (s)	28.4	23.9	0.2			1.2
Approach LOS	D	C				

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	61.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	13	17	982	24	30	609
Future Volume (Veh/h)	13	17	982	24	30	609
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	18	1067	26	33	662
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type			None			None
Median storage veh)						
Upstream signal (ft)			255			
pX, platoon unblocked	0.79	0.79			0.79	
vC, conflicting volume	1477	546			1093	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1082	0			599	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	98			96	
cM capacity (veh/h)	161	861			774	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	32	711	382	33	331	331
Volume Left	14	0	0	33	0	0
Volume Right	18	0	26	0	0	0
cSH	368	1700	1700	774	1700	1700
Volume to Capacity	0.09	0.42	0.22	0.04	0.19	0.19
Queue Length 95th (ft)	7	0	0	3	0	0
Control Delay (s)	18.1	0.0	0.0	9.9	0.0	0.0
Lane LOS	C			A		
Approach Delay (s)	18.1	0.0		0.5		
Approach LOS	C					

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	176	586	173	140	370	59	218	942	248	111	511	158
Future Volume (vph)	176	586	173	140	370	59	218	942	248	111	511	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3418		1770	3466		1770	5085	1583	1770	4905	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433	3418		1770	3466		1770	5085	1583	1770	4905	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	191	637	188	152	402	64	237	1024	270	121	555	172
RTOR Reduction (vph)	0	37	0	0	17	0	0	0	189	0	75	0
Lane Group Flow (vph)	191	788	0	152	449	0	237	1024	81	121	652	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases									4			
Actuated Green, G (s)	7.5	20.1		7.8	20.4		11.5	22.5	22.5	6.6	17.6	
Effective Green, g (s)	7.5	20.1		7.8	20.4		11.5	22.5	22.5	6.6	17.6	
Actuated g/C Ratio	0.10	0.27		0.10	0.27		0.15	0.30	0.30	0.09	0.23	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	343	916		184	942		271	1525	474	155	1151	
v/s Ratio Prot	0.06	c0.23		c0.09	0.13		c0.13	c0.20		0.07	0.13	
v/s Ratio Perm									0.05			
v/c Ratio	0.56	0.86		0.83	0.48		0.87	0.67	0.17	0.78	0.57	
Uniform Delay, d1	32.2	26.1		32.9	22.8		31.0	23.0	19.4	33.5	25.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.0	10.4		25.1	1.7		25.3	1.2	0.2	22.0	0.6	
Delay (s)	34.1	36.5		58.0	24.6		56.4	24.2	19.5	55.5	26.0	
Level of Service	C	D		E	C		E	C	B	E	C	
Approach Delay (s)		36.1			32.8			28.3			30.2	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	31.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	355	40	39	380	116	69	206	42	116	178	142
Future Volume (vph)	81	355	40	39	380	116	69	206	42	116	178	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.96			0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	1.00
Satd. Flow (prot)	1770	1835		1770	1797			1810		1770	1863	1583
Flt Permitted	0.21	1.00		0.33	1.00			0.89		0.43	1.00	1.00
Satd. Flow (perm)	384	1835		611	1797			1629		798	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	88	386	43	42	413	126	75	224	46	126	193	154
RTOR Reduction (vph)	0	7	0	0	19	0	0	10	0	0	0	78
Lane Group Flow (vph)	88	422	0	42	520	0	0	335	0	126	193	76
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	19.4	19.4		19.4	19.4			19.4		27.7	27.7	27.7
Effective Green, g (s)	19.4	19.4		19.4	19.4			19.4		27.7	27.7	27.7
Actuated g/C Ratio	0.35	0.35		0.35	0.35			0.35		0.49	0.49	0.49
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	132	634		211	621			563		459	919	781
v/s Ratio Prot		0.23			c0.29					c0.02	0.10	
v/s Ratio Perm	0.23			0.07				c0.21		0.12		0.05
v/c Ratio	0.67	0.67		0.20	0.84			0.60		0.27	0.21	0.10
Uniform Delay, d1	15.6	15.6		12.9	16.9			15.1		9.0	8.0	7.6
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	12.0	2.6		0.5	9.6			1.7		0.3	0.5	0.2
Delay (s)	27.6	18.2		13.4	26.5			16.8		9.3	8.5	7.8
Level of Service	C	B		B	C			B		A	A	A
Approach Delay (s)		19.8			25.6			16.8			8.5	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	56.1	Sum of lost time (s)	13.5
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	256	842	157	128	644	211	264	665	50	231	367	178
Future Volume (vph)	256	842	157	128	644	211	264	665	50	231	367	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	4965		1770	3539	1583	3433	3502		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	4965		1770	3539	1583	3433	3502		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	278	915	171	139	700	229	287	723	54	251	399	193
RTOR Reduction (vph)	0	30	0	0	0	178	0	6	0	0	0	138
Lane Group Flow (vph)	278	1056	0	139	700	51	287	771	0	251	399	55
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	16.2	26.3		9.6	19.7	19.7	11.2	22.0		14.5	25.3	25.3
Effective Green, g (s)	16.2	26.3		9.6	19.7	19.7	11.2	22.0		14.5	25.3	25.3
Actuated g/C Ratio	0.18	0.30		0.11	0.22	0.22	0.13	0.25		0.16	0.29	0.29
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	324	1477		192	788	352	434	871		290	1012	453
v/s Ratio Prot	c0.16	0.21		0.08	c0.20		0.08	c0.22		c0.14	c0.11	
v/s Ratio Perm						0.03						0.03
v/c Ratio	0.86	0.71		0.72	0.89	0.14	0.66	0.89		0.87	0.39	0.12
Uniform Delay, d1	35.0	27.7		38.1	33.3	27.6	36.8	32.0		36.0	25.4	23.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	19.5	1.7		12.7	11.9	0.2	3.8	12.8		22.6	1.2	0.6
Delay (s)	54.5	29.4		50.8	45.2	27.8	40.6	44.8		58.6	26.5	23.9
Level of Service	D	C		D	D	C	D	D		E	C	C
Approach Delay (s)		34.5			42.2			43.6			35.5	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	38.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	88.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	377	72	49	324	128	75	753	122	70	476	98
Future Volume (vph)	163	377	72	49	324	128	75	753	122	70	476	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.19	1.00	1.00	0.22	1.00	1.00	0.29	1.00	1.00	0.10	1.00	1.00
Satd. Flow (perm)	352	1863	1583	419	1863	1583	547	1863	1583	182	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	177	410	78	53	352	139	82	818	133	76	517	107
RTOR Reduction (vph)	0	0	57	0	0	98	0	0	69	0	0	58
Lane Group Flow (vph)	177	410	21	53	352	41	82	818	64	76	517	49
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	30.1	23.9	23.9	23.5	20.6	20.6	45.7	41.4	41.4	44.9	41.0	41.0
Effective Green, g (s)	30.1	23.9	23.9	23.5	20.6	20.6	45.7	41.4	41.4	44.9	41.0	41.0
Actuated g/C Ratio	0.33	0.27	0.27	0.26	0.23	0.23	0.51	0.46	0.46	0.50	0.46	0.46
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	215	494	419	152	425	361	335	856	727	159	847	720
v/s Ratio Prot	c0.06	c0.22		0.01	0.19		0.01	c0.44		c0.02	0.28	
v/s Ratio Perm	0.22		0.01	0.08		0.03	0.11		0.04	0.22		0.03
v/c Ratio	0.82	0.83	0.05	0.35	0.83	0.11	0.24	0.96	0.09	0.48	0.61	0.07
Uniform Delay, d1	24.7	31.2	24.6	26.2	33.1	27.5	13.0	23.5	13.7	19.3	18.5	13.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	21.8	11.1	0.0	1.4	12.5	0.1	0.4	21.7	0.2	2.3	3.3	0.2
Delay (s)	46.5	42.2	24.7	27.6	45.6	27.7	13.4	45.2	14.0	21.6	21.8	14.0
Level of Service	D	D	C	C	D	C	B	D	B	C	C	B
Approach Delay (s)		41.3			39.2			38.6			20.6	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	35.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	90.1	Sum of lost time (s)	18.0
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	1002	0	6	608	3	186	0	5	2	0	0
Future Volume (vph)	6	1002	0	6	608	3	186	0	5	2	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00			1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.95			0.95	
Satd. Flow (prot)	1770	3539		1770	3539	1583		1770			1770	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.73			0.74	
Satd. Flow (perm)	1770	3539		1770	3539	1583		1356			1385	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	1089	0	7	661	3	202	0	5	2	0	0
RTOR Reduction (vph)	0	0	0	0	0	2	0	85	0	0	0	0
Lane Group Flow (vph)	7	1089	0	7	661	1	0	122	0	0	2	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4			8	2			6		
Actuated Green, G (s)	0.7	18.8		0.7	18.8	18.8		9.1			9.1	
Effective Green, g (s)	0.7	18.8		0.7	18.8	18.8		9.1			9.1	
Actuated g/C Ratio	0.02	0.45		0.02	0.45	0.45		0.22			0.22	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	29	1580		29	1580	706		293			299	
v/s Ratio Prot	c0.00	c0.31		0.00	0.19							
v/s Ratio Perm						0.00		c0.09			0.00	
v/c Ratio	0.24	0.69		0.24	0.42	0.00		0.41			0.01	
Uniform Delay, d1	20.4	9.3		20.4	7.9	6.5		14.2			13.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	4.3	1.3		4.3	0.2	0.0		1.0			0.0	
Delay (s)	24.7	10.6		24.7	8.1	6.5		15.2			13.0	
Level of Service	C	B		C	A	A		B			B	
Approach Delay (s)		10.7			8.3			15.2			13.0	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	10.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	42.1	Sum of lost time (s)	13.5
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	217	130	131	48	80	65	57	490	56	100	608	81
Future Volume (vph)	217	130	131	48	80	65	57	490	56	100	608	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	0.99	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1745	1583		1829	1583	1770	3539	1583	1770	4996	
Flt Permitted	0.47	0.91	1.00		0.80	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	837	1617	1583		1484	1583	1770	3539	1583	1770	4996	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	236	141	142	52	87	71	62	533	61	109	661	88
RTOR Reduction (vph)	0	0	88	0	0	59	0	0	41	0	18	0
Lane Group Flow (vph)	182	195	54	0	139	12	62	533	20	109	731	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)	24.3	24.3	24.3		10.9	10.9	3.7	20.8	20.8	5.6	22.7	
Effective Green, g (s)	24.3	24.3	24.3		10.9	10.9	3.7	20.8	20.8	5.6	22.7	
Actuated g/C Ratio	0.38	0.38	0.38		0.17	0.17	0.06	0.32	0.32	0.09	0.35	
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	433	629	599		251	268	102	1146	512	154	1766	
v/s Ratio Prot	c0.06	0.04					0.04	c0.15		c0.06	0.15	
v/s Ratio Perm	0.10	0.07	0.03		c0.09	0.01			0.01			
v/c Ratio	0.42	0.31	0.09		0.55	0.04	0.61	0.47	0.04	0.71	0.41	
Uniform Delay, d1	14.1	14.0	12.8		24.4	22.3	29.5	17.3	14.9	28.5	15.7	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.3	0.1		2.6	0.1	9.8	1.4	0.1	13.8	0.7	
Delay (s)	14.8	14.3	12.9		27.1	22.4	39.4	18.6	15.0	42.3	16.4	
Level of Service	B	B	B		C	C	D	B	B	D	B	
Approach Delay (s)		14.1			25.5			20.3			19.7	
Approach LOS		B			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	64.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	464	27	30	468	80	28
Future Volume (Veh/h)	464	27	30	468	80	28
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	504	29	33	509	87	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None			TWLTL		
Median storage veh)				2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			533		1094	518
vC1, stage 1 conf vol					518	
vC2, stage 2 conf vol					575	
vCu, unblocked vol			533		1094	518
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			97		80	95
cM capacity (veh/h)			1035		445	557

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	533	542	117
Volume Left	0	33	87
Volume Right	29	0	30
cSH	1700	1035	598
Volume to Capacity	0.31	0.03	0.20
Queue Length 95th (ft)	0	2	18
Control Delay (s)	0.0	0.9	14.2
Lane LOS		A	B
Approach Delay (s)	0.0	0.9	14.2
Approach LOS			B

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	822	1	0	495	53	0	18	19	15	10	30
Future Volume (Veh/h)	26	822	1	0	495	53	0	18	19	15	10	30
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	28	893	1	0	538	58	0	20	21	16	11	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			2
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		425										
pX, platoon unblocked				0.87			0.87	0.87	0.87	0.87	0.87	
vC, conflicting volume	596			894			1224	1546	298	941	1517	298
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	596			369			747	1115	0	423	1083	298
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			100	89	98	96	94	95
cM capacity (veh/h)	976			1035			234	175	947	392	183	698

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	NB 1	SB 1
Volume Total	28	357	357	180	359	237	41	60
Volume Left	28	0	0	0	0	0	0	16
Volume Right	0	0	0	1	0	58	21	33
cSH	976	1700	1700	1700	1700	1700	359	682
Volume to Capacity	0.03	0.21	0.21	0.11	0.21	0.14	0.11	0.09
Queue Length 95th (ft)	2	0	0	0	0	0	10	7
Control Delay (s)	8.8	0.0	0.0	0.0	0.0	0.0	18.3	13.8
Lane LOS	A						C	B
Approach Delay (s)	0.3				0.0		18.3	13.8
Approach LOS							C	B

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	36.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	519	168	142	395	98	221	791	234	71	569	65
Future Volume (vph)	118	519	168	142	395	98	221	791	234	71	569	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.34	1.00	1.00	0.20	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	629	1863	1583	364	1863	1583	1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	128	564	183	154	429	107	240	860	254	77	618	71
RTOR Reduction (vph)	0	0	112	0	0	66	0	0	128	0	0	52
Lane Group Flow (vph)	128	564	71	154	429	41	240	860	126	77	618	19
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	25.9	25.9	25.9	25.9	25.9	25.9	10.9	25.2	25.2	3.8	18.1	18.1
Effective Green, g (s)	25.9	25.9	25.9	25.9	25.9	25.9	10.9	25.2	25.2	3.8	18.1	18.1
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.16	0.38	0.38	0.06	0.27	0.27
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	243	721	612	140	721	612	288	1333	596	100	957	428
v/s Ratio Prot		0.30			0.23		c0.14	c0.24		0.04	0.17	
v/s Ratio Perm	0.20		0.04	c0.42		0.03			0.08			0.01
v/c Ratio	0.53	0.78	0.12	1.10	0.60	0.07	0.83	0.65	0.21	0.77	0.65	0.04
Uniform Delay, d1	15.8	18.0	13.2	20.5	16.3	12.9	27.1	17.2	14.1	31.1	21.6	18.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	5.5	0.1	105.4	1.3	0.0	18.3	2.4	0.8	29.8	3.4	0.2
Delay (s)	17.8	23.6	13.2	125.9	17.6	12.9	45.4	19.6	14.9	61.0	24.9	18.2
Level of Service	B	C	B	F	B	B	D	B	B	E	C	B
Approach Delay (s)		20.6			41.1			23.3			27.9	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	66.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	59	0	1224	903	0
Future Volume (Veh/h)	0	59	0	1224	903	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	64	0	1330	982	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				582	1028	
pX, platoon unblocked	0.86	0.90	0.90			
vC, conflicting volume	1647	491	982			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	901	210	756			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	91	100			
cM capacity (veh/h)	239	715	765			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	64	0	665	665	655	327
Volume Left	0	0	0	0	0	0
Volume Right	64	0	0	0	0	0
cSH	715	1700	1700	1700	1700	1700
Volume to Capacity	0.09	0.00	0.39	0.39	0.39	0.19
Queue Length 95th (ft)	7	0	0	0	0	0
Control Delay (s)	10.5	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	10.5	0.0			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	37.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR2
Lane Configurations												
Traffic Volume (vph)	124	1048	103	107	374	155	224	695	129	282	698	46
Future Volume (vph)	124	1048	103	107	374	155	224	695	129	282	698	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.76		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.85		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5017		1770	3610		1770	3456		1770	3506	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5017		1770	3610		1770	3456		1770	3506	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	135	1139	112	116	407	168	243	755	140	307	759	50
RTOR Reduction (vph)	0	17	0	0	157	0	0	22	0	0	146	0
Lane Group Flow (vph)	135	1234	0	116	418	0	243	873	0	307	663	0
Turn Type	Prot	NA		Prot	Perm		Prot	NA		Prot	NA	
Protected Phases	7	4		3			5	2		1	6	
Permitted Phases					8							
Actuated Green, G (s)	6.0	17.0		5.0	16.0		12.4	19.0		13.0	19.6	
Effective Green, g (s)	6.0	17.0		5.0	16.0		12.4	19.0		13.0	19.6	
Actuated g/C Ratio	0.09	0.24		0.07	0.23		0.18	0.27		0.19	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	151	1218		126	825		313	938		328	981	
v/s Ratio Prot	0.08	c0.25		c0.07			0.14	c0.25		c0.17	0.19	
v/s Ratio Perm					0.12							
v/c Ratio	0.89	1.01		0.92	0.51		0.78	0.93		0.94	0.68	
Uniform Delay, d1	31.7	26.5		32.3	23.6		27.5	24.9		28.1	22.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	43.4	29.2		56.2	0.5		11.4	16.8		33.1	3.7	
Delay (s)	75.1	55.7		88.5	24.1		38.9	41.6		61.2	26.1	
Level of Service	E	E		F	C		D	D		E	C	
Approach Delay (s)		57.5						41.1			35.8	
Approach LOS		E						D			D	

Intersection Summary			
HCM 2000 Control Delay	44.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	371	182	79	152	118	124	983	111	86	758	71
Future Volume (vph)	265	371	182	79	152	118	124	983	111	86	758	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.65	1.00	1.00	0.30	1.00	1.00	0.30	1.00	1.00	0.20	1.00	1.00
Satd. Flow (perm)	1212	1863	1583	555	1863	1583	554	3539	1583	381	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	288	403	198	86	165	128	135	1068	121	93	824	77
RTOR Reduction (vph)	0	0	100	0	0	53	0	0	51	0	0	34
Lane Group Flow (vph)	288	403	98	86	165	75	135	1068	70	93	824	43
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	17.5	17.5	17.5	17.5	17.5	17.5	32.1	32.1	32.1	32.1	32.1	32.1
Effective Green, g (s)	17.5	17.5	17.5	17.5	17.5	17.5	32.1	32.1	32.1	32.1	32.1	32.1
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30	0.30	0.56	0.56	0.56	0.56	0.56	0.56
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	368	566	480	168	566	480	308	1972	882	212	1972	882
v/s Ratio Prot		0.22			0.09			c0.30			0.23	
v/s Ratio Perm	c0.24		0.06	0.15		0.05	0.24		0.04	0.24		0.03
v/c Ratio	0.78	0.71	0.21	0.51	0.29	0.16	0.44	0.54	0.08	0.44	0.42	0.05
Uniform Delay, d1	18.3	17.8	14.9	16.5	15.3	14.7	7.5	8.1	5.9	7.5	7.4	5.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.4	4.2	0.2	2.6	0.3	0.2	4.5	1.1	0.2	6.5	0.7	0.1
Delay (s)	28.7	22.0	15.1	19.1	15.6	14.8	11.9	9.2	6.1	13.9	8.0	5.9
Level of Service	C	C	B	B	B	B	B	A	A	B	A	A
Approach Delay (s)		22.6			16.1			9.2			8.4	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	57.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	53	1194	24	31	1096
Future Volume (Veh/h)	0	53	1194	24	31	1096
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	58	1298	26	34	1191
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			916			
pX, platoon unblocked	0.77	0.77			0.77	
vC, conflicting volume	1974	662			1324	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1673	0			830	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	93			94	
cM capacity (veh/h)	63	838			616	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	0	58	865	459	34	596	596
Volume Left	0	0	0	0	34	0	0
Volume Right	0	58	0	26	0	0	0
cSH	1700	838	1700	1700	616	1700	1700
Volume to Capacity	0.00	0.07	0.51	0.27	0.06	0.35	0.35
Queue Length 95th (ft)	0	6	0	0	4	0	0
Control Delay (s)	0.0	9.6	0.0	0.0	11.2	0.0	0.0
Lane LOS	A	A			B		
Approach Delay (s)	9.6		0.0		0.3		
Approach LOS	A						

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	355	826	173	218	489	130	186	766	117	181	858	164
Future Volume (vph)	355	826	173	218	489	130	186	766	117	181	858	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.97		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	4953		1770	4925		1770	3469		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	4953		1770	4925		1770	3469		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	386	898	188	237	532	141	202	833	127	197	933	178
RTOR Reduction (vph)	0	35	0	0	54	0	0	13	0	0	0	110
Lane Group Flow (vph)	386	1051	0	237	619	0	202	947	0	197	933	68
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	20.5	22.0		13.7	15.2		11.0	27.0		11.0	27.0	27.0
Effective Green, g (s)	20.5	22.0		13.7	15.2		11.0	27.0		11.0	27.0	27.0
Actuated g/C Ratio	0.23	0.25		0.15	0.17		0.12	0.30		0.12	0.30	0.30
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	404	1214		270	834		217	1044		217	1065	476
v/s Ratio Prot	c0.22	c0.21		0.13	0.13		c0.11	c0.27		0.11	0.26	
v/s Ratio Perm												0.04
v/c Ratio	0.96	0.87		0.88	0.74		0.93	0.91		0.91	0.88	0.14
Uniform Delay, d1	34.1	32.4		37.2	35.4		39.0	30.1		38.8	29.8	22.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	33.1	6.7		25.8	3.6		42.1	12.8		36.5	10.1	0.6
Delay (s)	67.3	39.1		63.0	39.0		81.1	43.0		75.4	39.9	23.5
Level of Service	E	D		E	D		F	D		E	D	C
Approach Delay (s)		46.5			45.2			49.6			43.0	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	46.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	89.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	6	33	85	21	78	42	885	80	55	587	40
Future Volume (vph)	25	6	33	85	21	78	42	885	80	55	587	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.93			0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1701			1716		1770	3539	1583	1770	3539	1583
Flt Permitted		0.87			0.83		0.41	1.00	1.00	0.27	1.00	1.00
Satd. Flow (perm)		1507			1459		758	3539	1583	505	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	7	36	92	23	85	46	962	87	60	638	43
RTOR Reduction (vph)	0	29	0	0	53	0	0	0	29	0	0	14
Lane Group Flow (vph)	0	41	0	0	147	0	46	962	58	60	638	29
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		10.5			10.5		36.4	36.4	36.4	36.4	36.4	36.4
Effective Green, g (s)		10.5			10.5		36.4	36.4	36.4	36.4	36.4	36.4
Actuated g/C Ratio		0.19			0.19		0.66	0.66	0.66	0.66	0.66	0.66
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		288			279		502	2346	1049	334	2346	1049
v/s Ratio Prot								c0.27			0.18	
v/s Ratio Perm		0.03			c0.10		0.06		0.04	0.12		0.02
v/c Ratio		0.14			0.53		0.09	0.41	0.05	0.18	0.27	0.03
Uniform Delay, d1		18.5			20.0		3.3	4.3	3.2	3.5	3.8	3.2
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.2			1.8		0.4	0.5	0.1	1.2	0.3	0.0
Delay (s)		18.7			21.8		3.7	4.8	3.3	4.7	4.1	3.2
Level of Service		B			C		A	A	A	A	A	A
Approach Delay (s)		18.7			21.8			4.6			4.1	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	54.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	82	468	511	38	23	42
Future Volume (Veh/h)	82	468	511	38	23	42
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	89	509	555	41	25	46
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	596				1262	576
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	596				1262	576
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				85	91
cM capacity (veh/h)	980				170	517

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	598	596	71
Volume Left	89	0	25
Volume Right	0	41	46
cSH	980	1700	484
Volume to Capacity	0.09	0.35	0.15
Queue Length 95th (ft)	7	0	13
Control Delay (s)	2.3	0.0	18.7
Lane LOS	A		C
Approach Delay (s)	2.3	0.0	18.7
Approach LOS			C

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	27	108	10	0	90
Future Volume (Veh/h)	0	27	108	10	0	90
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	29	117	11	0	98
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	220	122			128	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	220	122			128	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	97			100	
cM capacity (veh/h)	768	929			1458	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	29	128	98
Volume Left	0	0	0
Volume Right	29	11	0
cSH	929	1700	1458
Volume to Capacity	0.03	0.08	0.00
Queue Length 95th (ft)	2	0	0
Control Delay (s)	9.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	9.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	16.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	360	50	13	64	6
Future Volume (Veh/h)	0	360	50	13	64	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	391	54	14	70	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	68				452	61
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	68				452	61
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				88	99
cM capacity (veh/h)	1533				565	1004

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	391	68	77
Volume Left	0	0	70
Volume Right	0	14	7
cSH	1533	1700	589
Volume to Capacity	0.00	0.04	0.13
Queue Length 95th (ft)	0	0	11
Control Delay (s)	0.0	0.0	12.0
Lane LOS			B
Approach Delay (s)	0.0	0.0	12.0
Approach LOS			B

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	29.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	744	7	19	485	26	14	0	58	17	0	17
Future Volume (Veh/h)	27	744	7	19	485	26	14	0	58	17	0	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	809	8	21	527	28	15	0	63	18	0	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (ft)					644							
pX, platoon unblocked	0.90						0.90	0.90		0.90	0.90	0.90
vC, conflicting volume	555			817			1458	1468	813	1499	1444	527
vC1, stage 1 conf vol							871	871		569	569	
vC2, stage 2 conf vol							587	597		930	875	
vCu, unblocked vol	454			817			1453	1465	813	1499	1438	423
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			97			95	100	83	92	100	97
cM capacity (veh/h)	1000			811			276	292	378	217	289	570

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	29	817	21	527	28	78	36
Volume Left	29	0	21	0	0	15	18
Volume Right	0	8	0	0	28	63	18
cSH	1000	1700	811	1700	1700	353	315
Volume to Capacity	0.03	0.48	0.03	0.31	0.02	0.22	0.11
Queue Length 95th (ft)	2	0	2	0	0	21	10
Control Delay (s)	8.7	0.0	9.6	0.0	0.0	18.1	17.9
Lane LOS	A		A			C	C
Approach Delay (s)	0.3		0.3			18.1	17.9
Approach LOS						C	C

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection						
Int Delay, s/veh	0.6					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	511	48	0	29
Future Vol, veh/h	0	0	511	48	0	29
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	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	555	52	0	32

Major/Minor	Major2		Minor2	
Conflicting Flow All	-	0	-	304
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	590
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	590
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	SB
HCM Control Delay, s	0	11.4
HCM LOS		B

Minor Lane/Major Mvmt	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	590
HCM Lane V/C Ratio	-	-	0.053
HCM Control Delay (s)	-	-	11.4
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	78	0	0	24	0	1223	1	0	827	52
Future Volume (Veh/h)	0	0	78	0	0	24	0	1223	1	0	827	52
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	85	0	0	26	0	1329	1	0	899	57
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								1059			551	
pX, platoon unblocked	0.92	0.92	0.85	0.92	0.92	0.85	0.85			0.85		
vC, conflicting volume	1618	2258	478	1864	2286	665	956			1330		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	797	1489	49	1063	1519	258	609			1039		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	90	100	100	96	100			100		
cM capacity (veh/h)	246	114	862	148	109	631	826			566		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	85	26	886	444	599	357
Volume Left	0	0	0	0	0	0
Volume Right	85	26	0	1	0	57
cSH	862	631	1700	1700	1700	1700
Volume to Capacity	0.10	0.04	0.52	0.26	0.35	0.21
Queue Length 95th (ft)	8	3	0	0	0	0
Control Delay (s)	9.6	10.9	0.0	0.0	0.0	0.0
Lane LOS	A	B				
Approach Delay (s)	9.6	10.9	0.0		0.0	
Approach LOS	A	B				

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	776	43	166	516	12	30
Future Volume (Veh/h)	776	43	166	516	12	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	843	47	180	561	13	33
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)				503		
pX, platoon unblocked					0.86	
vC, conflicting volume			890		1788	866
vC1, stage 1 conf vol					866	
vC2, stage 2 conf vol					921	
vCu, unblocked vol			890		1834	866
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			76		94	91
cM capacity (veh/h)			761		231	353

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	890	180	561	46
Volume Left	0	180	0	13
Volume Right	47	0	0	33
cSH	1700	761	1700	307
Volume to Capacity	0.52	0.24	0.33	0.15
Queue Length 95th (ft)	0	23	0	13
Control Delay (s)	0.0	11.2	0.0	18.8
Lane LOS		B		C
Approach Delay (s)	0.0	2.7		18.8
Approach LOS				C

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	194	126	31	987	900	29
Future Volume (vph)	194	126	31	987	900	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.95		1.00	1.00	1.00	
Flt Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1712		1770	3539	3522	
Flt Permitted	0.97		0.95	1.00	1.00	
Satd. Flow (perm)	1712		1770	3539	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	211	137	34	1073	978	32
RTOR Reduction (vph)	41	0	0	0	3	0
Lane Group Flow (vph)	307	0	34	1073	1007	0
Turn Type	Prot		Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases						
Actuated Green, G (s)	13.3		1.6	27.5	21.9	
Effective Green, g (s)	13.3		1.6	27.5	21.9	
Actuated g/C Ratio	0.27		0.03	0.56	0.45	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	466		58	1994	1580	
v/s Ratio Prot	c0.18		0.02	c0.30	c0.29	
v/s Ratio Perm						
v/c Ratio	0.66		0.59	0.54	0.64	
Uniform Delay, d1	15.7		23.3	6.7	10.4	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	3.3		14.2	0.3	0.9	
Delay (s)	19.1		37.5	7.0	11.2	
Level of Service	B		D	A	B	
Approach Delay (s)	19.1			7.9	11.2	
Approach LOS	B			A	B	

Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	48.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	9	11	7	1	36	0	20	10	296	11	1
Future Volume (Veh/h)	0	9	11	7	1	36	0	20	10	296	11	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	10	12	8	1	39	0	22	11	322	12	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	724	690	12	701	684	28	13			33		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	724	690	12	701	684	28	13			33		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	97	99	97	100	96	100			80		
cM capacity (veh/h)	276	293	1068	287	295	1048	1606			1579		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	22	48	33	335
Volume Left	0	8	0	322
Volume Right	12	39	11	1
cSH	485	701	1606	1579
Volume to Capacity	0.05	0.07	0.00	0.20
Queue Length 95th (ft)	4	5	0	19
Control Delay (s)	12.8	10.5	0.0	7.6
Lane LOS	B	B		A
Approach Delay (s)	12.8	10.5	0.0	7.6
Approach LOS	B	B		

Intersection Summary			
Average Delay	7.6		
Intersection Capacity Utilization	39.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	1137	19	20	499	21	23	0	23	143	0	78
Future Volume (vph)	18	1137	19	20	499	21	23	0	23	143	0	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.93			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (prot)	1770	5073		1770	3518			1695			1718	
Flt Permitted	0.44	1.00		0.19	1.00			0.81			0.77	
Satd. Flow (perm)	819	5073		362	3518			1411			1374	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	1236	21	22	542	23	25	0	25	155	0	85
RTOR Reduction (vph)	0	2	0	0	4	0	0	18	0	0	40	0
Lane Group Flow (vph)	20	1255	0	22	561	0	0	32	0	0	200	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.6	20.6		20.6	20.6			11.2			11.2	
Effective Green, g (s)	20.6	20.6		20.6	20.6			11.2			11.2	
Actuated g/C Ratio	0.52	0.52		0.52	0.52			0.28			0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	423	2625		187	1820			397			386	
v/s Ratio Prot		c0.25			0.16							
v/s Ratio Perm	0.02			0.06				0.02			c0.15	
v/c Ratio	0.05	0.48		0.12	0.31			0.08			0.52	
Uniform Delay, d1	4.7	6.2		4.9	5.5			10.5			12.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	0.1		0.3	0.1			0.1			1.2	
Delay (s)	4.8	6.3		5.2	5.6			10.6			13.2	
Level of Service	A	A		A	A			B			B	
Approach Delay (s)		6.3			5.6			10.6			13.2	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	39.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

2035 Phase 1 AM Peak Hour Mitigation LOS Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	492	11	260	1173	270	135	575	363	104	345	44
Future Volume (vph)	36	492	11	260	1173	270	135	575	363	104	345	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	3539	1583	1770	3479	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1770	3539	1583	1770	3479	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	535	12	283	1275	293	147	625	395	113	375	48
RTOR Reduction (vph)	0	0	9	0	0	134	0	0	46	0	12	0
Lane Group Flow (vph)	39	535	3	283	1275	159	147	625	349	113	411	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	2.9	19.0	19.0	15.3	31.4	31.4	7.6	20.1	35.4	6.5	19.0	
Effective Green, g (s)	2.9	19.0	19.0	15.3	31.4	31.4	7.6	20.1	35.4	6.5	19.0	
Actuated g/C Ratio	0.04	0.24	0.24	0.19	0.40	0.40	0.10	0.25	0.45	0.08	0.24	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	126	852	381	343	1408	629	170	901	800	145	837	
v/s Ratio Prot	0.01	0.15		c0.16	c0.36		c0.08	c0.18	0.08	0.06	0.12	
v/s Ratio Perm			0.00			0.10			0.14			
v/c Ratio	0.31	0.63	0.01	0.83	0.91	0.25	0.86	0.69	0.44	0.78	0.49	
Uniform Delay, d1	37.0	26.8	22.8	30.5	22.4	15.9	35.1	26.6	14.9	35.5	25.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.4	1.5	0.0	14.8	8.6	0.2	33.8	4.4	0.4	22.8	2.1	
Delay (s)	38.4	28.2	22.8	45.3	30.9	16.1	68.9	31.0	15.3	58.3	27.8	
Level of Service	D	C	C	D	C	B	E	C	B	E	C	
Approach Delay (s)		28.8			30.8			30.5			34.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	78.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	1	15	7	0	18	27	544	2	11	790	14
Future Volume (Veh/h)	2	1	15	7	0	18	27	544	2	11	790	14
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	1	16	8	0	20	29	591	2	12	859	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								1253			753	
pX, platoon unblocked	0.90	0.90	0.90	0.90	0.90		0.90					
vC, conflicting volume	1264	1542	437	1120	1548	296	874			593		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1079	1386	164	920	1393	296	647			593		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	98	96	100	97	97			99		
cM capacity (veh/h)	146	122	770	192	121	700	844			979		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	19	28	324	298	442	444
Volume Left	2	8	29	0	12	0
Volume Right	16	20	0	2	0	15
cSH	446	398	844	1700	979	1700
Volume to Capacity	0.04	0.07	0.03	0.17	0.01	0.26
Queue Length 95th (ft)	3	6	3	0	1	0
Control Delay (s)	13.4	14.7	1.2	0.0	0.4	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	13.4	14.7	0.6		0.2	
Approach LOS	B	B				

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
58: White Avenue & First Street

03/15/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2	10	13	3	38	34	551	26	39	764	10
Future Volume (Veh/h)	0	2	10	13	3	38	34	551	26	39	764	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2	11	14	3	41	37	599	28	42	830	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								1055			951	
pX, platoon unblocked	0.93	0.93	0.93	0.93	0.93		0.93					
vC, conflicting volume	1336	1620	420	1198	1612	314	841			627		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1211	1517	228	1063	1508	314	680			627		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	98	91	97	94	96			96		
cM capacity (veh/h)	110	100	721	150	102	682	845			951		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	13	58	37	399	228	457	426
Volume Left	0	14	37	0	0	42	0
Volume Right	11	41	0	0	28	0	11
cSH	370	317	845	1700	1700	951	1700
Volume to Capacity	0.04	0.18	0.04	0.23	0.13	0.04	0.25
Queue Length 95th (ft)	3	16	3	0	0	3	0
Control Delay (s)	15.1	18.9	9.5	0.0	0.0	1.3	0.0
Lane LOS	C	C	A			A	
Approach Delay (s)	15.1	18.9	0.5			0.7	
Approach LOS	C	C					

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		

2035 Phase 1 PM Peak Hour Mitigation LOS Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	960	0	214	622	109	103	458	361	332	489	58
Future Volume (vph)	55	960	0	214	622	109	103	458	361	332	489	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3539		1770	3539	1583	1770	3539	1583	1770	3483	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433	3539		1770	3539	1583	1770	3539	1583	1770	3483	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	1043	0	233	676	118	112	498	392	361	532	63
RTOR Reduction (vph)	0	0	0	0	0	72	0	0	110	0	9	0
Lane Group Flow (vph)	60	1043	0	233	676	46	112	498	282	361	586	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	4.1	29.1		14.4	39.4	39.4	10.9	18.9	33.3	20.5	28.5	
Effective Green, g (s)	4.1	29.1		14.4	39.4	39.4	10.9	18.9	33.3	20.5	28.5	
Actuated g/C Ratio	0.04	0.29		0.14	0.39	0.39	0.11	0.19	0.33	0.20	0.28	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	139	1020		252	1381	618	191	662	522	359	983	
v/s Ratio Prot	0.02	c0.29		c0.13	0.19		0.06	c0.14	0.08	c0.20	0.17	
v/s Ratio Perm						0.03			0.10			
v/c Ratio	0.43	1.02		0.92	0.49	0.07	0.59	0.75	0.54	1.01	0.60	
Uniform Delay, d1	47.3	35.9		42.7	23.2	19.3	42.9	38.8	27.6	40.2	31.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.1	34.0		36.7	0.3	0.1	4.5	7.7	1.1	48.9	2.7	
Delay (s)	49.4	69.9		79.4	23.4	19.4	47.4	46.5	28.7	89.1	33.9	
Level of Service	D	E		E	C	B	D	D	C	F	C	
Approach Delay (s)		68.8			35.7			39.6			54.7	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	50.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	28	16	0	3	10	19	978	10	9	613	10
Future Volume (Veh/h)	13	28	16	0	3	10	19	978	10	9	613	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	30	17	0	3	11	21	1063	11	10	666	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								1253			753	
pX, platoon unblocked	0.96	0.96	0.93	0.96	0.96	0.93	0.93			0.93		
vC, conflicting volume	1278	1808	338	1496	1808	537	677			1074		
vC1, stage 1 conf vol	692	692		1110	1110							
vC2, stage 2 conf vol	586	1116		385	697							
vCu, unblocked vol	887	1437	138	1113	1437	350	502			928		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	89	98	100	99	98	98			99		
cM capacity (veh/h)	389	262	823	238	267	601	984			681		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	61	14	552	542	343	344
Volume Left	14	0	21	0	10	0
Volume Right	17	11	0	11	0	11
cSH	356	474	984	1700	681	1700
Volume to Capacity	0.17	0.03	0.02	0.32	0.01	0.20
Queue Length 95th (ft)	15	2	2	0	1	0
Control Delay (s)	17.2	12.8	0.6	0.0	0.5	0.0
Lane LOS	C	B	A		A	
Approach Delay (s)	17.2	12.8	0.3		0.2	
Approach LOS	C	B				

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	28	21	15	0	30	24	953	31	22	592	11
Future Volume (Veh/h)	22	28	21	15	0	30	24	953	31	22	592	11
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	30	23	16	0	33	26	1036	34	24	643	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (ft)								1055			951	
pX, platoon unblocked	0.90	0.90	0.97	0.90	0.90	0.89	0.97			0.89		
vC, conflicting volume	1300	1819	328	1512	1808	535	655			1070		
vC1, stage 1 conf vol	697	697		1105	1105							
vC2, stage 2 conf vol	603	1122		408	703							
vCu, unblocked vol	968	1545	248	1204	1532	218	585			822		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	88	97	94	100	95	97			97		
cM capacity (veh/h)	353	251	730	250	264	696	957			712		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	77	49	26	691	379	346	334
Volume Left	24	16	26	0	0	24	0
Volume Right	23	33	0	0	34	0	12
cSH	352	440	957	1700	1700	712	1700
Volume to Capacity	0.22	0.11	0.03	0.41	0.22	0.03	0.20
Queue Length 95th (ft)	21	9	2	0	0	3	0
Control Delay (s)	18.1	14.2	8.9	0.0	0.0	1.1	0.0
Lane LOS	C	B	A			A	
Approach Delay (s)	18.1	14.2	0.2			0.6	
Approach LOS	C	B					

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

2035 Phase 2 AM Peak Hour Mitigation LOS Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	492	11	260	1174	264	135	574	364	104	345	44
Future Volume (vph)	36	492	11	260	1174	264	135	574	364	104	345	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	3539	1583	1770	3479	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1770	3539	1583	1770	3479	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	535	12	283	1276	287	147	624	396	113	375	48
RTOR Reduction (vph)	0	0	9	0	0	131	0	0	46	0	12	0
Lane Group Flow (vph)	39	535	3	283	1276	156	147	624	350	113	411	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	2.9	19.0	19.0	15.3	31.4	31.4	7.6	20.1	35.4	6.5	19.0	
Effective Green, g (s)	2.9	19.0	19.0	15.3	31.4	31.4	7.6	20.1	35.4	6.5	19.0	
Actuated g/C Ratio	0.04	0.24	0.24	0.19	0.40	0.40	0.10	0.25	0.45	0.08	0.24	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	126	852	381	343	1408	629	170	901	800	145	837	
v/s Ratio Prot	0.01	0.15		c0.16	c0.36		c0.08	c0.18	0.08	0.06	0.12	
v/s Ratio Perm			0.00			0.10			0.14			
v/c Ratio	0.31	0.63	0.01	0.83	0.91	0.25	0.86	0.69	0.44	0.78	0.49	
Uniform Delay, d1	37.0	26.8	22.8	30.5	22.4	15.9	35.1	26.6	14.9	35.5	25.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.4	1.5	0.0	14.8	8.6	0.2	33.8	4.4	0.4	22.8	2.1	
Delay (s)	38.4	28.2	22.8	45.3	31.0	16.1	68.9	31.0	15.3	58.3	27.8	
Level of Service	D	C	C	D	C	B	E	C	B	E	C	
Approach Delay (s)		28.8			30.9			30.4			34.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	78.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	1	15	7	0	18	27	545	2	11	778	14
Future Volume (Veh/h)	2	1	15	7	0	18	27	545	2	11	778	14
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	1	16	8	0	20	29	592	2	12	846	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								1253			753	
pX, platoon unblocked	0.90	0.90	0.90	0.90	0.90		0.90					
vC, conflicting volume	1252	1530	430	1114	1536	297	861			594		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1047	1357	130	894	1365	297	611			594		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	98	96	100	97	97			99		
cM capacity (veh/h)	153	126	802	199	125	699	863			978		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	19	28	325	298	435	438
Volume Left	2	8	29	0	12	0
Volume Right	16	20	0	2	0	15
cSH	464	406	863	1700	978	1700
Volume to Capacity	0.04	0.07	0.03	0.18	0.01	0.26
Queue Length 95th (ft)	3	6	3	0	1	0
Control Delay (s)	13.1	14.5	1.2	0.0	0.4	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	13.1	14.5	0.6		0.2	
Approach LOS	B	B				

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2	10	13	3	38	34	552	26	39	752	10
Future Volume (Veh/h)	0	2	10	13	3	38	34	552	26	39	752	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2	11	14	3	41	37	600	28	42	817	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								1055			951	
pX, platoon unblocked	0.93	0.93	0.93	0.93	0.93		0.93					
vC, conflicting volume	1323	1608	414	1192	1600	314	828			628		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1201	1508	226	1061	1498	314	670			628		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	98	91	97	94	96			96		
cM capacity (veh/h)	112	102	724	150	103	682	854			950		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	13	58	37	400	228	450	420
Volume Left	0	14	37	0	0	42	0
Volume Right	11	41	0	0	28	0	11
cSH	374	318	854	1700	1700	950	1700
Volume to Capacity	0.03	0.18	0.04	0.24	0.13	0.04	0.25
Queue Length 95th (ft)	3	16	3	0	0	3	0
Control Delay (s)	15.0	18.8	9.4	0.0	0.0	1.3	0.0
Lane LOS	B	C	A			A	
Approach Delay (s)	15.0	18.8	0.5			0.7	
Approach LOS	B	C					

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	380	122	114	826	226	259	758	117	228	988	294
Future Volume (vph)	195	380	122	114	826	226	259	758	117	228	988	294
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91		0.97	0.95		1.00	0.95	1.00
Frt	1.00	0.96		1.00	0.97		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	4899		1770	4921		3433	3468		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	4899		1770	4921		3433	3468		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	212	413	133	124	898	246	282	824	127	248	1074	320
RTOR Reduction (vph)	0	63	0	0	55	0	0	14	0	0	0	131
Lane Group Flow (vph)	212	483	0	124	1089	0	282	937	0	248	1074	189
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	12.0	21.5		10.5	20.0		9.0	28.0		14.0	33.0	33.0
Effective Green, g (s)	12.0	21.5		10.5	20.0		9.0	28.0		14.0	33.0	33.0
Actuated g/C Ratio	0.13	0.24		0.12	0.22		0.10	0.31		0.16	0.37	0.37
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	236	1170		206	1093		343	1078		275	1297	580
v/s Ratio Prot	c0.12	0.10		0.07	c0.22		0.08	0.27		c0.14	c0.30	
v/s Ratio Perm												0.12
v/c Ratio	0.90	0.41		0.60	1.00		0.82	0.87		0.90	0.83	0.33
Uniform Delay, d1	38.4	28.9		37.8	35.0		39.7	29.3		37.3	25.9	20.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	32.5	0.2		4.9	26.1		14.6	9.6		30.1	6.2	1.5
Delay (s)	70.9	29.2		42.7	61.1		54.3	38.8		67.4	32.1	22.0
Level of Service	E	C		D	E		D	D		E	C	C
Approach Delay (s)		40.8			59.3			42.4			35.5	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	44.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

2035 Phase 2 PM Peak Hour Mitigation LOS Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	961	0	214	623	109	103	458	362	327	488	58
Future Volume (vph)	55	961	0	214	623	109	103	458	362	327	488	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3539		1770	3539	1583	1770	3539	1583	1770	3483	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433	3539		1770	3539	1583	1770	3539	1583	1770	3483	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	1045	0	233	677	118	112	498	393	355	530	63
RTOR Reduction (vph)	0	0	0	0	0	71	0	0	110	0	9	0
Lane Group Flow (vph)	60	1045	0	233	677	47	112	498	283	355	584	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	4.1	29.5		14.4	39.8	39.8	10.9	18.9	33.3	20.1	28.1	
Effective Green, g (s)	4.1	29.5		14.4	39.8	39.8	10.9	18.9	33.3	20.1	28.1	
Actuated g/C Ratio	0.04	0.29		0.14	0.39	0.39	0.11	0.19	0.33	0.20	0.28	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	139	1034		252	1395	624	191	662	522	352	969	
v/s Ratio Prot	0.02	c0.30		c0.13	0.19		0.06	c0.14	0.08	c0.20	0.17	
v/s Ratio Perm						0.03			0.10			
v/c Ratio	0.43	1.01		0.92	0.49	0.07	0.59	0.75	0.54	1.01	0.60	
Uniform Delay, d1	47.3	35.7		42.7	22.9	19.1	42.9	38.8	27.6	40.4	31.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.1	30.6		36.7	0.3	0.1	4.5	7.7	1.2	50.1	2.8	
Delay (s)	49.4	66.3		79.4	23.1	19.1	47.4	46.5	28.7	90.5	34.3	
Level of Service	D	E		E	C	B	D	D	C	F	C	
Approach Delay (s)		65.4			35.4			39.6			55.4	
Approach LOS		E			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	49.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	24	16	0	3	10	19	968	10	9	614	10
Future Volume (Veh/h)	13	24	16	0	3	10	19	968	10	9	614	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	26	17	0	3	11	21	1052	11	10	667	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								1253			753	
pX, platoon unblocked	0.96	0.96	0.93	0.96	0.96	0.93	0.93			0.93		
vC, conflicting volume	1273	1798	339	1483	1798	532	678			1063		
vC1, stage 1 conf vol	692	692		1100	1100							
vC2, stage 2 conf vol	580	1105		384	698							
vCu, unblocked vol	887	1431	137	1105	1431	349	502			920		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	90	98	100	99	98	98			99		
cM capacity (veh/h)	389	264	823	242	269	602	984			687		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	57	14	547	537	344	344
Volume Left	14	0	21	0	10	0
Volume Right	17	11	0	11	0	11
cSH	368	476	984	1700	687	1700
Volume to Capacity	0.16	0.03	0.02	0.32	0.01	0.20
Queue Length 95th (ft)	14	2	2	0	1	0
Control Delay (s)	16.6	12.8	0.6	0.0	0.5	0.0
Lane LOS	C	B	A		A	
Approach Delay (s)	16.6	12.8	0.3		0.2	
Approach LOS	C	B				

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	24	21	15	0	30	24	942	31	22	593	11
Future Volume (Veh/h)	21	24	21	15	0	30	24	942	31	22	593	11
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	26	23	16	0	33	26	1024	34	24	645	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (ft)								1055			951	
pX, platoon unblocked	0.90	0.90	0.97	0.90	0.90	0.89	0.97			0.89		
vC, conflicting volume	1296	1809	328	1500	1798	529	657			1058		
vC1, stage 1 conf vol	699	699		1093	1093							
vC2, stage 2 conf vol	597	1110		406	705							
vCu, unblocked vol	964	1532	246	1189	1520	218	585			813		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	90	97	94	100	95	97			97		
cM capacity (veh/h)	354	254	732	254	266	698	957			719		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	72	49	26	683	375	346	334
Volume Left	23	16	26	0	0	24	0
Volume Right	23	33	0	0	34	0	12
cSH	362	445	957	1700	1700	719	1700
Volume to Capacity	0.20	0.11	0.03	0.40	0.22	0.03	0.20
Queue Length 95th (ft)	18	9	2	0	0	3	0
Control Delay (s)	17.4	14.1	8.9	0.0	0.0	1.1	0.0
Lane LOS	C	B	A			A	
Approach Delay (s)	17.4	14.1	0.2			0.6	
Approach LOS	C	B					

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	355	826	173	218	489	130	186	766	117	181	858	164
Future Volume (vph)	355	826	173	218	489	130	186	766	117	181	858	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91		0.97	0.95		1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.97		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	4953		1770	4925		3433	3469		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	4953		1770	4925		3433	3469		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	386	898	188	237	532	141	202	833	127	197	933	178
RTOR Reduction (vph)	0	35	0	0	54	0	0	13	0	0	0	103
Lane Group Flow (vph)	386	1051	0	237	619	0	202	947	0	197	933	75
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	20.5	22.0		13.7	15.2		7.0	27.0		11.0	31.0	31.0
Effective Green, g (s)	20.5	22.0		13.7	15.2		7.0	27.0		11.0	31.0	31.0
Actuated g/C Ratio	0.23	0.25		0.15	0.17		0.08	0.30		0.12	0.35	0.35
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	404	1214		270	834		267	1044		217	1223	547
v/s Ratio Prot	c0.22	c0.21		0.13	0.13		0.06	c0.27		c0.11	c0.26	
v/s Ratio Perm												0.05
v/c Ratio	0.96	0.87		0.88	0.74		0.76	0.91		0.91	0.76	0.14
Uniform Delay, d1	34.1	32.4		37.2	35.4		40.5	30.1		38.8	26.1	20.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	33.1	6.7		25.8	3.6		11.6	12.8		36.5	4.5	0.5
Delay (s)	67.3	39.1		63.0	39.0		52.1	43.0		75.4	30.6	20.7
Level of Service	E	D		E	D		D	D		E	C	C
Approach Delay (s)		46.5			45.2			44.6			36.0	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	43.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	89.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Appendix D
AB52 Tribal Consultation

Foothill Gold Line

Metro Gold Line Foothill Extension Construction Authority

406 East Huntington Drive, Suite 202
Monrovia, CA 91016-3633

p 626.471.9050 f 626.471.9049
www.foothillgoldline.org

February 26, 2019

FGL-3RD-1866

Andrew Salas, Chairperson
Gabrieleno Band of Mission Indians - Kizh Nation
P.O. Box 393
Covina, CA, 91723

Sent by Certified Mail with Return Receipt

RE: Notice of Opportunity to Consult for the Metro Gold Line Foothill Extension Phase 2B – Supplemental EIR in the Counties of Los Angeles and San Bernardino

Dear Chairperson Salas,

The Metro Gold Line Foothill Extension Construction Authority (Authority) is initiating a Supplemental Environmental Impact Report (SEIR) for the Metro Gold Line Foothill Extension Phase 2B Project (Project). The Project is a 12.3-mile extension of the existing Metro Gold Line Light Rail Transit system from its current terminus in the City of Azusa, located in Los Angeles County, to the Montclair Transcenter, located in San Bernardino County. As a result of the proposed Project changes under review in the SEIR, the following earth disturbing activities may occur: (1) possible relocation of the future parking facility at the Pomona Station and (2) the possible widening of White Avenue from the existing railroad crossing north to the intersection with 6th Street in the city of La Verne. See attached exhibits for the location and limits of these activities.

A search of the Sacred Lands Files by the Native American Heritage Commission (NAHC) was completed for the proposed modified Project area, conducted through the NAHC, and sites have been located that may be impacted by the proposed modified Project. The NAHC recommends contacting you for additional information regarding these sites. State law, in accordance with Assembly Bill 52 (AB 52) and Section 21080.3.1(d) of the California Public Resources Code (PRC), allows California Native American tribes 30 days to request consultation regarding possible significant effects that implementation of the proposed modified Project may have on Tribal Cultural Resources (as defined in Section 21074 pf the PRC). The purpose of tribal consultation under AB 52 is to determine, as part of the CEQA review process, whether or not there are Tribal Cultural Resources within the proposed modified Project area, and, if so, whether or not the proposed modified Project would have a significant impact on those resources. If there might be significant impacts on Tribal Cultural Resources, then consultation would also help to determine the most appropriate way to avoid or mitigate those impacts.

Foothill Gold Line

Metro Gold Line Foothill Extension Construction Authority

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www.foothillgoldline.org

In accordance with Section 21080.3.1(d) of the PRC, you have 30 days from the receipt of this letter to either request or decline, in writing, consultation for the proposed modified Project. Please send your written response before March 28, 2019 to 406 E. Huntington Drive, Suite 202 Monrovia, CA 91016-3633. In your response, please reference the Metro Gold Line Foothill Extension Phase 2B, by name. If I do not receive a response by March 24, 2019, it will be presumed that you have declined consultation and we will proceed. We will begin consultation with you within 30 days of receiving a request for said consultation. Thank you, and we look forward to your response.

Respectfully,

Lisa Levy Buch
Chief Communications Officer
Metro Gold Line Foothill Extension Construction Authority

Enclosures –Exhibits

For all the Tribal letters, the same attachments were included with each letter about the Foothill Gold Line Project. The attachments are on the following pages.

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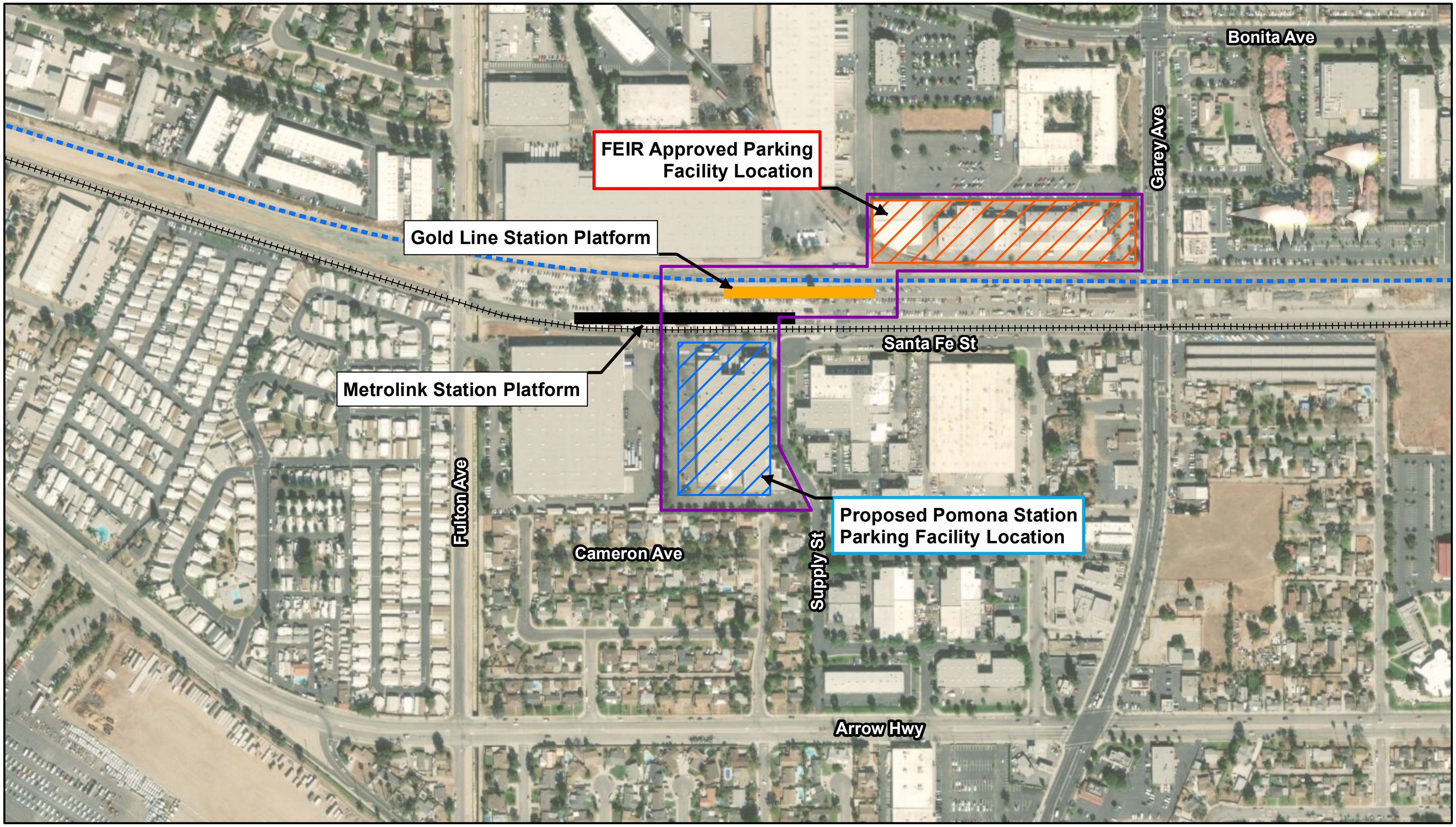

Legend

- Metro Gold Line Phase 2B
- Metrolink
- Metrolink Station Platform
- Gold Line Station Platform
- FEIR Approved Parking Facility Location
- Proposed Pomona Station Parking Facility Location
- Area of Potential Effects

Basemap Source: ESRI World Imagery

N

0 250 500

Feet

Figure 1
Area of Potential Effects Map –
Proposed Pomona Station Parking Facility
Metro Gold Line Phase 2B –
Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

JACOBS

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Legend

Area of Potential Effects

Metro Gold Line Phase 2B

Metrolink

Basemap Source: Google Earth Pro

Figure 2
Area of Potential Effects Map – Proposed Widening of White Avenue near La Verne Station
Metro Gold Line Phase 2B –
Azusa to Montclair Segment
Los Angeles County, California
San Bernardino County, California

JACOBS

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Foothill Gold Line

Metro Gold Line Foothill Extension Construction Authority

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February 26, 2019

FGL-3RD-1867

Sandonne Goad, Chairperson
Gabrielino/Tongva Nation
106 1/2 Judge John Aiso St., #231
Los Angeles, CA, 90012

Sent by Certified Mail with Return Receipt

RE: Notice of Opportunity to Consult for the Metro Gold Line Foothill Extension Phase 2B – Supplemental EIR in the Counties of Los Angeles and San Bernardino

Dear Chairperson Goad,

The Metro Gold Line Foothill Extension Construction Authority (Authority) is initiating a Supplemental Environmental Impact Report (SEIR) for the Metro Gold Line Foothill Extension Phase 2B Project (Project). The Project is a 12.3-mile extension of the existing Metro Gold Line Light Rail Transit system from its current terminus in the City of Azusa, located in Los Angeles County, to the Montclair Transcenter, located in San Bernardino County. As a result of the proposed Project changes under review in the SEIR, the following earth disturbing activities may occur: (1) possible relocation of the future parking facility at the Pomona Station and (2) the possible widening of White Avenue from the existing railroad crossing north to the intersection with 6th Street in the city of La Verne. See attached exhibits for the location and limits of these activities.

A search of the Sacred Lands Files by the Native American Heritage Commission (NAHC) was completed for the proposed modified Project area, conducted through the NAHC, and sites have been located that may be impacted by the proposed modified Project. The NAHC recommends contacting you for additional information regarding these sites. State law, in accordance with Assembly Bill 52 (AB 52) and Section 21080.3.1(d) of the California Public Resources Code (PRC), allows California Native American tribes 30 days to request consultation regarding possible significant effects that implementation of the proposed modified Project may have on Tribal Cultural Resources (as defined in Section 21074 pf the PRC). The purpose of tribal consultation under AB 52 is to determine, as part of the CEQA review process, whether or not there are Tribal Cultural Resources within the proposed modified Project area, and, if so, whether or not the proposed modified Project would have a significant impact on those resources. If there might be significant impacts on Tribal Cultural Resources, then consultation would also help to determine the most appropriate way to avoid or mitigate those impacts.

Foothill Gold Line

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In accordance with Section 21080.3.1(d) of the PRC, you have 30 days from the receipt of this letter to either request or decline, in writing, consultation for the proposed modified Project. Please send your written response before March 28, 2019 to 406 E. Huntington Drive, Suite 202 Monrovia, CA 91016-3633. In your response, please reference the Metro Gold Line Foothill Extension Phase 2B, by name. If I do not receive a response by March 27, 2019, it will be presumed that you have declined consultation and we will proceed. We will begin consultation with you within 30 days of receiving a request for said consultation. Thank you, and we look forward to your response.

Respectfully,

Lisa Levy Buch
Chief Communications Officer
Metro Gold Line Foothill Extension Construction Authority

Enclosures –Exhibits

Foothill Gold Line

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February 26, 2019 FGL-3RD-1868

Anthony Morales, Chairman
Gabrieleno/Tongva San Gabriel Band of Mission Indians
P.O. Box 693
San Gabriel, CA, 91778

Sent by Certified Mail with Return Receipt

RE: Notice of Opportunity to Consult for the Metro Gold Line Foothill Extension Phase 2B – Supplemental EIR in the Counties of Los Angeles and San Bernardino

Dear Chairperson Morales,

The Metro Gold Line Foothill Extension Construction Authority (Authority) is initiating a Supplemental Environmental Impact Report (SEIR) for the Metro Gold Line Foothill Extension Phase 2B Project (Project). The Project is a 12.3-mile extension of the existing Metro Gold Line Light Rail Transit system from its current terminus in the City of Azusa, located in Los Angeles County, to the Montclair Transcenter, located in San Bernardino County. As a result of the proposed Project changes under review in the SEIR, the following earth disturbing activities may occur: (1) possible relocation of the future parking facility at the Pomona Station and (2) the possible widening of White Avenue from the existing railroad crossing north to the intersection with 6th Street in the city of La Verne. See attached exhibits for the location and limits of these activities.

A search of the Sacred Lands Files by the Native American Heritage Commission (NAHC) was completed for the proposed modified Project area, conducted through the NAHC, and sites have been located that may be impacted by the proposed modified Project. The NAHC recommends contacting you for additional information regarding these sites. State law, in accordance with Assembly Bill 52 (AB 52) and Section 21080.3.1(d) of the California Public Resources Code (PRC), allows California Native American tribes 30 days to request consultation regarding possible significant effects that implementation of the proposed modified Project may have on Tribal Cultural Resources (as defined in Section 21074 pf the PRC). The purpose of tribal consultation under AB 52 is to determine, as part of the CEQA review process, whether or not there are Tribal Cultural Resources within the proposed modified Project area, and, if so, whether or not the proposed modified Project would have a significant impact on those resources. If there might be significant impacts on Tribal Cultural Resources, then consultation would also help to determine the most appropriate way to avoid or mitigate those impacts.

Foothill Gold Line

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Respectfully,

Lisa Levy Buch
Chief Communications Officer
Metro Gold Line Foothill Extension Construction Authority

Enclosures –Exhibits

Foothill Gold Line

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February 26, 2019

FGL-3RD-1869

Robert Dorame, Chairperson
Gabrielino Tongva Indians of California Tribal Council
P.O. Box 490
Bellflower, CA, 90707

Sent by Certified Mail with Return Receipt

RE: Notice of Opportunity to Consult for the Metro Gold Line Foothill Extension Phase 2B – Supplemental EIR in the Counties of Los Angeles and San Bernardino

Dear Chairperson Dorame,

The Metro Gold Line Foothill Extension Construction Authority (Authority) is initiating a Supplemental Environmental Impact Report (SEIR) for the Metro Gold Line Foothill Extension Phase 2B Project (Project). The Project is a 12.3-mile extension of the existing Metro Gold Line Light Rail Transit system from its current terminus in the City of Azusa, located in Los Angeles County, to the Montclair Transcenter, located in San Bernardino County. As a result of the proposed Project changes under review in the SEIR, the following earth disturbing activities may occur: (1) possible relocation of the future parking facility at the Pomona Station and (2) the possible widening of White Avenue from the existing railroad crossing north to the intersection with 6th Street in the city of La Verne. See attached exhibits for the location and limits of these activities.

A search of the Sacred Lands Files by the Native American Heritage Commission (NAHC) was completed for the proposed modified Project area, conducted through the NAHC, and sites have been located that may be impacted by the proposed modified Project. The NAHC recommends contacting you for additional information regarding these sites. State law, in accordance with Assembly Bill 52 (AB 52) and Section 21080.3.1(d) of the California Public Resources Code (PRC), allows California Native American tribes 30 days to request consultation regarding possible significant effects that implementation of the proposed modified Project may have on Tribal Cultural Resources (as defined in Section 21074 pf the PRC). The purpose of tribal consultation under AB 52 is to determine, as part of the CEQA review process, whether or not there are Tribal Cultural Resources within the proposed modified Project area, and, if so, whether or not the proposed modified Project would have a significant impact on those resources. If there might be significant impacts on Tribal Cultural Resources, then consultation would also help to determine the most appropriate way to avoid or mitigate those impacts.

Foothill Gold Line

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Respectfully,

Lisa Levy Buch
Chief Communications Officer
Metro Gold Line Foothill Extension Construction Authority

Enclosures –Exhibits

Foothill Gold Line

Metro Gold Line Foothill Extension Construction Authority

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February 26, 2019

FGL-3RD-1870

Charles Alvarez
Gabrielino-Tongva Tribe
23454 Vanowen Street
West Hills, CA, 91307

Sent by Certified Mail with Return Receipt

RE: Notice of Opportunity to Consult for the Metro Gold Line Foothill Extension Phase 2B – Supplemental EIR in the Counties of Los Angeles and San Bernardino

Dear Charles Alvarez,

The Metro Gold Line Foothill Extension Construction Authority (Authority) is initiating a Supplemental Environmental Impact Report (SEIR) for the Metro Gold Line Foothill Extension Phase 2B Project (Project). The Project is a 12.3-mile extension of the existing Metro Gold Line Light Rail Transit system from its current terminus in the City of Azusa, located in Los Angeles County, to the Montclair Transcenter, located in San Bernardino County. As a result of the proposed Project changes under review in the SEIR, the following earth disturbing activities may occur: (1) possible relocation of the future parking facility at the Pomona Station and (2) the possible widening of White Avenue from the existing railroad crossing north to the intersection with 6th Street in the city of La Verne. See attached exhibits for the location and limits of these activities.

A search of the Sacred Lands Files by the Native American Heritage Commission (NAHC) was completed for the proposed modified Project area, conducted through the NAHC, and sites have been located that may be impacted by the proposed modified Project. The NAHC recommends contacting you for additional information regarding these sites. State law, in accordance with Assembly Bill 52 (AB 52) and Section 21080.3.1(d) of the California Public Resources Code (PRC), allows California Native American tribes 30 days to request consultation regarding possible significant effects that implementation of the proposed modified Project may have on Tribal Cultural Resources (as defined in Section 21074 pf the PRC). The purpose of tribal consultation under AB 52 is to determine, as part of the CEQA review process, whether or not there are Tribal Cultural Resources within the proposed modified Project area, and, if so, whether or not the proposed modified Project would have a significant impact on those resources. If there might be significant impacts on Tribal Cultural Resources, then consultation would also help to determine the most appropriate way to avoid or mitigate those impacts.

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In accordance with Section 21080.3.1(d) of the PRC, you have 30 days from the receipt of this letter to either request or decline, in writing, consultation for the proposed modified Project. Please send your written response before March 28, 2019 to 406 E. Huntington Drive, Suite 202 Monrovia, CA 91016-3633. In your response, please reference the Metro Gold Line Foothill Extension Phase 2B, by name. If I do not receive a response by March 24, 2019, it will be presumed that you have declined consultation and we will proceed. We will begin consultation with you within 30 days of receiving a request for said consultation. Thank you, and we look forward to your response.

Respectfully,

Lisa Levy Buch
Chief Communications Officer
Metro Gold Line Foothill Extension Construction Authority

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Appendix E
Supplemental Noise and Vibration Analysis

ATSConsulting
acoustics, transportation + strategy

MEMORANDUM

To: Denis Cournoyer, PE
Metro Gold Line Foothill Extension Construction Authority

From: Shannon McKenna
Judy Rochat
Christopher Layman
ATS Consulting

Date: October 8, 2018

Subject: **DRAFT:** Updates to the Foothill Gold Line Extension Azusa to Montclair Noise and Vibration Assessment

Table of Contents

List of Figures

List of Tables

1. INTRODUCTION

This memorandum presents an updated noise and vibration analysis to refine the mitigation measures presented in the Final Environmental Impact Report (Final EIR) for the Metro Gold Line Foothill Extension from Azusa to Montclair Project. In 2016 as part of Addendum 3, the noise and vibration predictions were updated to reflect design refinements made since the Final EIR analysis[1]. However, the Addendum 3 assessment only updated the predicted levels based on minor changes in the track alignment and crossover locations. This assessment includes further study that was recommended in the Final EIR to finalize the mitigation measures including:

- Accounting for noise reduction from existing property walls and terrain.
- Additional vibration propagation measurements.
- Numerical modeling of vibration mitigation options.

Consistent with the 2013 Final EIR, all analyses in this memorandum use the Federal Transit Administration (FTA) noise and vibration prediction procedures and impact criteria outlined in the FTA Guidance Manual[2]. The prediction models are described in detail in the 2013 Final EIR. The updated predicted levels also use the most recent design drawings, dated May 20, 2018 and updated operating assumptions regarding headways and train lengths.

1.1 Summary of Changes to Impact Assessment

1.1.1 Noise

The updates to the noise impact assessment include changes to the operational assumptions regarding headways and accounting for noise reduction from existing property walls and terrain. The operating assumptions were changed from 10-minute peak headways in the 2013 Final EIR assessment down to 5- minute peak headways and the train length was increased from 2-car in the 2013 Final EIR up to 3-cars. These changes in operational assumptions result in about a 6 decibel increase in predicted LRT 24-hour day-night noise exposure (Ldn).

The 2013 Final EIR analysis did not account for noise reduction from existing property walls; however, it did recommend that existing walls should be taken into account before the mitigation design was finalized. Site visits were used to identify existing property walls and their heights, which were incorporated into the mitigation recommendations for this assessment. Terrain features or intervening buildings that could provide acoustic shielding were also incorporated into the assessment.

This updated assessment additionally includes a noise analysis of five park and ride facilities located near future rail stations in the cities of Glendora, San Dimas, La Verne, Pomona and Claremont.

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[1] Appendix B of Addendum No. 3 to Final Environmental Impact Report for Metro Gold Line Foothill Extension – Azusa to Montclair (SCH 2010121069) Evaluation Minor Design Changes of the Project Azusa to Montclair. March 2013.

[2] *Transit Noise and Vibration Impact Assessment* Document FTA-VA-90-1003-06. Office of Planning and Environment Federal Transit Administration. May 2006.

1.1.2 Vibration

The updates to the vibration impact assessment includes vibration propagation measurements at 5 additional locations and numerical modeling of different mitigation options.

The vibration propagation measurements are used to determine how easily vibration travels through the ground. The 2013 Final EIR prediction model combined measured vibration propagation data into worst-case results for three different areas: Glendora, San Dimas/La Verne, and Pomona/Claremont. Site-specific vibration propagation data were used to refine predicted levels and mitigation recommendations at the five measurement sites.

The 2013 Final EIR analysis recommended tire-derived aggregate (TDA) or ballast mat to reduce the predicted vibration levels to below the applicable threshold for ballast-and-tie-track. Typical TDA and single-layer ballast mat installations have been shown to provide vibration reductions at frequencies of 40 Hz and above. However, the vibration propagation data from the 2013 analysis and this analysis show very effective vibration transmissibility in the 31.5 Hz 1/3 octave band in Glendora.

ATS assessed different mitigation options for achieving vibration reduction in the 31.5 Hz 1/3 octave band using numerical modeling. The best performing mitigation options was one-inch and two-inch ballast mat installations. The numerical modeling showed the thicker 2-inch ballast mat option could provide the necessary vibration reduction in the 31.5 Hz 1/3 octave band in Glendora and San Dimas and a 1-inch ballast mat option would provide the necessary vibration reduction in Claremont.

Other mitigation options investigated with numerical modeling are: increasing the ballast thickness, resilient direct fixation fasteners, and a sound wall with a vibration mitigating foundation. The results from those mitigation options are presented in Appendix D.

Whereas in the original analysis elevated vibration levels due to crossovers were adjusted by a constant factor at all distances, the refined analysis uses a distance adjustment to account for lower levels at further distances from the crossover.

1.2 Summary of Mitigation Recommendations

1.2.1 Noise

The updated noise assessment recommends noise barriers, sound insulation, rail dampers and low-impact frogs as noise mitigation measures. The recommended noise barrier locations and heights are different than those recommended in the 2013 Final EIR due to additional noise impacts predicted because of changes to the operating assumptions and elimination of noise barriers where existing property walls would effectively reduce noise levels. Key points on the recommended noise mitigation measures are:

- A total length of 34,075 feet of noise barriers are recommended. Details on location and height are presented in Table 27. The table also specifies if the noise barriers should be located at the right-of-way line or 10 feet from the near track centerline.
- Locations where existing property walls or terrain will effectively reduce noise levels and no noise barrier is recommended are presented in Table 28.
- Residential sound insulation is recommended for upper stories and for residences located near grade-crossings. Noise barriers will not effectively break the line-of-sight for upper story receivers and where sound walls must end at intersections with streets.
- Metro requires noise barriers be reduced in height 250 feet from grade crossings to maintain visibility. The recommended mitigation measure is to use transparent panels on top of the reduced

height wall to maintain visibility and reduce noise levels. If transparent panels are not feasible, residential sound mitigation should be evaluated for all receivers affected by the reduced height of sound walls at intersections.

- Monoblock frogs provide a smoother transition through the gap in the rail at crossovers compared to typical RBM frogs, which results in lower noise and vibration levels. The locations where monoblock frogs are recommended is presented in Table 31.
- Rail dampers reduced rolling noise by the addition of a damped mass attached to the rails. The locations where real dampers are recommended is presented in Table 32.

1.2.2 Vibration

The updated analysis incorporating the additional vibration propagation measurements and numerical modeling of ballast mat showed that ballast mat and monoblock frogs would reduce the predicted vibration levels to below the applicable impact threshold at all sensitive receiver clusters except one. The recommended mitigation measures are summarized by city in Table 1. Detailed information on ballast mat and monoblock frog locations are provided in Table 31 and Table 34 respectively.

The sensitive receiver cluster where ballast mat and monoblock frog do not reduce the predicted level to below the impact threshold are the residences closest to the crossover east of the Dalton Wash in Glendora. A site-specific vibration propagation measurement indicated that there is very efficient vibration propagation in this area (Glendora WB16). Options for reducing the predicted vibration from the crossover at this location are:

- Install a spring-rail or moveable point frog with ballast mat
- Install a monoblock frog on floating slab track

Table 1: Vibration Mitigation Summary

City	Mitigation Measure	Length
Glendora	2 inch ballast mat	14,693 ft
San Dimas	1 inch ballast mat	550 ft
La Verne	None	0 ft
Pomona	none	0 ft
Claremont	1 inch ballast mat	2,000 ft
Claremont – Metrolink tracks	1 inch ballast mat	1,425 ft
Montclair	None	0 ft

Source: ATS Consulting 2017

2. CHANGES TO THE NOISE IMPACT ASSESSMENT

2.1 Changes in Headway Assumptions

Noise predictions were updated to reflect the new train schedule and train length as shown in Table 2. For most of the operating hours, the headways were reduced, increasing the number of trains. During peak hours, the headway was reduced from 10 minutes to 5 minutes. Also, the number of train cars increased from two to three. The decrease in headway and the increase in number of cars results in a 6.6 decibel increase in predicted Ldn compared to the 2013 Final EIR operating schedule assumptions.

Table 2: Operating Schedule for Noise Predictions

Time	Headway	Train Length
4am-5am	20 minutes	3 cars
5am-11am	5 minutes	3 cars
11am-4pm	12 minutes	3 cars
4pm-8pm	5 minutes	3 cars
8pm-12am	12 minutes	3 cars
12am-2am	20 minutes	3 cars

Source: Metro Gold Line Foothill Extension Construction Authority, 2017

2.2 Accounting for Existing Walls

The 2013 Final EIR analysis did not consider noise reduction from existing property walls. However, the Final EIR states:

> "During the final design of the project, the effectiveness of the existing barrier/privacy walls can be assessed and incorporated into final mitigation measures. It may be determined that a number of the existing barriers are effective sound walls, or that some may need to be only repaired or raised slightly to provide the appropriate level of noise reduction."

As part of this updated analysis, ATS made site visits to properties along the alignment where existing walls and earth berms would reduce and potentially eliminate noise impacts. The wall/berm heights were measured or estimated, and the noise predictions were updated to account for the acoustic shielding provided by the walls.

2.3 Accounting for Other Noise Shielding

In addition to walls and earth berms, other features along the alignment have the potential to at least partially shield sensitive receivers from train noise. These include: 1) intervening buildings, and 2) embankments where line of sight from the trains to the sensitive receivers is blocked by the terrain. The noise predictions were updated to include these features, where applicable.

2.4 TPSS Analysis

The TPSS analysis was updated using the TPSS locations in the current design drawings. The alternate locations for units 1, 2, and 5 that were included in the 2013 Final EIR have been eliminated, and the remaining TPSS units were re-assessed to confirm or update final distances between the TPSS unit and the nearest receivers. The noise levels were predicted using the same methodology that was used in the 2016 EIR Addendum 3.

3. CHANGES TO THE VIBRATION IMPACT ASSESSMENT

The 2013 Final EIR identified several locations in the corridor where vibration mitigation was recommended, but the predicted vibration level only slightly exceeded the FTA vibration impact threshold. The Final EIR recommended that "during final design the vibration predictions at these residences should be revisited to ensure that vibration mitigation is necessary".

In 2016 as part of Addendum 3, the vibration predictions were updated to reflect design refinements made since the Final EIR analysis[3]. However, the Addendum 3 vibration assessment did not include the further study recommended in the Final EIR, but only updated the predicted levels based on minor changes in the track alignment and crossover locations. This assessment includes the further study recommended in the Final EIR. To refine and finalize the vibration mitigation recommendations ATS completed:

- Site-specific vibration propagation measurements and
- Computer modeling of vibration mitigation measures.

Furthermore, in the 2013 Final EIR the adjustment due to regular RBM and monoblock frogs was a constant +10 dB and + 5dB, respectively. Since the adjustment depends on the proximity of the receptor to the crossover a conservative distance adjustment was established based on measured vibration propagation.

3.1 Vibration Propagation Measurements

Vibration propagation tests were completed at five sites in May and June 2017 to refine the predicted vibration levels and finalize the vibration mitigation recommendations. The vibration propagation measurements are used to determine the line source transfer mobility (LSTM). The LSTM quantifies how easily vibration will travel from the tracks, through the ground and into adjacent residences.

LSTM is measured using a drop hammer to generate a vibration force at points along a line where the proposed tracks will be located. The vibration response of the force generated by the drop hammer is measured at several distances from the line of impacts. A schematic of the vibration propagation test is shown in Figure 1.

The LSTM applied in the Final EIR prediction model combined the measured LSTM data into worst-case results for three different areas: Glendora, San Dimas/La Verne, and Pomona/Claremont. Site-specific vibration propagation data was used to refine predicted levels and vibration mitigation recommendations where vibration impact was predicted using the worst-case LSTM data. Table 3 lists the five sites where site-specific LSTM was measured in May and June 2017.

The updated predicted levels using the site-specific propagation measurements and refined mitigation recommendations are presented in Section 3.3. The results of the propagation measurements are presented in Appendix B. The key observations from the results are:

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[3] Appendix B of Addendum No. 3 to Final Environmental Impact Report for Metro Gold Line Foothill Extension – Azusa to Montclair (SCH 2010121069) Evaluation Minor Design Changes of the Project Azusa to Montclair. March 2013.

- The LSTM sites in Glendora showed similar trends to the data measured from the 2013 Final EIR Analysis. The peak LSTM values were in the 31.5 to 60 Hz range.
- The site at residential cluster Glendora WB16 is the only location that showed higher levels than the LSTM applied in the 2013 Final EIR prediction model. This is the residential cluster just east of the Dalton Wash.
- The LSTM measured at the San Dimas Red Roof Inn showed substantially lower LSTM levels compared to the measurements sites in Glendora. This is consistent with other LSTM measurements in San Dimas from the 2013 Final EIR.

Table 3: Vibration Propagation Measurement Locations

City	Cluster	Address
Glendora	WB 2	141 Washington Avenue
Glendora	WB 3a	375 S Glendora Avenue
Glendora	WB 16	1258 St Vladimir Street
Glendora	EB 12	1005 Gladstone Street
San Dimas	EB 1	Red Roof Inn

Source: ATS Consulting 2017

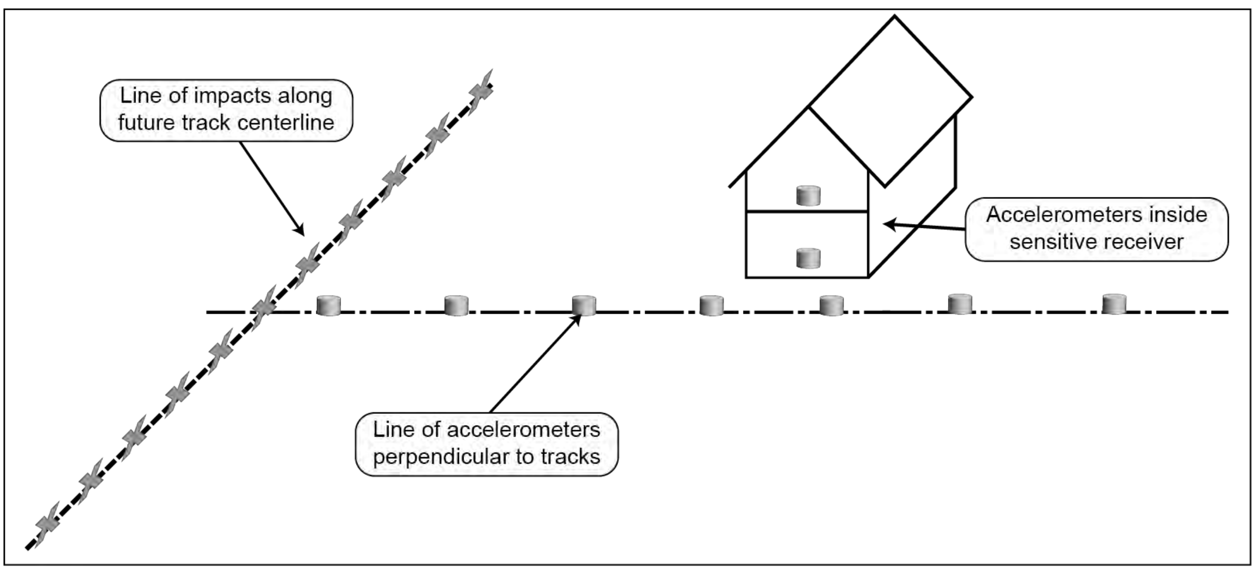

Figure 1: Schematic of Vibration Propagation Test

3.2 Vibration Mitigation Modeling

The 2013 Final EIR analysis recommended tire-derived aggregate (TDA) or ballast mat to reduce the predicted vibration levels to below the applicable threshold for ballast-and-tie-track. Typical TDA and single-layer ballast mat installations have been shown to provide vibration reductions at frequencies of 40 Hz and above. However, the vibration propagation data from the 2013 analysis and this analysis show very effective vibration transmissibility in the 31.5 Hz 1/3 octave band in Glendora.

ATS assessed different mitigation options for reducing vibration in the 31.5 Hz 1/3 octave band. The option with the best results is a two-inch installation of ballast mat. Sacramento Regional Transit recently performed validation measurements of a two-inch ballast mat installation at a residence that was 19 feet from the LRT track, which showed that the two-layer ballast mat successfully reduced the train vibration to below the FTA impact threshold[4].

The following section presents the modeling details and results for one-inch and two-inch ballast mat options. The modeling details and results for other mitigation options are presented in Appendix D. The mitigation options investigated are: ballast mat, increasing the ballast thickness, resilient direct fixation fasteners, and a sound wall with a vibration mitigating foundation.

3.2.1 Numerical Modeling Details

To estimate the influence of a ballast mat on the train groundborne vibration and groundborne noise a numerical model was constructed. The model followed a 2.5-dimensional approach[5], whereby the periodic stiffness of the rail pads, ties, and ballast are smoothed out by means of normalization to the tie spacing, thus creating a model geometry that is invariant in the direction of the track. This allows for a Fourier transform with respect to the coordinate along the track and leads to a solution in the frequency-wavenumber domain where the original 3D problem is replaced by a 2D problem for each wavenumber. The 2.5D methodology results in a considerable reduction of the time required to set up the model as well as the computation time.

The finite element method (FEM) was utilized for the track system (rails and sleepers) and the boundary element method (BEM) for the ground; at the track-ground interface the two methods were coupled together. The rail pads, ballast, and ballast mat were represented by a distributed system of linear springs and dampers, so that only the ballast underneath each sleeper contributes to the track stiffness. Lastly, the mass of the rail pads and ballast mat are ignored. The mass of the ballast is included.

The model consisted of a single moving axle load coupled to a ballasted track system that rests on the ground, see Figure 2. Properties of all the components in the model are presented in Table 4. The goal of the model was to quantify how effective the ballast mat is as a vibration mitigation measure. This can be achieved by examining the vibration at the track-ground interface with and without the ballast mat in place. The ratio of the vibration with and without the ballast mat is defined as the insertion loss, which is expressed in this report in decibels[6]. Positive values of insertion loss indicate that the ballast mat is providing vibration mitigation, whereas negative values of insertion loss indicate the mat is amplifying vibrations.

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[4] Vibration Mitigation Test Report. South Sacramento Corridor Phase 2 Submittal No TR049R1. Wilson Ihrig & Associates. 20 August 2015.

[5] S. François, M. Schevenels, P. Galvín, G. Lombaert and G. Degrande, *Computer Methods in Applied Mechanics and Engineering*, Volume 199, Issues 23–24, 15 April 2010, Pages 1536-1548.

[6] Insertion Loss = 20*log(vibration velocity without ballast mat / vibration velocity with ballast mat)

Manufacturer's data was used for the bedding modulus of the ballast mat for 1 and 2 inch thick mats. The 2 inch thick mat is simply two stacked 1 inch mats. The mass of the ballast that sits atop the mat was estimated by assuming a 14 inch deep ballast with a density of 106 lb/ft^3, and as previously mentioned only the ballast directly under the tie is accounted for.

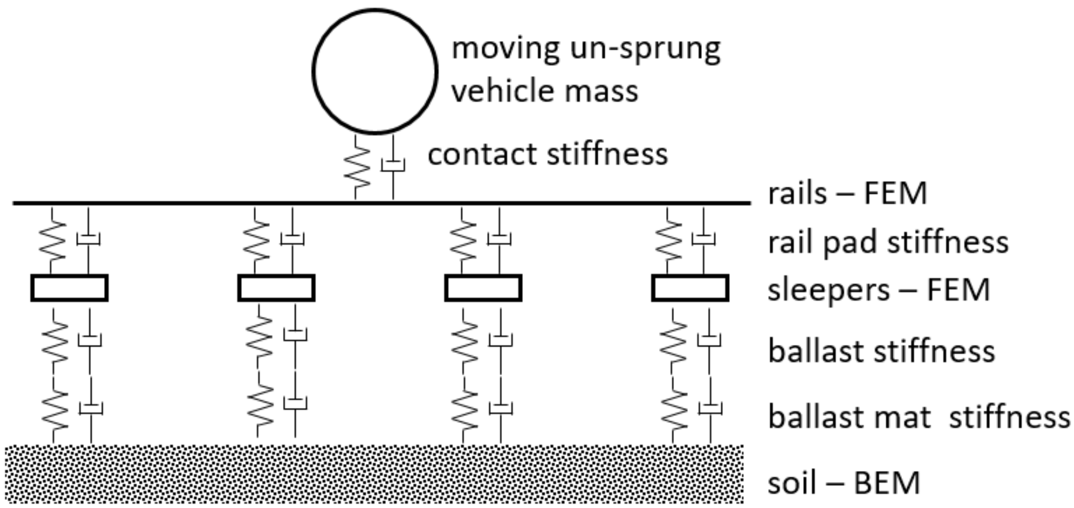


Figure 2: The Rail Vehicle Vibration Model for a Ballasted Track Including a Resilient Ballast Mat

Table 4: Model Parameters

Feature	Property	Value	Units
Rails	Mass/length	40	lbm/ft
	Bending stiffness	944	lbf in^2
Rail Pads	Dynamic Stiffness	856522	lbf/in
	Viscous Damping	5700	lbf s/in
Sleepers	Mass	660	lbm
	Moment of inertia	41	lbm ft^2
Ballast	Depth	14	in
	Density	106	lbm/ft^3
	Dynamic Stiffness	5257800	lbf/in
	Viscous Damping	570	lbf s/in
Ballast Mat	Dynamic Bedding Modulus: Single Layer	28	MN/m^3
	Dynamic Bedding Modulus: Double Layer	13	MN/m^3
	Viscous Damping	20	kN s/mm^3

Feature	Property	Value	Units
Vehicle	Speed	55	mph
	Un-spring mass: half a bogie	5700	lbm
	Contact Spring Stiffness	1	GPa
Soil	Shear Wave Speed	200, 400	m/s
	Compressional Wave Speed	400, 800	m/s
	Density	1800	kg/m^3
	Shear Damping Ratio	3	%
	Compressional Damping Ratio	3	%

3.2.2 Numerical Model Results

The insertion loss of the track with ballast mat referenced against the track without a ballast mat is shown in Figure 3. Results are given for soft and stiff soil conditions. The stiffer soil tends to improve the insertion loss at higher frequencies, whereas the softer soil shows improvement at lower frequencies. Because the frequency range of primary concern is 31.5 Hz to 50 Hz predictions using the stiffer soil are a conservative approach.

The insertion loss (or vibration reduction) used to predict vibration levels with mitigation is plotted with the numerical model results in Figure 3. The insertion loss used in the prediction model is limited to 10 decibels for a 1-inch mat and to 12 decibels for a 2-inch mat because measurements have shown that the models tend to overpredict the insertion loss at high frequencies[7]. At lower insertion loss values, the levels used in the predictions are the values provided by the numerical model.

[7] C.E. Hanson and H.L. Singleton Jr. Performance of ballast mats on passenger railroads: Measurement vs. projections. Journal of Sound and Vibration 293 (2006) 873-877. Accepted 26 August 2005.

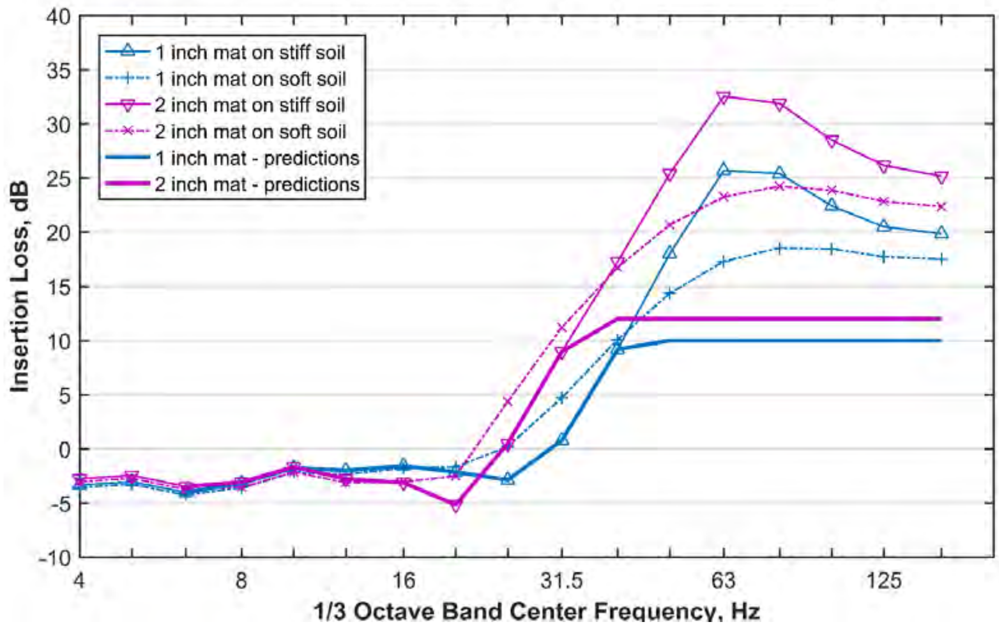


Figure 3: Numerical Model of Insertion Loss for Ballast Mat

3.3 Refined Vibration Predictions

This section presents the predicted levels at the sensitive receiver clusters where the site-specific vibration propagation measurements were performed. The predictions use the LSTM data presented in Appendix B and the vibration reduction for ballast mat from the numerical model presented in Section 3.2.

The predicted levels use the same prediction model as in the Final EIR, but apply the site-specific LSTM data. The predictions follow the Detailed Assessment Methodology from the FTA Guidance Manual. The key assumptions used in the prediction model are:

- The force density level (FDL) was measured on the Gold Line near the Chinatown Station.
- An operational speed of 65 mph. The FDL was measured for LRVs traveling an average of 53 mph. The FDL was adjusted to 65 mph using the approach recommended in the FTA Guidance Manual: 20*log(65mph / 53mph).
- A +2 decibel safety factor. The 2013 Final EIR used a +3 dB safety factor, but a smaller safety factor is warranted where there are site-specific LSTM measurements.
- In the original 2013 Final EIR the adjustment due to typical RBM and monoblock frogs was a constant +10 dB and + 5dB, respectively. A monoblock frog is a type of low-impact frog that was recommended in Addendum 3 as a mitigation measure. Since the adjustment depends on the proximity of the receptor to the crossover a conservative distance adjustment was established based on measured vibration propagation. At distances greater than 50 ft the additional vibration from the frog is assumed to decay at a rate of $15*\text{Log}_{10}(\text{dist})$, beyond 200 ft the adjustment is zero. The locations where monoblock frogs are assumed are listed in Table 31 in Section 5.1.4
- No building adjustment for coupling loss or floor amplification. This is consistent with the 2013 Final EIR prediction model.

3.3.1 Glendora WB 2: 141 Washington Avenue

Glendora WB 2 is a cluster of residences located near a proposed crossover. The nearest residential building is 66 feet from the westbound track. The nearest residential building to the crossover is 140 feet. An aerial photograph of the sensitive receivers in cluster Glendora WB 2 is shown in Figure 4.

The predicted vibration level was updated using site-specific LSTM data. The measured LSTM data are shown in Appendix B. Predicted vibration levels are shown for the standard tangent track, for the crossover, and with and without mitigation. The predicted level with the crossover assumes amplification from a monoblock frog.

The predicted levels are shown in Table 5 and in Figure 5. Without mitigation, the predicted level exceeds the FTA impact threshold between 31.5 Hz and 63 Hz. The recommended mitigation measure is two-inch ballast mat. Details on the ballast mat are discussed in Section 5.2.1.

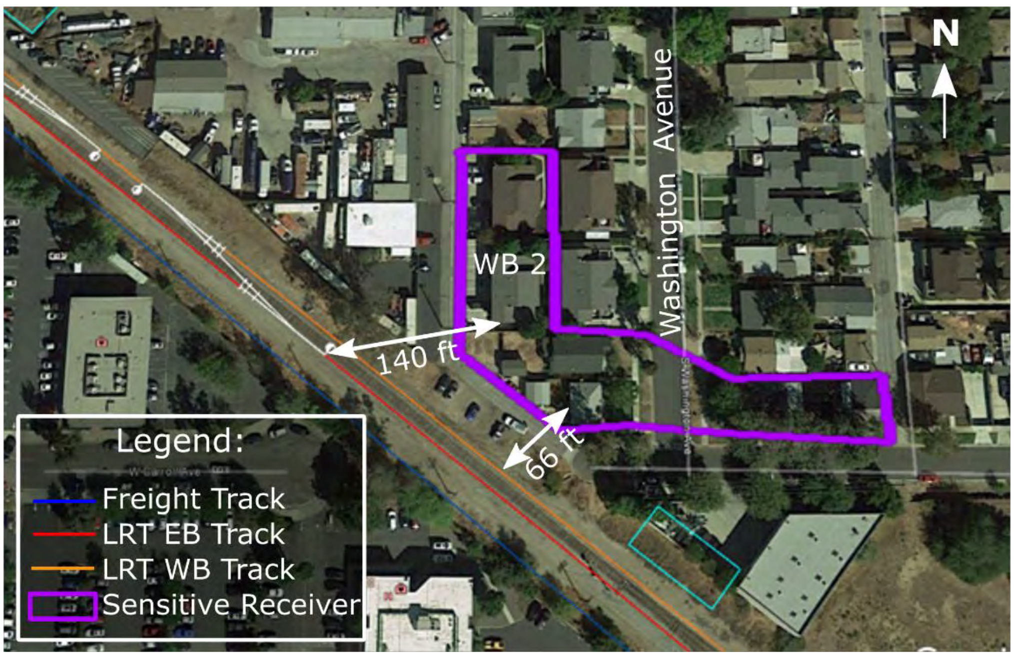


Figure 4: Aerial Photograph of Glendora WB2

Table 5: Predicted Vibration Levels at Glendora WB2

Cluster No.	Eng. Station	Dist., ft[1]	Speed, mph	Threshold, VdB	Predicted Band Max., VdB[2]	1/3 Octave Band, Hz[3]	Impact
WB2, no crossover	1494+00	66	65	72	75	50	Yes
WB2, with crossover	1495+00	140	65	72	71	50	—
WB2, no crossover, with mitigation	1494+00	66	65	72	66	20	—
WB2, with crossover and mitigation	1495+00	140	65	72	68	20	—

Table 5: Predicted Vibration Levels at Glendora WB2

Cluster No.	Eng. Station	Dist., ft[1]	Speed, mph	Threshold, VdB	Predicted Band Max., VdB[2]	1/3 Octave Band, Hz[3]	Impact

Source: ATS Consulting, 2018
Notes:
[1]The distance in feet from the closest sensitive receiver in the cluster to the proposed near light-rail track.
[2]Maximum predicted vibration level in any 1/3 octave band.
[3]The 1/3 octave band that corresponds to the predicted band maximum.

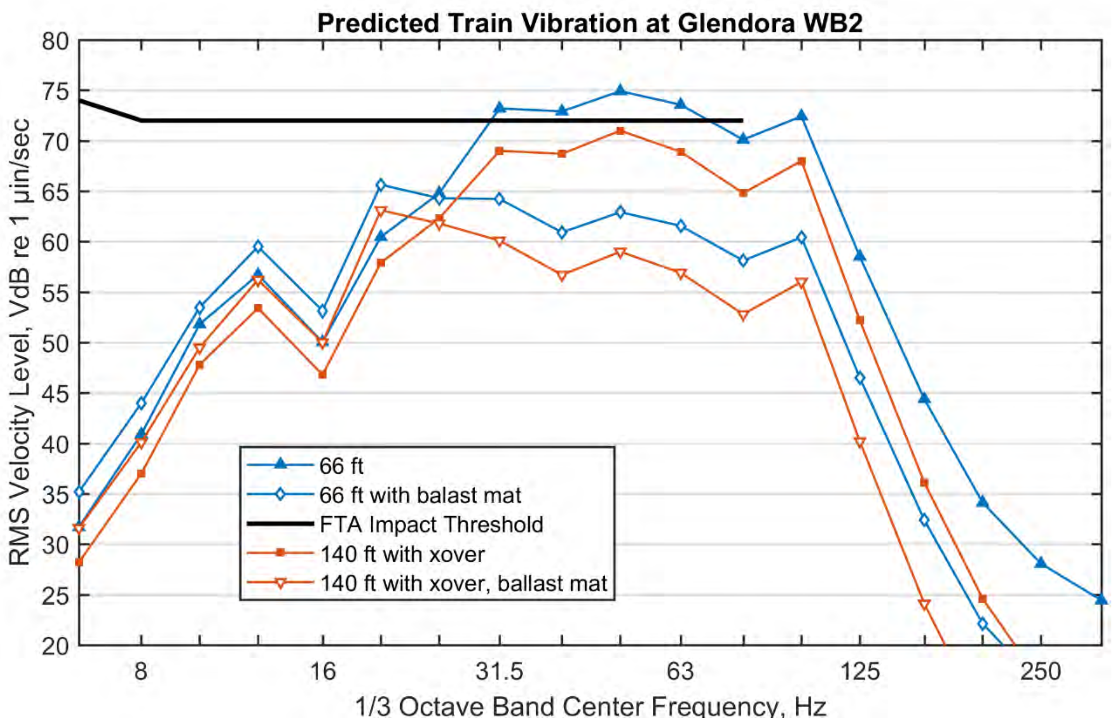


Figure 5: Predicted Train Vibration at Glendora WB2

3.3.2 Glendora WB3a: 375 S Glendora Avenue

Glendora WB 3a is a new development between Glendora Avenue and Ada Avenue. The proposed light-rail centerline curves closest to the town homes at the east end of the development. The nearest townhome to the light-rail track centerline is 47 feet. At the middle of the development, the townhomes are about 85 feet from the tracks. An aerial photograph of the development in Glendora WB 3a is shown in Figure 6.

The predicted vibration level was updated using site-specific LSTM data. The measured LSTM data is shown in Appendix B. Predicted vibration levels are shown for the townhomes closest to the tracks and the town homes in the middle of the development.

The predicted levels are shown in Table 6 and Figure 7. Without mitigation, the predicted level exceeds the FTA impact threshold at the closest building within the cluster. The recommended mitigation measure is two layers of ballast mat for the closest building. Details on the ballast mat are discussed in Section 5.2.1.

Figure 6: Aerial Photograph of Glendora WB3a

Table 6: Predicted Vibration Levels at Glendora WB3a

Cluster No.	Eng. Station	Dist., ft[1]	Speed, mph	Threshold, VdB	Predicted Band Max., VdB[2]	1/3 Octave Band, Hz[3]	Impact
WB3a east building	1516+00	47	65	72	76	50	Yes
WB3a other buildings	1511+00	85	65	72	68	31.5	—
WB3a east building with ballast mat	1516+00	47	65	72	67	20	—

Source: ATS Consulting, 2018
Notes:
[1]The distance in feet from the closest sensitive receiver in the cluster to the proposed near light-rail track.
[2]Maximum predicted vibration level in any 1/3 octave band.
[3]The 1/3 octave band that corresponds to the predicted band maximum.

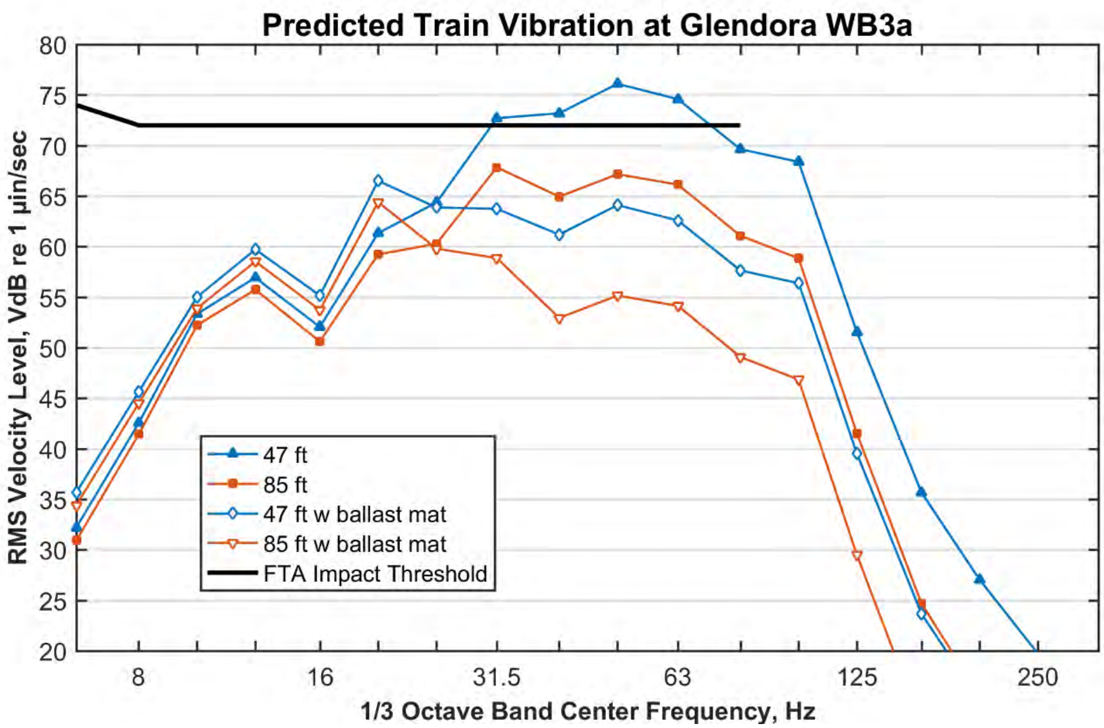


Figure 7: Predicted Train Vibration at Glendora WB3a

3.3.3 Glendora WB5 and WB6: Lemon Avenue and S Pasadena Avenue

Glendora WB5 and WB6 are clusters of multi-family residences located at the intersection of Lemon Avenue and S Pasadena Avenue. The nearest residences are 29 feet and 23 feet from the proposed track centerline in clusters WB5 and WB6, respectively. An aerial photograph of the sensitive receivers is shown in Figure 8.

A site-specific LSTM was completed at cluster WB5 as part of the 2013 Final EIR analysis (vibration propagation site V-13). A request for right-of-entry to the property at the north-east quadrant of the grade-crossing at Pasadena Avenue in cluster WB6 was not granted, so site-specific LSTM data could not be gathered on that property. Therefore, the LSTM data measured at cluster WB5 was also applied to cluster WB6.

The predicted levels using the LSTM data from site V-13 from the Final EIR analysis are shown in Table 7 and Figure 9. Without mitigation, the predicted level exceeds the FTA impact threshold. With two layers of ballast mat, the predicted level is reduced to below the impact threshold at both receivers. Details on the ballast mat are discussed in Section 5.2.1.

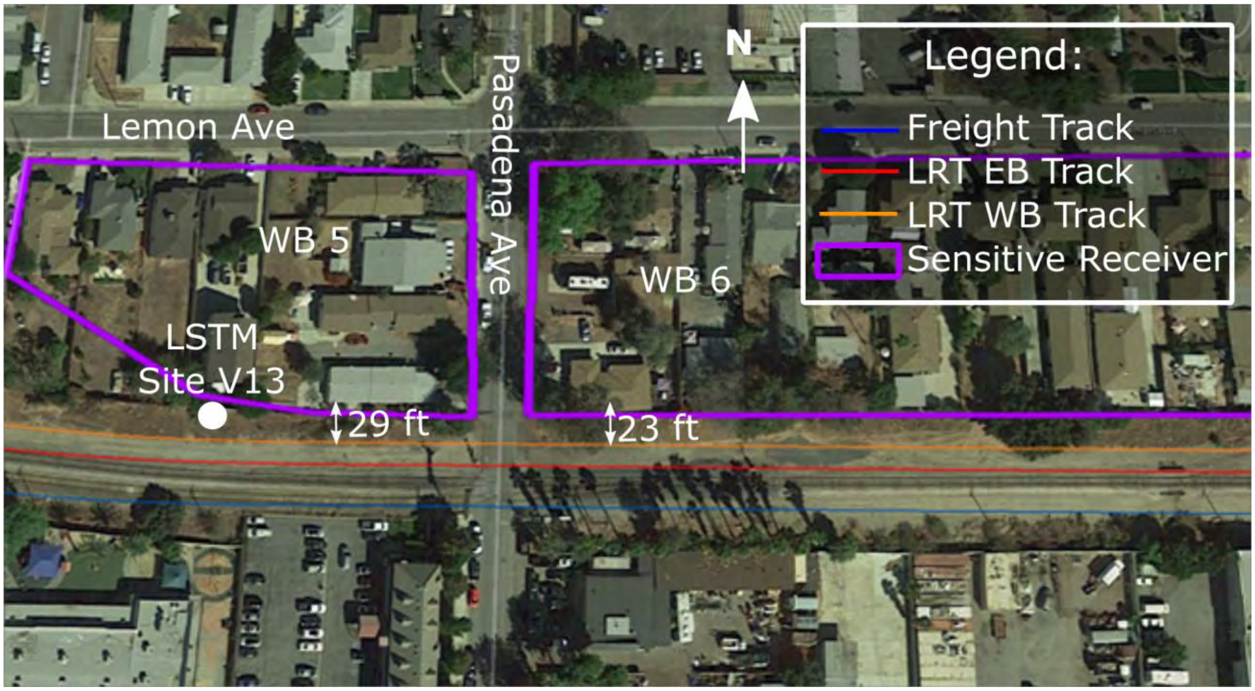


Figure 8: Aerial Photograph of Glendora WB5 and WB6

Table 7: Predicted Vibration Levels at Glendora WB5 and WB6

Cluster No.	Eng. Station	Dist., ft[1]	Speed, mph	Threshold, VdB	Predicted Band Max., VdB[2]	1/3 Octave Band, Hz[3]	Impact
WB5	1527+00	29	65	72	79	50	Yes
WB6	1530+50	23	65	72	82	50	Yes
WB5 with ballast mat	1527+00	29	65	72	68	31.5	—
WB6 with ballast mat	1530+50	23	65	72	69	31.5	—

Source: ATS Consulting, 2018
Notes:
[1]The distance in feet from the closest sensitive receiver in the cluster to the proposed near light-rail track.
[2]Maximum predicted vibration level in any 1/3 octave band.
[3]The 1/3 octave band that corresponds to the predicted band maximum.

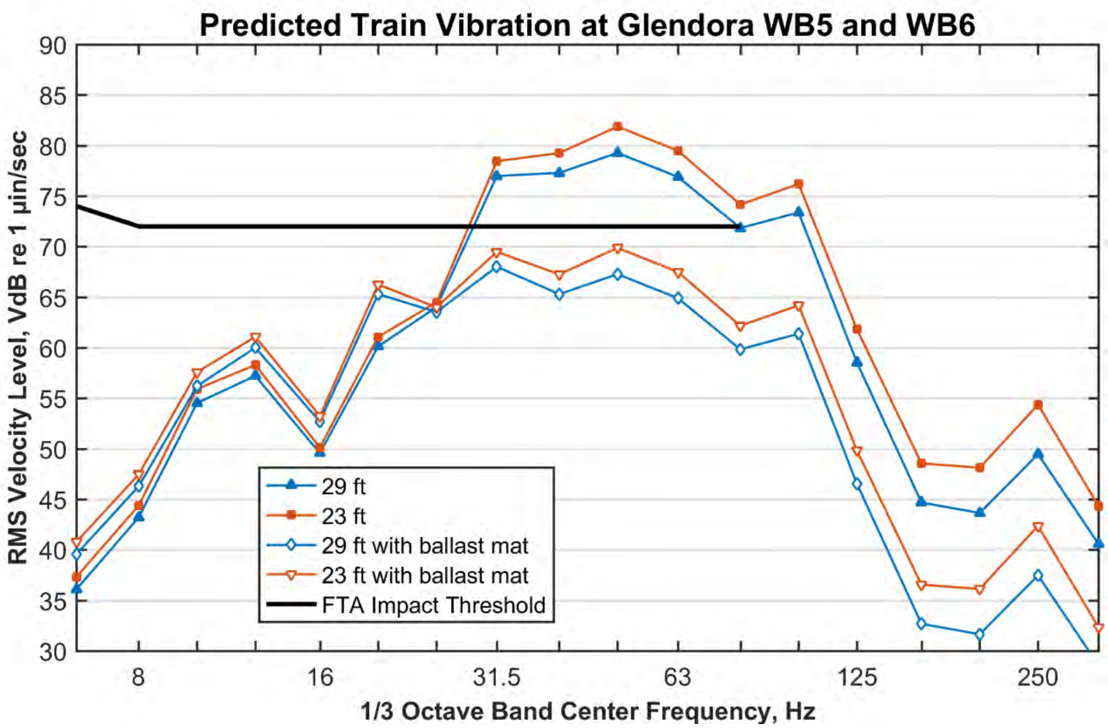


Figure 9: Predicted Train Vibration at Glendora WB5 and WB6

3.3.4 Glendora WB16: 1258 St Vladimir Street

Glendora WB16 is a cluster of single-family residences located near a proposed crossover. The nearest house is 40 feet from the westbound train and the nearest house to the crossover is 55 ft. An aerial photograph of the sensitive receivers in cluster Glendora WB16 is shown in Figure 10.

The predicted vibration level was updated using site-specific LSTM data. The measured LSTM data is shown in Appendix B. Glendora WB16 was the only location where the site-specific LSTM data exceeded the LSTM assumed in the Final EIR. The site-specific measurement showed particularly efficient vibration propagation in the 31.5 to 50 Hz frequency range. Predicted vibration levels are shown for the standard tangent track, for the crossover, and with and without mitigation. The predicted level with the crossover assumes amplification from a monoblock frog.

The predicted levels are shown in Table 8 and Figure 11. Without mitigation, the predicted level at the crossover exceeds the FTA impact threshold. With a two layer ballast mat, the predicted level at the crossover exceeds the FTA impact threshold. Additional or alternative mitigation measures to reduce the predicted vibration level to below the threshold at the crossover is discussed in Section 5.2.1.

Figure 10: Aerial Photograph of Glendora WB16

Table 8: Predicted Vibration Levels at Glendora WB16							
Cluster No.	**Eng. Station**	**Dist., ft[1]**	**Speed, mph**	**Threshold, VdB**	**Predicted Band Max., VdB[2]**	**1/3 Octave Band, Hz[3]**	**Impact**
WB16, no xover	1589+00	40	65	72	81	40	Yes
WB16, with xover	1585+00	55	65	72	84	40	Yes
WB16, no xover with ballast mat	1589+00	40	65	72	72	31.5	—
WB16, with xover and ballast mat	1585+00	55	65	72	75	31.5	Yes

Source: ATS Consulting, 2018
Notes:
[1]The distance in feet from the closest sensitive receiver in the cluster to the proposed near light-rail track.
[2]Maximum predicted vibration level in any 1/3 octave band.
[3]The 1/3 octave band that corresponds to the predicted band maximum.

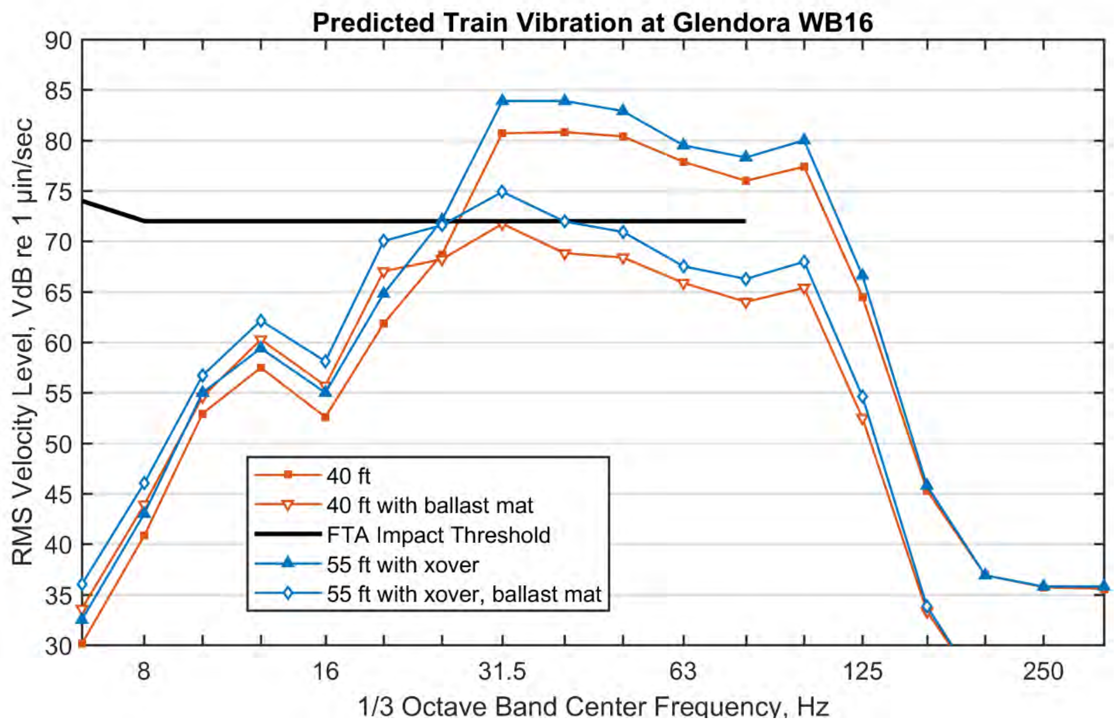


Figure 11: Predicted Train Vibration at Glendora WB16

3.3.5 Glendora EB12 and San Dimas WB1: 1005 Gladstone Street

Glendora EB12 and San Dimas WB1 are single-family residences on Gladstone Street. The proposed light-rail centerline curve is about 90 feet from the homes. An aerial photograph of the residences is shown in Figure 12.

The predicted vibration level was updated using site-specific LSTM data measured on the empty lot adjacent to Glendora EB12. The measured LSTM data is shown in Appendix B.

The predicted levels for the two clusters are shown in Table 9 and Figure 13. Without mitigation, the predicted levels are equal to the FTA impact threshold. No mitigation measures are recommended because the predicted level does not exceed the applicable impact threshold.

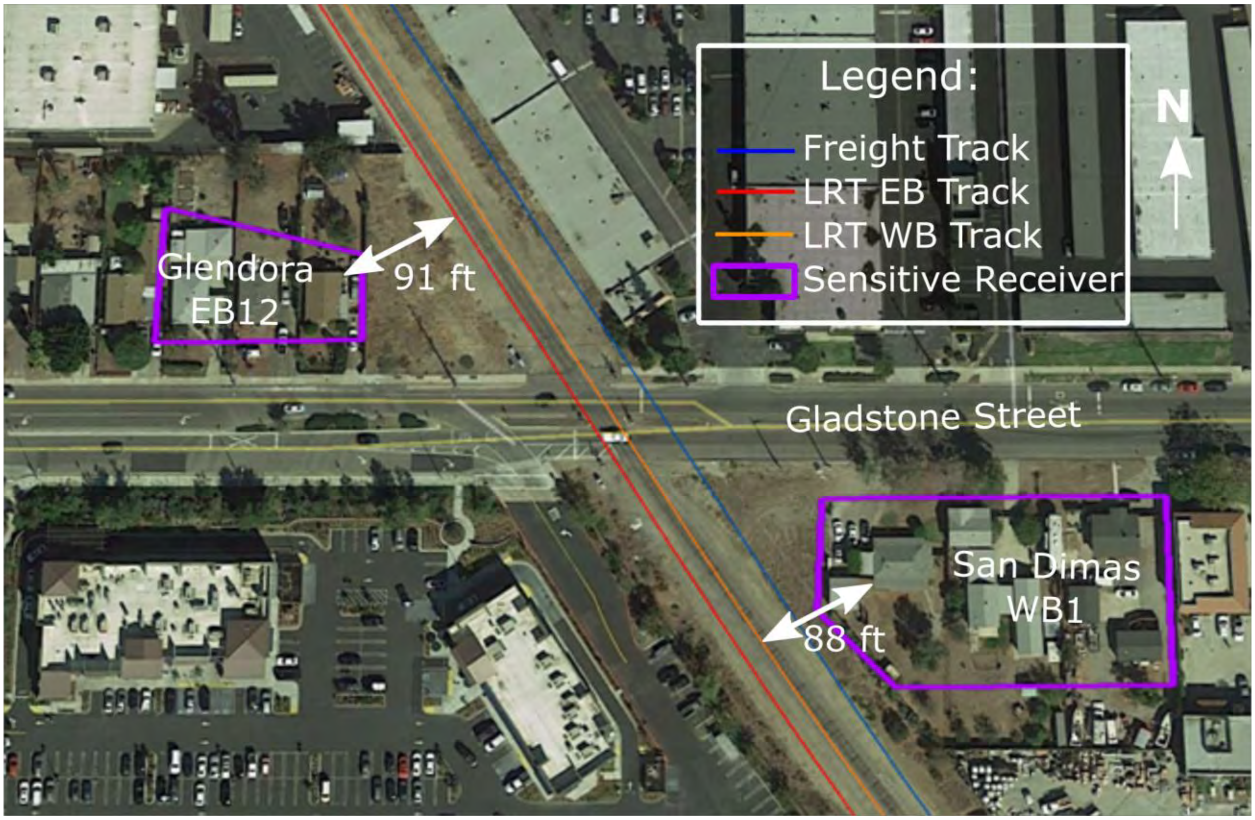


Figure 12: Aerial Photograph of Glendora EB12 and San Dimas WB1

Table 9: Predicted Vibration Levels at Glendora EB12 and San Dimas WB1

Cluster No.	Eng. Station	Dist., ft[1]	Speed, mph	Threshold, VdB	Predicted Band Max., VdB[2]	1/3 Octave Band, Hz[3]	Impact
Glendora EB12	1665+00	91	65	72	72	31.5	—
San Dimas WB1	1669+00	88	65	72	72	31.5	—

Source: ATS Consulting, 2018
Notes:
[1]The distance in feet from the closest sensitive receiver in the cluster to the proposed near light-rail track.
[2]Maximum predicted vibration level in any 1/3 octave band.
[3]The 1/3 octave band that corresponds to the predicted band maximum.

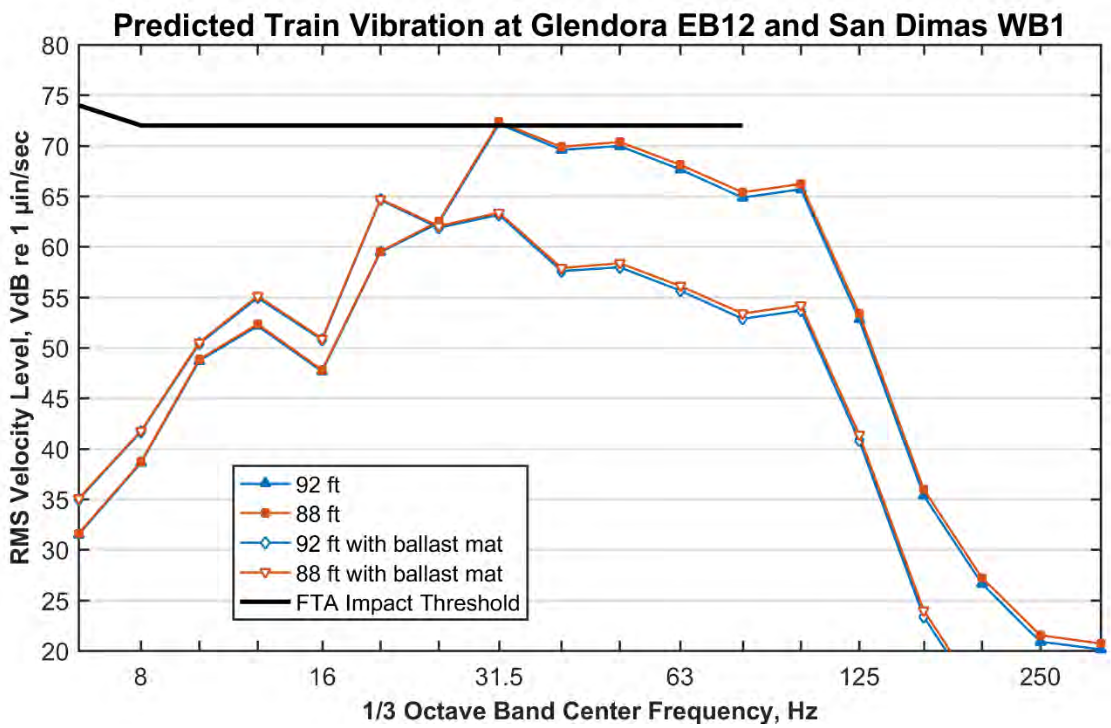


Figure 13: Predicted Train Vibration at Glendora EB12 and San Dimas WB1

3.3.6 San Dimas EB1: Red Roof Inn San Dimas

The Red Roof Inn San Dimas is located 14 feet from the proposed eastbound track centerline. An aerial photograph of the hotel is shown in Figure 14.

The predicted vibration level at the hotel was updated using site-specific LSTM data measured behind the hotel. The measured LSTM data is shown in Appendix B. The measured levels at the Red Roof Inn were significantly lower than the levels measured at the 4 other site-specific measurement locations. However, the results were consistent with the LSTM measurement completed nearby in San Dimas for the 2013 Final EIR assessment.

The predicted level for the hotel is shown in Table 10 and Figure 15. Without mitigation, the predicted level exceeds the FTA impact threshold. The recommended mitigation measure is one layer of ballast mat. Details on the ballast mat are discussed in Section 5.2.1.

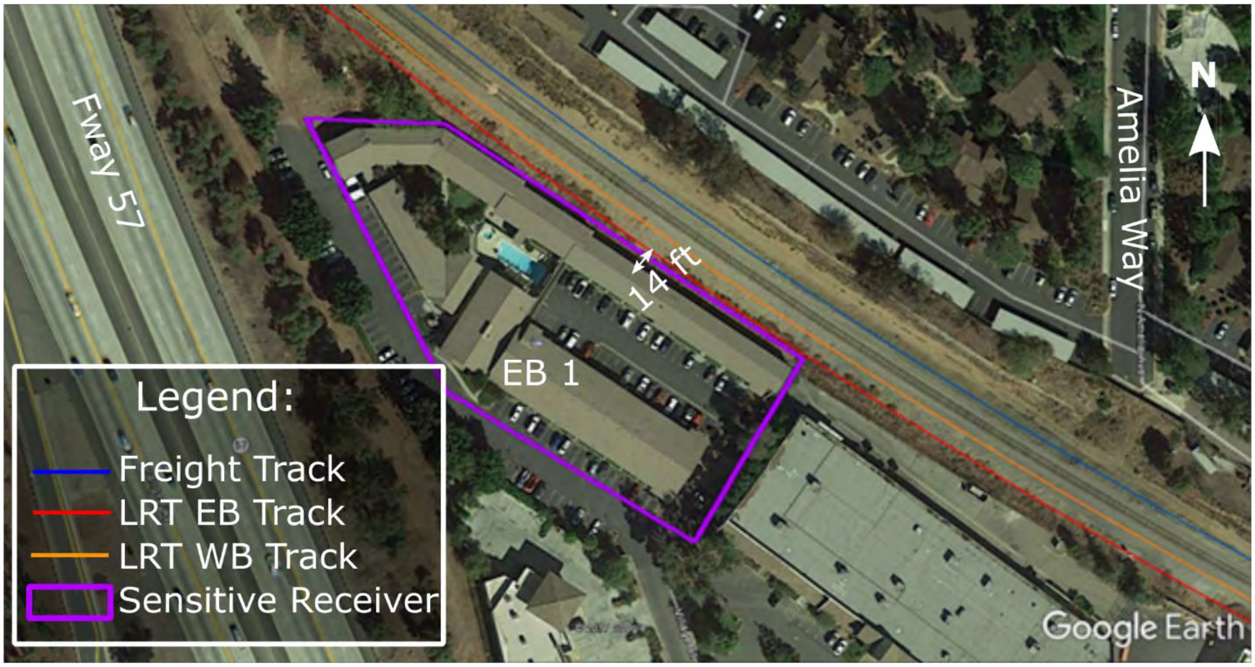


Figure 14: Aerial Photograph of San Dimas EB1

Table 10: Predicted Vibration Levels at San Dimas EB1

Cluster No.	Eng. Station	Dist., ft[1]	Speed, mph	Threshold, VdB	Predicted Band Max., VdB[2]	1/3 Octave Band, Hz[3]	Impact
San Dimas EB1	1686+00	14	65	72	77	100 Hz	Yes
San Dimas EB1, with ballast mat	1686+00	14	65	72	67	100 Hz	—

Source: ATS Consulting, 2018
Notes:
[1]The distance in feet from the closest sensitive receiver in the cluster to the proposed near light-rail track.
[2]Maximum predicted vibration level in any 1/3 octave band.
[3]The 1/3 octave band that corresponds to the predicted band maximum.

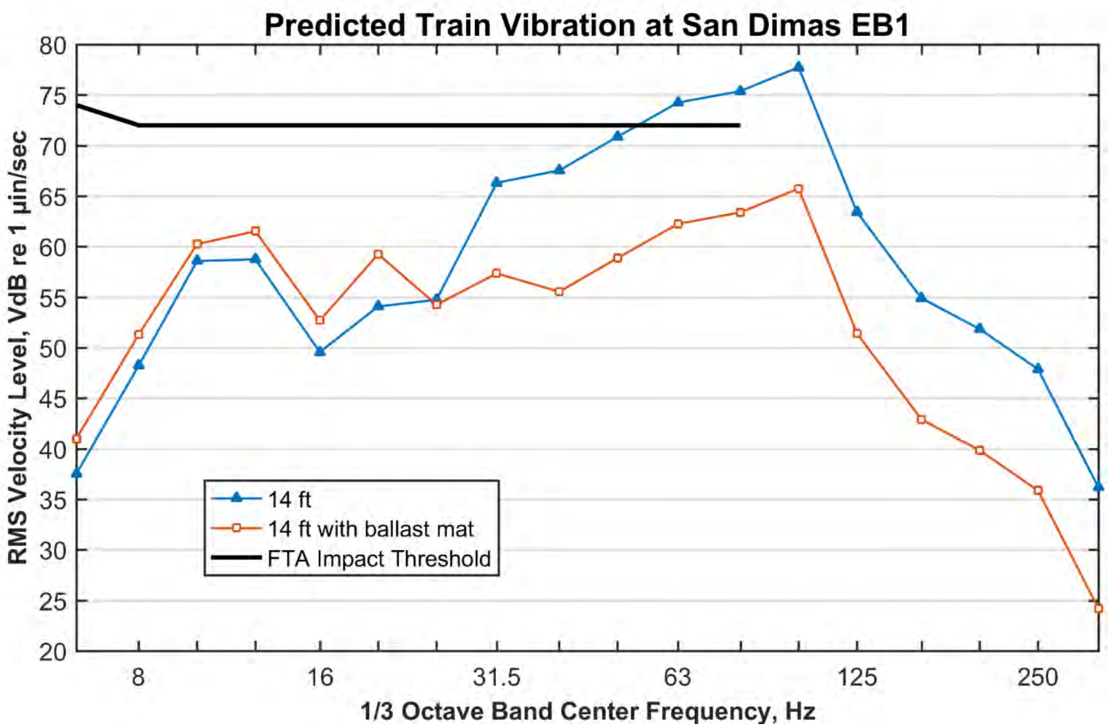


Figure 15: Predicted Train Vibration at San Dimas EB1

4. UPDATED NOISE AND VIBRATION IMPACT ASSESSMENT

The following sub-sections present the updated noise and vibration predictions. In addition to the changes in the impact assessment identified in Sections 2 and 3, the updated predicted levels use the most recent track alignment drawings, dated May 30, 2018. For vibration, any sensitive receiver clusters where the updated predictions have resulted in a change in determination of impact are noted. Due to changes in train consist lengths and headways, the predicted noise levels at all sensitive receivers has increased.

Consistent with the previous analyses, predicted noise and vibration levels assume monoblock frogs at crossovers near sensitive receivers. If monoblock are not implemented as specified in Table 31, noise and vibration impacts will need to be re-assessed near crossover locations. It is noted that diamond crossing do not accept monoblock frogs.

Predicted noise and vibration levels are presented for all sensitive receivers identified in the 2013 Final EIR and any new residential developments that were identified adjacent to the corridor in May 2017. The "WB", or westbound, clusters are located north of the tracks, and the "EB", or eastbound, clusters are located south of the tracks. The locations of the clusters are shown in maps included in the 2013 Final EIR. Sections 4.1 through 4.6 present the predicted levels for residential land uses. Section 4.7 presents the predicted levels for institutional land uses, such as schools, churches, or parks.

Predicted noise levels are provided both with and without the BNSF horn noise. The BNSF horn is a major source of noise in the project corridor even though there are only two to four freight trains per day because they are extremely loud. Where the BNSF freight track is relocated closer to receivers, the increase in horn noise can contribute to the predicted noise impact. The horn is located on the top of the locomotive, which requires a tall barrier to break the line-of-sight between the noise source and the sensitive receiver. Barrier recommendations presented in Section 5.1.1 did not consider mitigating BNSF horn noise due to the impractical barrier height required. Instead, sound insulation is recommended in Section 5.1.2 for residences where horn noise needs to be mitigated to reduce the predicted noise level to below the applicable impact threshold.

4.1 Glendora

Table 11 presents the updated predicted noise levels. Due to updated operations (decreased headways, longer train consists), all predicted levels are different from those in the Final EIR.

Table 12 presents the updated predicted vibration levels in Glendora. The one change to the identified impacts compared to Addendum 3 is at cluster EB12. The predicted vibration level at Glendora EB12 was identified as a predicted impact in Addendum 3. A site-specific LSTM measurement was completed at the cluster and the predicted level was revised to equal to the impact threshold. Because the predicted level does not exceed the applicable threshold, no impact is identified.

The noise and vibration mitigation measures for all receivers where the predicted levels exceed the applicable threshold are presented in Section 5.

Table 11: Predicted Noise Levels in Glendora, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist.[2], ft	Speed, mph	Existing Ldn, dBA	Predicted Ldn, dBA		Threshold[3]		Impact		No. of Impacts[4]	
					w/horns	no horns	Mod.	Sev.	w/horns	no horns	w/horns	no horns
Glendora Westbound												
WB0a[5]	1435+00	230	65	55	58.6	58.6	3.2	7.1	Moderate	Moderate	TBD	TBD
WB0[5]	1448+00	175	65	55	59.2	57.5	3.2	7.1	Moderate	-	TBD	-
WB1	1453+00	139	65	55	63.3	61.9	3.2	7.1	Severe	Moderate	2	2
WB1a	1458+00	163	65	55	60.1	57.3	3.2	7.1	Moderate	-	13	-
WB1b	1465+00	157	65	55	57.9	57.7	3.2	7.1	-	-	-	-
WB1c	1470+00	151	65	55	61.9	61.9	3.2	7.1	Moderate	Moderate	12	12
WB1d	1477+50	113	65	55	67.0	66.3	3.2	7.1	Severe	Severe	7	7
WB2	1494+00	55	65	58	68.0	68.0	2.4	5.8	Severe	Severe	5	5
WB3	1499+00	193	65	58	60.6	60.0	2.4	5.8	Moderate	-	4	-
WB3a	1510+00	85	65	58	62.0	58.4	2.4	5.8	Moderate	-	19	-
WB3b[5]	1502+00	47	65	58	64.3	60.7	2.4	5.8	Severe	Moderate	11	11
WB4	1522+50	27	55	56	70.2	69.3	2.9	6.6	Severe	Severe	12	12
WB5	1527+00	29	55	56	70.2	69.1	2.9	6.6	Severe	Severe	8	8
WB6	1530+50	23	65	56	72.3	71.6	2.9	6.6	Severe	Severe	20	20

Table 11: Predicted Noise Levels in Glendora, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist.[2], ft	Speed, mph	Existing Ldn, dBA	Predicted Ldn, dBA		Threshold[3]		Impact		No. of Impacts[4]	
					w/horns	no horns	Mod.	Sev.	w/horns	no horns	w/horns	no horns
WB7	1540+00	35	65	56	70.8	70.8	2.9	6.6	Severe	Severe	20	20
WB8	1548+00	44	65	56	70.2	69.3	2.9	6.6	Severe	Severe	9	9
WB9	1553+00	43	65	56	70.3	69.5	2.9	6.6	Severe	Severe	4	4
WB10	1555+00	32	65	56	72.0	71.3	2.9	6.6	Severe	Severe	4	4
WB11	1559+00	29	65	56	72.7	72.0	2.9	6.6	Severe	Severe	5	5
WB12	1564+00	48	65	56	68.9	68.8	2.9	6.6	Severe	Severe	6	6
WB13	1568+00	36	65	56	71.4	70.7	2.9	6.6	Severe	Severe	4	4
WB14	1572+00	39	65	56	71.0	70.2	2.9	6.6	Severe	Severe	4	4
WB15	1576+00	35	65	56	71.0	70.9	2.9	6.6	Severe	Severe	10	10
WB16	1587+00	43	65	58	72.8	72.8	2.4	5.8	Severe	Severe	12	12
WB17	1594+00	37	65	58	70.6	70.6	2.4	5.8	Severe	Severe	5	5
WB18	1599+00	37	65	58	70.6	70.6	2.4	5.8	Severe	Severe	8	8
WB18a[5]	1612+00	195	65	58	59.0	59.0	2.4	5.8	-	-	-	-
WB19	1616+00	37	65	58	70.2	70.2	2.4	5.8	Severe	Severe	19	19
WB20	1624+00	41	65	58	69.4	69.4	2.4	5.8	Severe	Severe	10	10
Glendora Eastbound												
EB1	1434+00	87	65	55	65.4	65.4	3.2	7.1	Severe	Severe	24	24
EB2	1444+00	50	65	55	68.8	68.7	3.2	7.1	Severe	Severe	12	12
EB3	1452+00	69	65	55	69.6	68.2	3.2	7.1	Severe	Severe	7	7
EB4	1457+00	66	65	55	70.8	68.4	3.2	7.1	Severe	Severe	5	5
EB5	1461+00	78	65	55	67.9	67.8	3.2	7.1	Severe	Severe	7	7
EB5a	1479+00	73	65	55	57.8	56.42	3.2	7.1	-	-	-	-
EB5b[5]	1485+00	247	65	55	62.3	60.8	3.2	7.1	Severe	Moderate	2	2
EB5c[5]	1503+00	225	65	58	64.5	63.6	2.4	5.8	Severe	Moderate	2	2
EB5d[5]	1495+00	530	65	58	58.8	58.5	2.4	5.8	-	-	-	-
EB6	1504+00	103	45	58	65.8	61.2	2.4	5.8	Severe	Moderate	4	4

Table 11: Predicted Noise Levels in Glendora, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist.[2], ft	Speed, mph	Existing Ldn, dBA	Predicted Ldn, dBA		Threshold[3]		Impact		No. of Impacts[4]	
					w/horns	no horns	Mod.	Sev.	w/horns	no horns	w/horns	no horns
EB6a[5]	1521+00	178	65	56	62.0	58.5	2.9	6.6	Moderate	-	30	-
EB7	1537+00	76	65	56	66.1	66.1	2.9	6.6	Severe	Severe	4	4
EB8	1542+00	100	65	56	66.7	66.6	2.9	6.6	Severe	Severe	4	4
EB9	1587+00	57	65	58	69.1	69.1	2.4	5.8	Severe	Severe	6	6
EB10	1610+00	100	65	58	64.7	64.7	2.4	5.8	Severe	Severe	4	4
EB11	1626+00	93	65	58	64.9	64.9	2.4	5.8	Severe	Severe	4	4
EB12	1664+00	91	65	64	69.2	68.7	1.5	3.9	Severe	Severe	3	3
Total Moderate Impacts in Glendora:											78+	33+
Total Severe Impacts in Glendora											273	252

Source: ATS Consulting, 2018
Notes:
[1] The buildings included in each cluster are detailed in the figures in the 2013 Final EIR
[2] The distance in feet from the closest sensitive receiver in the cluster to the proposed near light-rail track.
[3] The threshold is the allowable increase in noise from the existing Ldn. The FTA designates two threshold levels: moderate and severe.
[4] Number of dwelling units in the impacted cluster. TBD indicates a new development that is still under construction, so the number of units is not yet known.
[5] New residential development added to analysis after completion of Final EIR.

Table 12: Predicted Vibration Levels in Glendora, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist., ft[2]	Speed, mph	Threshold, VdB	Predicted Band Max., VdB[3]	1/3 Octave Band, Hz[4]	Impact	No. of Impacts[5]
Glendora Westbound								
WB0[6]	1435+00	230	65	72	66	31.5	no	-
WB0a[6]	1448+00	175	65	72	68	31.5	no	-
WB1	1453+00	139	65	72	69	31.5	no	-
WB1a	1458+00	163	65	72	68	31.5	no	-

Table 12: Predicted Vibration Levels in Glendora, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist., ft[2]	Speed, mph	Threshold, VdB	Predicted Band Max., VdB[3]	1/3 Octave Band, Hz[4]	Impact	No. of Impacts[5]
WB1b	1465+00	157	65	72	68	31.5	no	-
WB1c	1470+00	151	65	72	69	31.5	no	-
WB1d	1477+50	113	65	72	71	31.5	no	-
WB2 (no xover)	1495+00	66	65	72	75	50.0	Yes	5
WB2 (xover)	1494+00	140	65	72	71	50.0	no	-
WB3	1499+00	193	65	72	67	31.5	no	-
WB3a	1510+00	47	55	72	75	31.5	Yes	19
WB3b	1502+00	47	65	72	76	50.0	Yes	19
WB4	1522+50	27	55	72	84	50.0	Yes	12
WB5	1527+00	29	65	72	79	50.0	Yes	8
WB6	1530+50	23	65	72	82	50.0	Yes	20
WB7	1540+00	35	65	72	82	50.0	Yes	20
WB8	1548+00	44	65	72	79	50.0	Yes	9
WB9	1553+00	43	65	72	79	50.0	Yes	5
WB10	1555+00	32	65	72	83	50.0	Yes	3
WB11	1559+00	29	65	72	85	50.0	Yes	5
WB12	1564+00	48	65	72	78	50.0	Yes	6
WB13	1568+00	36	65	72	82	50.0	Yes	4
WB14	1572+00	39	65	72	81	50.0	Yes	5
WB15	1576+00	35	65	72	82	50.0	Yes	9
WB16 (no xover)	1589+00	40	65	72	81	40.0	Yes	12
WB16a (xover)	1585+00	55	65	72	84	40.0	Yes	12
WB17	1594+00	37	65	72	81	50.0	Yes	5
WB18	1599+00	37	65	72	81	50.0	Yes	8
WB18a[6]	1612+00	195	65	72	67	31.5	no	-
WB19	1616+00	37	65	72	81	50.0	Yes	19

Table 12: Predicted Vibration Levels in Glendora, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist., ft[2]	Speed, mph	Threshold, VdB	Predicted Band Max., VdB[3]	1/3 Octave Band, Hz[4]	Impact	No. of Impacts[5]
WB20	1624+00	41	65	72	80	50.0	Yes	10
Glendora Eastbound								
EB1	1434+00	87	65	72	73	31.5	no	-
EB2	1444+00	50	65	72	77	50.0	Yes	12
EB3	1452+00	69	65	72	74	31.5	Yes	7
EB4	1457+00	66	65	72	74	31.5	Yes	5
EB5	1461+00	78	65	72	73	31.5	Yes	7
EB5a	1479+00	73	65	72	74	31.5	Yes	13
EB5b[6]	1485+00	247	65	72	55	31.5	no	-
EB5c[6]	1503+00	225	65	72	66	31.5	no	-
EB5d[6]	1495+00	530	65	71	60	31.5	no	-
EB6	1504+00	103	45	72	68	31.5	no	-
EB6a[6]	1521+00	178	65	72	67	31.5	no	-
EB7	1537+00	76	65	72	73	31.5	Yes	4
EB8	1542+00	100	65	72	72	31.5	Yes	4
EB9	1587+00	57	65	72	76	50.0	Yes	6
EB10	1610+00	100	65	72	72	31.5	no	-
EB11	1626+00	93	65	72	72	31.5	Yes	4
EB12	1664+00	91	65	72	72	31.5	no	-
							Total Impacts in Glendora:	265

Source: ATS Consulting, 2018
Notes:
[1]The cluster numbers refer to the same sensitive receivers used for the noise analysis. The buildings included in each cluster are detailed in the figures in the 2013 Final EIR.
[2]The distance in feet from the closest sensitive receiver in the cluster to the proposed near light-rail track.
[3]Maximum predicted vibration level in any 1/3 octave band.
[4]The 1/3 octave band that corresponds to the predicted band maximum.
[5]Number of dwelling units in the impacted cluster.
[6]New residential development added to analysis after completion of Final EIR.

4.2 San Dimas

Table 13 presents the updated predicted noise levels. Due to updated operations (decreased headways, longer train consists), all predicted levels are different from those in the Final EIR.

Table 14 presents the updated predicted vibration levels in San Dimas. There is one change to the identified impacts compared to the Addendum 3 assessment. Vibration impact is no longer predicted at cluster WB1, a single family residence on Gladstone Street. Site-specific vibration propagation measurements were completed near the residence and the revised predicted level was equal to the impact threshold. No impact was identified because the predicted level does not exceed the applicable threshold.

The noise and vibration mitigation measures for all receivers where the predicted levels exceed the applicable threshold are presented in Section 5.

Table 13: Predicted Noise Levels in San Dimas, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist.[2], ft	Speed, mph	Existing Ldn, dBA	Predicted Ldn, dBA		Threshold[3]		Impact		No. of Impacts[4]	
					w/horns	no horns	Mod.	Sev.	w/horns	no horns	w/horns	no horns
San Dimas Westbound												
WB1	1668+00	55	65	64	70.6	69.4	1.5	3.9	Severe	Severe	3	3
WB2	1680+00	58	65	64	69.7	69.7	1.5	3.9	Severe	Severe	3	3
WB3	1683+00	78	65	60	61.3	61.3	2.0	5.0	-	-	-	-
WB4	1691+00	170	65	60	63.0	63.0	2.0	5.0	Moderate	Moderate	16	16
WB4a[5]	1695+00	189	65	60	62.7	62.6	2.0	5.0	Moderate	Moderate	20	20
WB4b[5]	1700+00	260	65	60	62.4	62.3	2.0	5.0	Moderate	Moderate	1	1
WB4c[5]	1707+00	221	65	60	63.1	61.7	2.0	5.0	Moderate	-	4	-
WB4d[5]	1713+00	266	65	60	61.7	61.6	2.0	5.0	-	-	-	-
WB5	1739+00	85	65	65	66.0	66.0	1.4	3.6	-	-	-	-
WB6	1745+00	101	65	64	67.8	65.3	1.5	3.9	Moderate	-	12	-
WB7	1766+00	94	65	61	65.3	65.2	2.0	5.0	Moderate	Moderate	5	5
WB8	1770+00	120	65	60	66.1	64.3	2.0	5.0	Severe	Moderate	10	10
San Dimas Eastbound												
EB1	1686+00	15	65	60	74.9	74.9	2.0	5.0	Severe	Severe	20	20

Table 13: Predicted Noise Levels in San Dimas, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist.[2], ft	Speed, mph	Existing Ldn, dBA	Predicted Ldn, dBA		Threshold[3]		Impact		No. of Impacts[4]	
					w/horns	no horns	Mod.	Sev.	w/horns	no horns	w/horns	no horns
EB2	1701+00	132	65	60	66.5	66.3	2.0	5.0	Severe	Severe	8	8
EB3	1705+00	68	65	60	66.0	64.4	2.0	5.0	Severe	Moderate	8	8
EB3a	1723+00	72	65	60	68.0	67.1	2.0	5.0	Severe	Severe	4	4
EB3b[7]	1727+00	179	65	60	62.9	62.3	2.0	5.0	Moderate	Moderate	3	3
Total Moderate Impacts in San Dimas:											61	63
Total Severe Impacts in San Dimas:											56	38

Source: ATS Consulting, 2018
Notes:
[1] The buildings included in each cluster are detailed in the figures in the 2013 Final EIR
[2]The distance in feet from the closest sensitive receiver in the cluster to the proposed near light-rail track.
[3]The threshold is the allowable increase in noise from the existing Ldn. The FTA designates two threshold levels: moderate and severe.
[4]Number of dwelling units in the impacted cluster.
[5]New residential development added to analysis after completion of Final EIR.

Table 14: Predicted Vibration Levels in San Dimas, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist., ft[2]	Speed, mph	Threshold, VdB	Predicted Band Max., VdB[3]	1/3 Octave Band, Hz[4]	Impact	No. of Impacts[5]
San Dimas Westbound								
WB1	1668+00	55	65	72	72	31.5	no	-
WB2	1680+00	58	65	72	70	31.5	no	-
WB3	1683+00	78	65	72	65	31.5	no	-
WB4	1691+00	170	65	72	55	12.5	no	-
WB4a[6]	1695+00	189	65	72	54	12.5	no	-
WB4b[6]	1700+00	260	65	72	52	12.5	no	-
WB4c[6]	1707+00	221	65	72	53	12.5	no	-

Table 14: Predicted Vibration Levels in San Dimas, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist., ft[2]	Speed, mph	Threshold, VdB	Predicted Band Max., VdB[3]	1/3 Octave Band, Hz[4]	Impact	No. of Impacts[5]
WB4d[6]	1713+00	266	65	72	52	12.5	no	-
WB5	1739+00	85	45	72	64	31.5	no	-
WB6	1745+00	101	65	72	61	31.5	no	-
WB7	1766+00	94	65	72	62	31.5	no	-
WB8	1770+00	120	65	72	58	31.5	no	-
San Dimas Eastbound								
EB1	1686+00	14	65	72	77	100	Yes	20
EB2	1701+00	132	65	72	57	31.5	no	-
EB3	1705+00	68	65	72	68	31.5	no	-
EB3a	1723+00	72	55	72	65	31.5	no	-
EB3b[6]	1727+00	179	65	72	54	12.5	no	-
							Total Impacts in San Dimas:	20

Source: ATS Consulting, 2018
Notes:
[1]The cluster numbers refer to the same sensitive receivers used for the noise analysis. The buildings included in each cluster are detailed in the figures in the 2013 Final EIR.
[2]The distance in feet from the closest sensitive receiver in the cluster to the proposed near light-rail track.
[3]Maximum predicted vibration level in any 1/3 octave band.
[4]The 1/3 octave band that corresponds to the predicted band maximum.
[5]Number of dwelling units in the impacted cluster.
[6]New residential development added to analysis after completion of Final EIR.

4.3 La Verne

Table 15 presents the updated predicted noise levels. Due to updated operations (decreased headways, longer train consists), all predicted levels are different from those in the Final EIR.

Table 16 presents the updated predicted vibration levels in La Verne. There are no vibration impacts predicted in La Verne, which is consistent with the findings in the Addendum 3 assessment. One major change is the predicted level at cluster WB4 is now equal to the impact threshold. The increase in predicted level compared to the Addendum 3 assessment is due to a revision to the distance between the receiver and the LRT track centerline when a second residential structure was identified on one of the lots. The predicted level does not exceed the impact threshold, so no impact is identified. Due to the conservative assumptions in the prediction model, we expect the train vibration to be below the impact threshold.

The noise and vibration mitigation measures for all receivers where the predicted levels exceed the applicable threshold are presented in Section 5.

Table 15: Predicted Noise Levels in La Verne, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist.[2], ft	Speed, mph	Existing Ldn, dBA	Predicted Ldn, dBA		Threshold[3]		Impact		No. of Impacts[4]	
					w/horns	no horns	Mod.	Sev.	w/horns	no horns	w/horns	no horns
La Verne Westbound												
WB1	1805+00	193	65	60	62.7	62.7	2.0	5.0	Moderate	Moderate	6	6
WB1a[5]	1802+00	230	65	60	61.1	61.1	2.0	5.0	-	-	-	-
WB2	1817+00	65	65	62	68.1	67.3	1.7	4.4	Severe	Severe	5	5
WB3	1820+00	70	65	62	67.0	66.9	1.9	4.7	Severe	Severe	5	5
WB4	1825+00	52	65	62	71.7	68.6	1.7	4.4	Severe	Severe	9	9
WB5	1829+00	73	65	62	70.0	66.6	1.7	4.4	Severe	Severe	5	5
WB6	1832+00	80	65	62	66.4	66.2	1.7	4.4	Moderate	Moderate	4	4
WB7	1850+00	101	65	61	67.0	64.6	2.0	5.0	Severe	Moderate	6	6
WB7a[5]	1844+00	238	65	61	62.7	62.1	2.0	5.0	-	-	-	-
WB7b[5]	1868+50	92	65	61	65.8	65.3	1.9	4.7	Moderate	Moderate	1	1
La Verne Eastbound												
EB1	1784+00	229	65	59	60.7	60.5	2.4	5.8	-	-	-	-
EB2	1876+00	260	55	59	63.6	63.4	2.4	5.8	Moderate	Moderate	2	2
EB3	1886+00	114	65	60	65.9	65.6	2.0	5.0	Severe	Severe	11	11
EB4	1891+00	120	65	60	73.6	65.6	2.2	5.4	Severe	Severe	9	9

Table 15: Predicted Noise Levels in La Verne, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist.[2], ft	Speed, mph	Existing Ldn, dBA	Predicted Ldn, dBA		Threshold[3]		Impact		No. of Impacts[4]	
					w/horns	no horns	Mod.	Sev.	w/horns	no horns	w/horns	no horns
Total Moderate Impacts in La Verne:											13	19
Total Severe Impacts in La Verne:											50	44

Source: ATS Consulting, 2017
Notes:
[1] The buildings included in each cluster are detailed in the figures in the 2013 Final EIR
[2]The distance in feet from the closest sensitive receiver in the cluster to the proposed near light-rail track.
[3]The threshold is the allowable increase in noise from the existing Ldn. The FTA designates two threshold levels: moderate and severe.
[4]Number of dwelling units in the impacted cluster.
[5]New residential development added to analysis after completion of Final EIR.

Table 16: Predicted Vibration Levels in La Verne, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist., ft[2]	Speed, mph	Threshold, VdB	Predicted Band Max., VdB[3]	1/3 Octave Band, Hz[4]	Impact	No. of Impacts[5]
La Verne Westbound								
WB1	1805+00	193	65	72	54	12.5	no	-
WB1a[6]	1802+00	230	65	72	53	12.5	no	-
WB2	1817+00	65	65	72	68	31.5	no	-
WB3	1820+00	70	65	72	67	31.5	no	-
WB4	1825+00	52	65	72	72	31.5	no	-
WB5	1829+00	73	65	72	66	31.5	no	-
WB6	1832+00	80	65	72	65	31.5	no	-
WB7	1850+00	101	65	72	61	31.5	no	-
WB7a[6]	1844+00	238	65	72	53	12.5	no	-
WB7b[6]	1868+50	92	65	72	63	31.5	no	-

Table 16: Predicted Vibration Levels in La Verne, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist., ft[2]	Speed, mph	Threshold, VdB	Predicted Band Max., VdB[3]	1/3 Octave Band, Hz[4]	Impact	No. of Impacts[5]
La Verne Eastbound								
EB1	1784+00	229	65	72	53	12.5	no	-
EB2	1876+00	260	55	72	51	12.5	no	-
EB3	1886+00	114	65	72	59	31.5	no	-
EB4	1891+00	120	65	72	58	31.5	no	-
							Total Impacts in La Verne:	0

Source: ATS Consulting, 2018
Notes:
[1]The cluster numbers refer to the same sensitive receivers used for the noise analysis. The buildings included in each cluster are detailed in the figures in the 2013 Final EIR.
[2]The distance in feet from the closest sensitive receiver in the cluster to the proposed near light-rail track.
[3]Maximum predicted vibration level in any 1/3 octave band.
[4]The 1/3 octave band that corresponds to the predicted band maximum.
[5]Number of dwelling units in the impacted cluster.
[6]New residential development added to analysis after completion of Final EIR.

4.4 Pomona

Table 17 presents the updated predicted noise levels. Due to updated operations (decreased headways, longer train consists), all predicted levels are different from those in the Final EIR.

Table 18 presents the updated predicted vibration levels in Pomona. There are no vibration impacts predicted in Pomona. In the Addendum 3 assessment, vibration impact was predicted at cluster WB2. However, the track alignment near cluster WB2 has been shifted farther from the residence as a result of changes to the Towne Avenue grade crossing. The relocation of the track alignment has resulted in a decrease in the predicted vibration level.

The noise and vibration mitigation measures for all receivers where the predicted levels exceed the applicable threshold are presented in Section 5.

Table 17: Predicted Noise Levels in Pomona, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist.[2], ft	Speed, mph	Existing Ldn, dBA	Predicted Ldn, dBA		Threshold[3]		Impact		No. of Impacts[4]	
					w/horns	no horns	Mod.	Sev.	w/horns	no horns	w/horns	no horns
Pomona Westbound												
WB1a[5]	1923+00	201	65	62	66.6	66.0	1.7	4.4	Severe	Moderate	36	36
WB1b[5]	1935+00	118	65	62	66.6	66.4	1.7	4.4	Severe	Severe	9	9
WB1c[5]	1958+00	68	65	62	66.8	66.6	1.7	4.4	Severe	Severe	TBD	TBD
WB1	1964+00	112	65	62	57.0	56.1	1.7	4.4	-	-	-	-
WB2	1968+00	88	65	62	60.3	60.1	1.7	4.4	-	-	-	-
Pomona Eastbound												
EB1	1929+00	154	65	62	66.0	66.0	1.7	4.4	Moderate	Moderate	5	5
EB2	1943+00	125	65	62	66.6	66.5	1.7	4.4	Severe	Severe	11	11
EB3	1967+00	210	65	62	58.73	58.4	1.7	4.4	-	-	-	-
Total Moderate Impacts in Pomona:											5	41
Total Severe Impacts in Pomona:											56	20

Source: ATS Consulting, 2018
Notes:
[1] The buildings included in each cluster are detailed in the figures in the 2013 Final EIR
[2]The distance in feet from the closest sensitive receiver in the cluster to the proposed near light-rail track.
[3]The threshold is the allowable increase in noise from the existing Ldn. The FTA designates two threshold levels: moderate and severe.
[4]Number of dwelling units in the impacted cluster.
[5]New residential development added to analysis after completion of Final EIR.

Table 18: Predicted Vibration Levels in Pomona, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist., ft[2]	Speed, mph	Threshold, VdB	Predicted Band Max., VdB[3]	1/3 Octave Band, Hz[4]	Impact	No. of Impacts[5]
Pomona Westbound								
WB1a[6]	1923+00	201	65	72	66	31.5	no	-
WB1b[6]	1935+00	118	65	72	69	31.5	no	-
WB1c[6]	1958+00	68	65	72	71	31.5	no	-
WB1	1964+00	112	65	72	69	31.5	no	-
WB2	1968+00	88	65	72	70	31.5	removed	-
Pomona Eastbound								
EB1	1929+00	154	65	72	67	31.5	no	-
EB2	1943+00	125	65	72	68	31.5	no	-
EB3	1967+00	210	65	72	66	31.5	no	-
							Total Impacts in Pomona:	0

Source: ATS Consulting, 2018
Notes:
[1]The cluster numbers refer to the same sensitive receivers used for the noise analysis. The buildings included in each cluster are detailed in the figures in the 2013 Final EIR.
[2]The distance in feet from the closest sensitive receiver in the cluster to the proposed near light-rail track.
[3]Maximum predicted vibration level in any 1/3 octave band.
[4]The 1/3 octave band that corresponds to the predicted band maximum.
[5]Number of dwelling units in the impacted cluster.
[6]New residential development added to analysis after completion of Final EIR.

4.5 Claremont

Table 19 presents the updated predicted noise levels. Due to updated operations (decreased headways, longer train consists), all predicted levels are different from those in the Final EIR.

Table 20 presents the updated predicted LRT vibration levels for Claremont. There is no change to the clusters with predicted impacts compared to the Addendum 3 assessment. There is one cluster where the predicted level is equal to the impact threshold. No impact is identified because the predicted level does not exceed the impact threshold.

Table 21 presents the updated predicted Metrolink vibration levels for Claremont for the sensitive receivers on the eastbound side of the track, where the Metrolink tracks will be relocated closer to the residences. The FTA impact threshold for the relocation of an existing vibration source, such as the Metrolink tracks, is an increase of more than three decibels. Compared to the Addendum 3 assessment, vibration impact from relocation of the Metrolink tracks was predicted at one additional receiver clusters, EB4a. Claremont EB4a is a new residential development that was not included in the previous analysis and the proposed Metrolink tracks will be 29 feet from the residential building.

The noise and vibration mitigation measures for all receivers where the predicted levels exceed the applicable threshold are presented in Section 5.

Table 19: Predicted Noise Levels in Claremont, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist.[2], ft	Speed, mph	Existing Ldn, dBA	Predicted Ldn, dBA		Threshold[3]		Impact		No. of Impacts[4]	
					w/horns	no horns	Mod.	Sev.	w/horns	no horns	w/horns	no horns
Claremont Westbound												
WB1	1971+00	154	65	62	59.7	59.1	1.7	4.4	-	-	-	-
WB2	1973+00	93	65	62	62.6	62.0	1.7	4.4	-		-	
WB3	1978+00	39	65	62	73.2	71.6	1.7	4.4	Severe	Severe	7	7
WB4	1983+00	68	65	62	66.0	63.0	1.7	4.4	Moderate	-	8	-
WB5	1990+00	35	65	62	59.4	58.7	1.7	4.4	-	-	-	-
WB6	2048+00	40	65	64	69.2	68.3	1.5	3.9	Severe	Severe	3	3
Claremont Eastbound												
EB1	1970+00	158	65	62	62.4	62.1	1.7	4.4	-	-	-	-
EB2	1974+00	144	65	62	63.7	62.5	1.7	4.4	-		-	
EB3	1978+00	146	65	62	68.1	65.5	1.7	4.4	Severe	Moderate	3	3
EB4	2008+00	88	55	64	72.7	69.4	1.5	3.9	Severe	Severe	10	10
EB4a[5]	2017+00	66	45	64	72.6	64.3	1.5	3.9	Severe	-	33	-

Table 19: Predicted Noise Levels in Claremont, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist.[2], ft	Speed, mph	Existing Ldn, dBA	Predicted Ldn, dBA		Threshold[3]		Impact		No. of Impacts[4]	
					w/horns	no horns	Mod.	Sev.	w/horns	no horns	w/horns	no horns
EB5	2035+00	74	65	64	68.6	68.5	1.5	3.9	Severe	Severe	9	9
EB6	2041+00	100	65	64	68.0	67.2	1.5	3.9	Severe	Moderate	6	6
EB7	2047+00	80	65	64	72.1	66.7	1.5	3.9	Severe	Moderate	4	4
Total Moderate Impacts in Claremont:											8	13
Total Severe Impacts in Claremont:											75	32

Source: ATS Consulting, 2018
Notes:
[1] The buildings included in each cluster are detailed in the figures in the 2013 Final EIR
[2] The distance in feet from the closest sensitive receiver in the cluster to the proposed near light-rail track.
[3] The threshold is the allowable increase in noise from the existing Ldn. The FTA designates two threshold levels: moderate and severe.
[4] Number of dwelling units in the impacted cluster.
[5] New residential development added to analysis after completion of Final EIR.

Table 20: Predicted LRT Vibration Levels in Claremont, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist., ft[2]	Speed, mph	Threshold, VdB	Predicted Band Max., VdB[3]	1/3 Octave Band, Hz[4]	Impact	No. of Impacts[5]
Claremont Westbound								
WB1	1971+00	154	65	72	65	31.5	no	-
WB2	1973+00	93	65	72	69	50	no	-
WB3	1978+00	39	65	72	77	63	yes	7
WB4	1983+00	68	65	72	72	50	no	-
WB5	1990+00	35	65	72	78	63	yes	50
WB6	2048+00	40	65	72	77	63	yes	3
Claremont Eastbound								
EB1	1970+00	158	65	72	65	31.5	no	-

Table 20: Predicted LRT Vibration Levels in Claremont, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist., ft[2]	Speed, mph	Threshold, VdB	Predicted Band Max., VdB[3]	1/3 Octave Band, Hz[4]	Impact	No. of Impacts[5]
EB2	1974+00	144	65	72	65	31.5	no	-
EB3	1978+00	146	65	72	65	31.5	no	-
EB4 (diamond xover)	2008+00	96	55	72	66	50	no	-
EB4a[6]	2017+00	66	65	72	71	50	no	-
EB5	2035+00	74	65	72	71	50	no	-
EB6	2041+00	100	65	72	68	50	no	-
EB7	2047+00	80	65	72	70	50	no	-
							Total Impacts in Claremont:	60

Source: ATS Consulting, 2018
Notes:
[1]The cluster numbers refer to the same sensitive receivers used for the noise analysis. The buildings included in each cluster are detailed in the figures in the 2013 Final EIR.
[2]The distance in feet from the closest sensitive receiver in the cluster to the proposed near light-rail track.
[3]Maximum predicted vibration level in any 1/3 octave band.
[4]The 1/3 octave band that corresponds to the predicted band maximum.
[5]Number of dwelling units in the impacted cluster.
[6]New residential development added to analysis after completion of Final EIR.

Table 21: Predicted Metrolink Vibration Levels in Claremont, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist., ft[2]	Change in Dist, ft	Predicted Current Band Max, VdB	Predicted Future Band Max., VdB[3]	1/3 Octave Band, Hz[4]	Impact	No. of Impacts[5]
Claremont Eastbound								
EB1	1970+00	115	0	68	68	40	no	-
EB2	1974+00	102	0	69	69	40	no	-
EB3	1978+00	106	0	68	68	40	no	-
EB4	2008+00	51	34	70	74	40	yes	10
EB4a[6]	2017+00	29	40	72	80	63	yes	33

Table 21: Predicted Metrolink Vibration Levels in Claremont, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist., ft[2]	Change in Dist, ft	Predicted Current Band Max, VdB	Predicted Future Band Max., VdB[3]	1/3 Octave Band, Hz[4]	Impact	No. of Impacts[5]
EB5	2035+00	67	40	68	72	40	yes	9
EB6	2041+00	65	26	70	72	40	no	-
EB7	2047+00	45	20	72	75	40	no	-
							Total Impacts in Claremont:	42

Source: ATS Consulting, 2018
Notes:
[1]The cluster numbers refer to the same sensitive receivers used for the noise analysis. The buildings included in each cluster are detailed in the figures in the 2013 Final EIR.
[2]The distance in feet from the closest sensitive receiver in the cluster to the proposed near light-rail track.
[3]Maximum predicted vibration level in any 1/3 octave band.
[4]The 1/3 octave band that corresponds to the predicted band maximum.
[5]Number of dwelling units in the impacted cluster.
[6]New residential development added to analysis after completion of Final EIR.

4.6 Montclair

In the 2013 Final EIR assessment, there were no sensitive receiver in Montclair. However, since the completion of that analysis a new residential development has been constructed south of the existing Montclair Metrolink station platform. Table 22 presents the predicted noise levels and Table 23 presents the predicted vibration levels. The predicted levels at the sensitive receiver in Montclair do not exceed the applicable impact threshold for noise or vibration.

The Metrolink tracks will not be relocated within Montclair, so the change in vibration levels of the Metrolink tracks is not assessed.

Table 22: Predicted Noise Levels in Montclair, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist.[2], ft	Speed, mph	Existing Ldn, dBA	Predicted Ldn, dBA		Threshold[3]		Impact		No. of Impacts[4]	
					w/horns	no horns	Mod.	Sev.	w/horns	no horns	w/horns	no horns
Montclair Eastbound												
EB1	2075+00	120	45	64	59.7	59.7	1.5	3.9	-	-	-	-
Total Moderate Impacts in Montclair:											0	0
Total Severe Impacts in Montclair:											0	0

Source: ATS Consulting, 2018
Notes:
[1] The buildings included in each cluster are detailed in the figures in the 2013 Final EIR
[2]The distance in feet from the closest sensitive receiver in the cluster to the proposed near light-rail track.
[3]The threshold is the allowable increase in noise from the existing Ldn. The FTA designates two threshold levels: moderate and severe.
[4]Number of dwelling units in the impacted cluster.
[5]New residential development added to analysis after completion of Final EIR.

Table 23: Predicted LRT Vibration Levels in Montclair, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist., ft[2]	Speed, mph	Threshold, VdB	Predicted Band Max., VdB[3]	1/3 Octave Band, Hz[4]	Impact	No. of Impacts[5]
Montclair Eastbound								
EB1[6](diamond xover)	2075+00	120	65	72	67	50	no	-
Total Impacts in Montclair:								0

Table 23: Predicted LRT Vibration Levels in Montclair, Category 2 Land Uses

Cluster No.[1]	Eng. Station	Dist., ft[2]	Speed, mph	Threshold, VdB	Predicted Band Max., VdB[3]	1/3 Octave Band, Hz[4]	Impact	No. of Impacts[5]

Source: ATS Consulting, 2018
Notes:
[1]The cluster numbers refer to the same sensitive receivers used for the noise analysis. The buildings included in each cluster are detailed in the figures in the 2013 Final EIR.
[2]The distance in feet from the closest sensitive receiver in the cluster to the proposed near light-rail track.
[3]Maximum predicted vibration level in any 1/3 octave band.
[4]The 1/3 octave band that corresponds to the predicted band maximum.
[5]Number of dwelling units in the impacted cluster.
[6]New residential development added to analysis after completion of Final EIR.

4.7 Institutional Land Uses

Table 24 presents the predicted noise levels at institutional land uses. The noise impact assessment does not include sensitive receiver Glendora EB B, because the Woodglen Medical Group building does not have any overnight patients, and offices are not considered noise sensitive. Table 25 presents the predicted vibration levels for institutional land uses. One vibration impact is predicted at Glendora EB B.

The noise and vibration mitigation measures for all receivers where the predicted levels exceed the applicable threshold are presented in Section 5.

Table 24: Predicted Noise Levels for Category 3 Land Uses

City	Land Use	Cluster No.[1]	Eng. Station	Dist.[2], ft	Speed, mph	Existing 1-hr Leq, dBA	Predicted 1-hr Leq, dBA		Threshold[3]		Impact	
							w/horns	no horns	Mod.	Sev.	w/horns	no horns
Glendora	Calvary Lutheran Church	EB A	1430+00	143	65	50	62.4	62.4	8.9	14.7	Moderate	Moderate
Glendora	Presbyterian Hospital	EB B	1495+00	67	45	61	64.6	64.6	4.3	8.6	-	-
Glendora	Kindred Transitional Care	EB B1	1498+00	212	55	61	59.6	59.6	4.3	8.6	-	-
Glendora	Foothill Christian Preschool (no freight)	EB C	1525+00	97	55	50	n/a	52.0	8.9	14.7	n/a	-
Glendora	Foothill Christian Preschool (w/ freight)	EB C	1525+00	97	55	75	67.2	52.2	1.2	4.9	-	-
San Dimas	Pioneer Park (no freight)	EB E	1719+00	404	55	58	n/a	58.6	5.3	9.9	n/a	-
San Dimas	Pioneer Park (w/ freight)	EB E	1719+00	404	55	75	64.4	58.7	1.2	4.9	-	-
La Verne	University of La Verne (no freight)	WB F	1847+00	32	35	57	n/a	63.8	5.6	10.4	n/a	Moderate
La Verne	University of La Verne (w/ freight)	WB F	1847+00	32	35	75	79.2	65.5	1.2	4.9	Moderate	-

Table 24: Predicted Noise Levels for Category 3 Land Uses

City	Land Use	Cluster No.[1]	Eng. Station	Dist.[2], ft	Speed, mph	Existing 1-hr Leq, dBA	Predicted 1-hr Leq, dBA		Threshold[3]		Impact	
							w/horns	no horns	Mod.	Sev.	w/horns	no horns
Claremont	Keck Graduate Institute	EB G	1993+00	183	65	58	64.7	63.8	5.3	9.9	Moderate	Moderate

Source: ATS Consulting, 2018
Notes:
[1]The buildings included in each cluster are detailed in Appendix C.
[2]The distance in feet from the closest sensitive receiver in the cluster to the proposed near light-rail track.
[3]The threshold is the allowable increase in noise from the existing Ldn. The FTA designates two threshold levels: moderate and severe.
[4]Number of dwelling units in the impacted cluster.
[5]New residential development added to analysis after completion of Final EIR.

Table 25: Predicted Vibration Levels for Category 3 Land Uses

City	Land Use	Cluster No.[1]	Eng. Station	Dist. ft[2]	Speed mph	Threshold, VdB	Predicted Band Max., VdB[3]	1/3 Octave Band, Hz[4]	Impact
Glendora	Calvary Lutheran Church	EB A	1430+00	143	65	75	69	31.5	—
Glendora	Presbyterian Hospital	EB B	1495+00	67	45	75	77	31.5	Yes
Glendora	Kindred Transitional Care	EB B1	1498+00	212	45	75	63	31.5	—
Glendora	Foothill Christian Preschool	EB C	1525+00	98	55	75	70	31.5	—
Glendora	Woodglen Medical Group	EB D	1527+00	70	55	75	73	31.5	—
San Dimas	Pioneer Park	EB E	1719+00	404	55	75	60	31.5	—
La Verne	University of La Verne	WB F	1847+00	32	35	75	75	31.5	—
Claremont	Keck Graduate Institute	EB G	1993+00	183	65	75	67	31.5	—

Source: ATS Consulting, 2018
Notes:
[1]The cluster numbers refer to the same sensitive receivers used for the noise analysis. The buildings included in each cluster are detailed in the figures in the 2013 Final EIR.
[2]The distance in feet from the closest sensitive receiver in the cluster to the proposed near light-rail track.
[3]Maximum predicted vibration level in any 1/3 octave band.
[4]The 1/3 octave band that corresponds to the predicted band maximum.
[5]New development added to analysis after completion of Final EIR.

4.8 TPSS Units

The only ancillary equipment expected to have the potential of causing noise impacts are the traction power substation (TPSS) units. The primary noise source from the TPSS units is from the transformer hum and the cooling system. On most modern TPSS units, the transformer hum is minimal so most noise is generated by the ventilation and cooling system.

Table 26 lists the TPPS unit locations and identifies the nearest sensitive receiver to each unit. Consistent with the 2016 Addendum 3, the predicted noise levels include updated reference noise levels for TPSS units based on measurements completed in March 2015 at two units on the Exposition Phase 1 line (reference sound pressure level of 58 dBA at 50 feet).

Table 26 also shows the predicted noise level and the applicable FTA noise impact criteria. The FTA noise impact criteria depends on the existing noise level at the nearest sensitive receiver, so the impact criteria varies for the different TPSS locations. Moderate noise impact is predicted at the TPSS sites located within 100 feet of a residential building. Recommended mitigation measures are presented in Section 5.1.6. The most effective mitigation measure is to specify quieter TPSS units.

Table 26: Predicted TPSS Noise Levels

City	TPSS	Eng. Station	Dist., ft[1]	Nearest Sensitive Receiver	Estimated TPSS Noise Ldn, dBA[2]	FTA Mod. Criteria[2], Ldn dBA	Impact
Glendora	B-1	1495+50	75	WB 2	61	57	**Yes**
Glendora	B-2	1560+02	84	WB 11	60	56	**Yes**
Glendora	B-3	1639+50	No noise sensitive receivers near this TPSS location				
San Dimas	B-4	1682+63	80	EB 1	60	58	**Yes**
San Dimas	B-5	1725+40	80	EB 3a	60	58	**Yes**
La Verne	B-6	1805+62	77	WB 1	61	58	**Yes**
La Verne	B-7	1861+52	No noise sensitive receivers near this TPSS location				
Pomona	B-8	1928+37	116	EB 1	57	59	No
Claremont	B-9	1977+87	50	EB 3	64	59	**Yes**
Claremont	B-10	2013+40	No noise sensitive receivers near this TPSS location				
Montclair	B-11	2083+70	No noise sensitive receivers near this TPSS location				

Source: ATS Consulting, 2018
Notes:
[1]The distance in feet from the closest sensitive receiver in the cluster to the proposed TPSS location.
[2] The FTA moderate noise impact criteria, based on the existing noise level at the receiver.

5. MITIGATION RECOMMENDATIONS

5.1 Noise

The updated noise analysis identified noise sensitive receivers where there is potential for future noise levels to exceed the applicable FTA noise impact threshold. Mitigation measures that may be incorporated into the design to reduce predicted noise levels to below the FTA thresholds are:

- **Noise barriers –** This is a common approach to reduce noise impacts from surface transportation sources. The primary requirements for an effective noise barrier are (1) the barrier must be high enough and long enough to break the line-of-sight between the sound source and the receiver; (2) the barrier must be of an impervious material with a minimum surface density of 4 lb/sq. ft; and (3) the barrier must not have any gaps or holes between panels or at the bottom. Because numerous materials meet these requirements, the selection of materials for noise barriers is usually dictated by aesthetics, durability, cost, and maintenance considerations.
- **Building Sound Insulation –** Sound insulation of residences and institutional buildings improve the outdoor-to-indoor noise reduction. Although this approach has no effect on noise in exterior areas, it may be the best choice for sites where noise barriers are not feasible or desirable, for buildings where indoor sensitivity is of most concern, or where horn noise dominates the noise environment.
- **Low-impact frogs –** Frogs are used in special trackwork such as turnouts and crossovers where two rails cross. At the gap where the two rails cross, the wheels strike the end of the gap and increase noise and vibration levels. There are alternatives to typical frogs that result in lower impact forces and lower noise level increases at receivers near special trackwork. The predicted noise and vibration levels assume that low-impact frogs will be implemented at the locations specified in Table 31. If not, noise impacts will need to be reassessed.
- **Rail Dampers –** Rail dampers are pre-formed or adjustable elements, usually mounted on the lateral sides of the rails using clips, bolts or glue in way that does not interfere with operations or maintenance of the track. The rail damper works to reduce the oscillation of the vibrating rail by coupling to a mass via a damped spring (e.g. steel block attached with rubber layer). Rail dampers can be tuned to match the type of rail to be damped. Research shows that rail dampers can reliably produce at least a 3 dB reduction in rolling noise. Table 32 list the locations where rail dampers are recommended.

5.1.1 Summary of Noise Barriers

The primary recommended mitigation measure is construction of noise barriers to shield sensitive receivers from train noise. Table 27 presents the noise barrier locations and heights. Noise barrier heights and lengths were adjusted at most sensitive receivers due to refinements in the design and analysis since the 2013 Final EIR. Refinements that results in adjustments to the noise barrier recommendations are:

- Existing walls, structures, and terrain were included to determine areas where these features remove or reduce noise impacts. Sensitive receiver clusters where existing walls, structure, or terrain reduced the predicted noise level to below the impact threshold are shown in Table 28.
- Headways between trains were reduced, and the number of trains per consist was increased. This change in operating assumptions increased the predicted noise level, resulting in predicted impact at additional sensitive receivers.

- Areas where the wall was limited to an ineffective height due to grade-crossing visibility requirements were removed and added to the recommended locations for sound insulation near grade crossings in Table 29.
- If impacts exceeded a moderate impact by 1dB or less, no sound wall or insulation is recommended. The FTA guidance manual recommends taking into account the predicted increase over existing noise levels, and also states that there is less need for mitigation if the predicted level falls just above the No Impact threshold. Locations with small residual exceedances over the moderate noise impact threshold are indicated in Table 27.
- The start and end station numbering has been updated to ensure wall lengths are sufficient to minimize flanking noise around the ends of barriers.
- Where reasonable, wall heights were capped at 10 feet above ground. Such cases include areas with a residual moderate exceedance of 1 dB or less.

These changes resulted in many walls being removed or added compared to the 2013 Final EIR assessment. Therefore, the wall numbering in Table 27 does not correspond to wall numbering in the 2013 Final EIR or Addendum 3.

Visibility and safety requirements require lower wall heights within 250 feet of an at-grade crossing. The recommended mitigation measure near intersections is for transparent barriers to be installed on top of the reduced wall height to maintain the total noise barrier height presented in Table 27 up to the intersection. If transparent panels are not feasible due to maintenance or safety and access concerns, sound insulation should be considered for all sensitive receivers affected by the reduced wall height.

Glendora Wall 8 is the only location where the predicted mitigated noise level exceeds the moderate noise impact threshold by more than one decibel. Reducing the predicted level to below the moderate noise impact threshold would require a wall height 19 feet above top-of-rail, which would be 13 to 15 feet above ground level. The wall height could be significantly lower if the wall were placed on private property further up the ridge just beyond the right-of-way.

Table 27: Recommended Locations for Noise Barriers

City	Wall No.[1]	Direction[2]	Eng. Station		Length (ft)	Placement Location[3]	Height Above Top-of-Rail[4] (ft)	Clusters Mitigated	Comments
			Start	End					
Glendora	1	WB	1468+00	1482+25	1,425	10' from NT	5	WB 1c, 1d	on elevated structure
Glendora	2	WB	1492+00	1497+50	550	10' from NT	6	WB 2	on elevated structure
Glendora	3	WB	1518+00	1528+25	1,025	ROW	8	WB 4, 5	
Glendora	4	WB	1529+00	1557+00	2,800	ROW	10	WB 6, 7, 8, 9, 10	0.3 dB moderate impact remains for WB 6 & 8 1.0 dB moderate impact remains for WB 9 & 10
Glendora	5	WB	1557+75	1570+00	1,225	ROW	11	WB 11,12, 13	
Glendora	6	WB	1571+00	1579+50	850	10' from NT	8	WB 14, 15	0.7 dB moderate impact remains for WB 14
Glendora	7	WB	1583+00	1589+00	600	ROW	9	WB 16	0.8 dB moderate impact remains for WB 16
			1588+60	1602+00	1,340	10' from NT	8	WB 16, 17, 18	0.8 dB moderate impact remains for WB 16
Glendora	8	WB	1612+00	1632+50	2,050	ROW	17	WB 19, 20	2.2 dB and 1.6 dB moderate impact remains for grouping WB 19 and WB 20 respectively.
			1632+50	NA	70	ROW, perpendicular to track	17	WB 20	Wall extends 70 ft east along property line to allow access for road
Glendora	9	EB	1430+25	1435+50	525	ROW	9	EB 1	Wall to begin 100 ft west of first residence, barrier at ROW
			1435+25	1454+25	1,900	10’ from NT	9	EB 2, 3, A (Cat. 3)	Barrier moved to 10’ from NT at the start of new 2B track
Glendora	10	EB	1455+50	1481+00	2550	10' from NT	7	EB 4, 5, 5a	Placing barrier at ROW, height above top-of-rail is reduced to 5’ in some sections, and length is reduced by 100’. Sections are also on elevated structure

Table 27: Recommended Locations for Noise Barriers

Glendora	11	EB	1535+50	1544+50	900	10' from NT	6	EB 7,8	
Glendora	12	EB	1584+00	1590+00	600	10' from NT	6	EB 9	
Glendora	13	EB	1604+00	1614+00	1000	10' from NT	5	EB 10	If sound wall height is raised to 8' above top-of rail, second story impact is mitigated
Glendora	14	EB	1623+00	1630+00	700	10' from NT	11	EB 11	If wall is built only to 10' above ground, exceeds moderate noise impact by 2.2 dB
Total Length, Glendora (ft)					**20,110**				
San Dimas	1	WB	1678+00	1682+00	400	ROW	7	WB 2	Sound wall can be terminated when ground height reaches the specified wall height both east and west of WB 2. If the sound wall is placed on the retaining wall then the height of the sound wall should be 12 feet above top of rail.
San Dimas	2	WB	1763+50	1772+00	850	ROW (on ret wall)	7	WB 7, 8	
San Dimas	4	EB	1699+00	1706+00	700	ROW (on ret wall)	5	EB 2, 3	
San Dimas	5	EB	1721+50	1726+50	500	10' from NT	4	EB 3a, 3b 3c	
San Dimas	6	EB	1735+00	1741+50	650	10' from NT (on ret wall)	10	EB 4	
Total Length, San Dimas (ft)					**3,100**				
La Verne	1	WB	1803+00	1808+00	500	ROW	5	WB 1	
La Verne	2	WB	1816+00	1827+50	1,150	ROW	5	WB 2, 3, 4	
La Verne	3	WB	1828+50	1834+25	615	ROW, perpendicula r to track	5	WB 5, 6	
La Verne	4	WB	1834+00	1835+25	125	10' from NT	4	WB 6	
La Verne	5	WB							Removed and recommended for sound insulation due to limited height at grade crossing

Table 27: Recommended Locations for Noise Barriers

La Verne	6	EB	1780+00	1790+00				EB 1	Existing sound wall is sufficient
La Verne	7	EB	1874+00	1880+00	600	22' from LRT track 1	5	EB 2	Walk is outside of storage track, between metrolink & LRT
La Verne	8	EB	1883+00	1893+75	1,075	10' from NT	6	EB 3, 4	A 6 ft wall leaves a 0.9 dB moderate impact at EB 3 and EB 4
Total Length, La Verne (ft)					**4,065**				
Pomona	1	WB	1919+00	1926+00	700	10' from NT	4	WB 1a	on elevated structure
Pomona	2	WB	1934+00	1949+50	1,550	10' from NT	4	WB 1b	on elevated structure, extends across bridge to match wall on south side of bridge
Pomona	2a	WB	1956+50	1962+00	550	10' from NT	4	WB 1c	on elevated structure
Pomona	3	EB	1927+00	1934+00	700	10' from NT	4	EB 1	on elevated structure
Pomona	4	EB	1937+00	1949+50	1,250	10' from NT	4	EB 2	on elevated structure
Pomona	5	EB	1965+00	1972+00				EB 3	Existing sound wall is sufficient
Total Length, Pomona (ft)					**4,750**				
Claremont	1	WB	1975+00	1980+25	525	ROW (on ret wall)	9	WB 3	Assumed to connect with existing property wall at 1975+00
Claremont	2a	EB	2033+50	2040+00	650	ROW (on ret wall)	4	EB 5	
Claremont	2b	EB	2040+00	2044+75	475	12.5' from Metrolink	4	EB 6	
Total Length, Claremont (ft)					**1,650**				
Montclair	1	WB	2053+50	2057+50	400	ROW	6	WB 7	
Total Length, Montclair (ft)					**400**				
Total Length, All Cities (ft)					**34,075**				

Table 27: Recommended Locations for Noise Barriers
Source: ATS Consulting, 2018 Notes: Heights may be significantly altered if quiet zones waivers are granted for at-grade crossings [1] Walls have been re-numbered since the 2013 Final EIR due to design and analysis refinements. [2] EB = towards Montclair (south side of tracks); WB = towards Azusa (north side of tracks) [3] ROW = right-of-way property line; NT = light rail near track; SCRRA = Metrolink trains; ret wall = top of retaining wall is the base of the sound wall [4] Wall heights listed are the effective heights, which must be reduced to a height of 3'7"at any location within 250ft of an at-grade crossing.

Table 28: Sensitive Receiver Clusters with Existing Mitigation

City	Cluster	Existing Mitigation
Glendora	WB 0	5.5 ft property wall
Glendora	WB 1a	5.75 ft property wall
Glendora	WB 1b	6.75 ft property wall
Glendora	WB 3	Will be blocked by property wall at WB 3b
Glendora	WB 3a	7 ft property wall
Glendora	WB 3b	6 ft property wall
Glendora	WB 18a	Acoustic shielding from embankment
Glendora	EB 5d	Acoustic shielding from buildings
Glendora	EB 6a	11 ft property wall
Glendora	C (Category 3)	11 ft property wall
San Dimas	WB 3	Acoustic shielding from embankment
San Dimas	WB 4	6 ft property wall
San Dimas	WB 4a	6 ft property wall
San Dimas	WB 4b	Acoustic shielding from buildings
San Dimas	WB 4c	Acoustic shielding from buildings
San Dimas	WB 4d	Acoustic shielding from buildings
San Dimas	WB 5	5.5 ft property wall
San Dimas	WB 6	8 ft property wall
San Dimas	EB 3b	Acoustic shielding from buildings
La Verne	WB 1a	Acoustic shielding from buildings
La Verne	WB 7a	Acoustic shielding from buildings
Pomona	WB 1c	5.75 ft property wall
Pomona	WB 1	15 ft property wall
Pomona	WB 2	9 ft property wall
Claremont	WB 1	6.75 ft property wall
Claremont	WB 2	6.75 ft property wall
Claremont	WB 4	7 ft property wall
Claremont	WB 5	9.75 ft property wall
Claremont	EB 4a	10.75 ft property wall
Montclair	EB 1	7.5 ft property wall

Source: ATS Consulting, 2017

5.1.2 Sound Insulation of Buildings

The 2013 Final EIR recommends sound insulation as a mitigation measure for sensitive receivers:

1. near intersections because sound barriers cannot extend into the intersection, which reduces their effectiveness for receivers located at the intersection, and
2. with second floors and higher where it may not be feasible or cost effective to increase the height of the barriers to provide adequate noise reduction

In addition to the sound flanking around the end of noise barriers at intersections, Metro requires reduced barrier height 250 feet from each intersection to maintain visibility. If transparent barriers are used near intersections, only the buildings closest to the intersection within the cluster need to be considered for sound insulation. Otherwise, all receivers within 250 feet of an intersection affected by the reduced wall heights should be considered for sound insulation.

Table 29 lists sensitive receiver clusters where sound insulation should be considered due to predicted noise impact near a grade crossing or where sound walls do not mitigate above the first story. Table 29 also recommends sound insulation for cluster San Dimas EB 1, the San Dimas Red Roof Inn. The façade of the building facing the tracks is a solid wall and does not have any windows or doors. The sound insulation of the wall should be verified to confirm that a sound wall is not necessary for that receiver.

Table 29: Recommended Locations for Sound Insulation

City	Cluster	Cross Street[1]	Stories to Mitigate[2]
Glendora	WB 0a	--	Above 1st
Glendora	WB 0	--	Above 1st
Glendora	WB 1	Barranca Avenue	All
Glendora	WB 2	--	Above 1st
Glendora	WB 3a	--	Above 1st
Glendora	WB 3b	--	Above 1st
Glendora	WB 4	Glendora Avenue	All
Glendora	WB 5	Pasadena Avenue	All
Glendora	WB 6	Pasadena Avenue	All
Glendora	WB 7	--	Above 1st
Glendora	WB 8	Glenwood Avenue	All
Glendora	WB 9	Glenwood Avenue	All
Glendora	WB 10	Elwood Avenue	All
Glendora	WB 11	Elwood Avenue	All
Glendora	WB 13	Lorraine Avenue	All
Glendora	WB 14	Lorraine Avenue	All
Glendora	WB 20	--	Above 1st

Table 29: Recommended Locations for Sound Insulation

City	Cluster	Cross Street[1]	Stories to Mitigate[2]
Glendora	EB 3	Barranca Avenue	All
Glendora	EB 4	Barranca Avenue	All
Glendora	EB 5b	Grand Avenue	All
Glendora	EB 5c	Vermont Avenue	All
Glendora	EB 6a	--	Above 1st
Glendora	EB 10[3]	--	Above 1st
Glendora	EB 11	--	Above 1st
Glendora	EB 12	Gladstone Street	All
San Dimas	WB 1	Gladstone Street	All
San Dimas	WB 4	--	Above 1st
San Dimas	WB 4c	Eucla Avenue	All
San Dimas	WB 6	Walnut Avenue	Above 1st
San Dimas	WB 8	--	Above 1st
San Dimas	EB 3	Eucla Avenue	All
San Dimas	EB 3a	Cataract Avenue	All
La Verne	WB 2	Wheeler Avenue	All
La Verne	WB 4	A Street	All
La Verne	WB 5	A Street	All
La Verne	WB 7	Fairplex Drive	All
La Verne	F (Category 3)	D Street	All
La Verne	WB 7b	White Avenue	All
La Verne	EB 4	Fulton Road	All
Pomona	EB 1	--	Above 1st
Pomona	WB 1a	Garey Ave	All
Pomona	WB 1c	--	Above 1st
Claremont	WB 3	Cambridge Avenue	All
Claremont	WB 5	--	Above 1st
Claremont	WB 6	Claremont Boulevard	All
Claremont	EB 3	Cambridge Avenue	All
Claremont	EB 4	Indian Hill	All
Claremont	EB 4a	Claremont Boulevard	All
Claremont	EB 6	Claremont Boulevard	All

Table 29: Recommended Locations for Sound Insulation

City	Cluster	Cross Street[1]	Stories to Mitigate[2]
Claremont	EB 7	Claremont Boulevard	All

Source: ATS Consulting, 2018

Notes: The cross street identifies cluster at the intersection, not the particular building where insulation should be applied.

[1] If transparent barriers are used near grade crossings, only the residence closest to the intersection needs to be considered. Otherwise, sound insulation for all windows (including 1st story) within 250" of the intersection should be considered.
[2] Sound insulation is recommended for all windows above the 1st story for locations where "Above 1st" is listed.
[3] Sound insulation not necessary for 2nd story if barrier height is raised to 8' above top-of-rail.

5.1.3 Quiet Zones for Horn Noise

The Federal Railroad Administration (FRA) regulations require all trains operating on the national rail system to sound horns as they approach an at-grade rail/roadway crossing. In 2005, the FRA finalized a horn rule that provides the opportunity to mitigate the effects of train horn noise by establishing "quiet zones." The FRA may grant a quiet zone if the affected jurisdiction agrees to implement supplemental safety measures such as four quadrant gates. If the application is approved, freight trains are not required to sound their horns as they approach at-grade crossings. Implementing a quiet zone requires cooperation by all jurisdictions involved with the grade crossing and is contingent on approval by the FRA.

Noise reduction from quiet zones is not considered in the predicted noise levels or the noise barrier recommendations in Table 27. Horn noise from freight and Metrolink trains is also not considered in the noise barrier recommendations. However, if quiet zones were approved it would reduce or eliminate noise exceedances. All at-grade crossings where petitions for quiet zone status is recommended are presented in Table 30.

Table 30: Recommended At-Grade Crossings to Petition for Quiet Zone

City	Cross Street	Clusters Mitigated[1]
Glendora	Barranca Avenue	EB 3, EB 4, WB 0, WB 1, WB 1a
Glendora	Grand Avenue	EB 5b
Glendora	Vermont Avenue	EB 5c, EB 6, WB 3, WB 3b
Glendora	Glendora Avenue	EB 6a, WB 3a, WB 4
Glendora	Pasadena Avenue	WB 5, 6, D (Category 3)
Glendora	Elwood Avenue	WB 10, 11
Glendora	Lorraine Avenue	WB 13, 14
San Dimas	Gladstone Street	WB 1
San Dimas	Eucla Avenue	EB 3, WB 4c
San Dimas	Cataract Avenue	EB 3a
San Dimas	Monte Vista Avenue	EB 3b

Table 30: Recommended At-Grade Crossings to Petition for Quiet Zone

City	Cross Street	Clusters Mitigated[1]
San Dimas	Walnut Avenue	WB 6
San Dimas	San Dimas Canyon Road	WB 8
La Verne	Wheeler Avenue	WB 2
La Verne	A Street	WB 4, WB 5
La Verne	D Street	WB 7a, F (Category 3)
La Verne	Fairplex Drive	WB 7
La Verne	White Avenue	WB 7b
La Verne	Fulton Road	EB 4[2]
Pomona	Garey Avenue	WB 1a
Claremont	Cambridge Avenue	WB 3, WB 4, EB 2, EB 3, G (Category 3)
Claremont	Indian Hill Boulevard	EB 4
Claremont	College Avenue	EB 4a, H (Category 3)
Claremont	Claremont Boulevard	WB 6, EB 6, EB 7

Source: ATS Consulting, 2018
Notes: Freight trains begin sounding their horns 1/4 mile before an intersection; a quiet zone will improve the noise environment at all clusters within a 1/4 mile of an at-grade crossing
[1]Clusters listed are most effected by horn noise. Other clusters nearby could also benefit from quiet zones.
[2]Locations of Metrolink tracks are not changing due to this project.

5.1.4 Low-impact Frogs

Low-impact frogs can be used to reduce noise and vibration from special trackwork. The low-impact frogs recommended are:

- Monoblock frogs – Monoblock frogs are also sometimes referred to as WBM (weldless, boltless manganese) frogs. Because they are milled out of a single block of steel and eliminate joints they create a smoother running surface through the frog. Monoblock frogs reduce the noise and vibration amplification from a standard RBM frog by about half.
- Spring-rail or Moveable point frog – Spring rail and moveable point frogs have a moveable wing rail held against the point rail by springs. These frogs are expensive, but they result in only a marginal increase in vibration levels compared to standard track, which is an 4 to 5 decibel noise reduction compared to standard RBM frogs .

Table 31 presents the crossover locations where monoblock or spring rail frogs are recommended. The crossover near Dalton Wash in Glendora (station 1581+00 to 1586+00) recommends a spring-rail frog or a monoblock frog. The type of frog selected needs to consider the other vibration mitigation measures in the area, which are discussed in Section 5.2.3.

Table 31: Recommended Noise Mitigation for Crossovers

Crossover Stationing	Location	Closest Receiver	Recommendation
1488+00 to 1493+00	Carroll Avenue, Glendora	Glendora WB2, Glendora B	Monoblock Frog
1581+00 to 1586+00	Dalton Wash, Glendora	Glendora WB15, WB16, and EB9	Spring rail frog or Monoblock frog (see Section 5.2.3)
1712+00 to 1717+00	Eucla Ave at Bonita Ave, San Dimas	San Dimas WB4c, WB4d, and EB3	Monoblock Frog
1797+00 to 1802+00	Carrion Road at Arrow Hwy, La Verne	La Verne WB 1a	Standard or Monoblock Frog
1872+00 to 1883+00	Between White Avenue and Fulton Avenue, La Verne	La Verne EB 2, 3	Monoblock Frog
2008+00 to 2011+00	East of Indian Hill Boulevard, Claremont	Claremont EB 4	Monoblock Frog
2067+00 to 2071+00	Monte Vista Avenue	Montclair EB 1	Standard or Monoblock Frog
2078+00 to 2081+00	Tail track east of Montclair station	Montclair EB 1	Standard or Monoblock Frog
Source: ATS Consulting, 2018			

5.1.5 Rail Dampers

Rail dampers reduce rolling noise by the use of damped mass-spring elements attached to the rails. Rail dampers do not reduce noise due to special trackwork or frogs. The only location recommended for rail dampers is in Claremont east of Indian Hill Boulevard. Inclusion of the freight and Metrolink horns results in a severe noise impact at EB4, which rail dampers reduce but do not eliminate this severe impact. Home insulation is also recommended.

Table 32: Recommended Locations for Rail Dampers

Crossover Stationing	Location	Closest Receiver	Comments
2005+00 to 2012+00	East of Indian Hill Boulevard, Claremont	Claremont EB4	On elevated structure and embankment.
Source: ATS Consulting, 2018			

5.1.6 Mitigation of TPSS Units

Noise impact is predicted at several of the proposed TPSS sites. The following mitigation measures are recommended to mitigate noise from the TPSS units:

- Include a noise limit in the purchase specifications for TPSS units. The recommended limit is a maximum level of 50 dBA at a distance of 50 feet from any part of the TPSS unit. It may be possible to procure quieter units when necessary.
- Locate the unit within the parcel as far from the sensitive receivers as feasible. If possible, orient the cooling fans away from sensitive receivers avoiding direct line-of-sight from the cooling fans to the sensitive receivers.

Table 33 shows the predicted noise level at the TPSS sites assuming the units are specified to have a sound level of 50 dBA at 50 feet. If the units meet the specification, the predicted noise level is reduced to below the noise impact threshold for all TPSS sites.

Table 33: Predicted TPSS Noise Levels With Mitigation

TPSS	Distance[1], ft	Nearest Sensitive Receiver	Estimated TPSS Noise with Spec[2], Ldn, dBA	FTA Mod. Criteria[3], Ldn dBA
B-1	75	WB 2	53	57
B-2	84	WB 11	52	56
B-3	No noise sensitive receivers near this TPSS location			
B-4	80	EB 1	52	58
B-5	80	EB 3a	52	58
B-6	77	WB 1	53	58
B-7	No noise sensitive receivers near this TPSS location			
B-8	Mitigation was not needed at this TPSS location			
B-9	50	EB 3	56	59
B-10	No noise sensitive receivers near this TPSS location			
B-11	No noise sensitive receivers near this TPSS location			

Source: ATS Consulting, 2017
Notes:
[1]The distance in feet from the closest sensitive receiver in the cluster to the proposed TPSS location.
[2]The estimated TPSS noise level assuming the units are specified to have a noise level of 50 dBA at 50 ft
[3] The FTA moderate noise impact criteria, based on the existing noise level at the receiver.

5.2 Vibration

The updated predicted vibration levels were used to identify vibration sensitive receivers where there is potential for future vibration levels to exceed the applicable FTA vibration impact threshold. Mitigation measures recommended to reduce vibration to below the FTA thresholds include:

- **Ballast Mats –** A ballast mat consists of a pad made of rubber or rubber-like material placed on the subballast with normal ballast, ties, and rail on top. The reduction in groundborne vibration provided by a ballast mat is strongly dependent on the frequency content of the vibration and the design and support of the mat.
- **Floating slab track –** The track is constructed on a concrete slab that is supported by resilient elements (either pads 2 to 6 inches thick or a continuous resilient mat). This type of track

construction is very expensive and is typically used only where substantial vibration mitigation is needed.

- **Low-impact frogs-** Frogs are used in special trackwork such as turnouts and crossovers where two rails cross. At the gap where the two wheels cross, the wheels strike the end of the gap which increases noise and vibration levels. There are alternatives to typical frogs that result in lower impact forces and lower vibration level increases at receivers near special trackwork.

5.2.1 Recommended LRT Vibration Mitigation

Table 34 presents the recommended measures to be incorporated into the design to reduce the predicted vibration levels to below the impact threshold. In Glendora and San Dimas, a 2-inch layer of ballast mat is recommended to reduce the predicted vibration levels to below the applicable impact threshold. In Claremont, a 1-inch layer of ballast mat is recommended to reduce the predicted vibration levels to below the applicable impact threshold. At sensitive receivers located near special trackwork, low impact frogs are also recommended as a vibration mitigation measure. Low-impact frogs are discussed in Section 5.2.3.

A thicker layer of ballast mat is recommended in Glendora and San Dimas because the predicted vibration levels exceed the impact threshold in the 31.5 Hz 1/3 octave band. The frequencies at which the ballast mat is effective at reducing vibration depends on the stiffness of the mat. A softer mat, which can be achieved by increasing the thickness of the mat, is predicted to achieve vibration mitigation below 40 Hz. The stiffness of the ballast mat is quantified using the bedding modulus (stiffness per unit area). The ballast mat should have the following properties to reduce the predicted vibration levels to below the impact threshold:

- 1-inch ballast mat: dynamic bedding modulus of 28 MN/m^3 (103 lbf/in^3) assuming loading from a typical Metro LRV
- 2-inch ballast mat: dynamic bedding modulus of 13 MN/m^3 (47 lbf/in^3) assuming loading from a typical Metro LRV

More details on the parameters of the ballast mat assumed in the prediction model are included in Section 3.2.

In some locations, the ballast mat is recommended to extend through intersections. Particularly between station 1519+00 and 1579+75 in Glendora, there are sensitive receivers adjacent to the intersection and less than 30 feet from the track centerline. Terminating the ballast mat at the intersection would degrade the performance of the ballast mat. Vibration mitigation should continue through the intersection. The specific design of the mitigation will depend on the track design through the intersection. Two options are:

- A resilient mat, similar to a ballast mat, under a concrete slab through the intersection.
- Ballast-and-tie track with a ballast mat covered with an asphalt slab.

Table 34: Recommended Locations for Vibration Mitigation

City	Eng. Station		Length (ft)	Mitigation Type	Clusters Mitigated
	Start	End			
Glendora	1435+32	1463+50	2818	2-inch Ballast Mat	EB 1-5
Glendora	1468+50	1480+00	1150	2-inch Ballast Mat	EB 5a
Glendora	1491+00	1505+00	1,400	2-inch Ballast Mat	WB 2, EB B
Glendora	1513+50	1516+50	300	2-inch Ballast Mat	WB 3a
Glendora	1519+00	1579+75	6075	2-inch Ballast Mat	WB 4-WB 15, EB 7
Glendora	1583+50	1602+00	1850	2-inch Ballast Mat	WB 16-18, EB 9
Glendora	1612+50	1632+50	1100	2-inch Ballast Mat	WB 19-20, EB 10-11
Total Length Glendora (ft)			14,693		
San Dimas	1683+00	1688+50	550	1-inch Ballast Mat	EB 1
Total Length San Dimas (ft)			550		
Claremont	1975+50	1980+25	475	1-inch Ballast Mat	WB 3
Claremont	1986+00	1997+75	1,175	1-inch Ballast Mat	WB 5
Claremont	2046+50	2050+00	350	1-inch Ballast Mat	WB 6
Total Length Claremont (ft)			2,000		
Total Ballast Mat (all cities):			17,243		

Source: ATS Consulting, 2018
Notes:
It is assumed that mitigation will be placed under both near and far tracks.

5.2.2 *Recommended Metrolink Vibration Mitigation*

Table 35 presents the recommended vibration mitigation measures to be incorporated into the relocated Metrolink tracks in Claremont. A 1-inch thick layer of ballast mat is recommended at the three sensitive receivers where the tracks will be relocated closest to the residences. The requirements for the ballast mat for the Metrolink tracks are the same as for the LRT tracks discussed in the previous section.

Table 35: Recommended Locations for Vibration Mitigation, Metrolink Tracks

City	Eng. Station		Length (ft)	Mitigation Type	Clusters Mitigated
	Start	End			
Claremont	2006+00	2010+50	450	1-inch Ballast Mat	EB 4
Claremont	2013+75	2019+50	575	1-inch Ballast Mat	EB4a
Claremont	2046+00	2050+00	400	1-inch Ballast Mat	EB 7

Source: ATS Consulting, 2018
Notes:
It is assumed that mitigation will be placed under both near and far SCRRA tracks.

5.2.3 Low impact frogs

Low-impact frogs can be used to reduce noise and vibration from special trackwork. Low-impact frogs are recommended as a vibration mitigation measure at the same locations as for the noise assessment. The locations where low-impact frogs are recommended are presented in Table 31 in Section 5.1.4.

The only special trackwork location where a monoblock frog will not reduce the predicted vibration levels to below the impact threshold is the crossover east of Dalton Wash. A site-specific vibration propagation measurement indicated that there is very efficient vibration propagation in this area (Glendora WB16). Options for reducing the predicted vibration from the crossover at this location are:

- Install a spring-rail or moveable point frog with ballast mat
- Install a monoblock frog on floating slab track

6. PARK AND RIDE IMPACT ASSESSMENT

This section presents the results of a community noise assessment of five parking facilities that are being considered near stations on the proposed Foothill Extension 2B of Metro's Gold Line. The purpose of the study is to evaluate if the noise associated with the parking areas will result in any additional noise impacts according to the guidelines set forth in the Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment* manual (2006). This document is commonly referred to as the FTA Guidance Manual.

The parking facilities are located in the cities of Glendora, San Dimas, La Verne, Pomona and Claremont, and would be positioned near future rail stations. Each location has two design alternatives: a Metro Approved design and an Alternative design. Furthermore, for the cities of Glendora, San Dimas and Pomona there is an additional Expanded parking alternative. Engineering drawings for the various parking options are shown in Figure 16 to Figure 20. (SFR: Single Family Residence, MFR: Multi-Family Residence)

6.1 Methodology

The noise levels due to the parking activities are estimated following the assessment methodology presented in the FTA Guidance Manual. The noise predictions are based on a reference sound equivalent level, $SEL_{ref.}$ SEL_{ref} is a building block for determining the total project noise level. SEL_{ref} is used to estimate the maximum equivalent 1-hour Leq, which is then used to estimate the equivalent 24-hour day-night noise level, Ldn. Ldn is the most common measure of total community noise over a 24-hour period and is used by FTA to evaluate residential noise impacts from proposed transit projects.

SEL_{ref} for parking facilities is estimated to be 92 dBA at 50 feet, assuming 1000 cars going into and out of the facility in the in peak activity hour. Calculation of Leq(hr) is as follows:

$$\text{Leq(hr)} = SEL_{ref} + C_N - 35.6$$

$$C_N = 10*\text{Log(NumberSpaces/1000)}$$

NumberSpaces = Number of spaces applicable to the receiver

Because only the peak hour is estimated, the 24-hour Ldn is estimated as Leq(peak hour)+2 dB. This adjustment is based on ATS's experience with previous measurements. This estimated Ldn is at 50 ft, therefore predicted noise levels at nearby receivers are distanced adjusted against the level at 50 ft.

6.2 Results

As can been seen in the engineering drawings in Figure 16 to Figure 20, most of the residential receivers are at least 90 ft from the proposed parking facilities. The one exception is the Expanded Parking option for the Pomona Station. In this case, the parking would be within 50 ft of single family residences. Table 36 summarizes the noise levels predicted for the five parking facilities and the various options. Shown also are the existing noise, total project noise (LRT, Metrolink and freight) with and without the parking noise, and the moderate and severe FTA impact thresholds.

In all cases, the additional noise due to the parking facilities is predicted to increase total project noise by 0 to 1.2 dB. The largest predicted change is for the Expanded Parking option at the Pomona Station. In all cases, the predicted total project noise is below the applicable FTA impact threshold for Moderate Impact.

Note that these predictions are based on conservative assumptions, and the actual noise from the parking lot activities is expected to be lower than the predictions.

6.3 Recommendations

Because the predicted levels are all below the FTA impact thresholds for Moderate Impact, no mitigation measures recommended.

Table 36: Summary of Parking Facility Predicted Noise Levels

Facility	Closest Receiver Location	Dist. to Closest Rec., ft	Total Number of Spaces	Number of Applicable Space	Ldn, dBA						New Impact?
					Existing Noise	Predicted Parking Noise	Project Noise w/o Parking	Project Noise with Parking	Thresh. Mod Impact	Thresh. Sev. Impact	
Glendora: Metro Approved	EB 6, STA 1505+00	115	315	315	58.0	49.8	65.8	65.9	60.4	63.8	no
Glendora: Alternative	EB 6, STA 1505+00	115	420	420	58.0	51.0	65.8	66.0	60.4	63.8	no
Glendora: Expanded	EB 6, STA 1505+00	90	421	421	58.0	52.1	65.8	66.0	60.4	63.8	no
San Dimas: Metro Approved	EB 3b, STA 1727+00	90	289	145	60.0	47.4	62.9	63.1	62.0	65.0	no
San Dimas: Alternative	EB 3b, STA 1727+00	90	450	225	60.0	49.4	62.9	63.3	62.0	65.0	no
San Dimas: Expanded	EB 3b, STA 1727+00	90	373	187	60.0	48.6	62.9	63.2	62.0	65.0	no
Pomona: Metro Approved	EB 4, STA 1894+00[a]	175	275	138	59.8	44.3	57.3	57.8	62.1	65.2	no
Pomona: Alternative	EB 4, STA 1894+00	300	980	490	59.8	47.5	57.3	58.2	62.1	65.2	no
Pomona: Expanded	EB 4, STA 1894+00	50	467	234	59.8	52.1	57.3	58.5	62.1	65.2	no
La Verne: Metro Approved	WB 7b, STA 1867+00	140	302	151	61.3	45.7	65.8	65.9	63.1	66.0	no
La Verne: Alternative	WB 7b, STA 1867+00	375	600	300	61.3	44.4	65.8	65.8	63.1	66.0	no
Claremont: Metro Approved	EB 4A, STA 2019+00	170	760	380	64.0	48.9	72.6	72.6	65.5	67.9	no
Claremont: Alternative	EB 4A, STA 2019+00	170	1260	630	64.0	51.1	72.6	72.6	65.5	67.9	no

[a]Existing noise for this location taken from nearby 1894+00 in La Verne

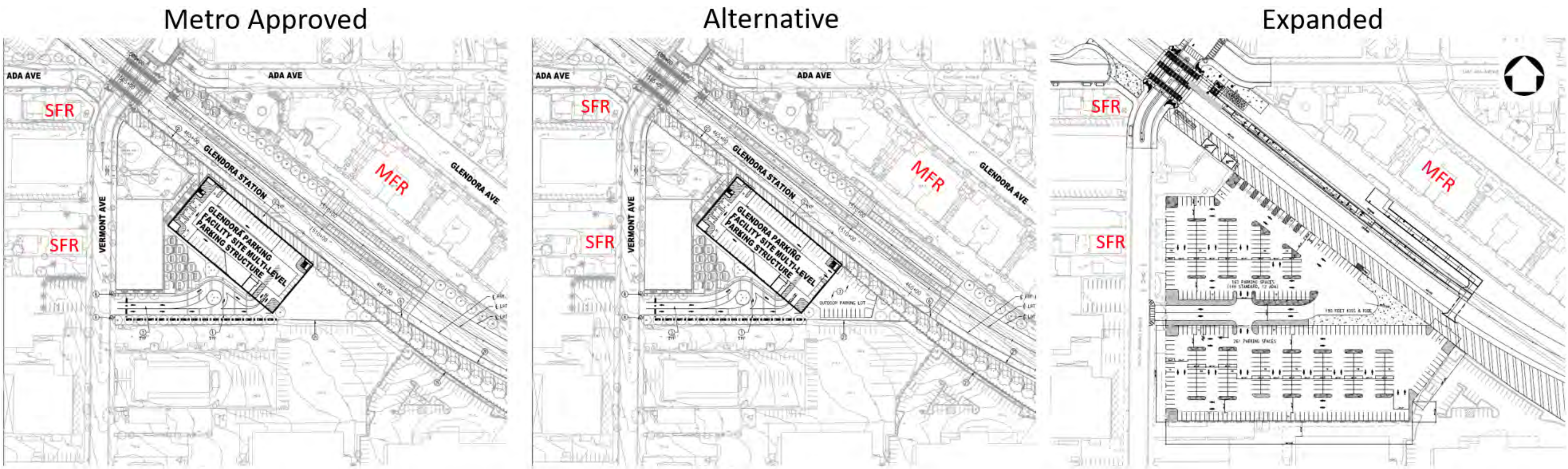


Figure 16: Glendora Parking

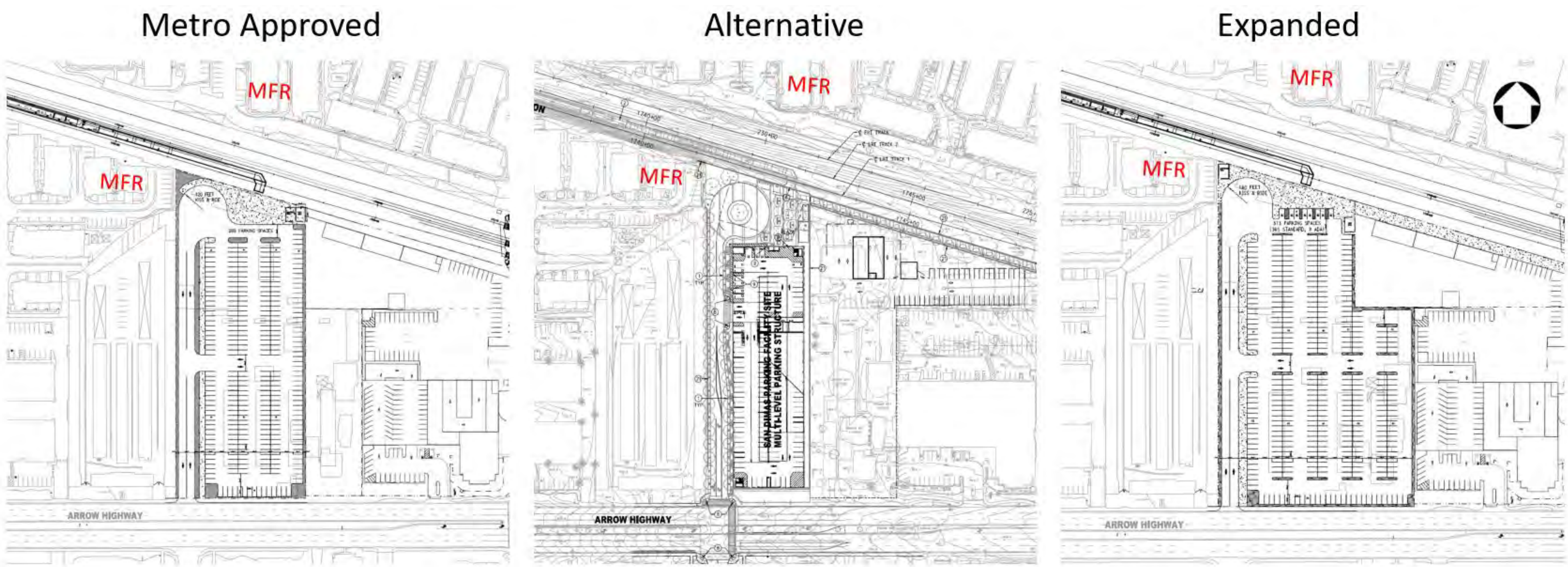


Figure 17: San Dimas Parking

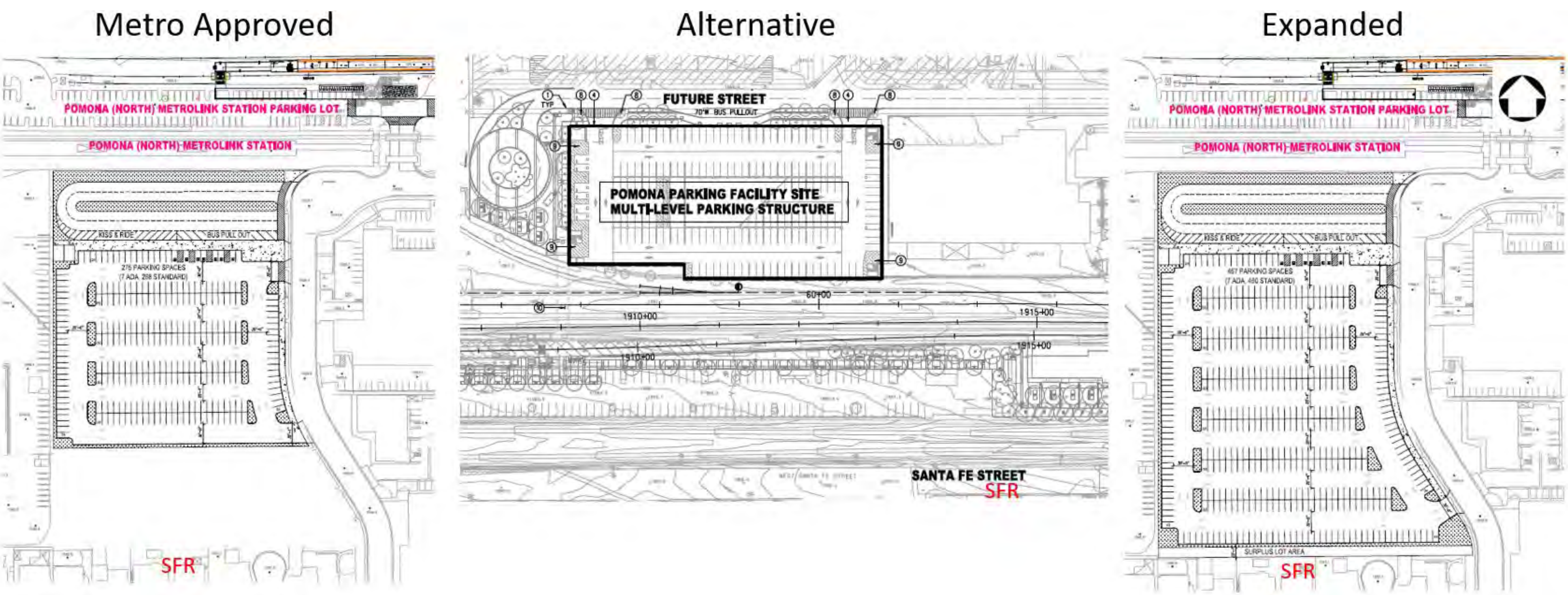


Figure 18: Pomona Parking

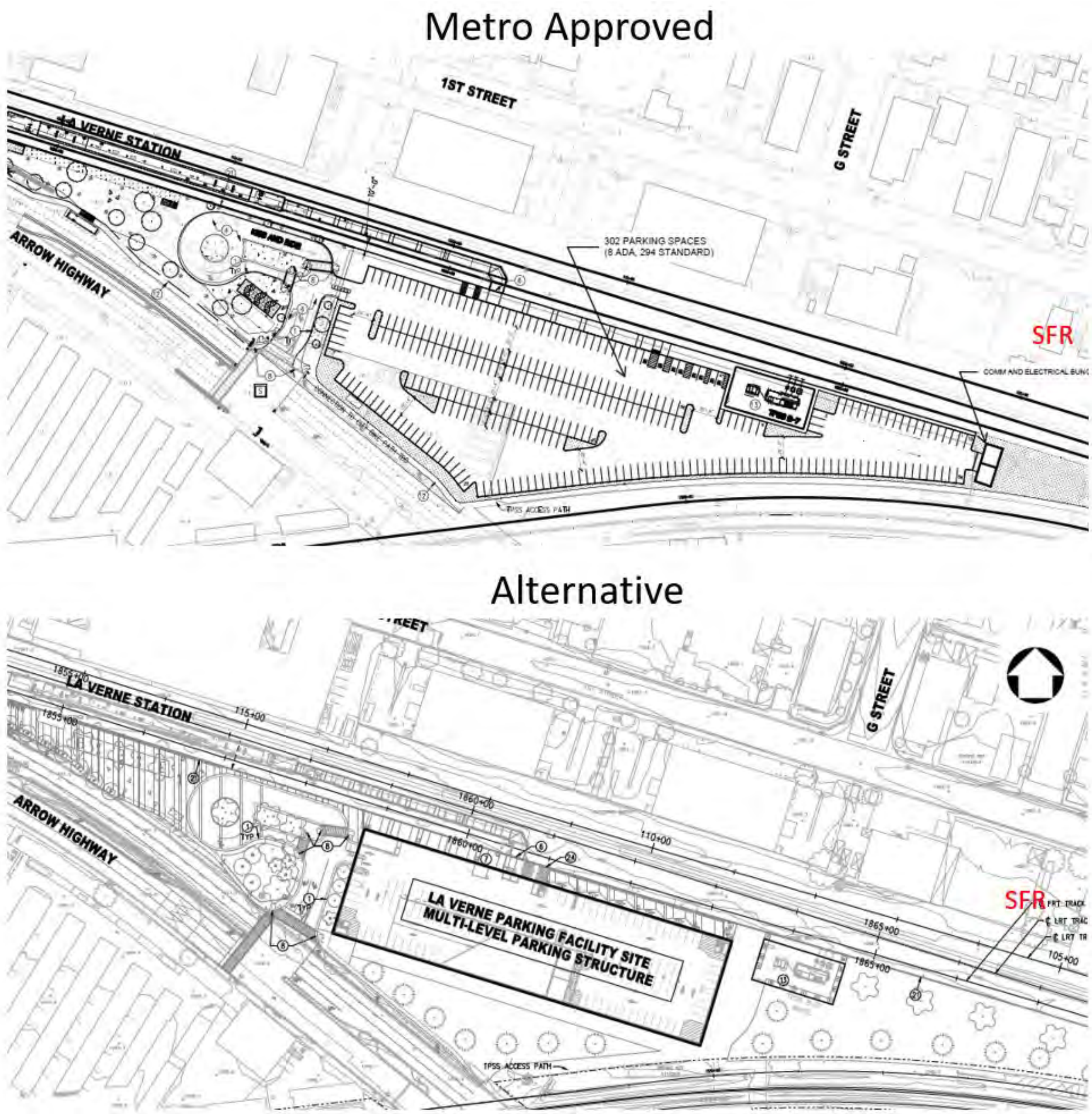


Figure 19: La Verne Parking

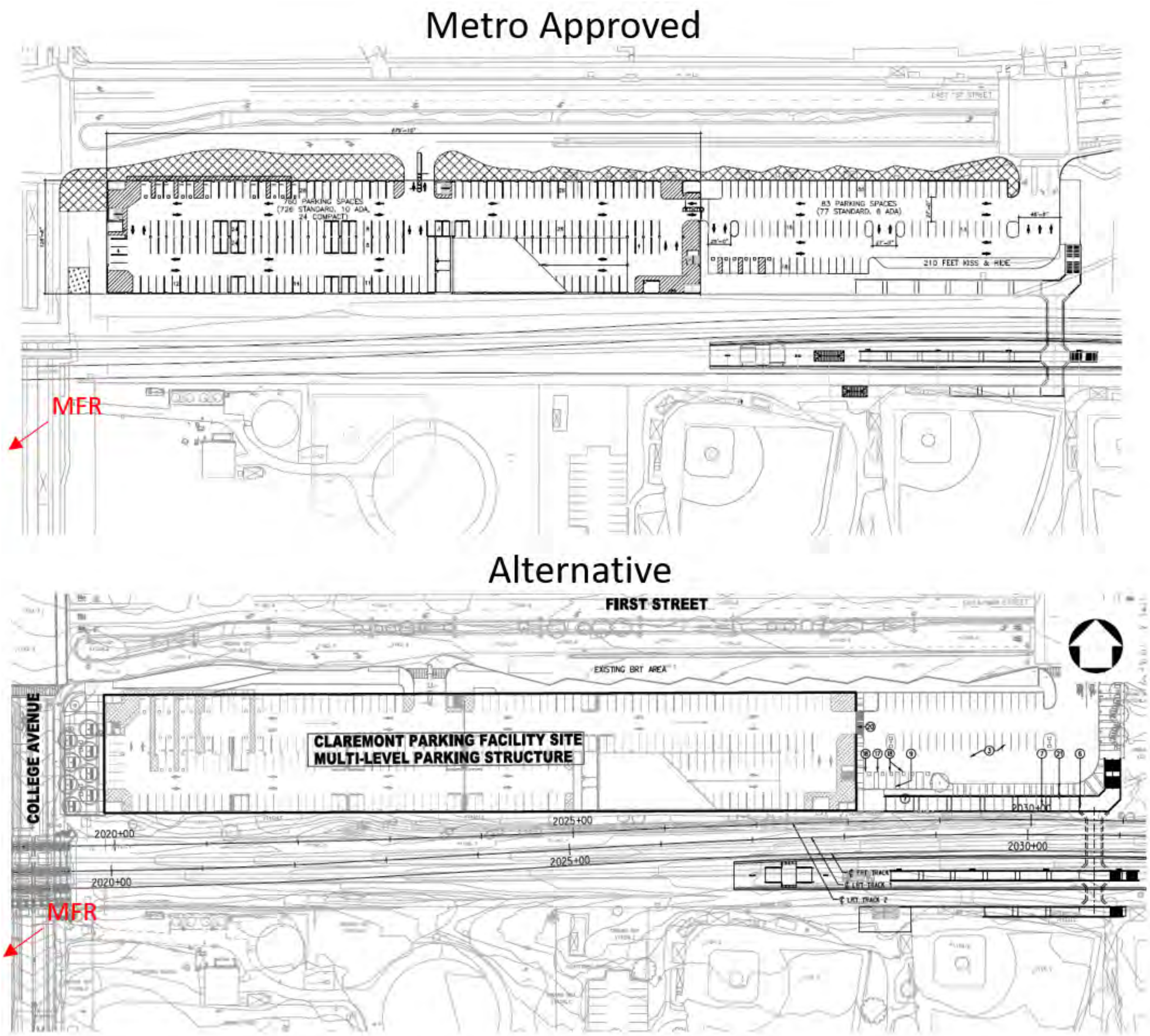


Figure 20: Claremont Parking

APPENDIX A: BACKGROUND ON NOISE AND VIBRATION LEVELS

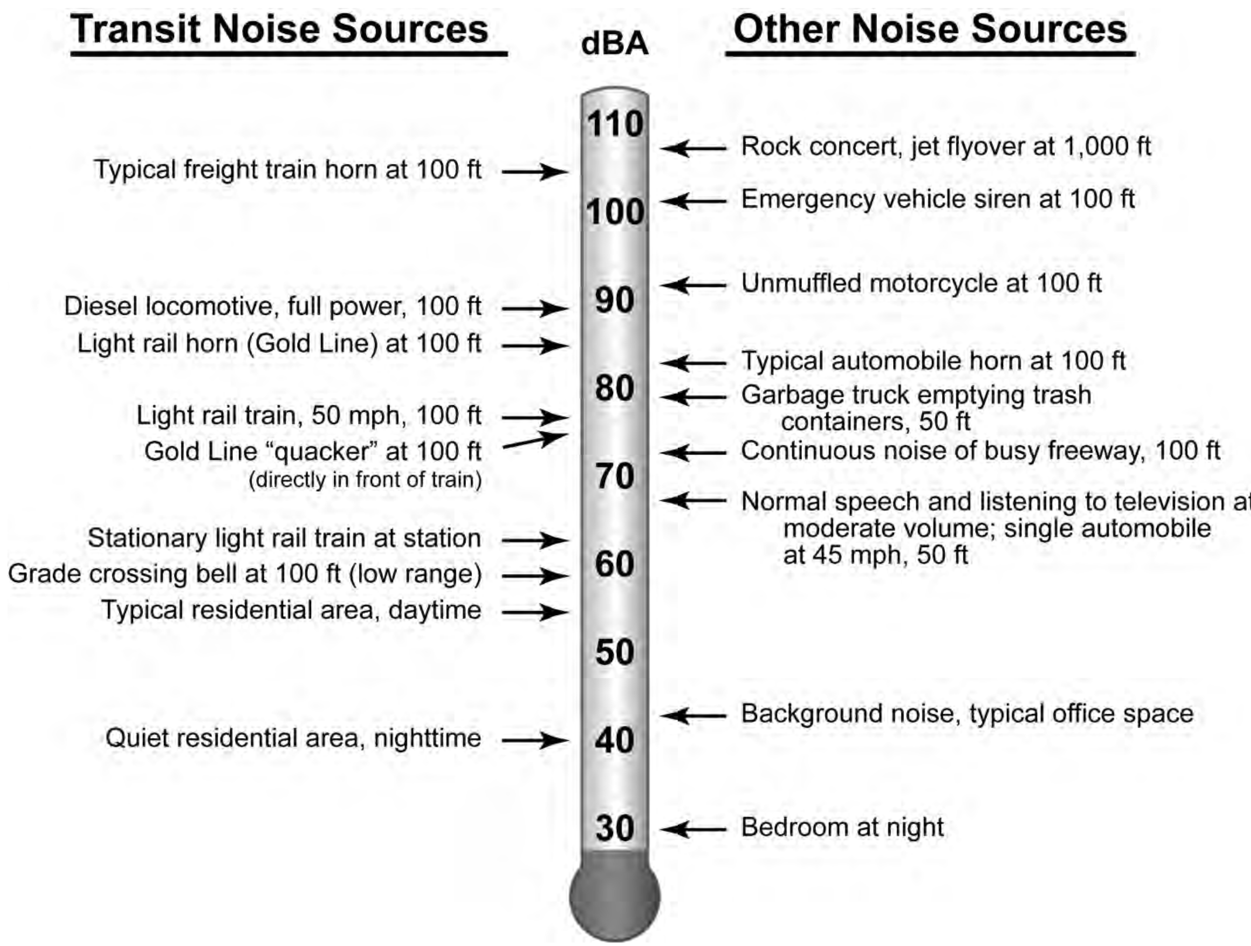
A.1 Background on Noise

Noise is typically defined as unwanted or undesirable sound, where sound is characterized by small air pressure fluctuations above and below the atmospheric pressure. The basic parameters of environmental noise that affect human response to sound are:

- Intensity or level
- Frequency content
- Variation with time

Intensity is determined by how greatly the sound pressure fluctuates above and below the atmospheric pressure, and is expressed on a logarithmic scale in units of decibels (dB). By using this scale, the range of normally encountered sound can be expressed by values between 0 and 120 dB. In addition, the dB scale corresponds to how humans perceive sound loudness. On a relative basis, a 3-dB change in sound level generally represents a noticeable change in loudness, whereas a 10-dB change is typically perceived as a doubling (or halving) in the loudness of a sound.

The frequency content of noise is related to the tone or pitch of the sound, and is expressed based on the rate of the air pressure fluctuations in cycles per second called hertz (Hz). The human ear can detect frequencies from about 20 Hz to 17,000 Hz; however, the sensitivity of human hearing varies with frequency. The A-weighting system is commonly used when measuring environmental noise to which humans are most sensitive. This system provides a single-number descriptor that correlates with the subjective human response. Sound levels measured using this weighting system are called “A-weighted” sound levels and are expressed as “dBA.” Figure 21 includes examples of A-weighted sound levels from common indoor and outdoor noise sources.



Source: FTA 2006

Figure 21: Sound Levels of Typical Indoor and Outdoor Sources

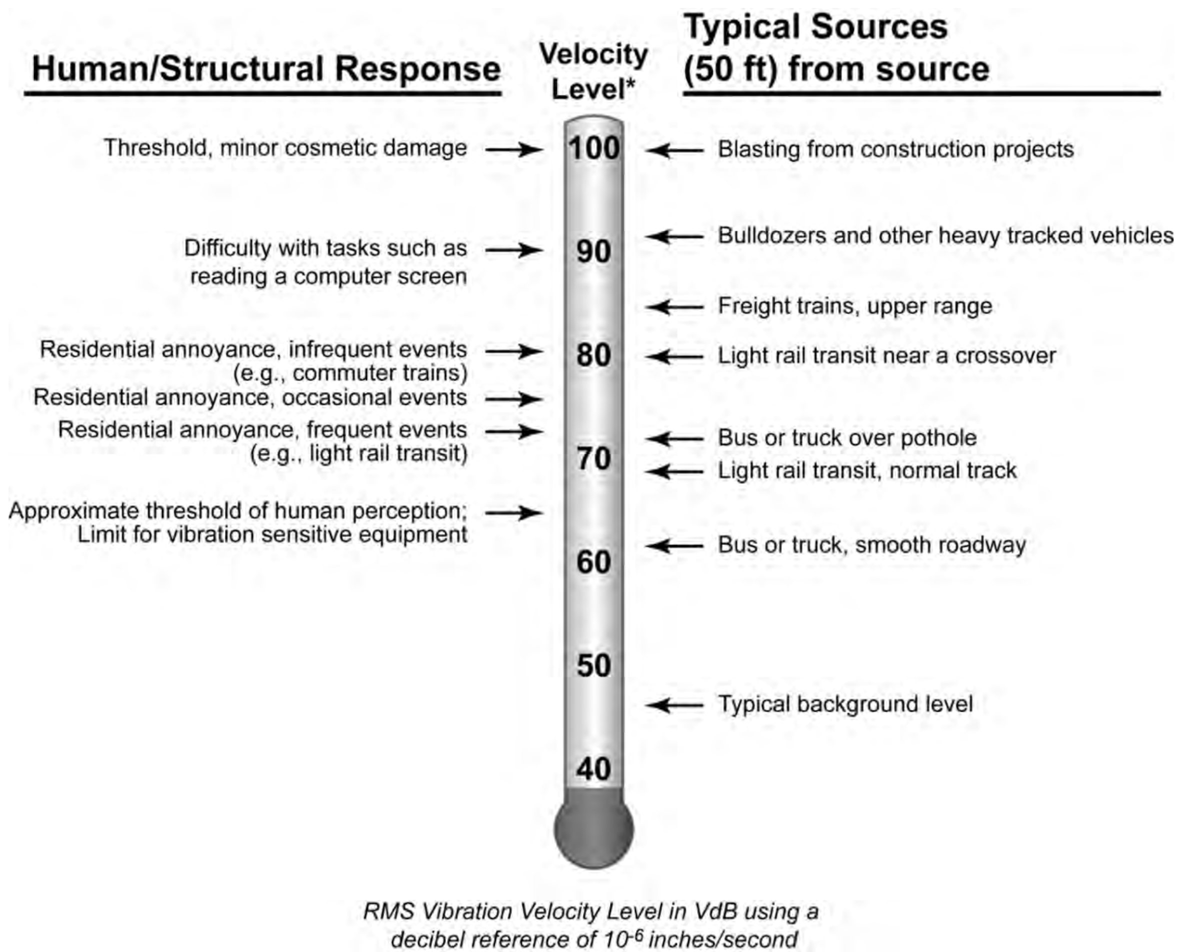
Environmental sound constantly fluctuates. The metrics used in this report to characterize varying sound environments are:

- **Maximum Sound Level (L_{max})** is the maximum sound level that occurs during an event such as a train passing. L_{max} is the maximum sound level using the slow setting on a standard sound level meter.
- **Equivalent Sound Level (L_{eq})** is the most common means of characterizing fluctuating community noise. L_{eq} represents a constant sound that, over a specified period of time, has the same sound energy as the time-varying sound. L_{eq} is used by the Federal Transit Administration (FTA) to evaluate noise effects at institutional land uses—such as schools, churches, and libraries—from proposed transit projects.
- **Day-Night Sound Level (L_{dn})** is a 24-hour L_{eq} with an adjustment to reflect the greater sensitivity to nighttime noise experienced by most people. The adjustment is a 10 dB penalty for all sound that occurs between the hours of 10:00 p.m. to 7:00 a.m., which means that any event occurring during the nighttime is equivalent to 10 occurrences of the same event during the daytime. L_{dn} is the most common measure of total community noise over a 24-hour period and is used by the FTA to evaluate residential noise effects from proposed transit projects.
- **Percent Exceedance Level (L_{XX})** is the sound level that is exceeded for a certain percentage of the measurement period (e.g., L_{99} is the sound level exceeded during 99 percent of the measurement period). For a 1-hour period, L_{99} is the sound level exceeded for all except 36 seconds of the hour. L_1 represents typical maximum sound levels, L_{33} is approximately equal to L_{eq} when free-flowing traffic is the dominant noise source, L_{50} is the median sound level, and L_{99} is close to the minimum sound level.
- **Sound Exposure Level (SEL)** is a measure of the acoustic energy of an event such as a train passing. The acoustic energy of the event is compressed into a 1-second period. SEL increases as the sound level of the event increases and as the duration of the event increases. It is often used as an intermediate value in calculating overall metrics such as L_{eq} and L_{dn}.

A.2 Background on Vibration

Groundborne vibration travels from the train through the soil and may cause perceptible shaking or vibration inside buildings. Groundborne vibration can be measured in terms of displacement, velocity, or acceleration. Velocity is the preferred measure for evaluating groundborne vibration from transit projects because it is typically considered to correspond best with human sensitivity to vibration. In this report, groundborne vibration is expressed in terms of the root-mean-square (rms) vibration velocity level in decibels (VdB). The abbreviation VdB is used in place of dB to avoid confusing vibration decibels with sound decibels.

Figure 22 illustrates typical groundborne vibration levels for common sources and criteria for human and structural response to groundborne vibration. As the figure illustrates, the range of interest for vibration is approximately 50 to 100 VdB (from imperceptible background vibration to the threshold of potential damage). The approximate threshold of human perception to vibration is 65 VdB. Humans generally do not find vibration from light-rail transit operations annoying until the vibration exceeds 70 to 75 VdB.



Source: FTA 2006

Figure 22: Typical Groundborne Vibration Levels and Criteria

A.3 Noise and Vibration Sources Associated with Light-Rail Transit Systems

The following noise and vibration sources have been evaluated:

- **Light-Rail Vehicle Operations—**This is the normal noise from the operation of light-rail vehicles. It includes noise from steel wheels rolling on steel rails (wheel/rail noise) and from propulsion motors, air-conditioning, and other auxiliary equipment on the vehicles. As expected, the wheel/rail noise increases with speed. At speeds greater than 20 to 30 mph, the wheel/rail noise usually dominates noise from the vehicle auxiliary equipment. Train operations also create groundborne vibration that may be intrusive to occupants of buildings when the tracks are approximately 100 feet or closer to buildings. However, the vibration from light-rail transit (LRT) operations is almost never sufficient to cause minor cosmetic damage to buildings.
- **Traffic Noise—**The project would result in changes in traffic patterns and volumes near the proposed stations and at-grade crossings. In all cases, the forecasted change in traffic volume is insufficient to cause more than a 1 dB change in sound levels; therefore, a detailed assessment of noise impacts from traffic noise has not been performed.
- **Audible Warnings—**Audible warnings are required by the California Public Utilities Commission at all gate-protected at-grade LRT/roadway crossings. The required audible warnings are ringing bells that are located on the masts of the crossing gates and the sounding of horns located on the lead vehicle of the trains.
- **Special Trackwork—**Turnouts and crossovers require special trackwork where two rails cross. The special fixture used where two rails cross is referred to as a “frog.” Standard frogs have gaps, and the train wheels must “jump” across the gap. The wheels striking the ends of the gap increase noise levels near the “frog” by approximately 6 dB and increase groundborne vibration levels by approximately 10 VdB.
- **Ancillary Equipment—**Traction power supply substations (TPSS) are the only ancillary equipment associated with the project that could create noise impacts. The ventilation fans provided at each substation would be the dominant noise source of most TPSS units.
- **BNSF and Metrolink Operations—**The tracks for the Burlington Northern Santa Fe Railway (BNSF) and Metrolink trains operating in the project right-of-way would be relocated within the existing right-of-way to accommodate the light-rail tracks. In some cases, the tracks would be relocated closer to residences, which would increase noise and vibration levels at those locations. The noise and vibration from BNSF and Metrolink operations, including the wheel/rail noise, groundborne vibration, and noise from audible warnings, is included in the noise and vibration assessments.
- **Construction Noise and Vibration—**All the sources discussed previously are associated with operation of the project. Similar to any other major transportation infrastructure project, construction would require use of heavy equipment that generates relatively high noise and vibration levels.

A.4 Regulatory Setting

The Federal Transit Authority (FTA) established specific noise and vibration criteria for light-rail transit; therefore, these criteria and analytical methodologies are applied. The analysis follows the procedures and criteria in the FTA's Transit Noise and Vibration Impact Assessment, also referred to as the FTA Guidance Manual (FTA 2006).

APPENDIX B: VIBRATION PROPAGATION TEST RESULTS

Vibration propagation tests were performed at five locations along the project right-of-way. The results from the vibration propagation test are the LSTM and coherence. The coherence is a measure of confidence in the results of the LSTM. Coherence values close to 1 indicate strong confidence in the results and coherence levels less than 0.2 indicate the results should be used with caution because the input force characteristics are not closely related with the measured vibration. For each measurement site, best-fit coefficients were derived for each 1/3 octave band to model LSTM level vs. distance. This appendix presents the measured LSTM, coherence, and best-fit coefficients for each measurements site.

Glendora WB2: 141 Washington Avenue

Table 37: Best-Fit Coefficients for Glendora WB2

	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315
A	28.5	33.7	38.8	40.5	43.6	46.3	50.5	60.7	63.3	61.5	63.6	62.9	56.5	61.8	68.9	67.3	73.1	78.6
B	-10.4	-11.8	-12.3	-10.3	-9.9	-8.2	-7.9	-12.6	-12.9	-12.0	-14.4	-15.8	-13.3	-19.0	-25.6	-29.3	-36.0	-41.6

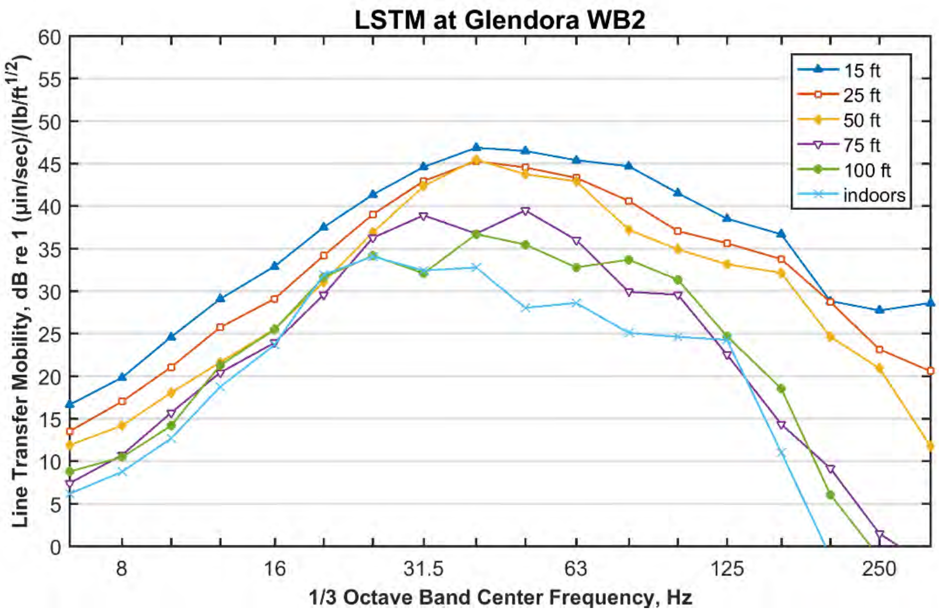


Figure 23: LSTM at Glendora WB2

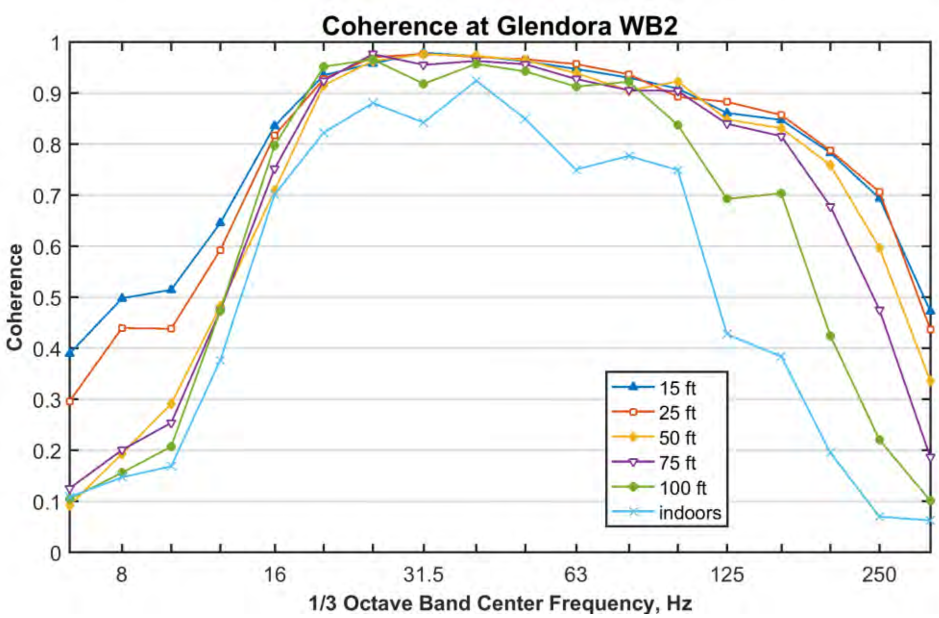


Figure 24: Coherence at Glendora WB2

Glendora WB3a: 375 S Glendora Ave

Table 38: Best-Fit Coefficients for Glendora WB3a

	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315
A	18.5	21.2	25.2	29.6	36.9	45.8	62.1	69.0	93.7	99.0	93.3	89.4	90.3	85.5	84.9	81.5	55.5	36.1
B	-5.0	-4.4	-4.3	-4.6	-5.6	-8.2	-15.8	-18.9	-32.1	-34.8	-32.8	-33.3	-37.1	-38.9	-42.7	-44.6	-33.6	-24.4

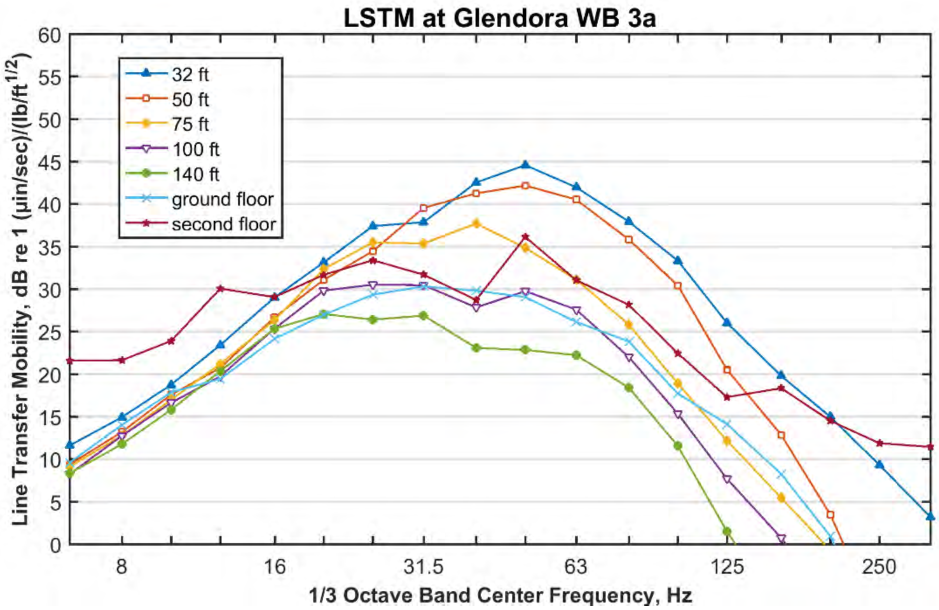


Figure 25: LSTM at Glendora WB3a

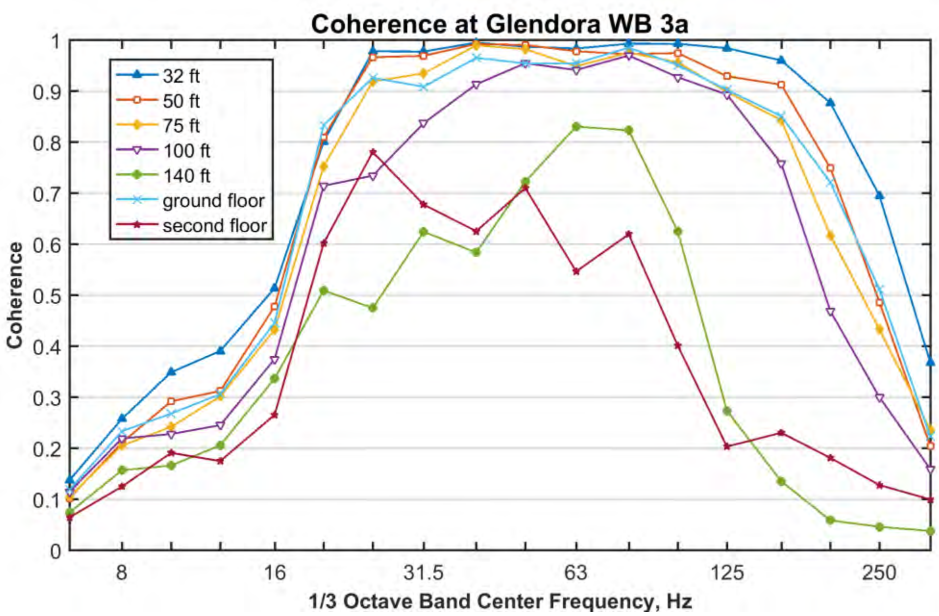


Figure 26: Coherence at Glendora WB3a

Glendora WB16: 1258 St Vladimir Street

Table 39: Best-Fit Coefficients for Glendora WB16																		
	6.3	**8**	**10**	**12.5**	**16**	**20**	**25**	**31.5**	**40**	**50**	**63**	**80**	**100**	**125**	**160**	**200**	**250**	**315**
A	31.4	38.1	43.1	50.6	51.7	48.5	51.5	60.3	63.5	66.3	72.2	64.5	56.8	59.8	69.1	68.7	64.5	62.8
B	-14.5	-16.2	-16.0	-17.6	-14.7	-9.9	-7.2	-9.3	-9.8	-13.2	-19.1	-15.2	-12.2	-16.5	-28.6	-32.4	-30.8	-30.4

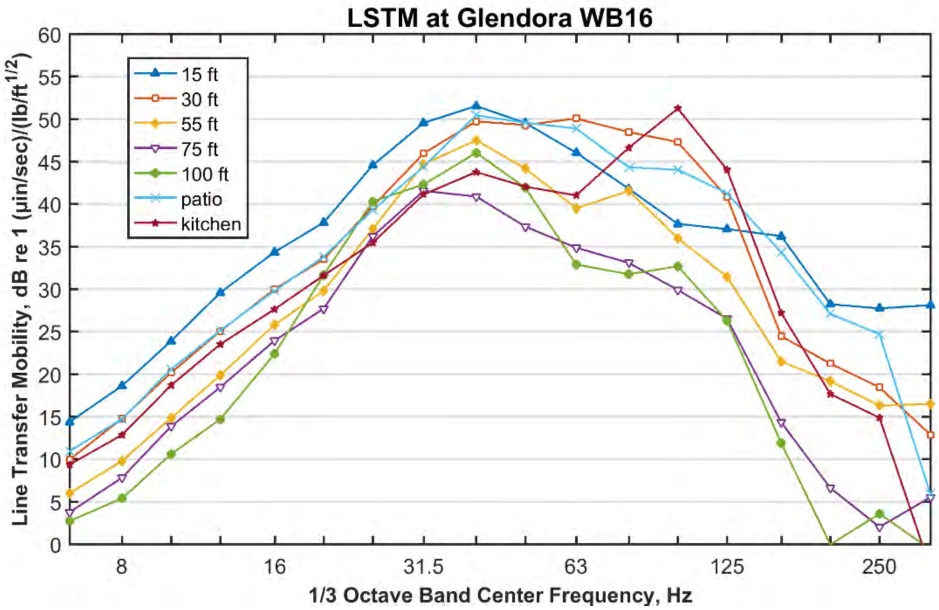


Figure 27: LSTM at Glendora WB16

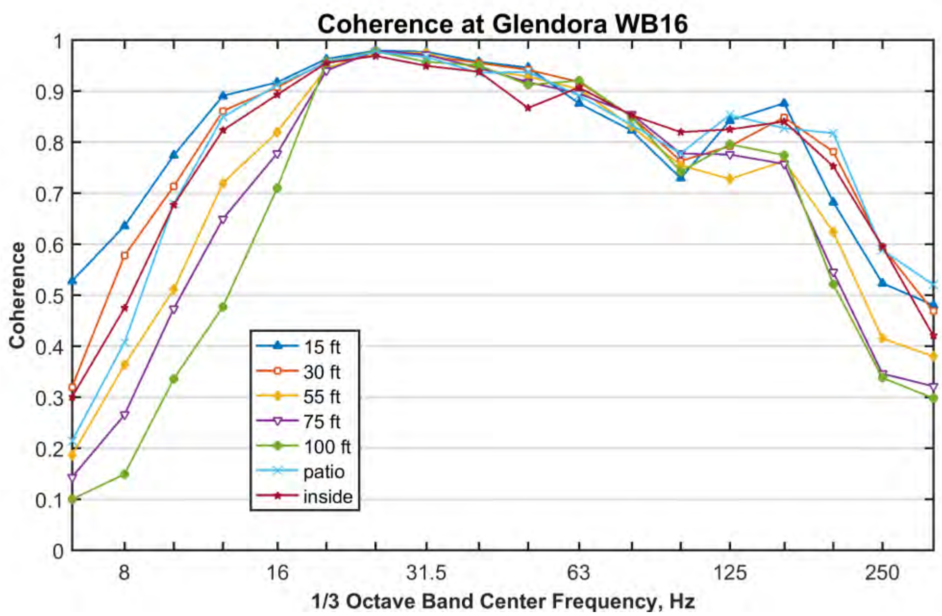


Figure 28: Coherence at Glendora WB16

Glendora EB12 / San Dimas WB1: 1005 Gladstone Street

Table 40: Best-Fit Coefficients for Glendora EB12

	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315
A	21.4	19.7	28.3	36.4	37.1	38.3	50.8	58.1	67.0	76.0	77.8	81.7	79.9	82.5	77.8	64.9	65.0	57.5
B	-6.0	-5.0	-7.6	-9.8	-7.1	-4.1	-8.8	-10.8	-15.5	-21.0	-23.6	-26.8	-27.6	-31.0	-32.9	-29.8	-32.9	-30.0

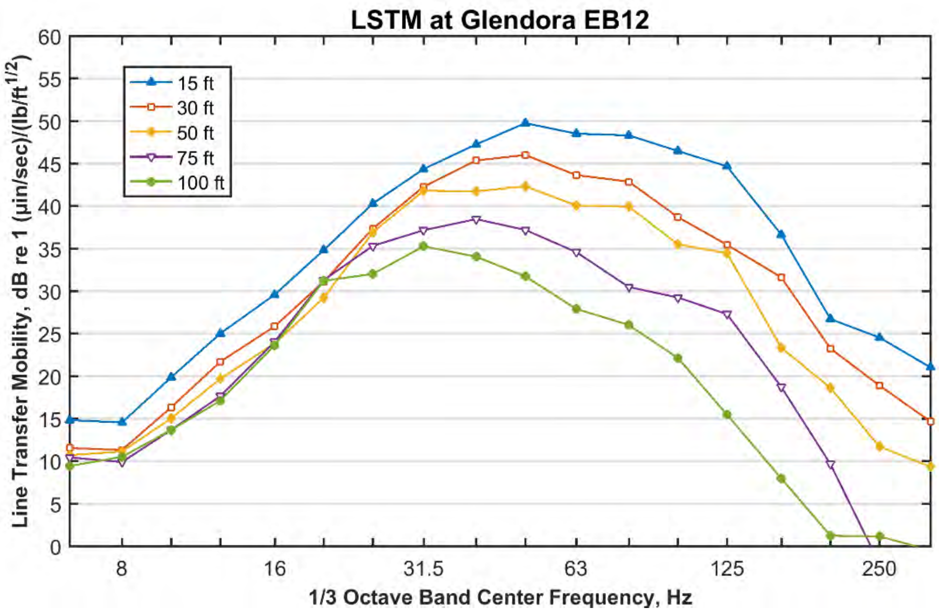


Figure 29: LSTM at Glendora EB12

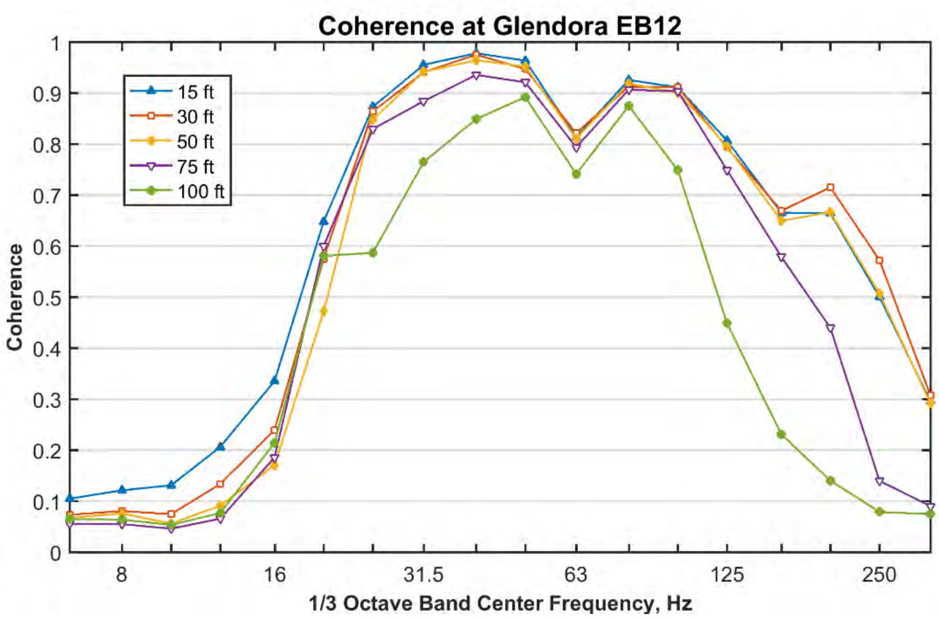


Figure 30: Coherence at Glendora EB12

San Dimas EB1: Red Roof Inn

Table 41: Best-Fit Coefficients for San Dimas EB1

	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315
A	24.4	27.4	30.9	28.3	33.0	34.4	35.0	45.7	51.5	53.0	60.6	70.8	76.2	81.7	87.2	83.0	79.8	52.2
B	-6.9	-7.0	-7.2	-4.4	-7.5	-9.2	-8.9	-13.9	-16.8	-15.9	-20.5	-28.3	-33.8	-41.4	-46.6	-45.2	-45.0	-32.3

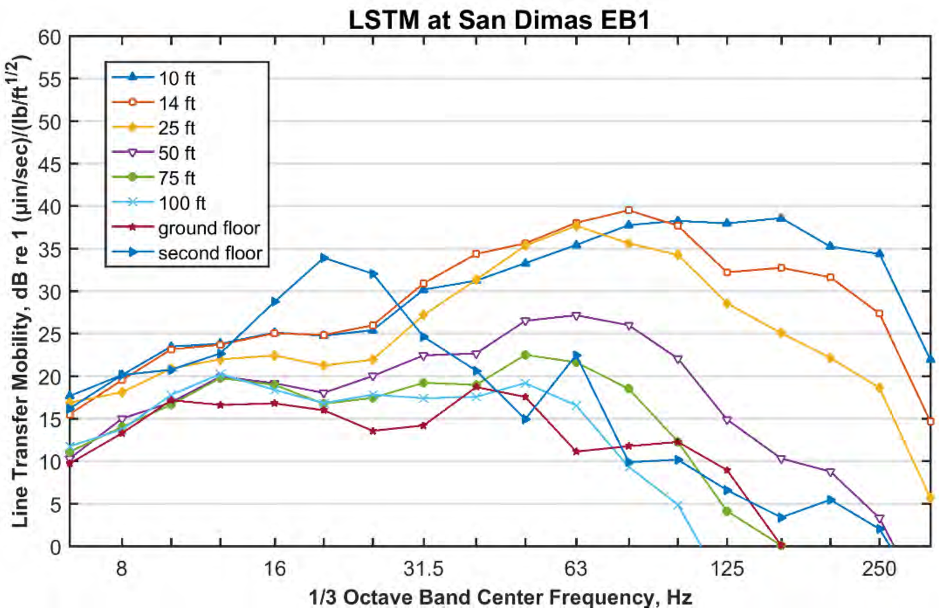


Figure 31: LSTM at San Dimas EB1

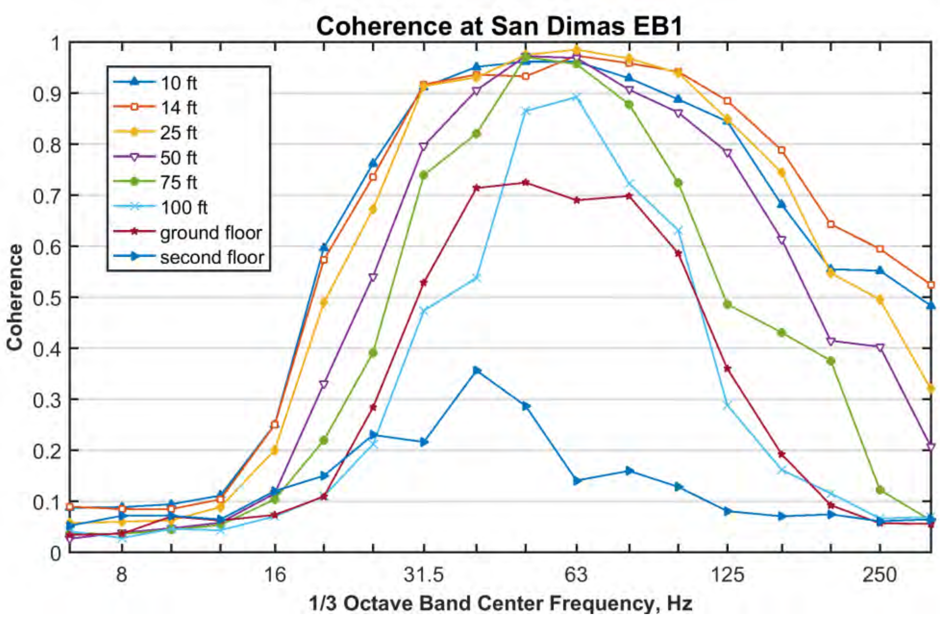


Figure 32: Coherence at San Dimas EB1

APPENDIX C: NEW RESIDENTIAL AND INSTITUTIONAL DEVELOPMENTS

Below are figures of new developments assessed as part of this report. Other receivers were unchanged from the previous EIR and were therefore not included.

Figure 33: Aerial Photograph of New Receivers Glendora WB0 and WB0a

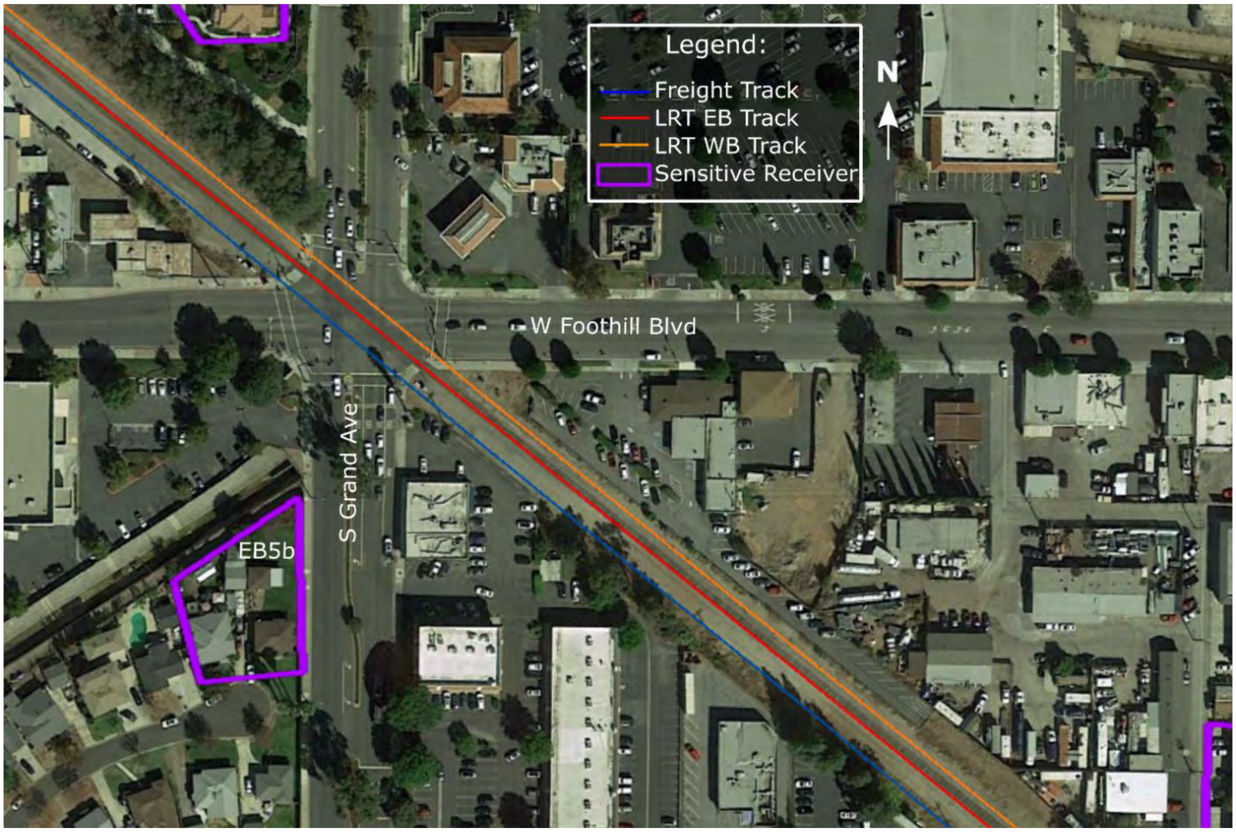


Figure 34: Aerial Photograph of New Receiver Glendora EB5b

Figure 35: Aerial Photograph of New Receivers Glendora EB5c, EB5d, WB3b, and B1

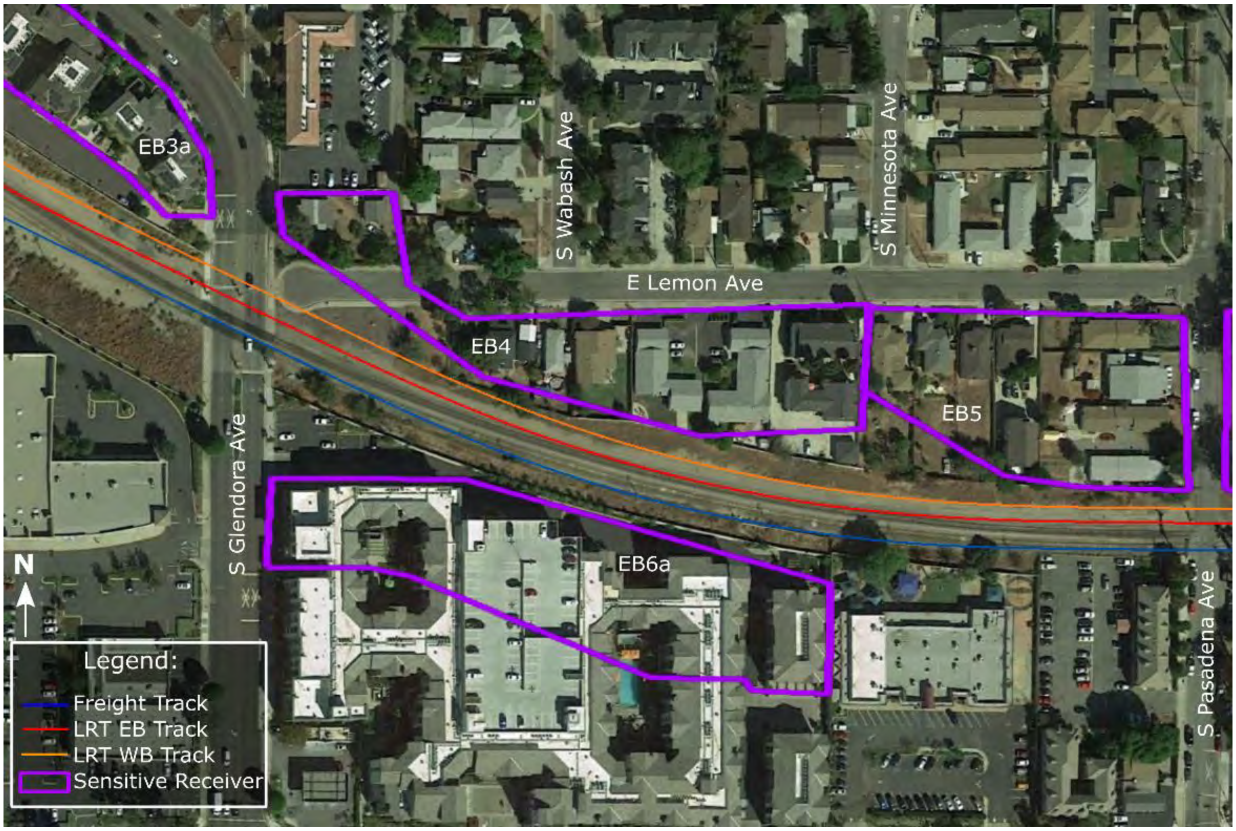


Figure 36: Aerial Photograph of New Receiver Glendora EB6a

Figure 37: Aerial Photograph of New Receiver Glendora WB18a

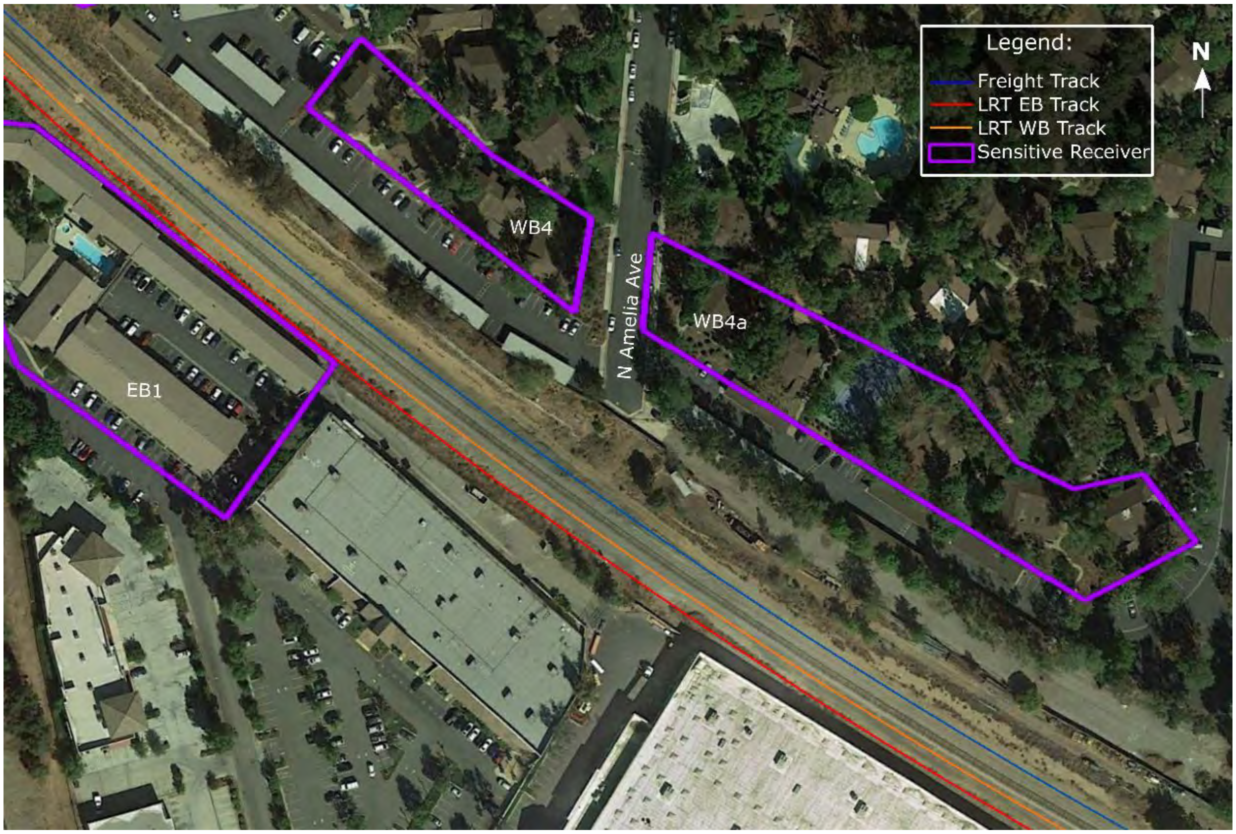


Figure 38: Aerial Photograph of New Receiver San Dimas WB4a

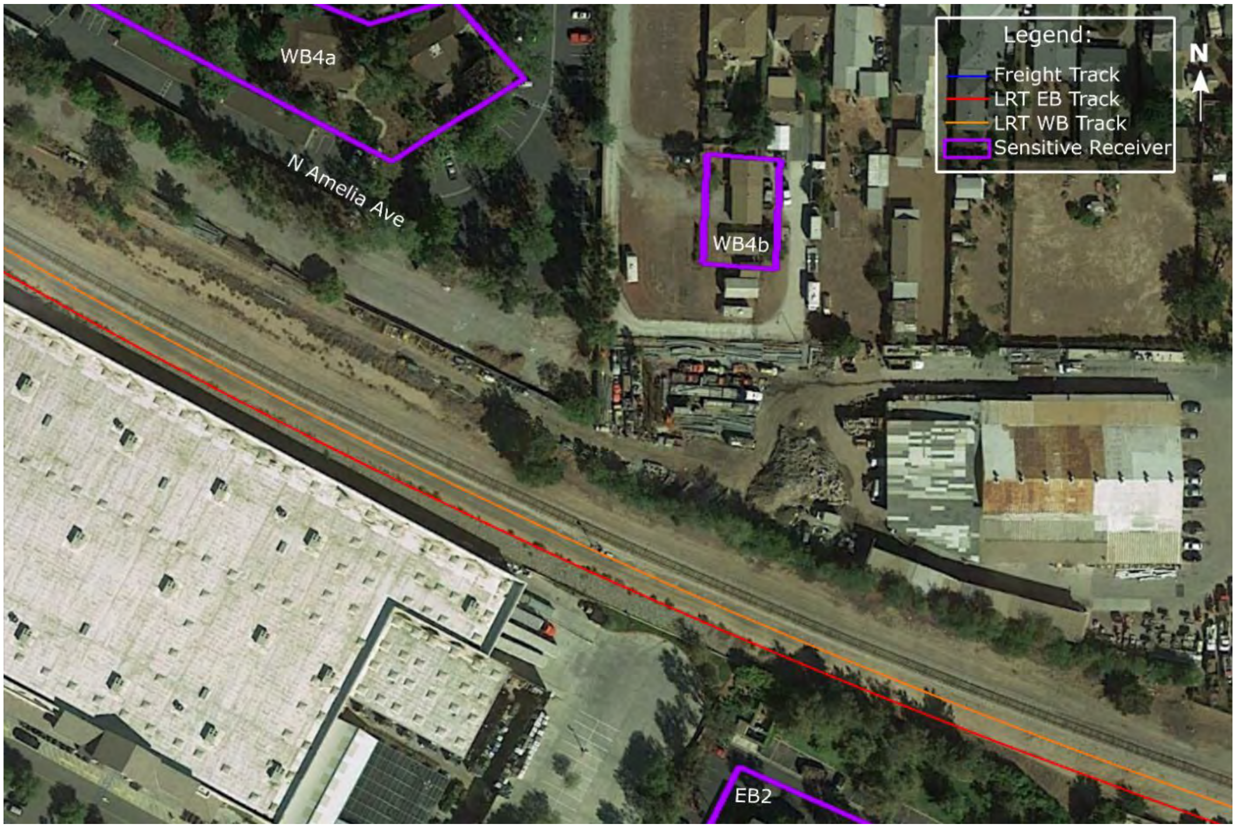


Figure 39: Aerial Photograph of New Receiver San Dimas WB4b

Figure 40: Aerial Photograph of New Receivers San Dimas WB4c and WB4d

Figure 41: Aerial Photograph of New Receiver San Dimas EB3b

Figure 42: Aerial Photograph of New Receiver La Verne WB1a

Figure 43: Aerial Photograph of New Receiver San Dimas WB7a

Figure 44: Aerial Photograph of New Receiver San Dimas WB7b

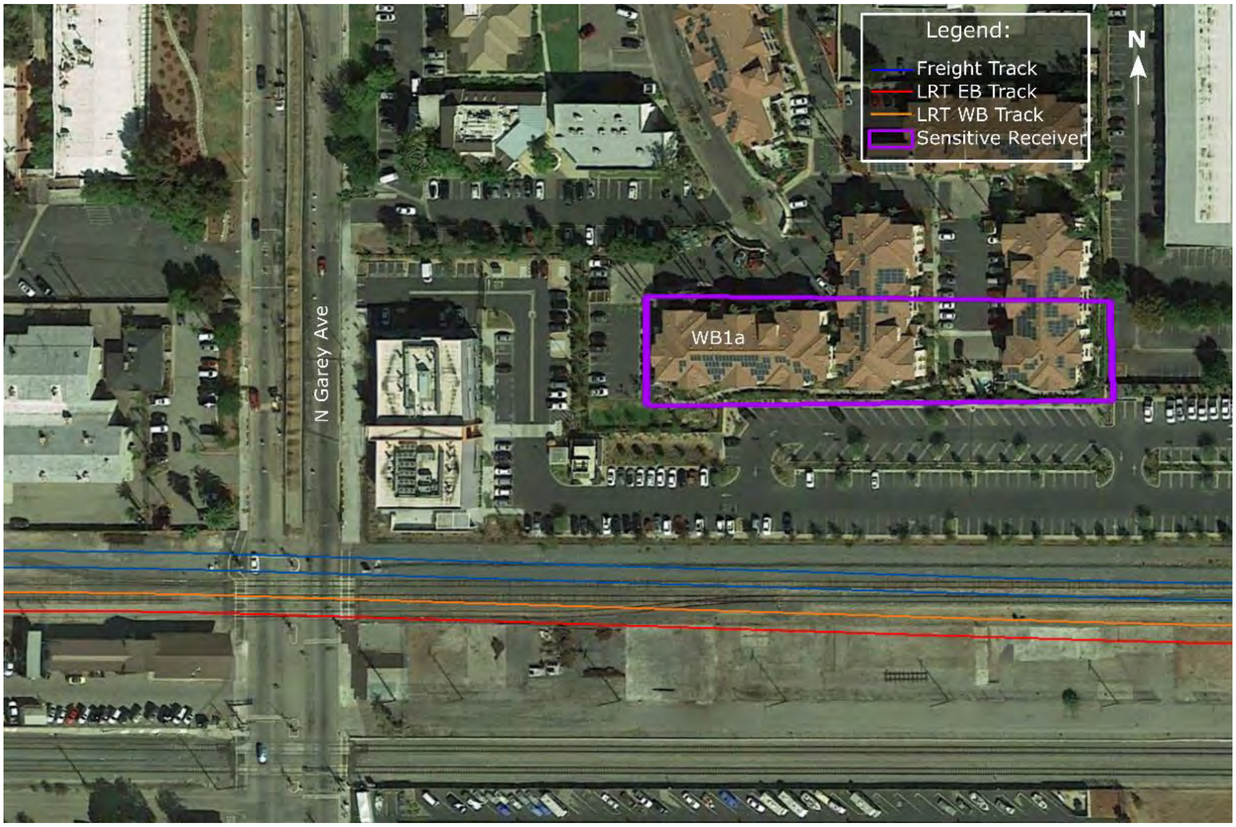


Figure 45: Aerial Photograph of New Receiver Pomona WB1a

Figure 46 Aerial Photograph of New Receiver Pomona WB1b

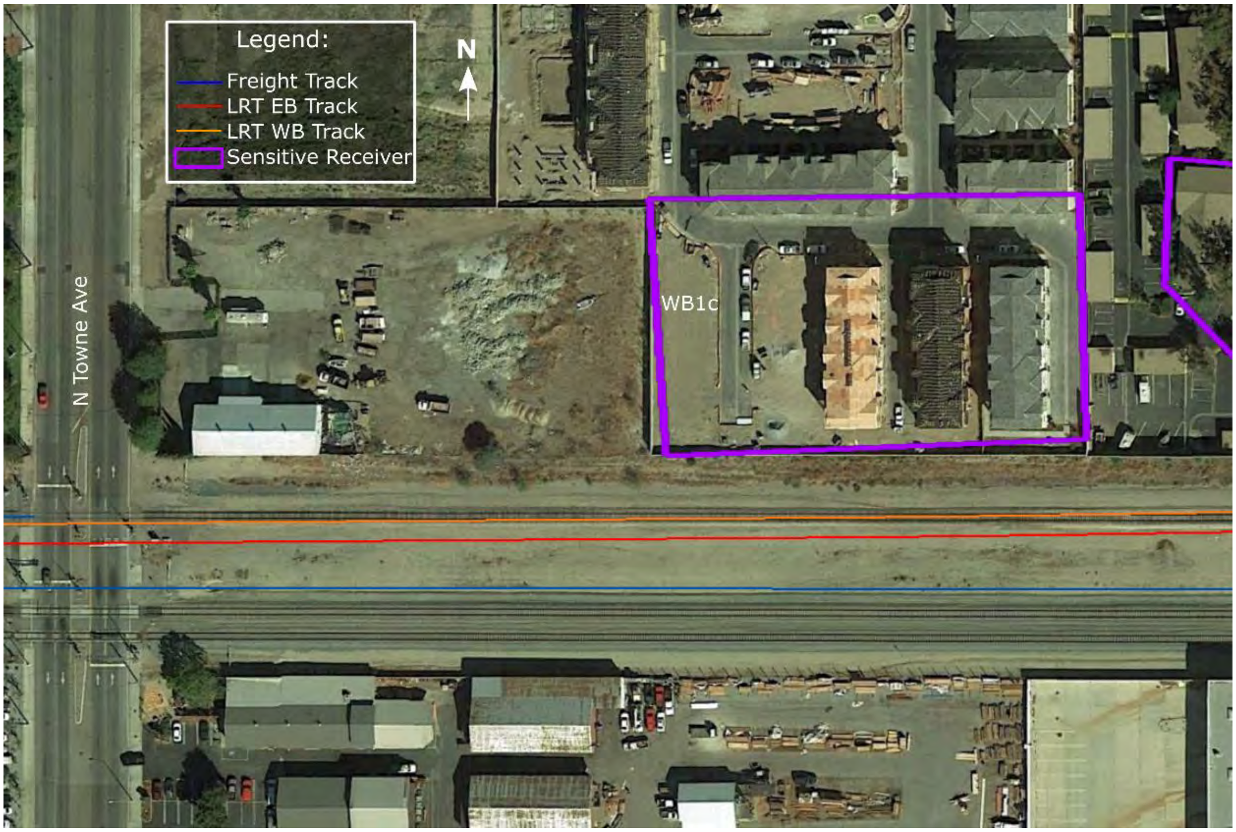


Figure 47 Aerial Photograph of New Receiver Pomona WB1c

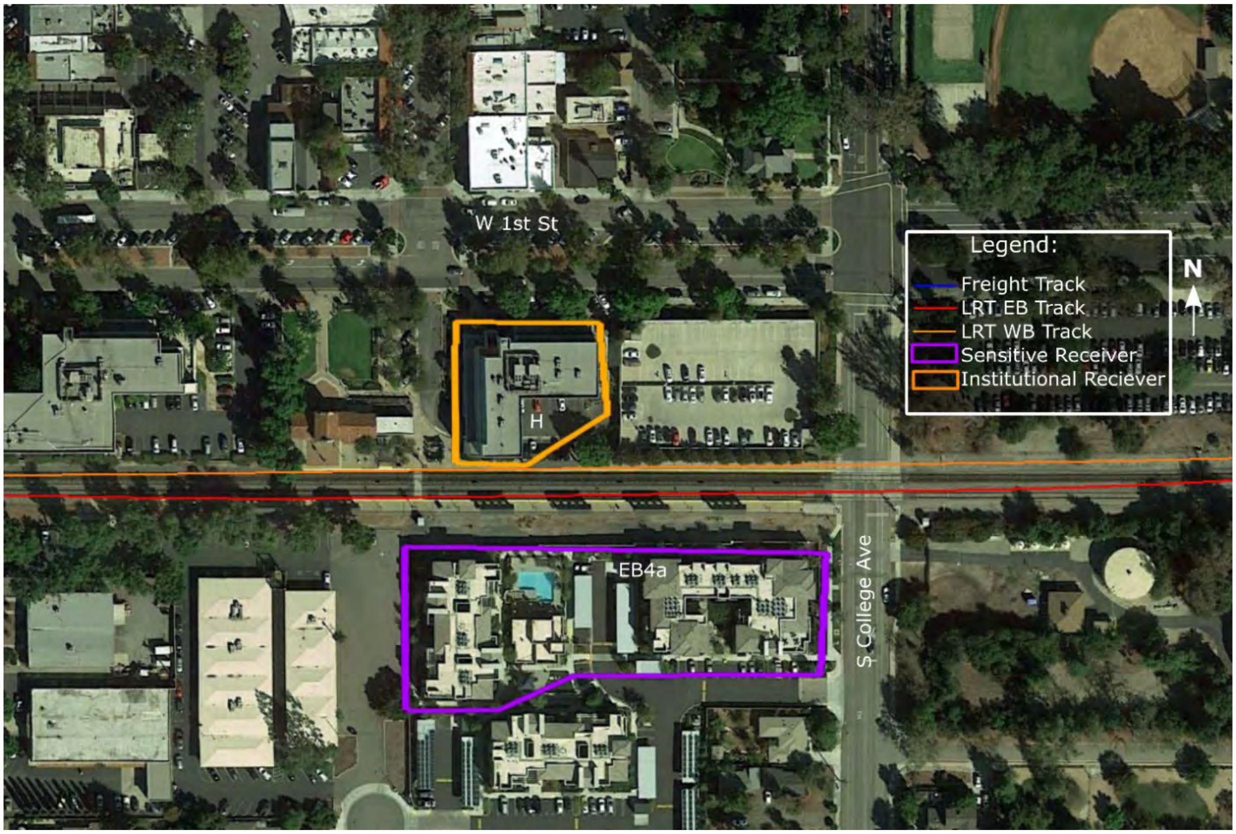


Figure 48 Aerial Photograph of New Receiver Claremont EB4a and H

Figure 49 Aerial Photograph of New Receiver Montclair EB1

APPENDIX D: ALTERNATIVE VIBRATION MITIGATION MEASURES

In addition to the analysis of ballast mats as the preferred method for vibration mitigation, the performance of several other options was also examined. These included the use of a wayside sound barrier with a vibration mitigating foundation, increasing the thickness of the ballast in conjunction with a single layer ballast mat, and using highly compliant resilient fastener on the ties.

The modeling approach used for these additional mitigation options follows the same approach as that used in the preferred ballast mat analysis, see Section 3.2. In brief, all the models utilized the 2.5D method, whereby the original 3D problem is replaced by a 2D problem with a wavenumber transform in the direction of the track. Thereby, all periodic features in the direction of the track are smoothed out in a 2D fashion, relative to the fastener spacing distance.

The objective of the numerical modeling was to identify mitigation options that would provide vibration reduction in the 31.5 Hz 1/3 octave band. Traditional mitigation options for ballast and tie track have generally shown vibration reduction at frequencies of 40 Hz and above. However, the vibration propagation measurements in Glendora show relatively efficient vibration propagation in the 31.5Hz 1/3 octave band.

D.1 Wayside Sound Barrier with Foundation

Based on previous experience, there has been some indication that wayside sound barriers with a sizable foundation may provide groundborne vibration mitigation, in addition to the primary purpose of the wall to mitigate wayside noise. The effectiveness of such a foundation, however, can be highly dependent on both frequency and the spatial relation between the track, wall and receiver. The model considered the most extreme case where the receiver is just opposite a sound wall that is very close to the tracks.

Three configurations were analyzed for solid concrete sound walls with foundations, and are detailed in Table 42. In all cases the receiver distance from the tracks is held constant.

Table 42: Vibration Mitigating Sound Wall Configurations

Wall	Receiver Distance from Track	Height Above Ground	Depth Below Ground	Wall Thickness
#1	22 ft	3 ft	3 ft	10 in
#2	22 ft	3 ft	6 ft	10 in
#3	22 ft	3 ft	3 ft	36 in

A typical model geometry for the wall foundation problem is shown in Figure 50. Since only the effect of the wall foundation is of interest, the moving vehicle was not considered and a unit harmonic input loading was applied to the rails to generate the vibration response in the ground, with and without the wall in place. The result is the wall insertion loss, as previously described for the ballast mat.

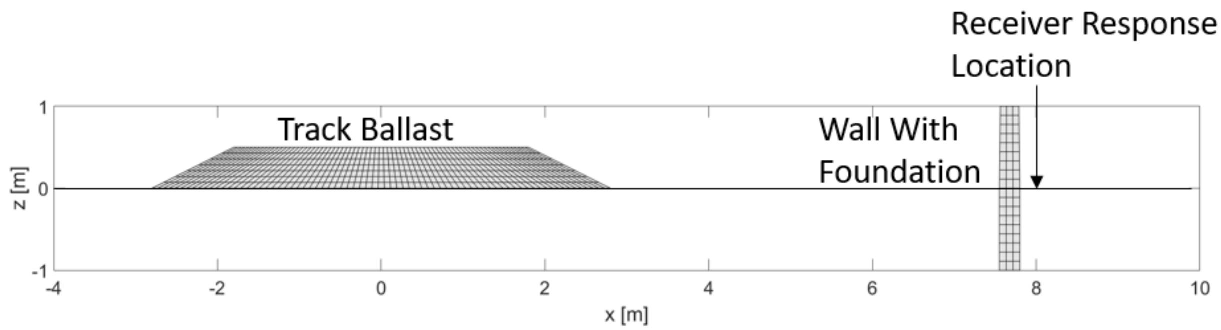


Figure 50: Model Geometry for a Sound Wall with Foundation

The results for the three wall cases is shown in Figure 51. Curves for the 2-inch ballast mat are also plotted for comparison. As shown, for the frequency range of interest the 10-inch sound wall with foundation does not achieve useful mitigation performance in the 31.5 Hz 1/3 octave band. In the 31.5 Hz to 50 Hz range, the 36-inch-thick sound wall performs between 2.5 dB to 5 dB better than the 10-inch-thick wall, though it underperforms the 2-inch ballast mat. The poorer performance of the sound wall at lower frequencies is due to the increased transmission through the wall at low frequencies and that at low frequencies, or long wavelengths, the wall appears shallower and the foundation has less influence on the propagating surface waves.

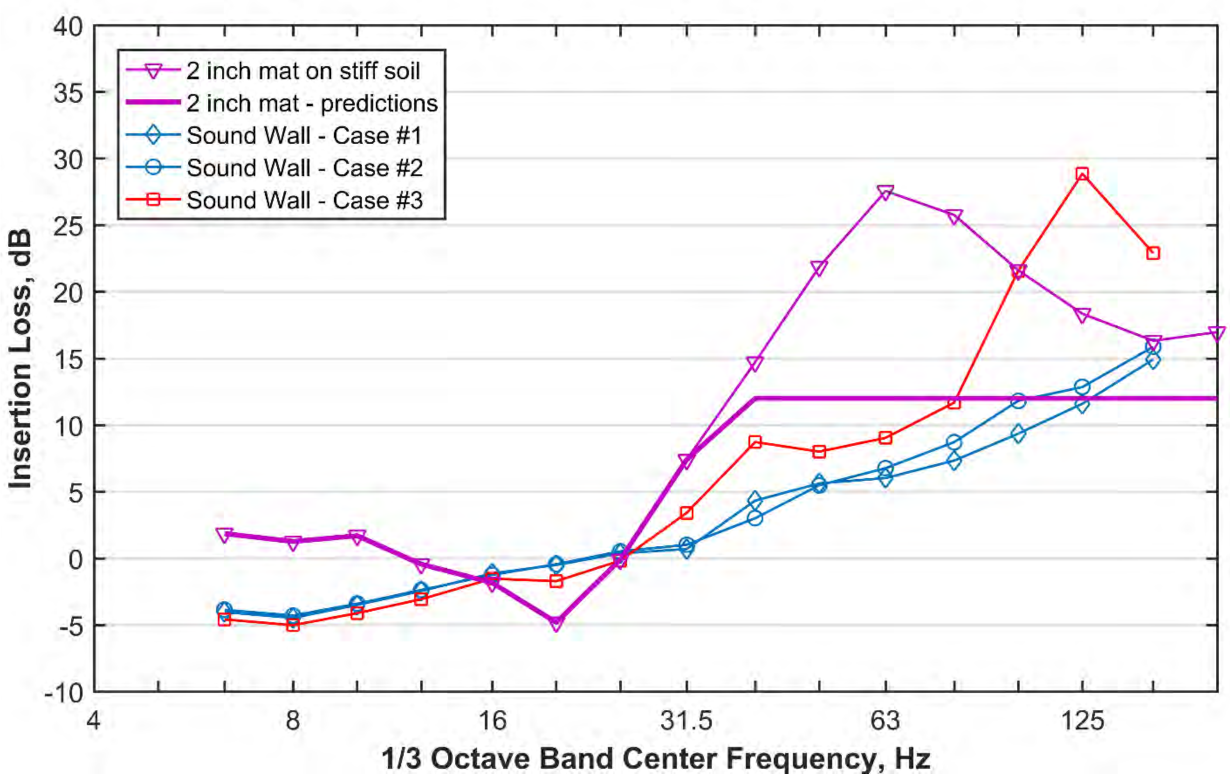


Figure 51: Insertion Loss of a Wayside Sound Barrier with Foundation

D.2 Increased Ballast Mass

In this model, the thickness of the ballast that sits atop a 1-inch ballast mat is increased, and the resulting insertion loss is compared the to the 1-inch and 2-inch ballast mat from the preferred mitigation option. Figure 52 shows the modeled results, and it is seen that with even an unrealistic four times the original ballast thickness the insertion loss still under performs that of the 2-inch ballast mat.

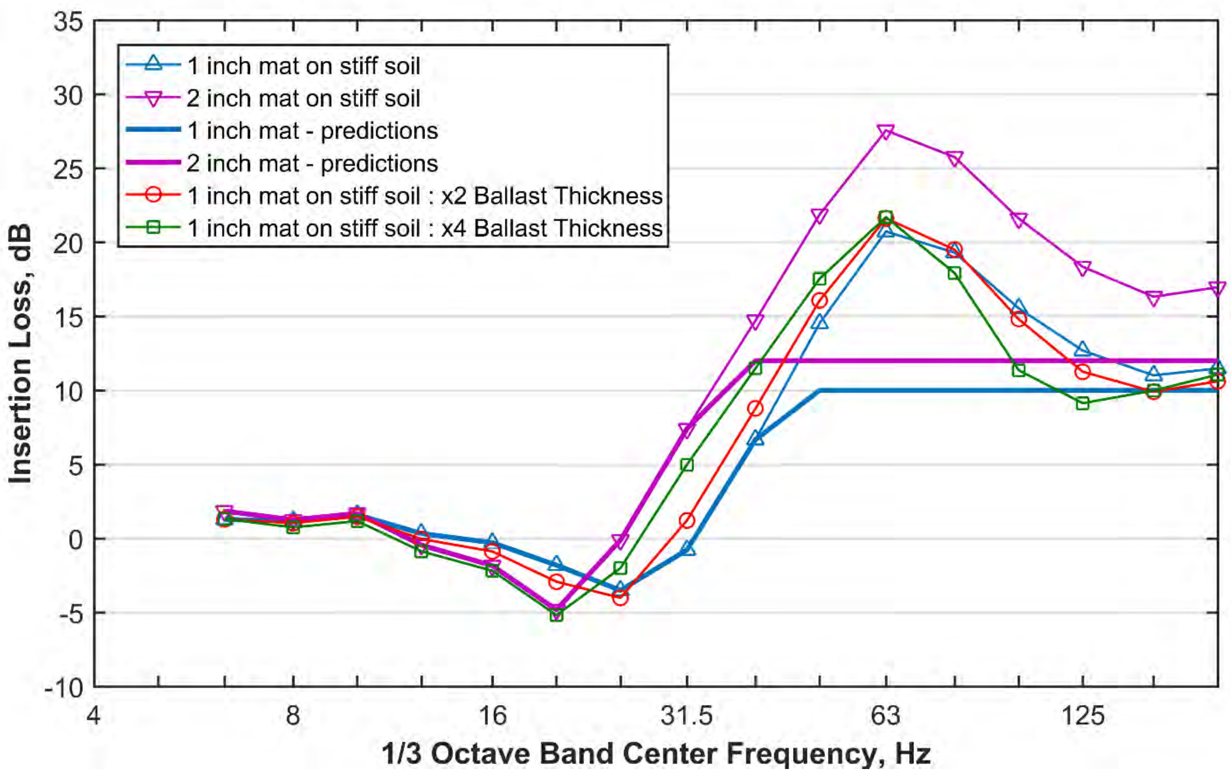


Figure 52: Effect on Insertion Loss due to Increased Ballast Mass

D.3 Highly Compliant Direct Fixation Fasteners

The final mitigation alternative that was examined was the use of highly compliant direct fixation fasteners (HCDF) on the concrete ties. Although this would be an unusual configuration it is not without precedent (Beacon Hill Boston MBTA). The model consisted of a ballast and tie track with no ballast mat, all other parameters are those used in the preferred option, see Table 4. Three different dynamic stiffness of the fasteners were examined: Case#1 was 51435 lbf/in, Case #2 was 68580 lbf/in, and Case #3 was 97155 lbf/in. As shown in Figure 53, Cases #1 and #2 (the softer fasteners) had performance about as well as the 1-inch ballast mat, but they both underperformed the 2-inch mat at all the relevant frequencies.

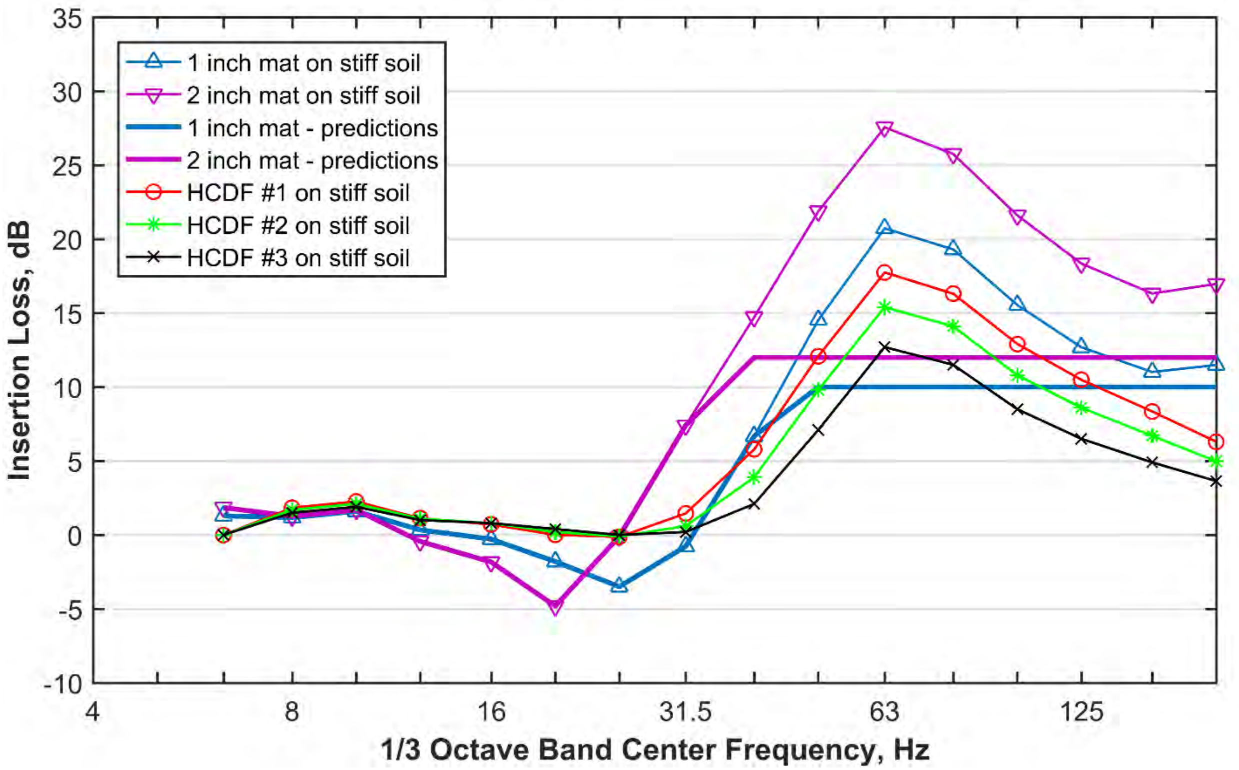


Figure 53: Insertion Loss of HCDF on Ballast and Tie Track

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