Appendix H. Transportation Analysis Report (TAR) – 2020

Final

Transportation Analysis Report (TAR): Lincoln Bridge Multi-Modal Improvement Project

Prepared for:
City of Los Angeles
& Caltrans

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LA17-2940

FEHR & PEERS

Table of Contents

Appendices

List of Figures

List of Tables

1. INTRODUCTION

Fehr & Peers prepared this Transportation Analysis Report for the Lincoln Bridge Multi-Modal Improvement Project, which proposes to replace the existing Lincoln Boulevard Bridge over Ballona Creek. The new structure will provide enhanced multi-modal travel opportunities, including an additional southbound travel lane, protected bike lanes in both directions, new sidewalks, and additional improvements to Culver Boulevard and Lincoln Boulevard. This report provides an analysis of traffic operations and multi-modal safety. Portions of the analysis results will also be used to comply with environmental impact analysis requirements for the California Environmental Quality Act (CEQA).

PROJECT DESCRIPTION

The Project is located within the City of Los Angeles in Los Angeles County, California. The Project proposed by the City, in cooperation with Caltrans, would replace the existing Lincoln Boulevard Bridge over Ballona Creek with a new structure that will relieve the existing southbound vehicular bottleneck and provide enhanced multi-modal travel opportunities. The new Lincoln Bridge would provide an additional travel lane in the southbound direction, protected bike lanes in both directions, and new sidewalks on both sides of the street. The protected bike lanes and sidewalks would extend from Fiji Way to Jefferson Boulevard. Other improvements include adding new bike lanes and sidewalks on the Culver Boulevard overcrossing, as well as reconfiguring the Lincoln Boulevard southbound approach at Jefferson Boulevard. **Figure 1** presents the Existing Conditions along Lincoln Bridge, as well as the lane configurations of the proposed Project.

The transportation analysis was conducted for five scenarios:

- Existing Conditions (2019)
- Opening Year No Build Conditions (2025)
- Opening Year Build Conditions (2025)
- Design Year No Build Conditions (2045)
- Design Year Build Conditions (2045)

The traffic operations analysis focuses on the AM and PM peak hours.

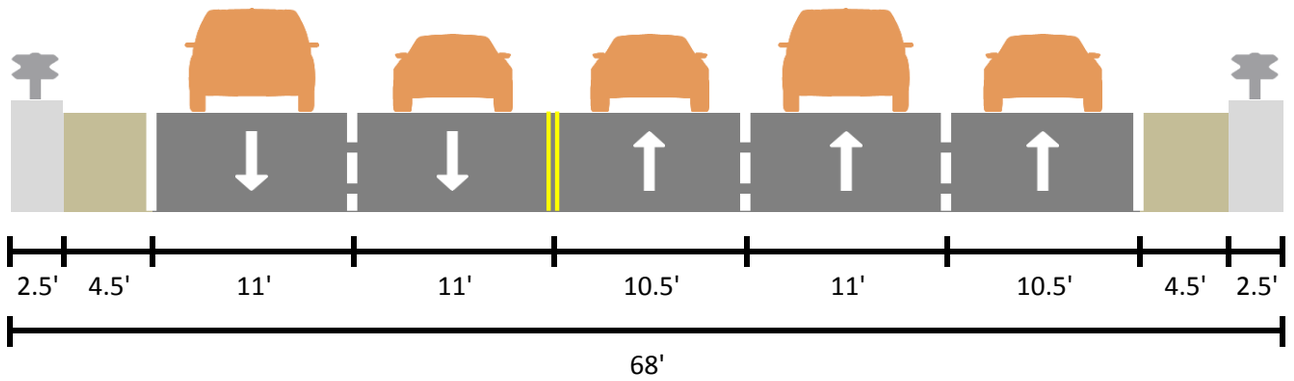
REPORT ORGANIZATION

The report is organized into the following chapters:

- ***Data Collection and Analysis Methodology*** – Chapter 2 presents the study area, data collection and operational analysis methodologies.
- ***Existing (2019) Transportation Conditions*** – Chapter 3 presents the existing physical and operational characteristics of the transportation system within the study area.
- ***Travel Demand Forecasts*** – Chapter 4 presents Opening Year (2025) and Design Year (2045) peak period traffic forecasts for the study area.

- ***Opening Year & Design Year Traffic Operations Analysis*** – Chapter 5 presents Opening Year (2025) and Design Year (2045) traffic operations analysis results.
- ***VMT Analysis*** – Chapter 6 presents the results of the VMT analysis for the study area, both with and without the Project.
- ***Bicycle and Pedestrian Analysis*** – Chapter 7 presents an analysis of how the project is expected to affect bicycle and pedestrian conditions within the study area.
- ***Traffic Analysis Summary*** – Chapter 8 presents an overall summary of the transportation analysis results.

Existing



Build Conditions

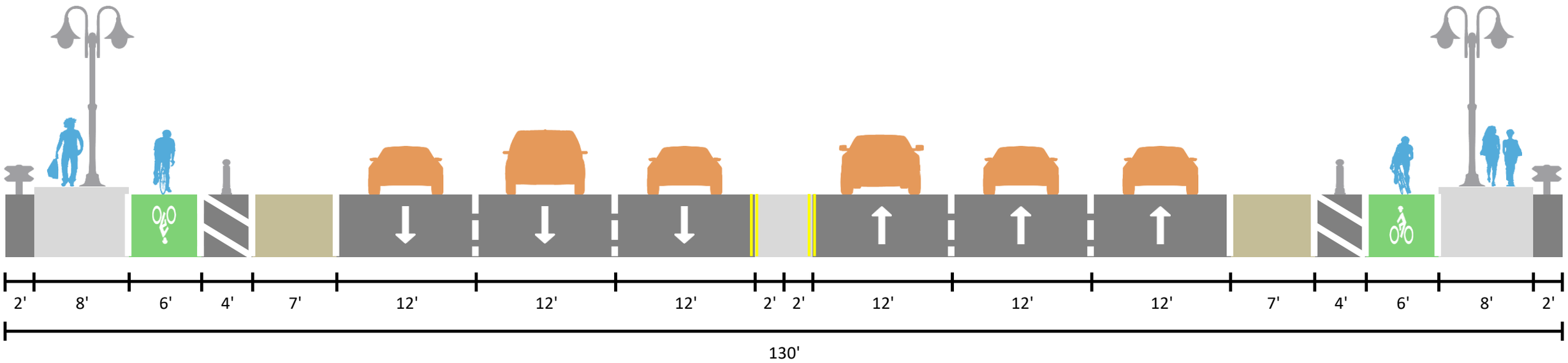


Figure 1

Lincoln Bridge Cross-Sections

2. DATA COLLECTION AND ANALYSIS METHODOLOGY

This chapter presents the study area, data collection and operational analysis methodologies.

STUDY AREA

The study area is defined as Lincoln Boulevard between Fiji Way and Jefferson Boulevard. The study area also includes the Culver Boulevard overpass. **Figure 2** illustrates the transportation analysis study area. This study evaluates the following intersections:

1. Lincoln Boulevard & Fiji Way
2. Lincoln Boulevard & Culver Loop to Lincoln Boulevard
3. Lincoln Boulevard & Jefferson Boulevard
4. Culver Boulevard & Culver Loop to Lincoln Boulevard

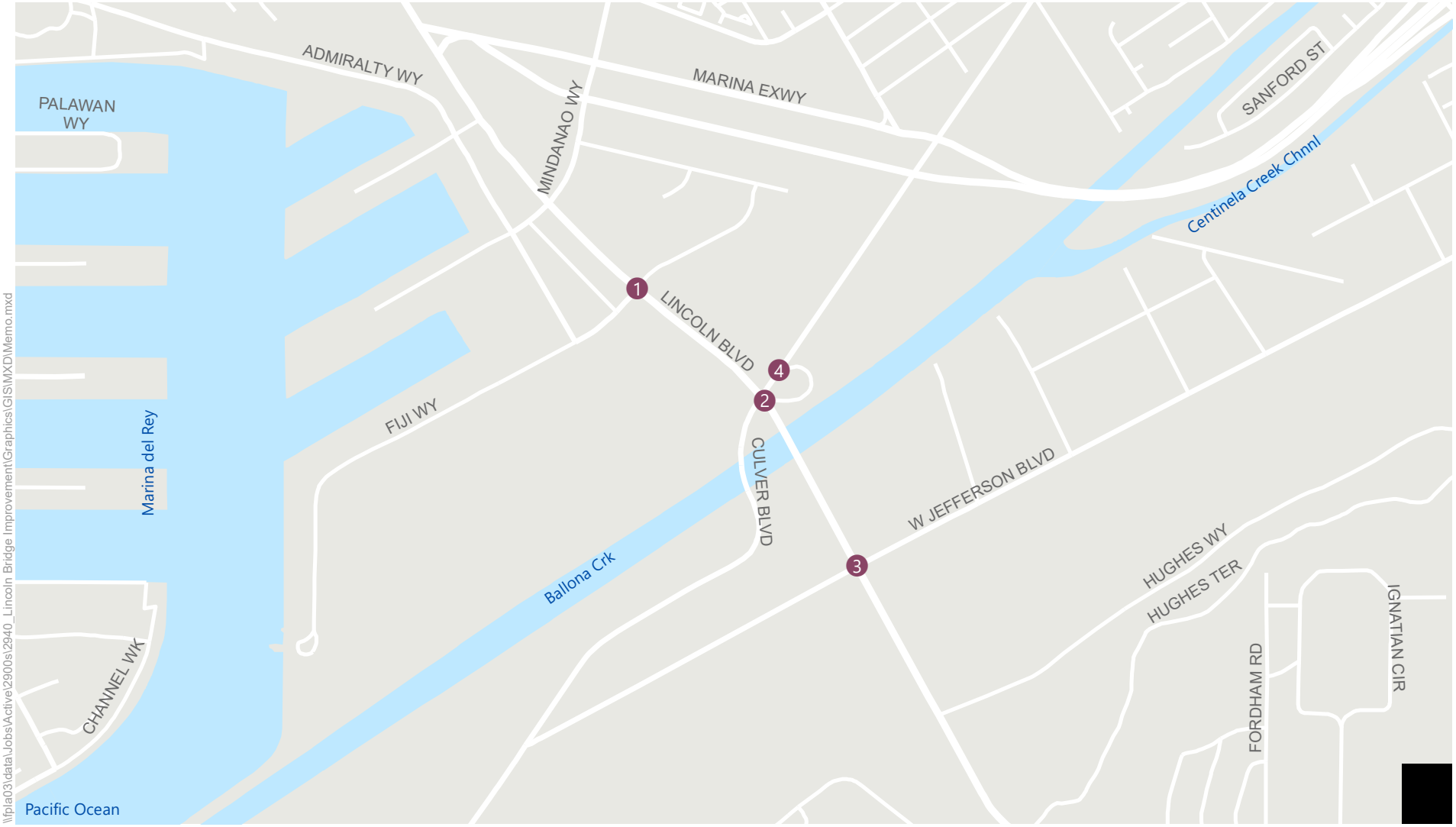
TRAVEL DEMAND FORECASTING METHODOLOGY

The 2016 City of Los Angeles Travel Demand Model was used to develop future year forecasts for the Lincoln Bridge Multi-Modal Improvement Project. The base year of the model is 2016 and the future year of the model is 2040. The Los Angeles Travel Demand Model reflects socio-economic data and a transportation network that is consistent with the 2016 Southern California Association of Governments (SCAG) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) model. As part of the City of Los Angeles Travel Demand Model development, the outputs from each of the four model steps (trip generation, trip distribution, mode choice, and assignment) were verified to be consistent with the outputs from the SCAG regional model at the countywide level.

The City of Los Angeles Model is a focused version of the SCAG RTP model that includes more zonal and roadway network detail within the City of Los Angeles and adjacent cities. In 2016, Fehr & Peers updated the City of Los Angeles Travel Demand Model as part of the *Infill and Complete Streets – Capturing VMT Impacts and Benefits to CEQA Project* with the Department of City Planning. The citywide model update focused on consistency with the latest version of the SCAG regional travel demand model, improving key components of the model process, and meeting or exceeding industry standards for calibration and validation. The details of the updated Los Angeles Travel Demand Model are available as part of the *Model Development Report: 2016 City of Los Angeles Travel Demand Model* (Fehr & Peers, 2017).

Fehr & Peers used the City of Los Angeles Travel Demand Model to generate 2040 forecasts within the study area. AM and PM peak hour traffic forecasts were developed for each of the four study intersections based on post-processed model outputs using the difference methodology. This methodology is consistent with methodologies delineated in the National Cooperative Highway Research Program Report (NCHRP) 255 published by the Transportation Research Board (TRB): Highway Traffic Data for Urbanized Area Project Planning and Design (Transportation Research Board, December 1982). The Base Year (2016) and Future Year (2040) models were used to calculate straight-line annual growth rates for turning movements at study intersections. The growth rates were then applied to existing traffic counts (collected November 2019) to

develop the Opening Year (2025) and Design Year (2045) No Build Conditions traffic projections. The City of Los Angeles Travel Demand Model network was then edited to include the additional southbound lane on Lincoln Boulevard to reflect Build Conditions, and post-processed volumes were developed as outlined previously for the Opening Year (2025) and Design Year (2045) Build scenarios.



[redacted]

● Study Intersections

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Figure 2

Lincoln Bridge Study Area

STUDY AREA SOCIO-ECONOMIC DATA

Socio-economic estimates for the study area, including a radius of approximately one mile surrounding the project, were compiled from the Los Angeles Travel Demand Model for the years 2016 and 2040. These years represent the base and future years of the model. **Table 1** compares the population, household, and employment estimates within the project area between 2016 and 2040. The 2040 estimates show approximately 30% growth in population and households and 20% growth in total employment.

TABLE 1: CITY OF LOS ANGELES SOCIO-ECONOMIC DATA COMPARISON

Forecast	Population	Households	Employment
2016 LA Model	43,370	21,000	23,845
2040 LA Model	55,245	26,865	28,015

Source: Fehr & Peers, 2020.

CITY OF LOS ANGELES TRAVEL DEMAND MODEL TRANSPORTATION NETWORK

The highway and transit network transportation system improvements included in the future year scenario of the City of Los Angeles Travel Demand Model were selected from the projects included in the 2040 Plan scenario of the 2016 SCAG RTP/SCS. The SCAG project list is divided into three sections:

- Federal Transportation Improvement Program (FTIP): includes six years of committed funding for projects included on the 2015 FTIP and Amendments 1-7 and 12
- Financially Constrained RTP: includes funded projects beyond those included in the FTIP
- Strategic Plan: includes an unconstrained list of potential projects that the region would pursue given additional funding and commitment

The improvements selected for the City of Los Angeles Travel Demand Model future scenario include those projects from the FTIP and Financially Constrained lists within the boundaries of the City model. These include 48 arterial projects, 19 highway projects, and 19 transit projects. Near the proposed Project, these include:

- Improving the SR-90/SR-1 (Lincoln Boulevard) Intersection
- Widening Sepulveda Boulevard between Jefferson Boulevard and Green Valley Circle
- Widening I-405 between La Tijera Boulevard and Jefferson Boulevard

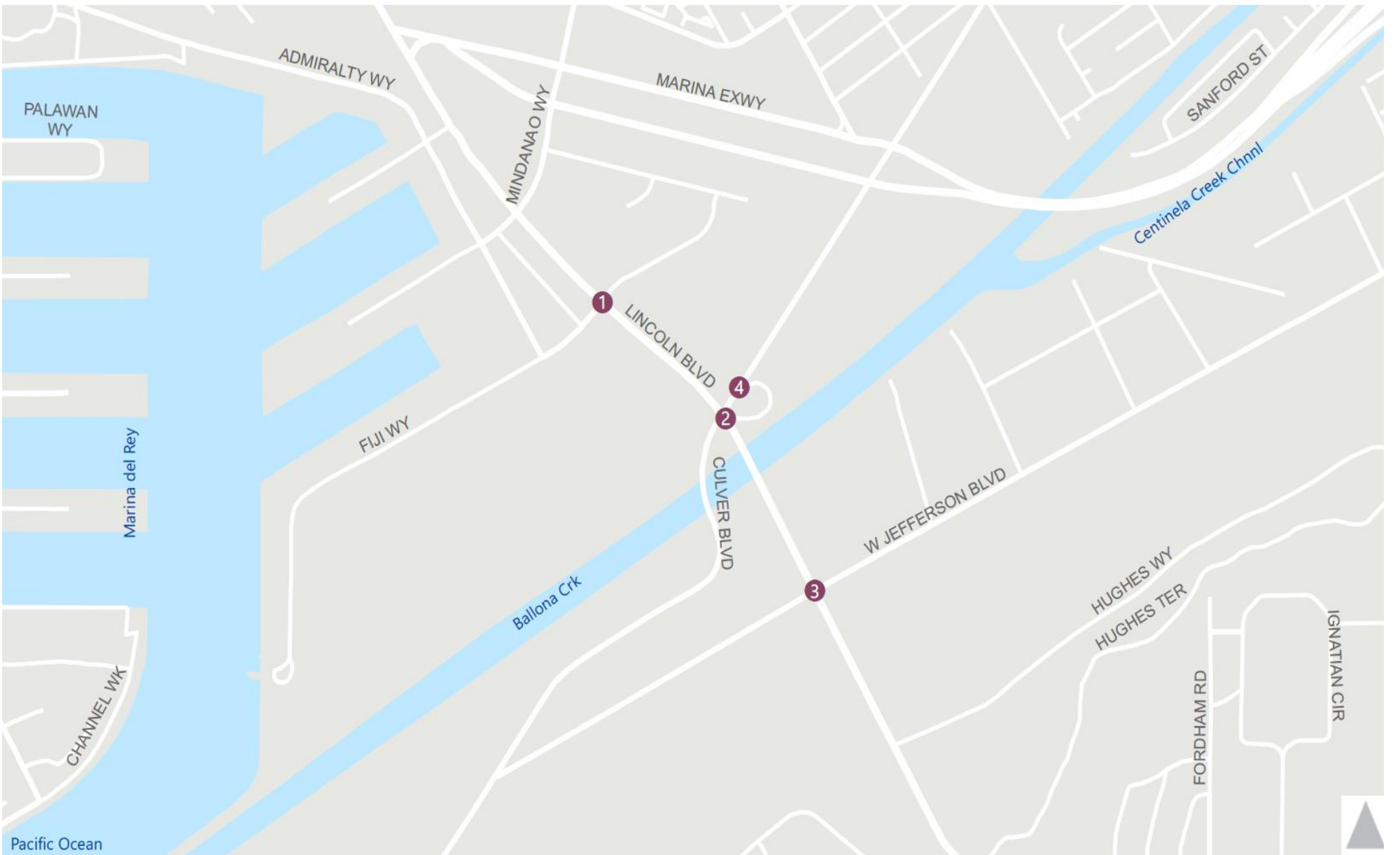
As part of the analysis for this Project, Fehr & Peers added network detail to the City of Los Angeles Travel Demand Model to better reflect existing conditions within the study area. These edits included turn penalties that reflect turning restrictions within the study area, including a westbound protected left turning movement from the Culver Loop to southbound Lincoln Boulevard, as well as a more detailed representation of the existing lane configuration along Lincoln Boulevard. As part of the future year Build model, Fehr & Peers edited the model network to reflect the additional southbound lane on Lincoln Boulevard that is part of the analyzed Project.

DATA COLLECTION AND VOLUME DEVELOPMENT

Traffic and transportation data collection efforts were undertaken to determine existing peak hour traffic volumes and lane configurations within the study area. Existing and proposed pedestrian/bicycle facilities were identified and transit service information for routes within the area was also collected.

LOCAL STREET SYSTEM TRAFFIC DATA

Weekday intersection turning movement vehicle counts were conducted during the morning (7:00 to 10:00 AM) and evening (3:00 to 6:00 PM) peak periods at all of the study intersections in November 2019. All counts were conducted while schools were in session and are included in **Appendix A**. Peak hour volumes were balanced across the study intersections to account for the differences in unique intersection peak hours. The peak hour traffic volumes are shown in **Figure 3**. Bicycle and pedestrian crossing volumes were also collected at each of the four study intersections during this time.



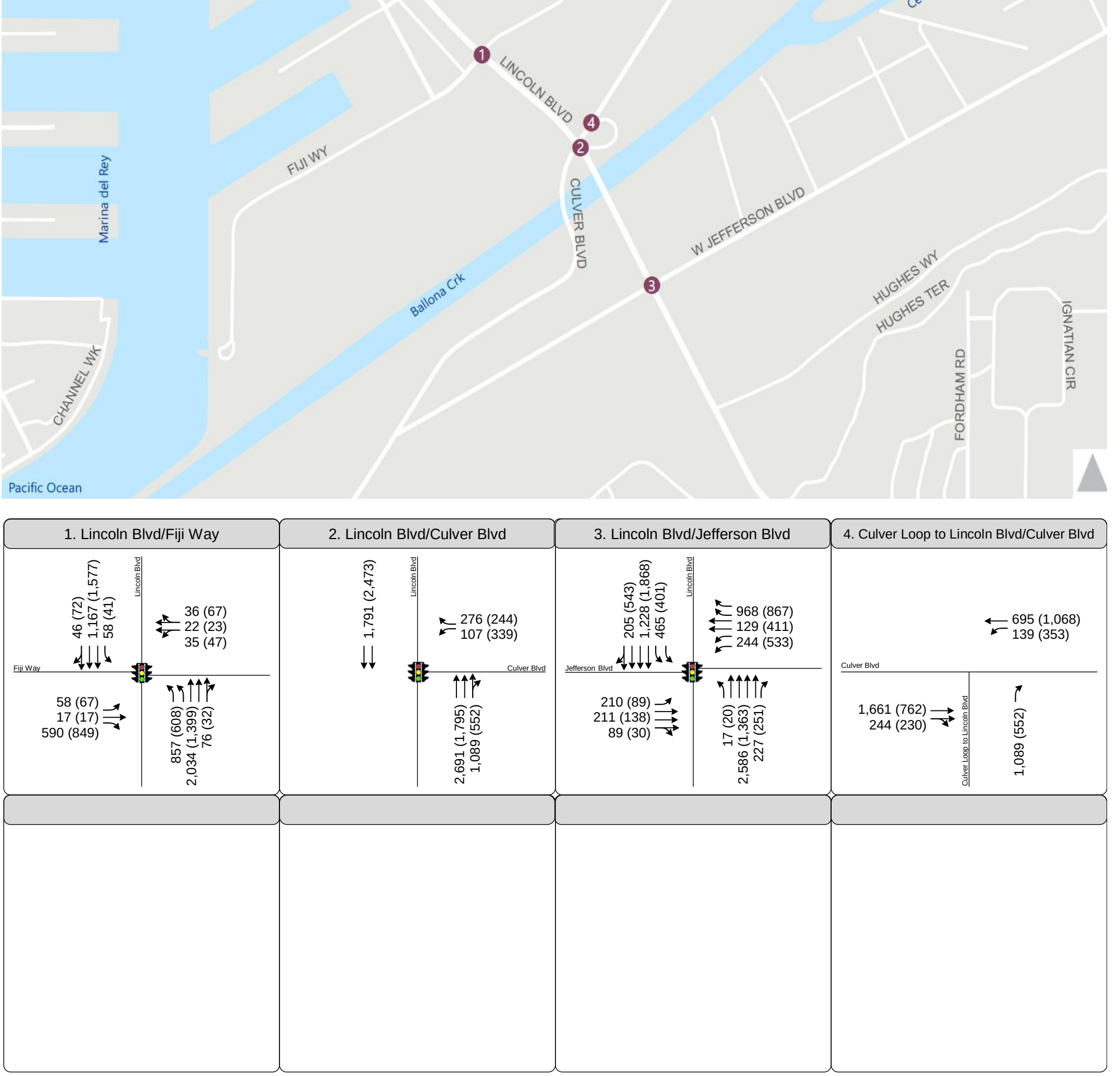


Figure 3

Peak Hour Traffic Volumes and Lane Configurations
Existing (2019) Conditions

TRAFFIC OPERATIONS ANALYSIS METHODOLOGY

Traffic operations for the study area were analyzed using the Synchro 9.0 software program. Synchro calculates vehicle delay and level of service based on procedures outlined in the Transportation Research Board's *2010 Highway Capacity Manual* (HCM 2010).

The analysis results include a descriptive term known as level of service (LOS). LOS is a measure of traffic operating conditions, which varies from LOS A (indicating free-flow traffic conditions with little or no delay) to LOS F (representing over-saturated conditions where traffic flows exceed design capacity resulting in long queues and delays). These ratings represent the perspective of drivers and are an indication of the comfort and convenience associated with driving. Peak hour traffic volumes, lane configurations, and signal timing plans were used as inputs for the LOS calculations. **Table 2** summarizes the relationship between the average control delay per vehicle and LOS for signalized and unsignalized intersections. Results from Synchro were used to determine delay and LOS at all intersections.

TABLE 2: LOS THRESHOLDS FOR SIGNALIZED AND UNSIGNALIZED INTERSECTIONS

LOS	Signalized Intersection Average Control Delay (sec/veh)	Unsignalized Intersection Average Control Delay (sec/veh)	General Description
A	≤ 10	≤ 10	Little to no congestion or delays.
B	> 10 to 20	> 10 to 15	Limited congestion. Short delays.
C	> 20 to 35	> 15 to 25	Some congestion with average delays.
D	> 35 to 55	> 25 to 35	Significant congestion and delays.
E	> 55 to 80	> 35 to 50	Severe congestion and delays.
F	> 80	> 50	Total breakdown with extreme delays.

Source: *2010 Highway Capacity Manual*, Transportation Research Board, 2010.

3. EXISTING (2019) TRANSPORTATION CONDITIONS

This chapter describes the Existing (2019) Conditions of the roadway facilities, pedestrian and bicycle facilities, and transit service. It also presents existing traffic volumes and operations for the study intersections.

ROADWAY NETWORK

As noted above, **Figure 2** illustrates the traffic study area, which is defined as Lincoln Boulevard between Fiji Way and Jefferson Boulevard, and the Culver Boulevard overpass. The characteristics of the major roadways serving the study area are described below. The street descriptions include the designation of the roadway under the *Mobility Plan 2035, An Element of the General Plan* adopted by the Los Angeles City Council in September 2016.

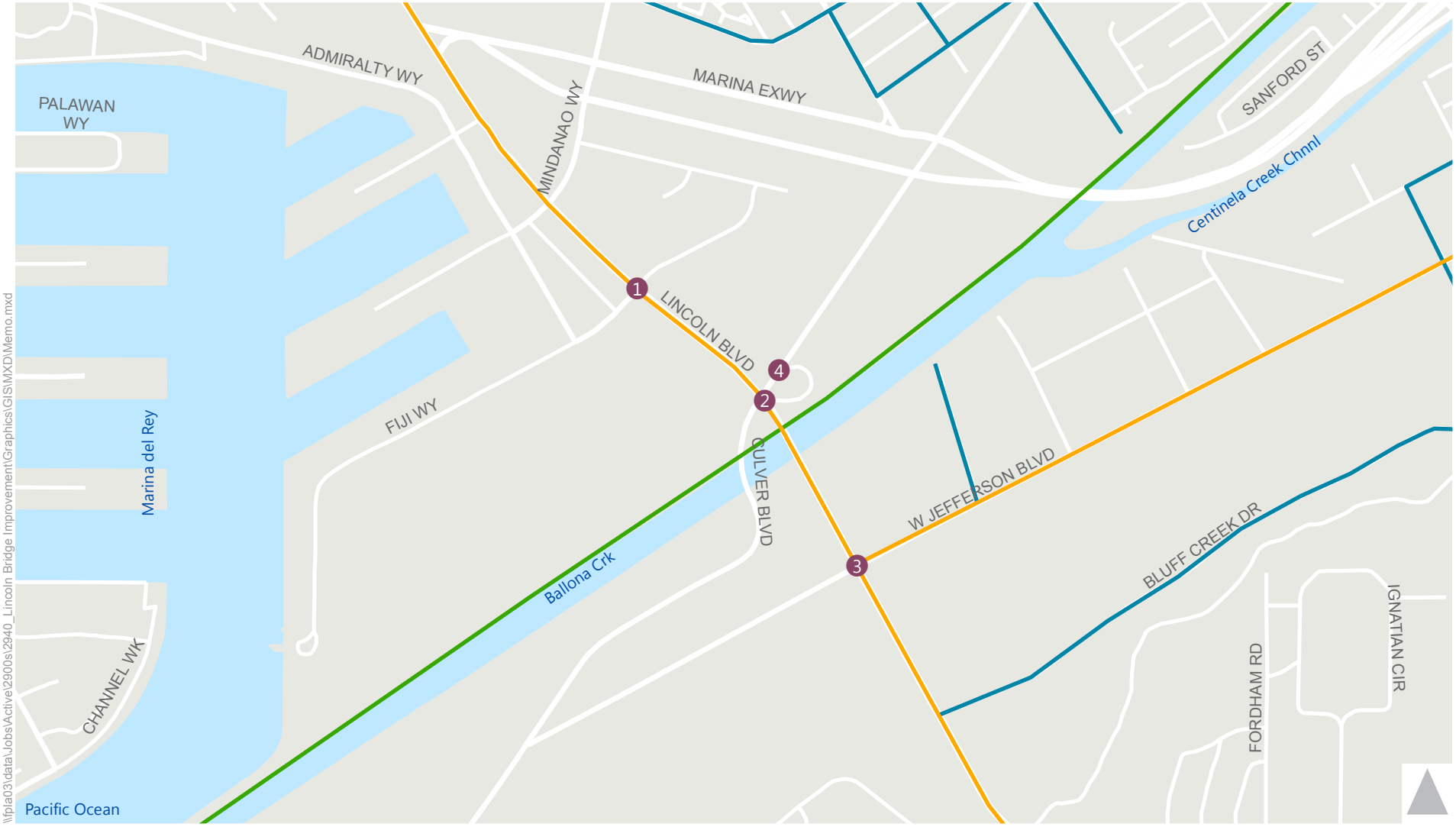
Lincoln Boulevard is designated as a Boulevard I and runs north/south with two to three travel lanes in each direction. On the bridge, the southbound direction provides two travel lanes and the northbound direction provides three travel lanes. At Jefferson Boulevard, the southbound direction widens to provide four travel lanes. Lanes are 10 feet wide and parking is not permitted on either side.

Jefferson Boulevard is designated as a Boulevard II and runs east/west with two to three travel lanes in each direction. Lanes are approximately 10 feet wide and parking is not permitted on either side of the street.

Culver Boulevard is designated as an Avenue I east of the Project and an Avenue III west of the Project. The street runs northeast/southwest with one travel lane in the southwest direction and two lanes in the northeast direction. The Culver Loop provides northbound and southbound access to Lincoln Boulevard with one right-turn lane from Culver Boulevard to northbound Lincoln Boulevard, one protected left-turn lane from Culver Boulevard to southbound Lincoln Boulevard, and one left-turn lane from Lincoln Boulevard onto northeast-bound Culver Boulevard. The Culver overpass provides one travel lane in each direction.

Fiji Way is designated as a Local Street. It runs east/west and provides one to two travel lanes west of Lincoln Boulevard and provides one travel lane in each direction east of Lincoln. Lanes are approximately 10 feet wide with parking permitted on both sides of the street, east of Lincoln.

Figure 4 illustrates those roads in the study area that are classified as enhanced street networks, according to the *Mobility Plan 2035*. The Neighborhood Enhanced Network designation indicates streets have been prioritized for future streetscape improvements to provide a calm and safe environment for walking, biking, and the circulation of slower moving modes. The Bicycle Enhanced Network consists of streets prioritized for safe and comfortable bicycle travel, and enhanced bicycle facilities. The Transit Enhanced Network is a network of streets prioritized for upgrades to improve transit performance and enhance rider facilities, such as transit shelters. Lincoln Boulevard is part of the Transit Enhanced Network.



Study Intersections

Bicycle Enhanced Network

Neighborhood Enhanced Network

Transit Enhanced Network

Figure 4

Mobility Plan 2035 Enhanced Street Network

INTERSECTION TRAFFIC OPERATIONS

Existing intersection traffic volumes, lane configurations, and signal timings were used to calculate LOS for the study intersections during the AM and PM peak hours. Existing lane configurations are shown in **Figure 3.** The results of the LOS analysis were calculated using Synchro 9.0 software and are presented in **Table 3**. LOS calculation sheets are presented in **Appendix B**.

The traffic volumes collected along Lincoln Boulevard reveal peak hour directionality. Peak hour volumes are heavier in the northbound direction in the AM peak hour and in the southbound direction during the PM peak hour. Therefore, the southbound bottleneck due to the lane reduction at the Lincoln Bridge is more prominent during the PM peak hour. As the results show, two of the four study intersections operate at LOS C or better during the PM peak hour. The following intersections operate at LOS D, E, or F during one or more of the peak hours analyzed:

1. Lincoln Boulevard & Fiji Way (LOS D during the AM peak hour)
2. Lincoln Boulevard & Culver Loop to Lincoln Boulevard (LOS E during the AM peak hour)
3. Lincoln Boulevard & Jefferson Boulevard (LOS F during the AM peak hour and LOS D during the PM peak hour)

TABLE 3: EXISTING (2019) CONDITIONS PEAK HOUR INTERSECTION OPERATIONS

	Intersection	AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS
1	Lincoln Boulevard & Fiji Way	36.1	D	33.4	C
2	Lincoln Boulevard & Culver Loop to Lincoln Boulevard [1]	64.1	E	28.6	C
3	Lincoln Boulevard & Jefferson Boulevard	128.4	F	38.4	D
4	Culver Boulevard & Culver Loop to Lincoln Boulevard [2]	<5.0	A	<5.0	A

Source: Fehr & Peers, 2020.
[1]Signal timing modified for the WBR movement to enable HCM2010 analysis.
[2]Unsignalized intersection - LOS calculated using HCM 2010, as a Two-Way Stop Control.

QUEUE ANALYSIS

Table 4 shows the 95th percentile queue lengths for critical turning movements at each of the four intersections in the study area. Queue lengths exceed storage lengths at the following approaches:

- Lincoln Boulevard & Fiji Way – NBL (AM peak hour)
- Lincoln Boulevard & Culver Loop to Lincoln Boulevard – WBR (AM peak hour)
- Lincoln Boulevard & Culver Loop to Lincoln Boulevard – WBL (PM peak hour)
- Lincoln Boulevard & Jefferson Boulevard – SBL (AM and PM peak hours)
- Lincoln Boulevard & Jefferson Boulevard – WBR (AM peak hour)
- Lincoln Boulevard & Jefferson Boulevard – EBL (AM peak hour)

Queue analysis calculations are presented in **Appendix C**.

TABLE 4: EXISTING (2019) CONDITIONS PEAK HOUR 95TH PERCENTILE QUEUES

Intersection		Movement	Storage Length (ft)	95th Percentile Queue (ft)	
				AM	PM
1	Lincoln Boulevard & Fiji Way	NBL	330	**#500**	325
		SBL	215	100	75
		EBL	175	100	100
		EBR[3]	--	**--**	**--**
2	Lincoln Boulevard & Culver Loop to Lincoln Boulevard	WBR	310	**#425**[1]	300
		WBL	310	175	**#475**
3	Lincoln Boulevard & Jefferson Boulevard	NBL	200	50	50
		NBR	210	100	50
		SBL	250	**#400**	**m225**
		WBL	440	175	325
		WBR	440	**#700**	275
		EBL	200	**#350**	175
4	Culver Boulevard & Culver Loop to Lincoln Boulevard	WBL	250	50[2]	75[2]

Source: Fehr & Peers, 2020.
Notes: Queue lengths have been rounded to the next 25 feet.
[1]This movement has both a protected and permissive right turn, but only the permissive portion was analyzed due to custom phasing.
[2]Queue length calculated based on HCM 2010 LOS analysis and an average vehicle length of 25 feet.
[3]This movement has a dedicated right-turn lane, with a Yield control, and merges with SB Lincoln Boulevard downstream.
Bold indicates that 95th percentile queue length exceeds available storage.
# indicates that 95th percentile volume exceeds capacity, queue may be longer.
m indicates volume for 95th percentile queue is metered by upstream signal.

EXISTING PUBLIC TRANSIT SERVICE

Five local and rapid bus routes currently serve the area, as illustrated in **Figure 5** and described below.

BIG BLUE BUS

Line 3/Rapid 3 runs along Lincoln Boulevard through the study area and connects Santa Monica to the Los Angeles International Airport. The local route has 20 minute headways and the rapid route has 12 minute headways during the peak hours.

METRO

Line 110 runs northeast/southwest along Jefferson Boulevard in the study area. Line 110 runs between Playa Vista and Bell Gardens and has 20 minute headways.

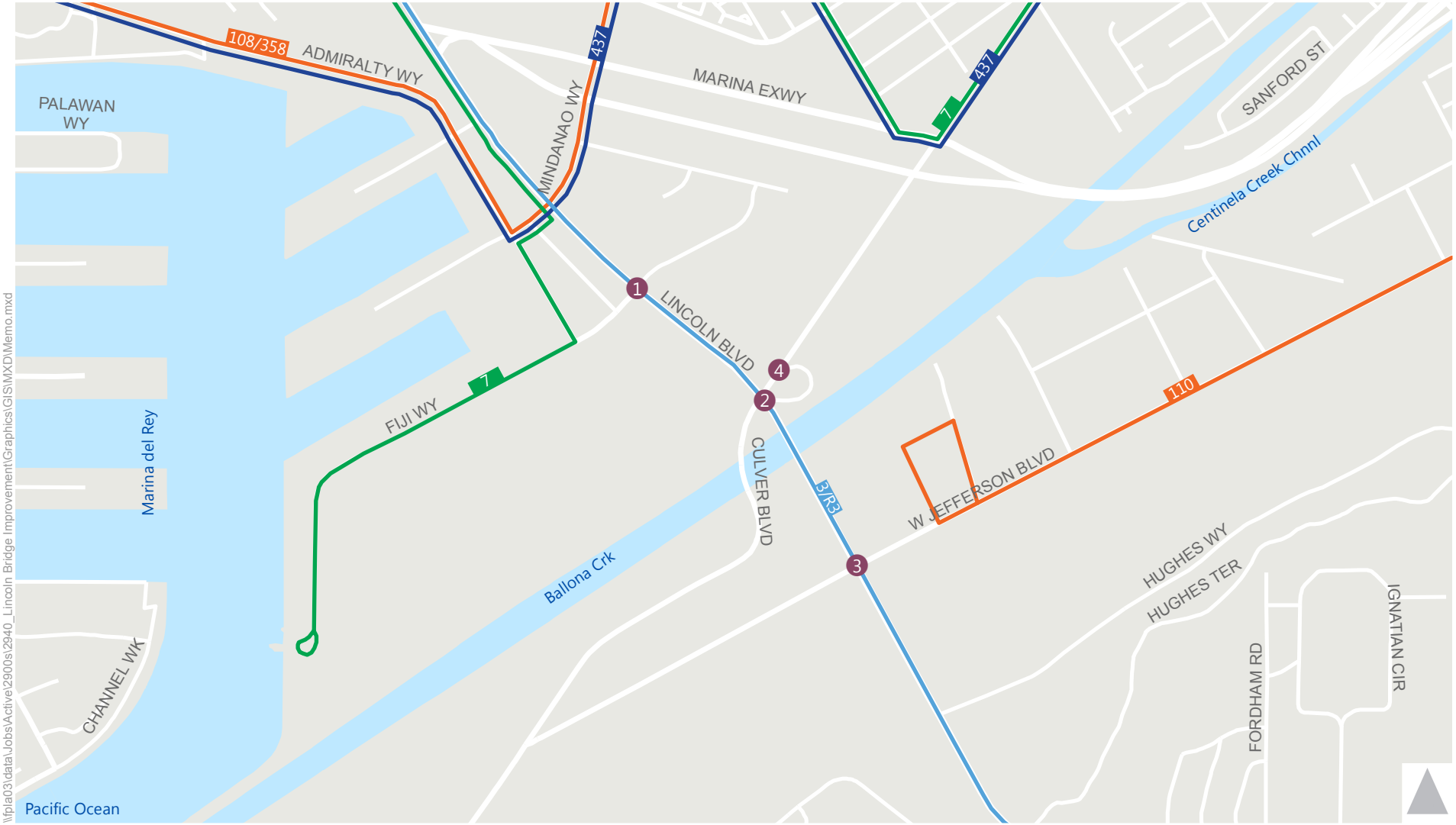
Line 108/358 runs northwest/southeast along Admiralty Way and north along Mindanao Way north of the project site. The line connects Pico Rivera and Marina Del Rey and has 15 minute headways in the peak hours.

CULVER CITY BUS

Line 7 connects Culver City with the Fisherman's Village, running along Fiji Way and north along Lincoln Boulevard. The line has 40 minute headways throughout the day.

LADOT

Line 437 runs northwest/southeast along Admiralty Way and north along Mindanao Way near the project site. The line runs between Venice and Downtown Los Angeles and has six buses that depart in the AM peak hour with 20-30 minute headways. In the PM peak hour, the line has six buses that run with 15-30 minute headways.



- Study Intersections
- Metro Local
- Santa Monica Big Blue Bus
- Culver City Bus
- LADOT Commuter Express

Figure 5

Lincoln Bridge Existing Transit

EXISTING AND PLANNED BICYCLE AND PEDESTRIAN FACILITIES

Figure 6 shows existing and planned designated bicycle facilities in the Project area. As shown, there are existing bike lanes along Fiji Way west of Lincoln Boulevard and on and Lincoln Boulevard south of Jefferson Boulevard in the study area. There is a bike path along Admiralty Way and along the Ballona Creek. Metro's *Active Transportation Strategic Plan (ATSP)* identifies corridors proposed to receive improved bicycle and pedestrian improvements. The ATSP identifies improvements along portions of Lincoln Boulevard (the addition of a bike lane as part of the Project description), Fiji Way, and the southern end of Culver Boulevard within the study area. The City's *Mobility Plan 2035* includes the Ballona Creek Bike Path as part of its Bicycle Enhanced Network (BEN).

The Ballona Wetlands Restoration Project, currently under environmental review, proposes to restore wetlands along Ballona Creek, west of Lincoln Boulevard and includes several possible improvements to the bicycle and pedestrian facilities along the creek and in the study area. The improvement options include a bicycle and pedestrian path on the south side of the creek, a pedestrian-only path on the south side of the creek, and/or a new bicycle and pedestrian bridges over Lincoln Boulevard (just north of the Culver Bridge) and across the creek (west of the Lincoln Bridge). These possible improvements are in addition to the improvements shown in **Figure 6**. Together, the Ballona Wetlands Restoration Project and the Lincoln Bridge Multi-Modal Improvement Project aim to fill gaps in the active transportation network in the area, while offering recreational opportunities along Ballona Creek.

Currently, there are no sidewalks along either side of the Lincoln Bridge. South of the bridge, there is a sidewalk only along the eastern side of Lincoln Boulevard. There are also no sidewalks present north of the bridge until the intersection at Fiji Way. Sidewalks are present on Jefferson Boulevard east of Lincoln Boulevard, and on Fiji Way. There are no sidewalks on Culver Boulevard or on Jefferson Boulevard west of Lincoln. Crosswalks with all four legs are present at Lincoln Boulevard & Jefferson Boulevard, and only three legs are present at Lincoln Boulevard & Fiji Way. With the exception of a continental crosswalk across the westbound right-turn lane at Lincoln Boulevard & Fiji Way, the study intersections do not have high-visibility crosswalks.

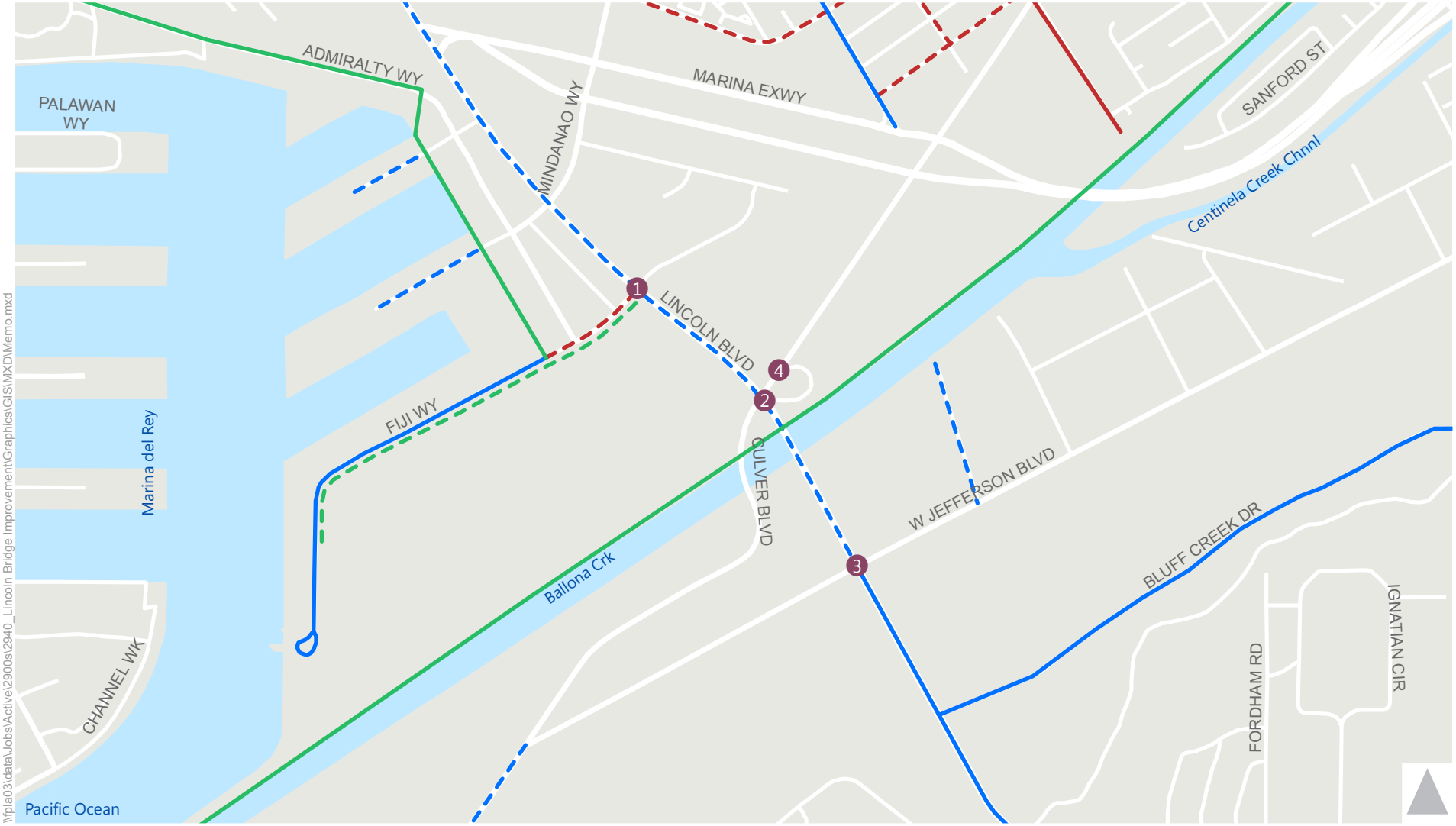


Figure 6

Lincoln Bridge Existing and Planned Bicycle Facilities

COLLISION HISTORY DATA

This section summarizes collision statistics within the study area. Caltrans data recorded 18 collisions on Lincoln Boulevard between Fiji Way and Jefferson Boulevard from July 1, 2012 to June 30, 2015 (**Table 5**). One of those collisions was fatal, and 14 collisions included injuries. Four collisions involved a bicyclist or pedestrian. Speeding was the primary collision factor for five of the 18 collisions. In addition to the 18 collisions along Lincoln Boulevard from Caltrans data, the same time period showed an additional 29 collisions occurring at the Fiji Way and Jefferson Boulevard intersections, according to data included in the SafeTREC UC Berkeley Transportation Injury Mapping System (TIMS). **Table 6** shows the accident rates per million vehicle miles on Lincoln Boulevard between Fiji Way and Jefferson Boulevard.

TIMS data recorded 12 collisions on the Culver Boulevard overcrossing during the same time period. Two collisions involved a fixed object while the remainder involved another motor vehicle. None of the collisions on the Culver Boulevard overcrossing resulted in a fatality and none involved a bicyclist or pedestrian.

TABLE 5: COLLISION CHARACTERISTICS BY LOCATION

Location	Total	Fatal	Injury	Multi-Vehicle	Dark	Bicycle	Pedestrian	Speeding
Lincoln Boulevard	18	1	14	12	8	3	1	5
Culver Boulevard	12	0	12	10	2	0	0	5

Data from July 1, 2012 to June 30, 2015
Source: Caltrans TASAS, 2017 and TIMS, 2017.

TABLE 6: ACCIDENT RATES BY TYPE

Location	Actual			Average		
	Fatal	Fatal + Injury	Total	Fatal	Fatal + Injury	Total
Lincoln Boulevard	0.026	0.39	0.47	0.012	0.37	0.83

Note: Accident rates expressed as number of accidents per million vehicle miles
Data from July 1, 2012 to June 30, 2015
Source: Caltrans TSAR, 2017.

4. TRAVEL DEMAND FORECASTS

The travel demand forecasts were developed using the validated City of Los Angeles model as discussed in greater detail in Chapter 2. The approach to developing travel demand forecasts started with the recognition that regional travel demand models typically do not contain sufficient detail or sensitivity for local applications, such as developing directional arterial and local street volume forecasts. Instead, the regional model provides a starting point for creating a more detailed citywide model. Having a valid City of Los Angeles model is a critical step in ensuring a high level of confidence in the traffic volume forecasts being used to evaluate the Lincoln Bridge Multi-Model Improvement Project.

FUTURE YEAR FORECASTS

Because the widening of the bridge along Lincoln Boulevard would provide additional lane capacity in the southbound direction, travel patterns within the study area would likely change as a result of the Project. Accordingly, the roadway network in the City of Los Angeles model was adjusted to reflect the lane configuration changes for the Project, and demand volumes were forecasted for the Build and No Build scenarios, for both 2025 and 2045.

Figure 7 shows the intersection volumes for Opening Year (2025) No Build Conditions. **Figure 8** shows the intersection volumes for Design Year (2045) No Build Conditions. The addition of the third southbound lane along the Lincoln Boulevard Bridge allows for additional vehicle capacity, and thus requires a set of forecasts different from the No Build scenarios. **Figure 9** and **Figure 10** present the forecasted intersection volumes for the Opening Year (2025) and Design Year (2045) Build scenarios.

Both the AM and PM peak hour volume increases primarily occur in the non-peak direction. These increases indicate that Lincoln Boulevard is essentially at capacity during the AM peak hour in the northbound direction and during the PM peak hour in the southbound direction, limiting the ability for future increases in traffic volumes. During the AM peak hour, larger volume increases occur along Lincoln Boulevard in the southbound direction (as a percentage of existing volumes). During the PM peak hour, larger volume increases occur in the northbound direction. This pattern holds true for both 2025 and 2045.

Traffic volumes in the southbound direction increase more in the Build scenario, when compared to No Build, as a result of the additional lane capacity. In the northbound direction, volumes remain the same between the No Build and Build scenarios for both 2025 and 2045. Slight volume decreases also occur for some turning movements (e.g. westbound left-turns from Jefferson Boulevard onto Lincoln Boulevard), between the No Build and Build scenarios, due to fewer trips on roadways that serve as an alternate route to southbound Lincoln Boulevard. It should be noted that both the No Build and Build forecasts represent travel demand that may not be fully realized during the peak hours due to the existing bottlenecks and capacity constraints along Lincoln Boulevard to the north and south of the study area.

AVERAGE DAILY TRAFFIC (ADT) FORECASTS

Average daily traffic (ADT) forecasts were developed for the segment of Lincoln Boulevard (northbound and southbound) between Jefferson Boulevard and Fiji Way for the four future year scenarios. ADT forecasts were developed using straight-line growth from 2011 Caltrans ADT data available for the segment, based on the 2016 and 2040 Los Angeles Travel Model volumes. Volumes increase in 2025 and 2045, with larger increases under Build Scenarios, as is seen in turning movement volume forecasts.

TABLE 7: LINCOLN BOULEVARD AVERAGE DAILY TRAFFIC (ADT) VOLUMES

2017 PeMS ADT[1]	Opening Year (2025)		Design Year (2045)	
	No Build	Build	No Build	Build
60,000	64,400	67,000	75,800	78,900

[1]2017 counts from Caltrans Performance Management System (PeMS) are most recent available.

Source: Fehr & Peers, 2020.

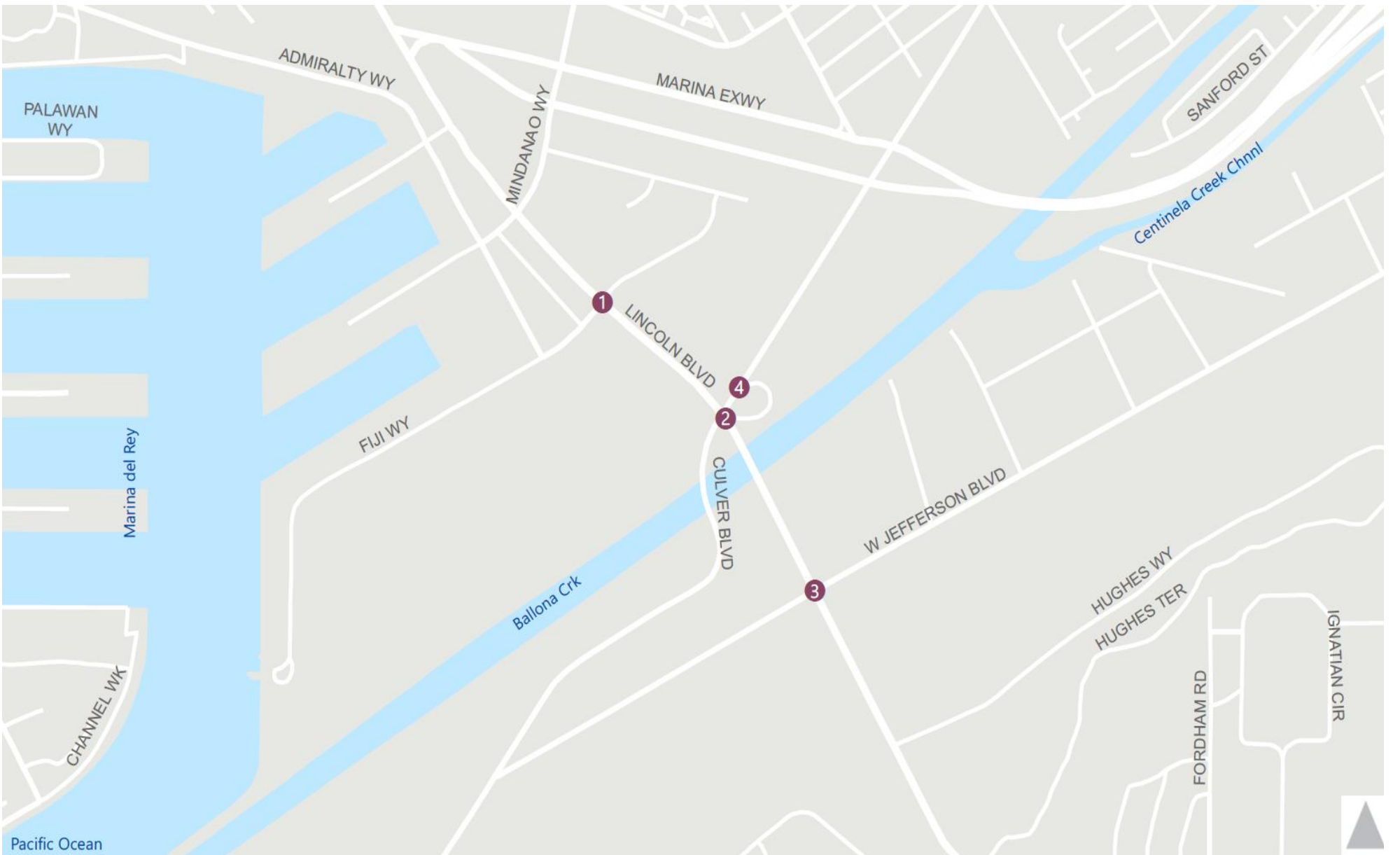
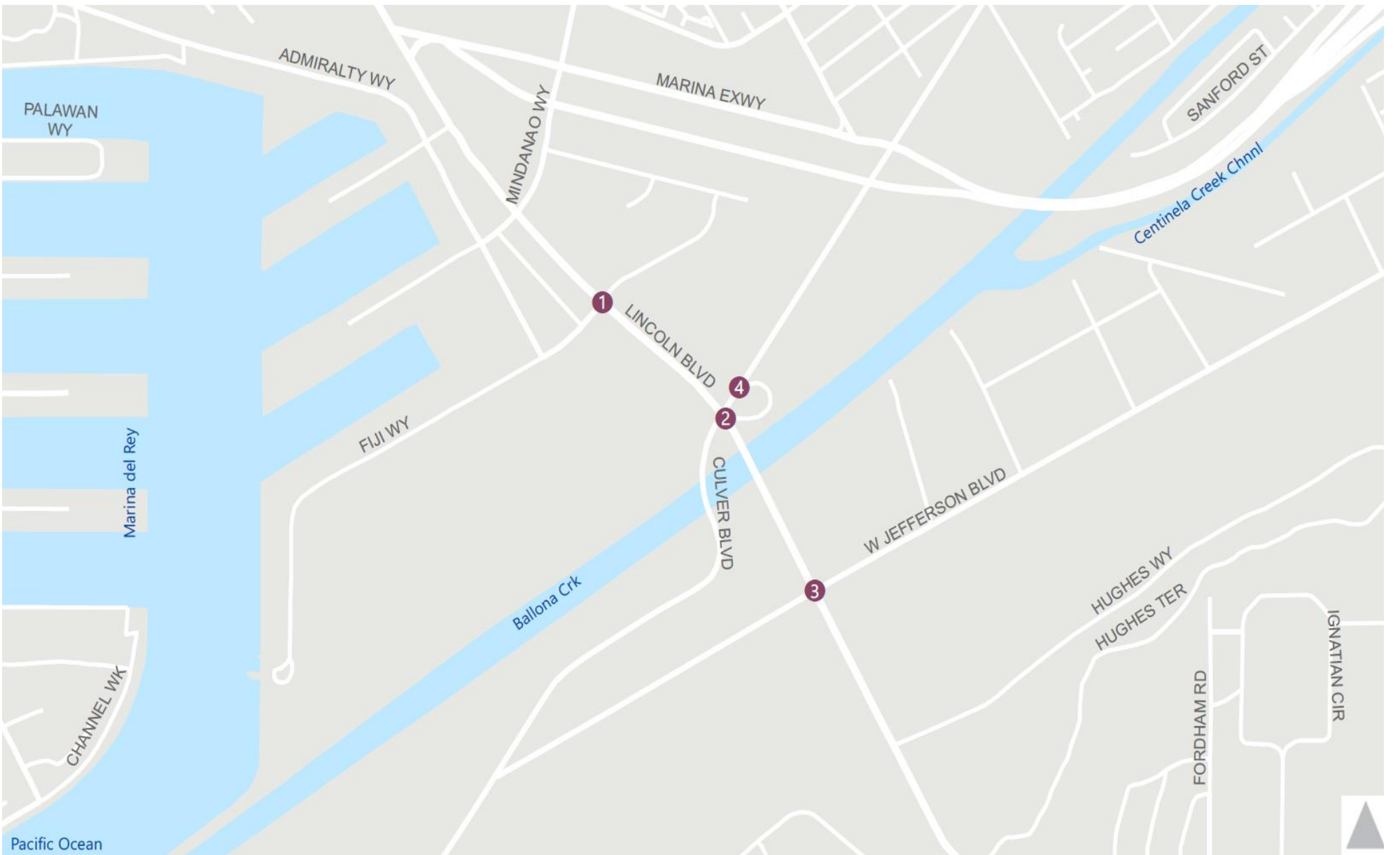


Figure 7

Peak Hour Traffic Volumes and Lane Configurations
Opening Year (2025) No Build



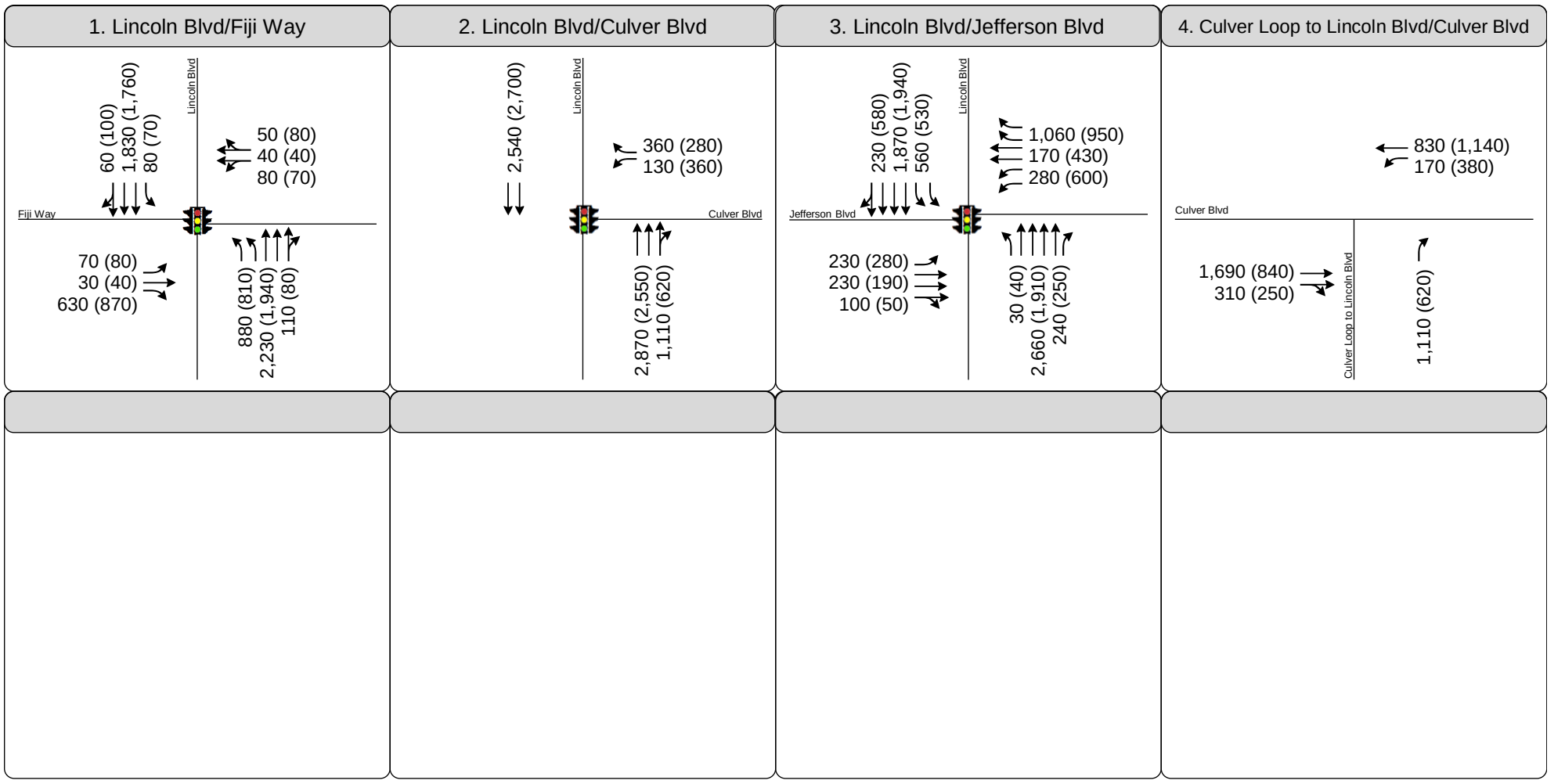
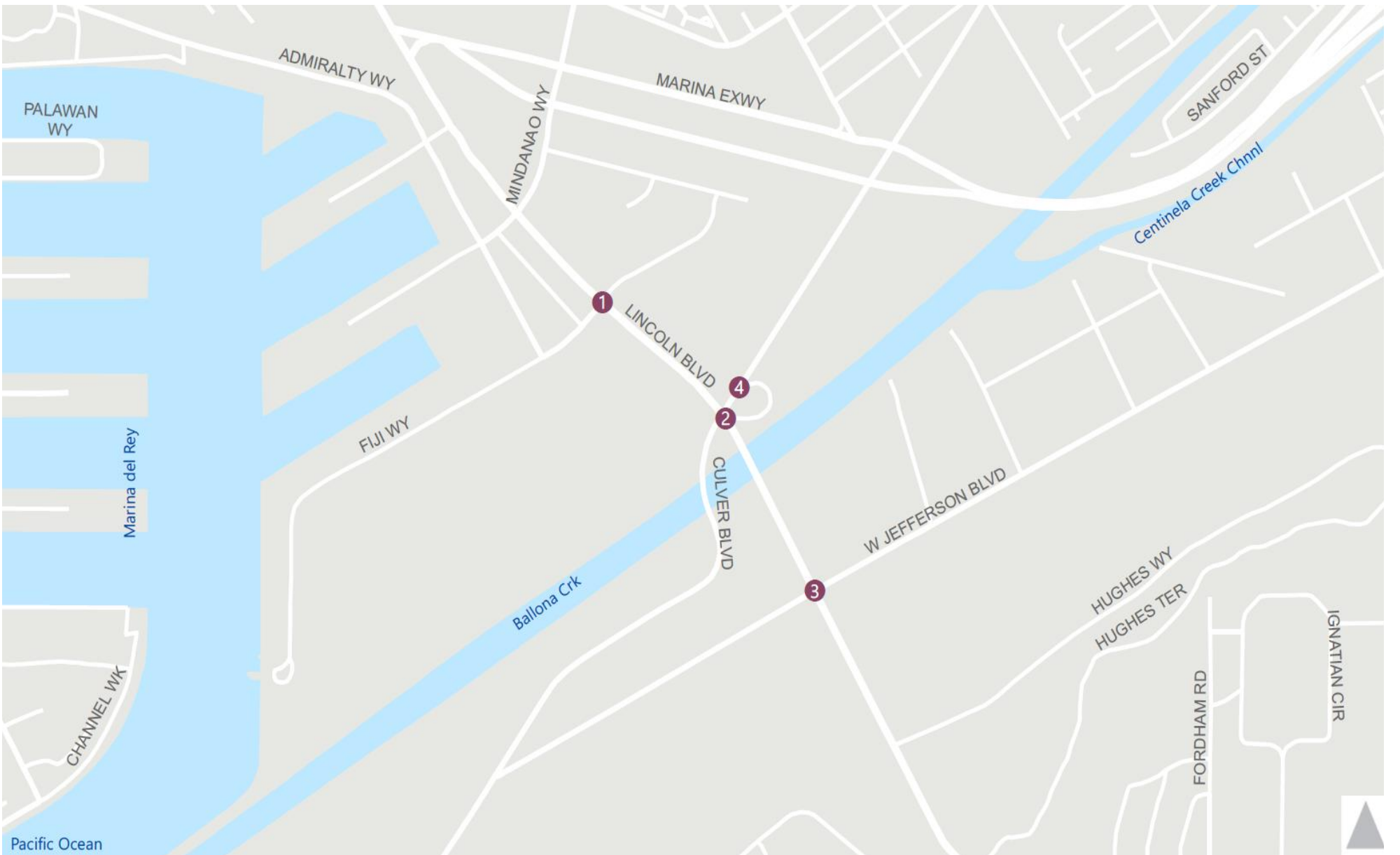


Figure 8

Peak Hour Traffic Volumes and Lane Configurations
Design Year (2045) No Build



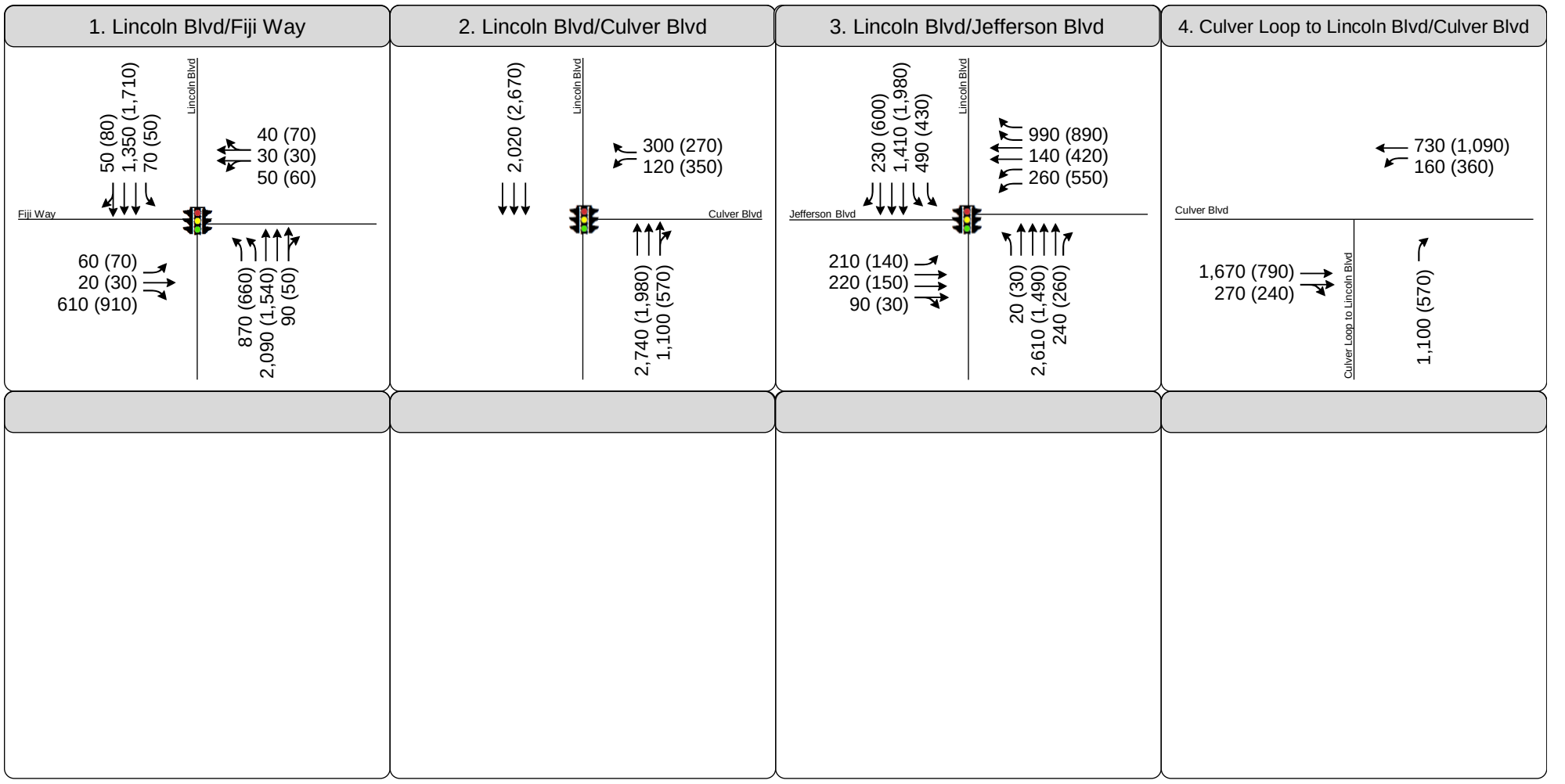
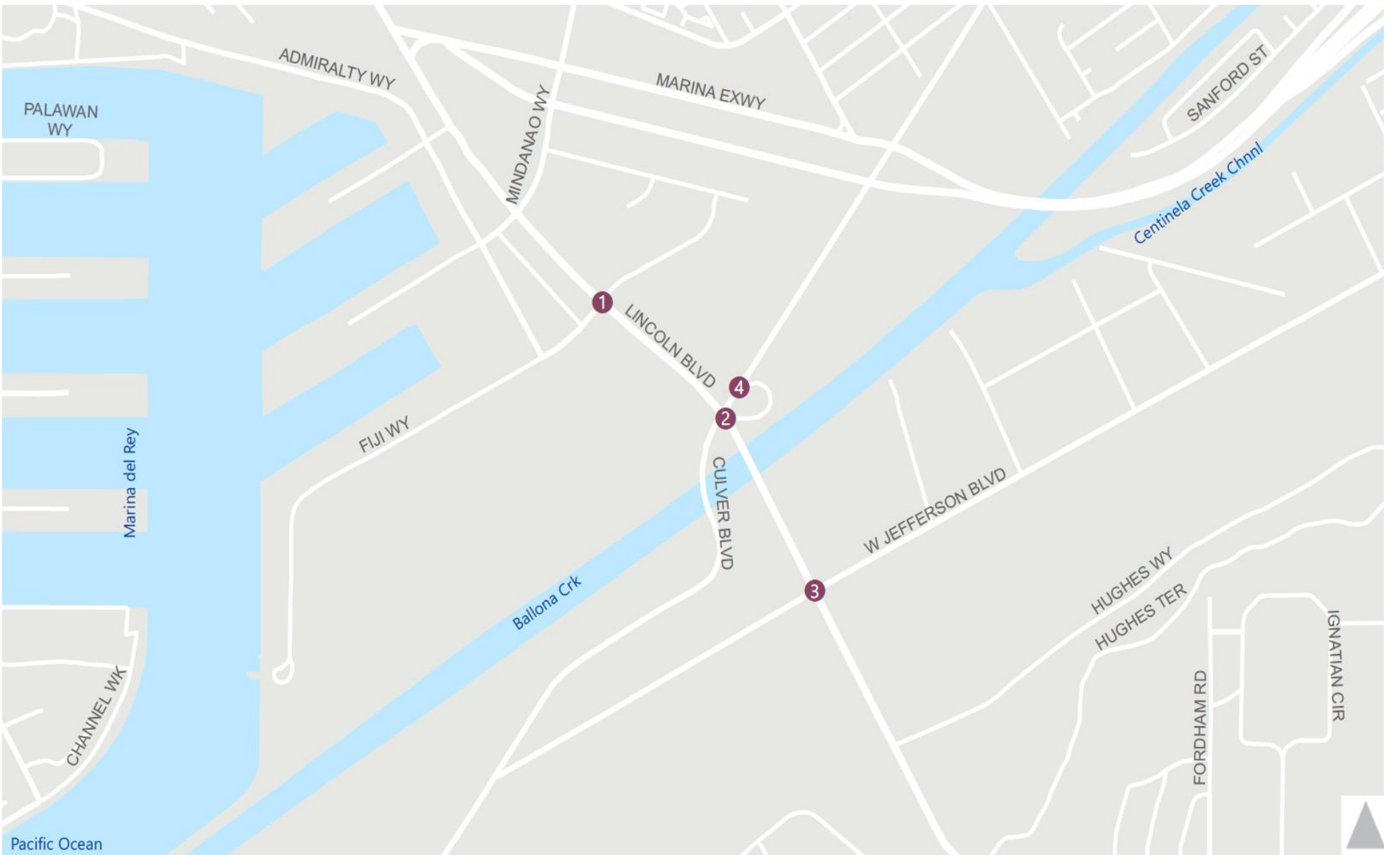


Figure 9

Peak Hour Traffic Volumes and Lane Configurations
Opening Year (2025) With Project



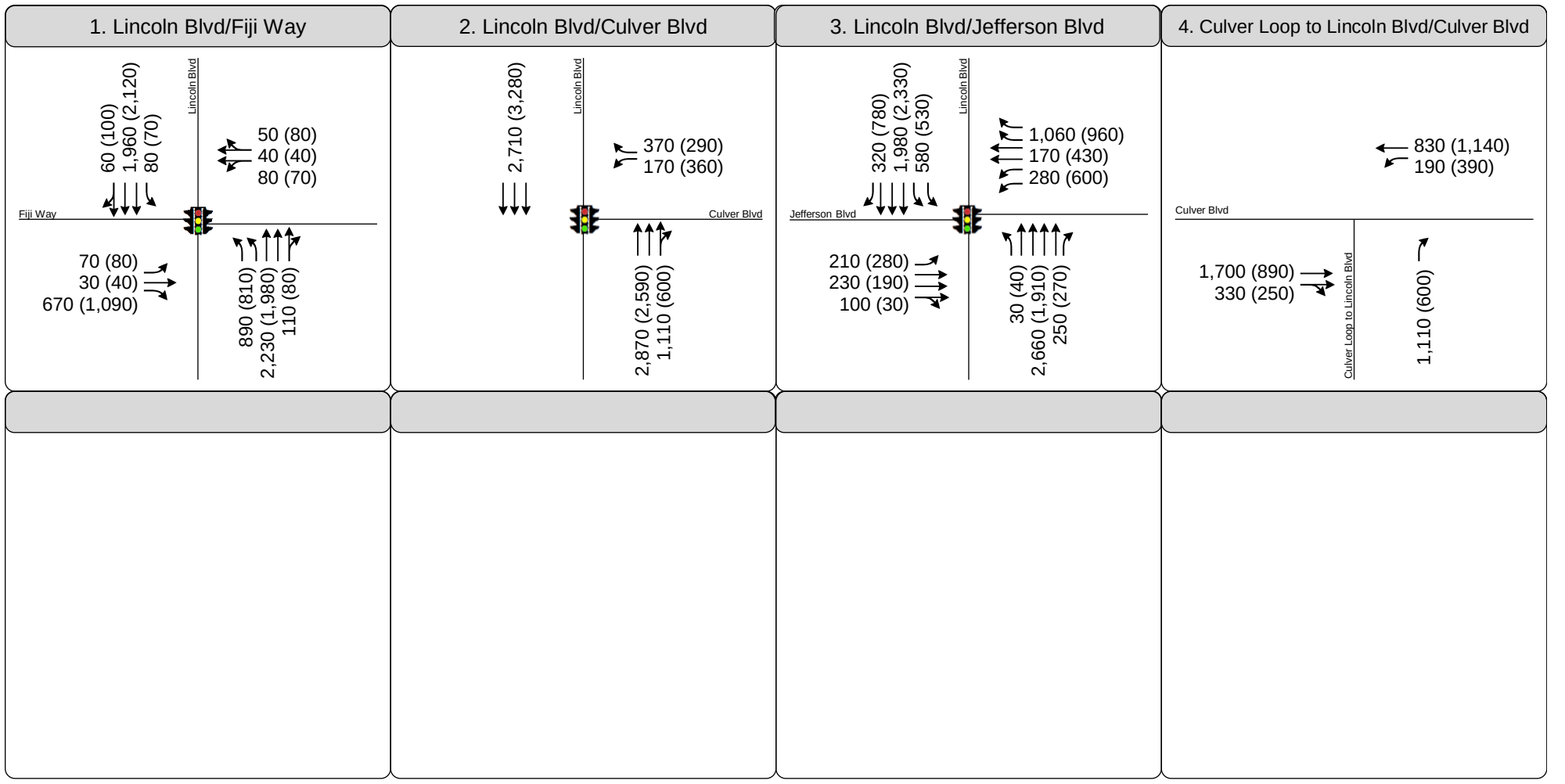


Figure 10

Peak Hour Traffic Volumes and Lane Configurations
Design Year (2045) With Project

5. OPENING YEAR & DESIGN YEAR TRAFFIC OPERATIONS ANALYSIS

This chapter presents the results of the traffic operations analysis for Opening Year (2025) and Design Year (2045) Conditions. The analysis focuses on intersection operations for the No Build and Build scenarios. Technical calculations supporting the results can be found in **Appendices D** through **G**. The Opening Year (2025) analysis is presented first, followed by the Design Year (2045). The analysis was conducted with the methodology described in **Chapter 2**.

FUTURE ROADWAY NETWORK ASSUMPTIONS

NO BUILD ASSUMPTIONS

Under this scenario, Lincoln Boulevard and Culver Boulevard would remain unchanged. The lane configurations along Culver Boulevard and Lincoln Boulevard in the study area are the same as Existing (2019) Conditions. Existing signal timings were used for this analysis. This scenario does not meet the project Purpose and Need. Rather, it provides a basis for the analysis and evaluation of the proposed Project.

Figure 7 and **Figure 8** present the traffic forecasts and study area lane configurations for the No Build scenario.

BUILD ASSUMPTIONS

Under this scenario, vehicle lane configurations would reflect the following changes:

- Between Fiji Way and Jefferson Boulevard, the existing 2-lane segment of southbound Lincoln Boulevard would be widened to 3 travel lanes
- The Lincoln Boulevard southbound approach lane configuration at the Lincoln Boulevard & Jefferson Boulevard intersection would be changed from two left turn lanes, three through lanes and a shared through/right-turn lane to two left turn lanes, three through lanes and a separate right-turn lane (L-L-T-T-T-TR to L-L-T-T-T-R)

Figure 9 and **Figure 10** present the traffic forecasts and study area lane configurations for the Build scenario. Existing signal timings were also used for this analysis.

In addition to these added travel lanes, the project would add a protected bike lane and a new sidewalk in each direction along the Lincoln Bridge and a new bike lane and sidewalk in each direction on the Culver Boulevard overcrossing.

OPENING YEAR (2025) INTERSECTION OPERATIONS

No Build and Build intersection traffic operations were evaluated under AM and PM peak hour conditions using Opening Year (2025) volume forecasts, as shown in **Figure 7** (No Build) and **Figure 9** (Build).

Table 8 presents the LOS results for each of the study intersections. Results worksheets are presented in **Appendix D.** Two of the four intersections operate at LOS C or better under the No Build and Build scenarios (PM peak hour only). The following intersections operate at LOS D, E, or F during one or more of the peak hours analyzed:

1. Lincoln Boulevard & Fiji Way (LOS D during the AM peak hour, No Build and Build)
2. Lincoln Boulevard & Culver Loop to Lincoln Boulevard (LOS E during the AM peak hour, No Build; and LOS D during the AM peak hour, Build)
3. Lincoln Boulevard & Jefferson Boulevard (LOS F during the AM peak hour, No Build and Build. LOS D during the PM peak hour, No Build and Build)

Decreases in delay in the Build scenario, as at the intersection of Lincoln Boulevard & Culver Loop to Lincoln Boulevard, can be attributed to the additional southbound travel lane on Lincoln Boulevard.

TABLE 8: OPENING YEAR (2025) CONDITIONS PEAK HOUR INTERSECTIONS OPERATIONS

	Intersection	No Build				Build			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Lincoln Boulevard & Fiji Way	36.8	**D**	34.2	C	36.5	**D**	34.0	C
2	Lincoln Boulevard & Culver Loop to Lincoln Boulevard[1]	75.7	**E**	33.4	C	53.1	**D**	21.1	C
3	Lincoln Boulevard & Jefferson Boulevard	127.3	**F**	39.8	**D**	110.3	**F**	39.2	**D**
4	Culver Boulevard & Culver Loop to Lincoln Boulevard[2]	<5.0	A	<5.0	A	<5.0	A	<5.0	A

Source: Fehr & Peers, 2020.
[1]Signal timing modified for the WBR movement to enable HCM2010 analysis
[2]Unsignalized intersection – LOS calculated using HCM 2010, as a Two-Way Stop control.
Bold indicates intersection operating at LOS D or worse.

OPENING YEAR (2025) QUEUE ANALYSIS

Table 9 shows the 95th percentile queue lengths for critical turning movements at each of the four intersections in the study area. Queue lengths exceed storage capacities at the following approaches:

- Lincoln Boulevard & Fiji Way – NBL (AM peak hour, No Build and Build. PM peak hour, No Build and Build)
- Lincoln Boulevard & Culver Loop to Lincoln Boulevard – WBR (AM and PM peak hours, No Build and Build. PM peak hour, No Build and Build)
- Lincoln Boulevard & Culver Loop to Lincoln Boulevard – WBL (PM peak hour, No Build and Build)
- Lincoln Boulevard & Jefferson Boulevard – SBL (AM and PM peak hours, No Build and Build)
- Lincoln Boulevard & Jefferson Boulevard – SBR (PM peak hour, Build only)
- Lincoln Boulevard & Jefferson Boulevard – WBR (AM peak hour, No Build and Build)
- Lincoln Boulevard & Jefferson Boulevard – EBL (AM and PM peak hours, No Build and Build)

Queue analysis calculations are presented in **Appendix E**.

TABLE 9: OPENING YEAR (2025) CONDITIONS PEAK HOUR 95TH PERCENTILE QUEUES

Intersection		Movement	Storage Length (ft)	95th Percentile Queue (ft)			
				No Build		Build	
				AM	PM	AM	PM
1	Lincoln Boulevard & Fiji Way	NBL	330	**#525**	**350**	**#525**	**350**
		SBL	215	125	100	125	100
		EBL	175	100	100	100	100
		EBR[3]	--	**--**	**--**	**--**	**--**
2	Lincoln Boulevard & Culver Loop to Lincoln Boulevard	WBR	310	**#500**[1]	**325**[1]	**475**[1]	**350**[1]
		WBL	310	175	**#500**	175	**#500**
3	Lincoln Boulevard & Jefferson Boulevard	NBL	200	75	75	50	75
		NBR	210	100	50	75	50
		SBL	250	**m#425**	**m250**	**#400**	**m#325**
		SBR	125	-	-	150	**m375**
		WBL	440	200	325	175	325
		WBR	440	**#725**	300	**#625**	300
		EBL	200	**#375**	**225**	**#300**	**225**
4	Culver Boulevard & Culver Loop to Lincoln Boulevard	WBL	250	75[2]	75[2]	75[2]	75[2]

Source: Fehr & Peers, 2020.
Notes: Queue lengths have been rounded to the next 25 feet.
[1]This movement has both a protected and permissive right turn, but only the permissive portion was analyzed due to custom phasing.
[2]Queue length calculated based on HCM 2010 LOS analysis and an average vehicle length of 25 feet.
[3]This movement has a dedicated right-turn lane, with a Yield control, and merges with SB Lincoln Boulevard downstream.
Bold indicates that 95th percentile queue length exceeds available storage.
# indicates that 95th percentile volume exceeds capacity, queue may be longer.
m indicates volume for 95th percentile queue is metered by upstream signal.

DESIGN YEAR (2045) INTERSECTION OPERATIONS

No Build and Build intersection traffic operations were evaluated under AM and PM peak hour conditions using Design Year (2045) volume forecasts shown in **Figure 8** (No Build) and **Figure 10** (Build).

Table 10 presents the LOS results for each of the study intersections. Results worksheets are presented in **Appendix F.** One of the four intersections is estimated to operate at LOS C or better during both the AM and PM peak hour under No Build and Build scenarios. The following intersections are estimated to operate at LOS D, E, or F during one or more peak hour:

1. Lincoln Boulevard & Fiji Way (LOS D during the AM and PM peak hours, No Build and Build.)

2. Lincoln Boulevard & Culver Loop to Lincoln Boulevard (LOS F during the AM peak hour, No Build, and LOS D during the PM peak hour, No Build, and LOS E during the AM Peak, Build)
3. Lincoln Boulevard & Jefferson Boulevard (LOS F during the AM peak hour, No Build and Build, and LOS D during the PM Peak hour, No Build and Build)

Decreases in delay in the Build scenario, as at the intersection of Lincoln Boulevard & Culver Loop to Lincoln Boulevard, can be attributed to the additional southbound travel lane on Lincoln Boulevard in the Build scenario. The intersection of Lincoln Boulevard & Culver Loop to Lincoln Boulevard is estimated to operate at LOS F and D during the AM and PM peak hours under No Build conditions, but improves to LOS E and C during the AM and PM peak hours under Build conditions.

TABLE 10: DESIGN YEAR (2045) CONDITIONS PEAK HOUR INTERSECTION OPERATIONS

	Intersection	No Build				Build			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Lincoln Boulevard & Fiji Way	40.2	**D**	37.4	**D**	41.0	**D**	40.0	**D**
2	Lincoln Boulevard & Culver Loop to Lincoln Boulevard[1]	113.0	**F**	47.7	**D**	70.4	**E**	29.1	C
3	Lincoln Boulevard & Jefferson Boulevard	125.7	**F**	54.3	**D**	107.1	**F**	54.0	**D**
4	Culver Boulevard & Culver Loop to Lincoln Boulevard[2]	<5.0	A	<5.0	A	5.6	A	<5.0	A

Source: Fehr & Peers, 2020.
[1]Signal timing modified for the WBR movement to enable HCM2010 analysis
[2]Unsignalized intersection – LOS calculated using HCM 2010, as a Two-Way Stop control
Bold indicates intersection operating at LOS D or worse.
Underline indicates LOS worsens under Build Conditions.

DESIGN YEAR (2045) QUEUE ANALYSIS

Table 11 shows the 95th percentile queue for critical turning movements at each of the four intersections in the study area. Queue lengths are estimated to exceed storage capacities at the following approaches:

- Lincoln Boulevard & Fiji Way – NBL (AM and PM peak hours, No Build and Build)
- Lincoln Boulevard & Culver Loop to Lincoln Boulevard – WBR (AM and PM peak hours, No Build and Build)
- Lincoln Boulevard & Culver Loop to Lincoln Boulevard – WBL (PM peak hour, No Build and Build)
- Lincoln Boulevard & Jefferson Boulevard – SBL (AM and PM peak hours, No Build and Build)
- Lincoln Boulevard & Jefferson Boulevard – SBR (AM and PM peak hours, Build only)
- Lincoln Boulevard & Jefferson Boulevard – WBR (AM and PM peak hours, No Build and Build)
- Lincoln Boulevard & Jefferson Boulevard – EBL (AM and PM peak hours, No Build and Build)

Queue analysis calculations are presented in **Appendix G**.

TABLE 11: DESIGN YEAR (2045) CONDITIONS PEAK HOUR 95TH PERCENTILE QUEUES

Intersection		Movement	Storage Length (ft)	95th Percentile Queue (ft)			
				No Build		Build	
				AM	PM	AM	PM
1	Lincoln Boulevard & Fiji Way	NBL	330	**#525**	**m#475**	**m#525**	**#450**
		SBL	215	125	125	125	125
		EBL	175	100	125	100	125
		EBR[3]	--	**--**	**--**	**--**	**--**
2	Lincoln Boulevard & Culver Loop to Lincoln Boulevard	WBR	310	**600**[1]	**375**[1]	**#600**[1]	**375**
		WBL	310	200	**#525**	225	**#525**
3	Lincoln Boulevard & Jefferson Boulevard	NBL	200	75	100	75	100
		NBR	210	100	75	100	75
		SBL	250	**m#350**	**m#300**	**#500**	**m#375**
		SBR	125	-	-	**m225**	**m#700**
		WBL	440	200	350	200	350
		WBR	440	**#775**	**#475**	**#675**	**#450**
		EBL	200	**#400**	**#475**	**300**	**#475**
4	Culver Boulevard & Culver Loop to Lincoln Boulevard	WBL	250	75[2]	75[2]	100[2]	100[2]

Source: Fehr & Peers, 2020.
Notes: Queue lengths have been rounded to the next 25 feet.
[1]Movement has both a protected & permissive right turn, but only the permissive portion was analyzed due to custom phasing.
[2]Queue length calculated based on HCM 2010 LOS analysis and an average vehicle length of 25 feet.
[3]This movement has a dedicated right-turn lane, with a Yield control, and merges with SB Lincoln Boulevard downstream.
Bold indicates that 95th percentile queue length exceeds available storage.
# indicates that 95th percentile volume exceeds capacity, queue may be longer.
m indicates volume for 95th percentile queue is metered by upstream signal.
Underline indicates queue worsens under Build Conditions.

6. VMT ANALYSIS

An estimate of daily vehicle miles traveled (VMT) related to a project is an important input into the greenhouse gas and air quality sections of an environmental impact report. This section summarizes the methodology for estimating daily VMT and presents the results from the City of Los Angeles Travel Demand Model.

The Los Angeles Travel Demand Model was used to estimate VMT by isolating all roadway segments within a 1.5-mile radius of the Lincoln Bridge. The number of vehicles on each roadway segment was multiplied by the segment length within this boundary using the 2040 model, under both No Build and Build Conditions. Straight line growth rates were developed between the 2016 base year model and the 2040 model results, and then applied to 2040 VMT results to determine estimates for Opening Year (2025) and Design Year (2045) Conditions. **Table 12** summarizes the results of this analysis, comparing VMT estimates for No Build and Build Conditions. The VMT results for Build Conditions reflects the additional southbound lane on Lincoln Boulevard.

As a result of the Project, VMT in the study area is estimated to decrease by approximately 0.9% compared to No Build conditions in 2025, and by 4.1% in 2045. The decrease in VMT is due to the elimination of the existing southbound bottleneck on the bridge, which results in vehicles using alternate routes that, while time efficient, require traveling a greater distance. The 1.5-mile radius used for this analysis includes alternative routes across Ballona Creek, including SR-90 and Centinela Avenue, both east of the Project. VMT reductions as a result of the Project can therefore be attributed to the Project's addition of southbound capacity, providing a more direct route for many trips.

TABLE 12: VEHICLE MILES TRAVELED (VMT)

Year	No Build	Build	Difference	Percent Difference
Opening Year (2025)	615,554	610,131	-5,423	-0.9%
Design Year (2045)	683,464	655,807	-27,657	-4.1%

Source: Fehr & Peers, 2020.

7. BICYCLE AND PEDESTRIAN ANALYSIS

Although Lincoln Boulevard serves as a critical north-south connection on the Westside, existing pedestrian facilities are discontinuous north and south of the bridge with no sidewalks provided on the bridge. Lincoln Boulevard also lacks bicycle facilities across the bridge despite its connection to the east-west Ballona Creek Bicycle Path that runs just under the Lincoln Bridge parallel to Ballona Creek. This lack of connectivity and protection along a high volume, high speed road not only discourages active transportation, but also raises safety concerns for bicyclists and pedestrians attempting to access nearby facilities and destinations.

The proposed Project would improve connectivity and accessibility to the coastal areas of the Westside for all modes of travel. The improvements on the Lincoln Bridge include widening the bridge to accommodate protected bicycle lanes, and sidewalks on both sides. These bicycle and pedestrian improvements will extend between Jefferson Boulevard and Fiji Way. Adding a separated bicycle lane along this segment will create a complete bicycle network, on which cyclists safely and conveniently can travel to and through the area.

Class IV protected bicycle lanes on Lincoln Boulevard will provide a connection to the Ballona Creek Bicycle Path as well as existing bicycle facilities south of Jefferson Boulevard and on Fiji Way. Additionally, the proposed improvements will better connect cyclists and pedestrians to the retail and residential developments south of Ballona Creek in Playa Vista off of Jefferson Boulevard. Nearby educational institutions, such as the Westside Neighborhood School, Playa Vista Elementary School, Loyola Marymount University, and Playa Vista Public Library, will be more accessible via active transportation modes.

With average daily traffic exceeding 60,000 vehicles and a speed limit of 45 miles per hour, industry standards recommend separated bicycle lanes. (National Association of City Transportation Officials). Studies have found that separated bicycle lanes increase cycling and reduce vehicle traffic (Federal Highway Administration, May 2015). Furthermore, separated bicycle lanes are more feasible along routes without parking on the shoulder, few transit stops and limited intersections, all of which are characteristics of this segment of Lincoln Boulevard (California Department of Transportation, December 2015).

Demand for bicycle and pedestrian facilities was noted during traffic counts. The project team counted 80 cyclists and 81 pedestrians in the AM peak hour within the study area. During the PM peak hour, the project team counted 36 cyclists and 66 pedestrians. The proposed separated bicycle facility and sidewalks will promote the safety of current as well as future cyclists and pedestrians. As discussed in the Collision History Data section, four out of 18 collisions between July 2012 and June 2015 involved bicyclists and pedestrians. Additionally, five of the 18 collisions were primarily due to speeding. Physical separation from fast-moving vehicular traffic is beneficial to decrease the risk for bicyclists and pedestrians traveling along the Lincoln Bridge.

8. TRAFFIC ANALYSIS SUMMARY

This section summarizes the results of the Opening Year (2025) and Design Year (2045) AM and PM peak hour traffic analysis results for the Lincoln Bridge Multi-Modal Improvement Project. The Build scenarios are compared to the No Build scenarios.

INTERSECTION OPERATIONS

Opening Year (2025) and Design Year (2045) peak hour intersection operations are summarized in **Table 8** and **Table 10,** respectively. In the Opening Year (2025) scenario, three of the four study intersections are expected to operate at LOS D, E, or F in both No Build and Build scenarios. However, two of the four intersections are expected to operate as LOS C during the PM peak hour, under the No Build and Build scenarios. In the Design Year (2045) scenario, three of the four intersections are expected to operate at LOS D, E, or F in both No Build and Build scenarios. In the Design Year, the intersection of Lincoln Boulevard & Fiji Way is estimated to operate at LOS D during the AM and PM peak hours, under No Build and Build conditions, with minor increases in average delay in the Build scenario due to induced demand for the additional capacity available on Lincoln Boulevard downstream of the intersection. Also, in the Design Year AM and PM peak hours, the intersection of Lincoln Boulevard & Culver Loop to Lincoln Boulevard is expected to operate at LOS F and LOS D under No Build conditions, respectively, and improve to LOS C in the PM peak hour under Build conditions.

QUEUE ANALYSIS

Opening Year (2025) and Design Year (2045) peak hour 95th percentile queue analysis results are summarized in **Table 9** and **Table 11,** respectively. In the Opening Year (2025) scenario, peak hour queues are estimated to exceed available storage at five of thirteen turn lanes during the AM peak hour and at six of thirteen turn lanes during the PM peak hour under Build conditions, including the added southbound right-turn lane at Lincoln Boulevard & Jefferson Boulevard in the PM peak hour. In the Design Year (2045) scenario, peak hour queues are estimated to exceed available storage at six of thirteen turn lanes during the AM peak hour and at seven of thirteen turn lanes during the PM peak hour under Build conditions, including the added southbound right-turn at Lincoln Boulevard & Jefferson Boulevard in both AM and PM peak hours.

BICYCLE AND PEDESTRIAN ANALYSIS

With the multi-modal improvements along the Lincoln Bridge, it is expected that bicycle and pedestrian convenience and safety will be improved. The protected bicycle lanes will create a more robust bicycle network in the area that improves the surrounding communities' connectivity to Ballona Creek Bicycle Path and other nearby retail, residential, and academic destinations. The safety risks of cyclists and pedestrians are expected to decrease as exposure to high volume and fast-moving vehicular traffic is minimized due to separated facilities along Lincoln Bridge.

REFERENCES

2000 Highway Capacity Manual, Transportation Research Board, 2000.

2010 Highway Capacity Manual, Transportation Research Board, 2010.

Active Transportation Strategic Plan, Los Angeles County Metropolitan Transportation Authority (Metro), 2016.

Evaluation of Bicycle-related Roadway Measures: A Summary of Available Research, Federal Highway Administration, February 2014.

Mobility Plan 2035, An Element of the General Plan, City of Los Angeles, 2016.

Model Development Report: 2016 City of Los Angeles Travel Demand Model, Fehr & Peers, February 2017.

National Cooperative Highway Research Program (NCHRP) Report 255: Highway Traffic Data for Urbanized Area Project Planning and Design, Transportation Research Board, December 1982.

Separated Bike Lane Planning and Design Guide, Federal Highway Administration, May 2015.

Urban Bikeway Design Guide: Conventional Bike Lanes, National Association of City Transportation Officials, accessed November 2017: https://nacto.org/publication/urban-bikeway-design-guide/bike-lanes/conventional-bike-lanes/

APPENDIX A – TURNING MOVEMENT VEHICLE COUNTS

Prepared by National Data & Surveying Services

Lincoln Blvd/Pacific Coast Hwy & Fiji Way

Peak Hour Turning Movement Count

ID: 19-05673-001
City: Marina Del Rey

Day: Tuesday
Date: 11/19/2019

PEAK HOURS

AM	08:00 AM - 09:00 AM
NOON	NONE
PM	04:45 PM - 05:45 PM

COUNT PERIODS

AM	07:00 AM - 10:00 AM
NOON	NONE
PM	03:00 PM - 06:00 PM

Lincoln Blvd/Pacific Coast Hwy — SOUTHBOUND

AM	46	1179	34	24	2152	AM
NOON	0	0	0	0	0	NOON
PM	72	1577	23	18	1541	PM

Fiji Way — EASTBOUND

AM	NOON	PM	
925	0	705	
0	0	2	0
58	0	65	1
17	0	17	1
596	0	849	1
AM	NOON	PM	

CONTROL

Signalized

TEV	5014	0	4791
	AM	NOON	PM
PHF	0.97		0.97

WESTBOUND — Fiji Way

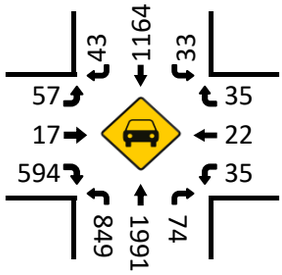
PM	NOON	AM	
67	0	36	0
23	0	22	2
47	0	35	0
0	0	0	0
72	0	127	
PM	NOON	AM	

Lincoln Blvd/Pacific Coast Hwy — NORTHBOUND

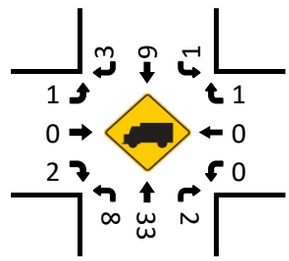
PM	2473	0	608	1391	32	PM
NOON	0	0	0	0	0	NOON
AM	1810	0	857	2034	76	AM

0 3 1 0 (EB turning movements)
0 2 3 0 (NB turning movements)
0 2 0 0 (WB turning movements)

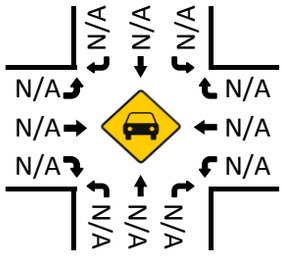
Cars (AM)



HT (AM)



Cars (NOON)



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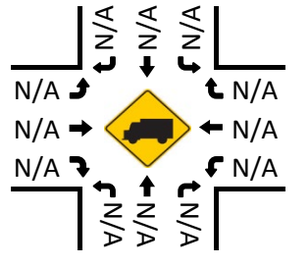
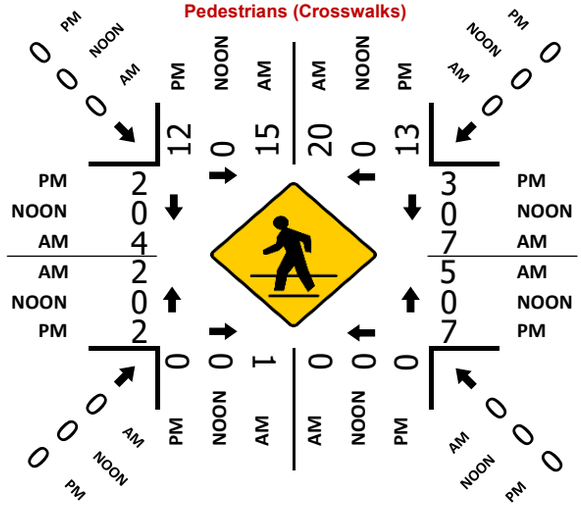
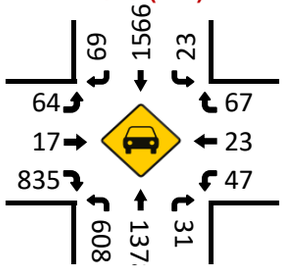


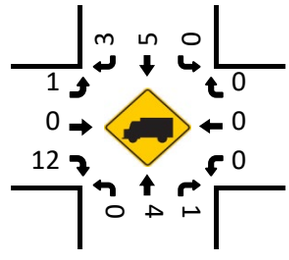
Pedestrians (Crosswalks)



Cars (PM)



HT (PM)



Prepared by National Data & Surveying Services

Lincoln Blvd/Pacific Coast Hwy & Culver Blvd

Peak Hour Turning Movement Count

ID: 19-05673-002
City: Marina Del Rey

Day: Tuesday
Date: 11/19/2019

PEAK HOURS

AM: 07:45 AM - 08:45 AM
NOON: NONE
PM: 05:00 PM - 06:00 PM

COUNT PERIODS

AM: 07:00 AM - 10:00 AM
NOON: NONE
PM: 03:00 PM - 06:00 PM

Lincoln Blvd/Pacific Coast Hwy — SOUTHBOUND

AM	0	1791	0	0	3004	AM
NOON	0	0	0	0	0	NOON
PM	0	2456	0	0	2053	PM
	0	2	0	0		

Culver Blvd — EASTBOUND

AM	NOON	PM	
0	0	0	
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
AM	NOON	PM	

CONTROL

Signalized

TEV	5976	0	5400
	AM	NOON	PM
PHF	0.92		0.98

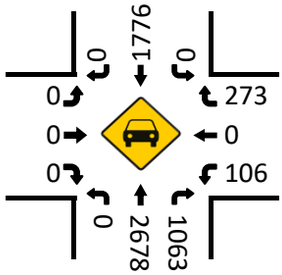
Culver Blvd — WESTBOUND

	PM	NOON	AM
2	236	0	276
0	0	0	0
0	339	0	107
0	0	0	0
	552	0	1074
	PM	NOON	AM

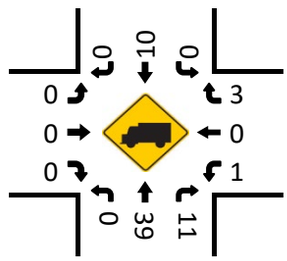
Lincoln Blvd/Pacific Coast Hwy — NORTHBOUND

PM	2795	0	0	1817	552	PM
NOON	0	0	0	0	0	NOON
AM	1898	0	0	2728	1074	AM
		0	0	2.5	0.5	

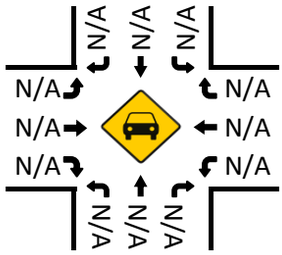
Cars (AM)



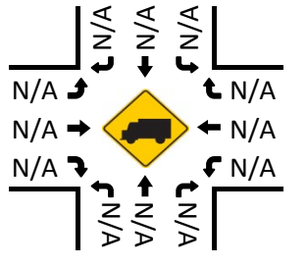
HT (AM)



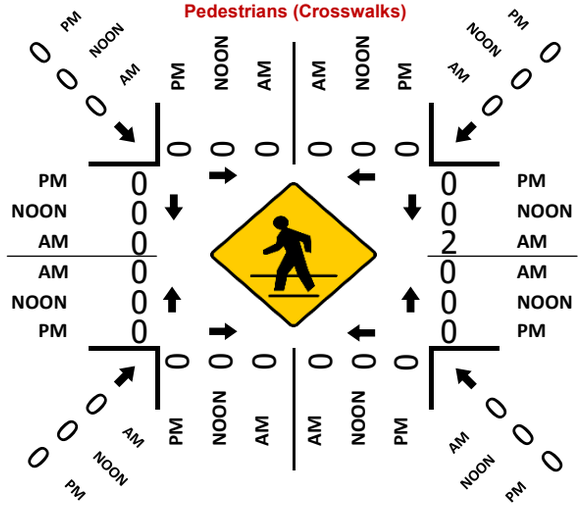
Cars (NOON)



HT (NOON)



Pedestrians (Crosswalks)


PM
NOON
AM
0
0
0

Prepared by National Data & Surveying Services

Lincoln Blvd/Pacific Coast Hwy & W Jefferson Blvd

Peak Hour Turning Movement Count

ID: 19-05673-003
City: Playa Vista

Day: Tuesday
Date: 11/19/2019

PEAK HOURS

AM: 07:45 AM - 08:45 AM
NOON: NONE
PM: 05:00 PM - 06:00 PM

COUNT PERIODS

AM: 07:00 AM - 10:00 AM
NOON: NONE
PM: 03:00 PM - 06:00 PM

Lincoln Blvd/Pacific Coast Hwy — SOUTHBOUND

AM	202	1209	458	0	3764	AM
NOON	0	0	0	0	0	NOON
PM	540	1841	399	0	2319	PM
	0	4	2	0		

W Jefferson Blvd — EASTBOUND

AM	NOON	PM	
345	0	969	
0	0	0	0
210	0	89	1
211	0	138	3
89	0	30	0
AM	NOON	PM	

W Jefferson Blvd — WESTBOUND

PM	NOON	AM	
867	0	968	2
411	0	129	2
533	0	244	2
0	0	0	0
788	0	896	
PM	NOON	AM	

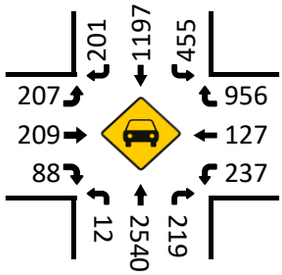
CONTROL: Signalized

TEV	6550	0	6482
	AM	NOON	PM
PHF	0.93		0.97

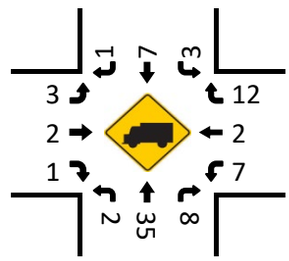
Lincoln Blvd/Pacific Coast Hwy — NORTHBOUND

PM	2406	2	18	1363	251	PM
NOON	0	0	0	0	0	NOON
AM	1545	3	14	2586	227	AM
		0	1	4	1	

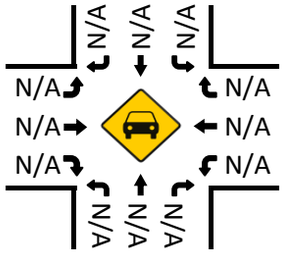
Cars (AM)



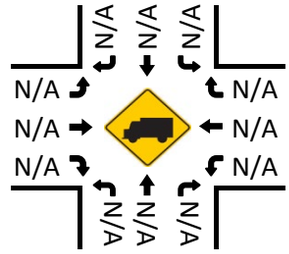
HT (AM)



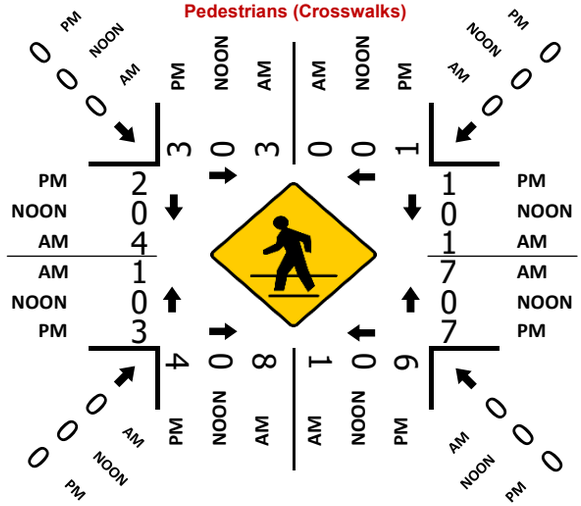
Cars (NOON)



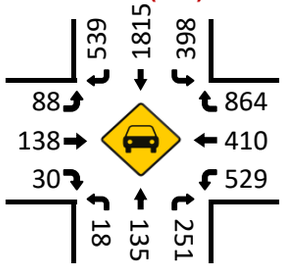
HT (NOON)



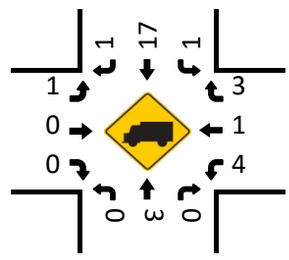
Pedestrians (Crosswalks)



Cars (PM)



HT (PM)



Prepared by National Data & Surveying Services

Culver Loop to Lincoln Blvd & Culver Blvd

Peak Hour Turning Movement Count

ID: 19-05673-004
City: Playa Vista

Day: Tuesday
Date: 11/19/2019

PEAK HOURS

AM: 07:45 AM - 08:45 AM
NOON: NONE
PM: 05:00 PM - 06:00 PM

COUNT PERIODS

AM: 07:00 AM - 10:00 AM
NOON: NONE
PM: 03:00 PM - 06:00 PM

SOUTHBOUND — Culver Loop to Lincoln Blvd

AM	0	0	0	0	0	AM
NOON	0	0	0	0	0	NOON
PM	0	0	0	0	0	PM

EASTBOUND — Culver Blvd

AM	NOON	PM	
695	0	1068	⇦
0	0	0	0 ↶
0	0	0	0 ↱
1661	0	762	1.5 →
251	0	230	0.5 ↴
AM	NOON	PM	

WESTBOUND — Culver Blvd

PM	NOON	AM	
0	0	0	0 ↶
1068	0	695	1 ←
353	0	143	1 ↰
0	0	0	0 ↩
1318	0	2750	⇨
PM	NOON	AM	

CONTROL: No Control

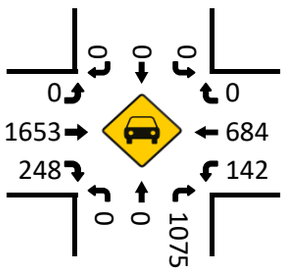
TEV	3839	0	2969
	AM	NOON	PM
PHF	0.94		0.96

NORTHBOUND — Culver Loop to Lincoln Blvd

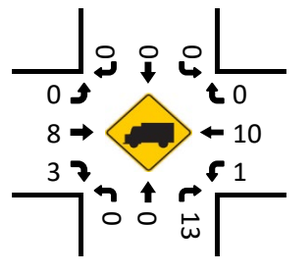
PM	583	0	0	0	556	PM
NOON	0	0	0	0	0	NOON
AM	394	0	0	0	1089	AM

Turning movements at the intersection: 0 0 0 0 | 0 0 0 1

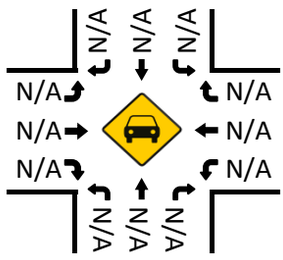
Cars (AM)



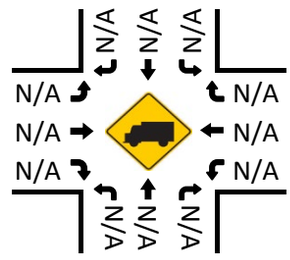
HT (AM)



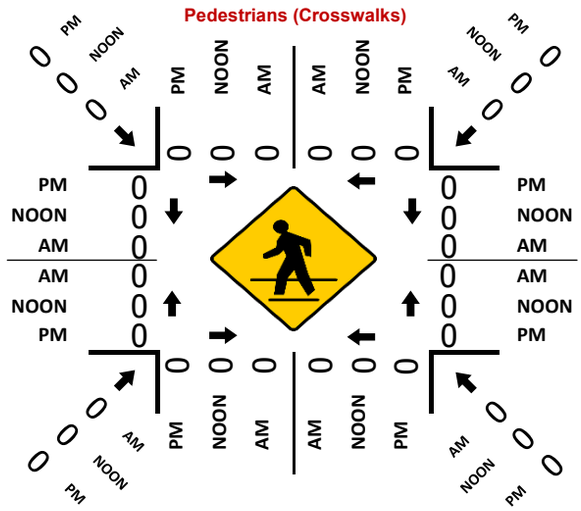
Cars (NOON)



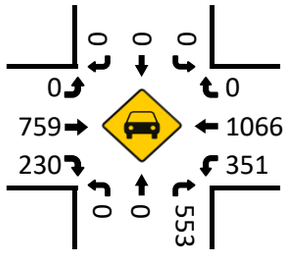
HT (NOON)



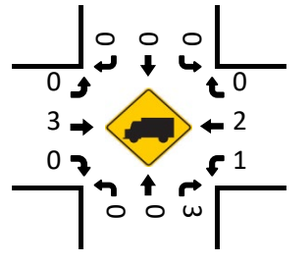
Pedestrians (Crosswalks)



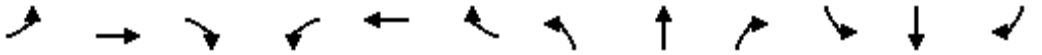
Cars (PM)



HT (PM)



APPENDIX B – EXISTING INTERSECTION LEVEL OF SERVICE (LOS) CALCULATION SHEETS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	58	17	590	34	22	36	857	2034	76	58	1167	46
Future Volume (veh/h)	58	17	590	34	22	36	857	2034	76	58	1167	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)	0.97		1.00	0.97		0.94	1.00		0.98	1.00		0.98
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	1827	1681	1900	1900	1820	1900	1863	1864	1900	1845	1878	1900
Adj Flow Rate, veh/h	60	18	0	35	23	8	884	2097	75	60	1203	45
Adj No. of Lanes	1	1	1	0	2	0	2	3	0	1	3	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	4	13	0	0	0	0	2	2	2	3	1	1
Cap, veh/h	196	210	202	201	149	53	935	2617	93	409	2475	93
Arrive On Green	0.12	0.12	0.00	0.12	0.12	0.12	0.27	0.52	0.52	0.23	0.49	0.49
Sat Flow, veh/h	1306	1681	1615	1175	1193	422	3442	5040	180	1757	5070	190
Grp Volume(v), veh/h	60	18	0	37	0	29	884	1409	763	60	811	437
Grp Sat Flow(s),veh/h/ln	1306	1681	1615	1240	0	1550	1721	1696	1827	1757	1709	1841
Q Serve(g_s), s	5.6	1.2	0.0	3.1	0.0	2.2	32.7	44.4	44.8	3.5	20.7	20.7
Cycle Q Clear(g_c), s	7.8	1.2	0.0	4.4	0.0	2.2	32.7	44.4	44.8	3.5	20.7	20.7
Prop In Lane	1.00		1.00	0.96		0.27	1.00		0.10	1.00		0.10
Lane Grp Cap(c), veh/h	196	210	202	209	0	193	935	1761	949	409	1669	899
V/C Ratio(X)	0.31	0.09	0.00	0.18	0.00	0.15	0.95	0.80	0.80	0.15	0.49	0.49
Avail Cap(c_a), veh/h	305	349	335	319	0	322	953	1827	984	409	1669	899
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.2	50.3	0.0	52.2	0.0	50.8	46.4	25.7	25.8	39.6	22.3	22.3
Incr Delay (d2), s/veh	0.3	0.1	0.0	0.4	0.0	0.4	17.4	3.9	7.2	0.2	1.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.6	0.0	1.2	0.0	1.0	17.9	21.7	24.4	1.7	10.0	11.0
LnGrp Delay(d),s/veh	54.5	50.4	0.0	52.6	0.0	51.1	63.8	29.6	33.0	39.8	23.3	24.2
LnGrp LOS	D	D		D		D	E	C	C	D	C	C
Approach Vol, veh/h		78			66			3056			1308	
Approach Delay, s/veh		53.6			51.9			40.4			24.4	
Approach LOS		D			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	35.3	72.5		22.2	39.3	68.5		22.2
Change Period (Y+Rc), s	* 5	* 5		6.0	4.0	* 5		6.0
Max Green Setting (Gmax), s	* 18	* 70		27.0	36.0	* 52		27.0
Max Q Clear Time (g_c+I1), s	5.5	46.8		9.8	34.7	22.7		6.4
Green Ext Time (p_c), s	0.1	20.7		0.0	0.6	15.1		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	36.1
HCM 2010 LOS	D

Notes

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	107	276	2691	1089	0	1791
Future Volume (veh/h)	107	276	2691	1089	0	1791
Number	7	14	6	16	5	2
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1881	1900	0	1881
Adj Flow Rate, veh/h	116	300	2925	1184	0	1947
Adj No. of Lanes	1	1	3	0	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	1	1	1	0	1
Cap, veh/h	366	324	2711	952	0	2600
Arrive On Green	0.20	0.20	0.73	0.73	0.00	0.73
Sat Flow, veh/h	1810	1599	3895	1309	0	3762
Grp Volume(v), veh/h	116	300	2652	1457	0	1947
Grp Sat Flow(s),veh/h/ln	1810	1599	1712	1611	0	1787
Q Serve(g_s), s	8.2	27.6	109.1	109.1	0.0	48.9
Cycle Q Clear(g_c), s	8.2	27.6	109.1	109.1	0.0	48.9
Prop In Lane	1.00	1.00		0.81	0.00	
Lane Grp Cap(c), veh/h	366	324	2491	1172	0	2600
V/C Ratio(X)	0.32	0.93	1.06	1.24	0.00	0.75
Avail Cap(c_a), veh/h	426	376	2491	1172	0	2600
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	51.0	58.7	20.4	20.4	0.0	12.2
Incr Delay (d2), s/veh	0.5	26.6	38.1	116.9	0.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	14.6	64.1	85.9	0.0	24.5
LnGrp Delay(d),s/veh	51.5	85.3	58.6	137.3	0.0	14.3
LnGrp LOS	D	F	F	F		B
Approach Vol, veh/h	416		4109			1947
Approach Delay, s/veh	75.9		86.5			14.3
Approach LOS	E		F			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		114.9		35.1		114.9		
Change Period (Y+Rc), s		5.8		* 4.7		5.8		
Max Green Setting (Gmax), s		104.2		* 35		104.2		
Max Q Clear Time (g_c+I1), s		50.9		29.6		111.1		
Green Ext Time (p_c), s		30.9		0.7		0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	64.1
HCM 2010 LOS	E

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	210	211	89	244	129	976	17	2594	227	465	1228	205
Future Volume (veh/h)	210	211	89	244	129	976	17	2594	227	465	1228	205
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		0.98	1.00		1.00	1.00		0.98	1.00		0.99
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	1881	1887	1900	1881	1900	1881	1900	1881	1863	1863	1881	1900
Adj Flow Rate, veh/h	226	227	51	262	139	939	18	2789	190	500	1320	207
Adj No. of Lanes	1	3	0	2	2	2	1	4	1	2	4	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, %	1	1	1	1	0	1	0	1	2	2	1	1
Cap, veh/h	249	333	71	639	478	1173	32	1898	749	978	3232	505
Arrive On Green	0.14	0.08	0.08	0.18	0.13	0.13	0.02	0.29	0.29	0.28	0.57	0.57
Sat Flow, veh/h	1792	4238	904	3476	3610	2814	1810	6471	1560	3442	5676	887
Grp Volume(v), veh/h	226	182	96	262	139	939	18	2789	190	500	1128	399
Grp Sat Flow(s),veh/h/ln	1792	1717	1708	1738	1805	1407	1810	1618	1560	1721	1618	1709
Q Serve(g_s), s	18.6	7.7	8.3	10.0	5.2	12.8	1.5	44.0	0.0	18.2	19.6	19.7
Cycle Q Clear(g_c), s	18.6	7.7	8.3	10.0	5.2	12.8	1.5	44.0	0.0	18.2	19.6	19.7
Prop In Lane	1.00		0.53	1.00		1.00	1.00		1.00	1.00		0.52
Lane Grp Cap(c), veh/h	249	270	134	639	478	1173	32	1898	749	978	2763	973
V/C Ratio(X)	0.91	0.67	0.72	0.41	0.29	0.80	0.57	1.47	0.25	0.51	0.41	0.41
Avail Cap(c_a), veh/h	303	893	444	639	939	1532	125	1898	749	978	2763	973
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	63.6	67.2	67.5	54.0	58.7	15.8	73.1	53.0	23.3	45.0	18.1	18.1
Incr Delay (d2), s/veh	25.9	2.9	7.0	0.4	0.3	2.4	14.8	214.1	0.8	0.4	0.4	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	11.0	3.8	4.2	4.8	2.6	10.0	0.9	47.9	4.9	8.7	8.8	9.7
LnGrp Delay(d),s/veh	89.4	70.2	74.5	54.4	59.0	18.1	87.9	267.1	24.1	45.4	18.6	19.4
LnGrp LOS	F	E	E	D	E	B	F	F	C	D	B	B
Approach Vol, veh/h		504			1340			2997			2027	
Approach Delay, s/veh		79.6			29.5			250.6			25.4	
Approach LOS		E			C			F			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	48.6	50.0	33.6	17.8	7.2	91.4	25.5	25.9
Change Period (Y+Rc), s	* 6	* 6	* 6	* 6	4.6	* 6	4.6	* 6
Max Green Setting (Gmax), s	* 20	* 44	* 25	* 39	10.4	* 54	25.4	* 39
Max Q Clear Time (g_c+I1), s	20.2	46.0	12.0	10.3	3.5	21.7	20.6	14.8
Green Ext Time (p_c), s	0.0	0.0	0.7	1.5	0.0	18.6	0.3	5.1

Intersection Summary	
HCM 2010 Ctrl Delay	128.4
HCM 2010 LOS	F

Notes

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1661	244	139	695	0	1089
Future Vol, veh/h	1661	244	139	695	0	1089
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Free
Storage Length	-	50	140	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	1767	260	148	739	0	1159

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1767	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.115	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.2095	-	-	-
Pot Cap-1 Maneuver	-	-	354	-	0	0
Stage 1	-	-	-	-	0	0
Stage 2	-	-	-	-	0	0
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	354	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.7	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	354	-
HCM Lane V/C Ratio	-	-	-	0.418	-
HCM Control Delay (s)	0	-	-	22.3	-
HCM Lane LOS	A	-	-	C	-
HCM 95th %tile Q(veh)	-	-	-	2	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	17	849	47	23	67	608	1399	32	41	1577	72
Future Volume (veh/h)	67	17	849	47	23	67	608	1399	32	41	1577	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)	0.97		1.00	0.97		0.94	1.00		0.98	1.00		0.98
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	1827	1681	1900	1900	1825	1900	1863	1864	1900	1845	1878	1900
Adj Flow Rate, veh/h	69	18	0	48	24	40	627	1442	30	42	1626	72
Adj No. of Lanes	1	1	1	0	2	0	2	3	0	1	3	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	4	13	0	0	0	0	2	2	2	3	1	1
Cap, veh/h	173	210	202	175	80	138	715	2115	44	596	2776	123
Arrive On Green	0.12	0.12	0.00	0.12	0.12	0.12	0.21	0.41	0.41	0.34	0.55	0.55
Sat Flow, veh/h	1272	1681	1615	1007	636	1107	3442	5127	107	1757	5030	223
Grp Volume(v), veh/h	69	18	0	62	0	50	627	954	518	42	1105	593
Grp Sat Flow(s),veh/h/ln	1272	1681	1615	1365	0	1385	1721	1696	1842	1757	1709	1835
Q Serve(g_s), s	6.8	1.2	0.0	4.5	0.0	4.3	22.9	29.9	29.9	2.1	27.8	27.8
Cycle Q Clear(g_c), s	11.0	1.2	0.0	5.7	0.0	4.3	22.9	29.9	29.9	2.1	27.8	27.8
Prop In Lane	1.00		1.00	0.78		0.80	1.00		0.06	1.00		0.12
Lane Grp Cap(c), veh/h	173	210	202	220	0	173	715	1399	760	596	1886	1012
V/C Ratio(X)	0.40	0.09	0.00	0.28	0.00	0.29	0.88	0.68	0.68	0.07	0.59	0.59
Avail Cap(c_a), veh/h	278	349	335	336	0	288	953	1826	992	596	1886	1012
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.6	50.3	0.0	52.4	0.0	51.6	49.9	31.2	31.2	29.1	19.3	19.3
Incr Delay (d2), s/veh	0.6	0.1	0.0	0.7	0.0	0.9	7.6	2.7	4.9	0.0	1.3	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.6	0.0	2.1	0.0	1.7	11.6	14.4	16.1	1.0	13.4	14.7
LnGrp Delay(d),s/veh	57.2	50.4	0.0	53.1	0.0	52.5	57.5	33.9	36.1	29.1	20.6	21.8
LnGrp LOS	E	D		D		D	E	C	D	C	C	C
Approach Vol, veh/h		87			112			2099			1740	
Approach Delay, s/veh		55.8			52.9			41.5			21.2	
Approach LOS		E			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	49.1	58.6		22.2	31.0	76.7		22.2
Change Period (Y+Rc), s	* 5	* 5		6.0	4.0	* 5		6.0
Max Green Setting (Gmax), s	* 18	* 70		27.0	36.0	* 52		27.0
Max Q Clear Time (g_c+I1), s	4.1	31.9		13.0	24.9	29.8		7.7
Green Ext Time (p_c), s	0.0	21.7		0.0	2.1	16.8		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	33.4
HCM 2010 LOS	C

Notes

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	339	244	1795	552	0	2473
Future Volume (veh/h)	339	244	1795	552	0	2473
Number	7	14	6	16	5	2
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1881	1900	0	1881
Adj Flow Rate, veh/h	346	249	1832	563	0	2523
Adj No. of Lanes	1	1	3	0	0	2
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	1	1	1	0	1
Cap, veh/h	376	332	2830	830	0	2582
Arrive On Green	0.21	0.21	0.72	0.72	0.00	0.72
Sat Flow, veh/h	1810	1599	4087	1149	0	3762
Grp Volume(v), veh/h	346	249	1590	805	0	2523
Grp Sat Flow(s),veh/h/ln	1810	1599	1712	1644	0	1787
Q Serve(g_s), s	28.1	21.9	36.1	40.0	0.0	99.9
Cycle Q Clear(g_c), s	28.1	21.9	36.1	40.0	0.0	99.9
Prop In Lane	1.00	1.00		0.70	0.00	
Lane Grp Cap(c), veh/h	376	332	2473	1187	0	2582
V/C Ratio(X)	0.92	0.75	0.64	0.68	0.00	0.98
Avail Cap(c_a), veh/h	426	376	2473	1187	0	2582
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	58.2	55.8	10.8	11.3	0.0	19.6
Incr Delay (d2), s/veh	23.7	7.2	1.3	3.1	0.0	13.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.5	10.3	17.2	18.9	0.0	53.4
LnGrp Delay(d),s/veh	81.9	63.0	12.1	14.5	0.0	32.7
LnGrp LOS	F	E	B	B		C
Approach Vol, veh/h	595		2395			2523
Approach Delay, s/veh	74.0		12.9			32.7
Approach LOS	E		B			C

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		114.2		35.8		114.2		
Change Period (Y+Rc), s		5.8		* 4.7		5.8		
Max Green Setting (Gmax), s		104.2		* 35		104.2		
Max Q Clear Time (g_c+I1), s		101.9		30.1		42.0		
Green Ext Time (p_c), s		2.2		1.0		60.5		

Intersection Summary	
HCM 2010 Ctrl Delay	28.6
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	138	30	533	411	876	20	1378	251	401	1868	543
Future Volume (veh/h)	93	138	30	533	411	876	20	1378	251	401	1868	543
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		0.98	1.00		0.99
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	1881	1885	1900	1881	1900	1881	1900	1881	1863	1863	1881	1900
Adj Flow Rate, veh/h	96	142	-12	549	424	798	21	1421	207	413	1926	548
Adj No. of Lanes	1	3	0	2	2	2	1	4	1	2	4	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	1	0	1	0	1	2	2	1	1
Cap, veh/h	118	341	0	588	646	1426	35	1791	699	1128	2996	844
Arrive On Green	0.07	0.07	0.00	0.17	0.18	0.18	0.02	0.28	0.28	0.33	0.59	0.59
Sat Flow, veh/h	1792	5314	0	3476	3610	2814	1810	6471	1559	3442	5041	1419
Grp Volume(v), veh/h	96	130	0	549	424	798	21	1421	207	413	1854	620
Grp Sat Flow(s),veh/h/ln	1792	1715	0	1738	1805	1407	1810	1618	1559	1721	1618	1607
Q Serve(g_s), s	7.9	3.6	0.0	23.4	16.4	5.7	1.7	30.5	0.0	13.8	37.6	38.3
Cycle Q Clear(g_c), s	7.9	3.6	0.0	23.4	16.4	5.7	1.7	30.5	0.0	13.8	37.6	38.3
Prop In Lane	1.00		0.00	1.00		1.00	1.00		1.00	1.00		0.88
Lane Grp Cap(c), veh/h	118	341	0	588	646	1426	35	1791	699	1128	2884	955
V/C Ratio(X)	0.81	0.38	0.00	0.93	0.66	0.56	0.60	0.79	0.30	0.37	0.64	0.65
Avail Cap(c_a), veh/h	303	1338	0	589	939	1654	125	1898	725	1128	2884	955
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.1	67.1	0.0	61.5	57.3	11.5	73.0	50.3	26.5	38.5	20.0	20.1
Incr Delay (d2), s/veh	12.3	0.7	0.0	22.1	1.1	0.3	15.1	3.7	1.1	0.2	1.1	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	4.3	1.7	0.0	13.0	8.3	7.3	1.0	14.1	5.7	6.6	16.9	17.8
LnGrp Delay(d),s/veh	81.4	67.8	0.0	83.6	58.4	11.8	88.1	54.0	27.6	38.7	21.1	23.5
LnGrp LOS	F	E		F	E	B	F	D	C	D	C	C
Approach Vol, veh/h		226			1771			1649			2887	
Approach Delay, s/veh		73.6			45.2			51.1			24.1	
Approach LOS		E			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	55.2	47.5	31.4	16.0	7.5	95.1	14.5	32.8
Change Period (Y+Rc), s	* 6	* 6	* 6	* 6	4.6	* 6	4.6	* 6
Max Green Setting (Gmax), s	* 20	* 44	* 25	* 39	10.4	* 54	25.4	* 39
Max Q Clear Time (g_c+I1), s	15.8	32.5	25.4	5.6	3.7	40.3	9.9	18.4
Green Ext Time (p_c), s	0.6	9.0	0.0	0.7	0.0	12.9	0.2	6.1

Intersection Summary	
HCM 2010 Ctrl Delay	38.4
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	1.9

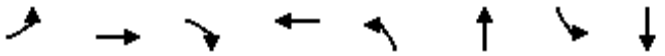
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	762	230	353	1068	0	552
Future Vol, veh/h	762	230	353	1068	0	552
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Free
Storage Length	-	50	140	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	794	240	368	1113	0	575

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	794	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.115	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.2095	-	-	-
Pot Cap-1 Maneuver	-	-	831	-	0	0
Stage 1	-	-	-	-	0	0
Stage 2	-	-	-	-	0	0
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	831	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.2	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	831	-
HCM Lane V/C Ratio	-	-	-	0.442	-
HCM Control Delay (s)	0	-	-	12.7	-
HCM Lane LOS	A	-	-	B	-
HCM 95th %tile Q(veh)	-	-	-	2.3	-

APPENDIX C – EXISTING QUEUE CALCULATION SHEETS



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	60	18	608	95	884	2175	60	1250
v/c Ratio	0.33	0.07	0.94	0.22	0.95	0.65	0.35	0.53
Control Delay	51.9	44.0	35.5	29.2	65.3	17.0	59.3	26.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.9	44.0	35.5	29.2	65.3	17.0	59.3	26.7
Queue Length 50th (ft)	46	13	114	22	375	377	49	272
Queue Length 95th (ft)	85	35	#325	46	#497	587	90	352
Internal Link Dist (ft)		612		364		482		642
Turn Bay Length (ft)					330			
Base Capacity (vph)	257	349	712	590	950	3349	242	2376
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	0.23	0.05	0.85	0.16	0.93	0.65	0.25	0.53

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	116	300	4109	1947
v/c Ratio	0.31	0.89	1.16	0.76
Control Delay	51.3	83.9	101.2	16.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	51.3	83.9	101.2	16.0
Queue Length 50th (ft)	95	280	~1782	595
Queue Length 95th (ft)	154	#417	m#1577	718
Internal Link Dist (ft)	551		941	912
Turn Bay Length (ft)		275		
Base Capacity (vph)	424	378	3557	2573
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	0.27	0.79	1.16	0.76

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	226	323	262	139	1049	18	2789	244	500	1540
v/c Ratio	0.84	0.65	0.54	0.50	1.44	0.21	0.87	0.23	1.07	0.40
Control Delay	87.4	57.8	64.3	72.6	235.1	74.0	38.0	5.0	116.4	22.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.4	57.8	64.3	72.6	235.1	74.0	38.0	5.0	116.4	22.6
Queue Length 50th (ft)	215	89	123	70	~598	17	704	37	~274	279
Queue Length 95th (ft)	#326	123	170	106	#686	45	794	76	#393	349
Internal Link Dist (ft)		299		669			900			403
Turn Bay Length (ft)	200		440		340	200		210	250	
Base Capacity (vph)	302	1324	587	938	727	125	3201	1086	466	3875
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.24	0.45	0.15	1.44	0.14	0.87	0.22	1.07	0.40

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.

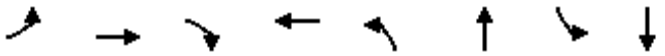
Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1661	244	139	695	0	1089
Future Vol, veh/h	1661	244	139	695	0	1089
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Free
Storage Length	-	50	140	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	1767	260	148	739	0	1159

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1767	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.115	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.2095	-	-	-
Pot Cap-1 Maneuver	-	-	354	-	0	0
Stage 1	-	-	-	-	0	0
Stage 2	-	-	-	-	0	0
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	354	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.7	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	354	-
HCM Lane V/C Ratio	-	-	-	0.418	-
HCM Control Delay (s)	0	-	-	22.3	-
HCM Lane LOS	A	-	-	C	-
HCM 95th %tile Q(veh)	-	-	-	2	-



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	69	18	875	141	627	1475	42	1700
v/c Ratio	0.28	0.05	1.24	0.23	0.81	0.50	0.17	0.74
Control Delay	47.0	41.9	139.9	23.1	55.8	19.1	48.5	32.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.0	41.9	139.9	23.1	55.8	19.1	48.5	32.6
Queue Length 50th (ft)	49	12	~578	26	260	345	28	422
Queue Length 95th (ft)	96	35	#832	56	307	332	68	530
Internal Link Dist (ft)		612		364		482		642
Turn Bay Length (ft)					330			
Base Capacity (vph)	247	349	706	609	950	3073	293	2293
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	0.28	0.05	1.24	0.23	0.66	0.48	0.14	0.74

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	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	346	249	2395	2523
v/c Ratio	0.89	0.68	0.67	0.99
Control Delay	82.5	57.0	16.7	36.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	82.5	57.0	16.7	36.2
Queue Length 50th (ft)	325	196	628	~1260
Queue Length 95th (ft)	#474	293	742	#1487
Internal Link Dist (ft)	551		941	912
Turn Bay Length (ft)		275		
Base Capacity (vph)	424	399	3558	2556
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	0.82	0.62	0.67	0.99

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	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	96	173	549	424	903	21	1421	259	413	2486
v/c Ratio	0.60	0.46	0.84	0.69	0.76	0.24	0.50	0.24	0.75	0.69
Control Delay	80.8	58.7	70.7	65.0	22.6	74.6	31.1	1.4	66.0	27.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.8	58.7	70.7	65.0	22.6	74.6	31.1	1.4	66.0	27.6
Queue Length 50th (ft)	92	49	275	213	222	20	270	0	199	498
Queue Length 95th (ft)	151	77	319	261	257	50	343	28	m213	m505
Internal Link Dist (ft)		299		669			900			403
Turn Bay Length (ft)	200		440		340	200		210	250	
Base Capacity (vph)	302	1321	658	938	1196	125	2841	1094	550	3627
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.13	0.83	0.45	0.76	0.17	0.50	0.24	0.75	0.69

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	762	230	353	1068	0	552
Future Vol, veh/h	762	230	353	1068	0	552
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Free
Storage Length	-	50	140	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	794	240	368	1113	0	575

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	794	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.115	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.2095	-	-	-
Pot Cap-1 Maneuver	-	-	831	-	0	0
Stage 1	-	-	-	-	0	0
Stage 2	-	-	-	-	0	0
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	831	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.2	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	831	-
HCM Lane V/C Ratio	-	-	-	0.442	-
HCM Control Delay (s)	0	-	-	12.7	-
HCM Lane LOS	A	-	-	B	-
HCM 95th %tile Q(veh)	-	-	-	2.3	-

APPENDIX D – OPENING YEAR (2025) INTERSECTION LEVEL OF SERVICE (LOS) CALCULATION SHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	20	600	50	30	40	870	2090	90	70	1320	50
Future Volume (veh/h)	60	20	600	50	30	40	870	2090	90	70	1320	50
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)	0.97		1.00	0.97		0.94	1.00		0.98	1.00		0.98
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	1827	1681	1900	1900	1809	1900	1863	1864	1900	1845	1878	1900
Adj Flow Rate, veh/h	62	21	0	52	31	12	897	2155	90	72	1361	50
Adj No. of Lanes	1	1	1	0	2	0	2	3	0	1	3	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	4	13	0	0	0	0	2	2	2	3	1	1
Cap, veh/h	185	210	202	203	140	54	943	2626	109	400	2465	91
Arrive On Green	0.12	0.12	0.00	0.12	0.12	0.12	0.27	0.52	0.52	0.23	0.49	0.49
Sat Flow, veh/h	1294	1681	1615	1180	1117	434	3442	5006	208	1757	5074	186
Grp Volume(v), veh/h	62	21	0	52	0	43	897	1457	788	72	917	494
Grp Sat Flow(s),veh/h/ln	1294	1681	1615	1193	0	1538	1721	1696	1822	1757	1709	1842
Q Serve(g_s), s	5.9	1.4	0.0	4.8	0.0	3.2	33.3	46.5	47.1	4.3	24.5	24.5
Cycle Q Clear(g_c), s	9.1	1.4	0.0	6.2	0.0	3.2	33.3	46.5	47.1	4.3	24.5	24.5
Prop In Lane	1.00		1.00	0.99		0.28	1.00		0.11	1.00		0.10
Lane Grp Cap(c), veh/h	185	210	202	204	0	192	943	1779	955	400	1660	895
V/C Ratio(X)	0.34	0.10	0.00	0.26	0.00	0.22	0.95	0.82	0.82	0.18	0.55	0.55
Avail Cap(c_a), veh/h	292	349	335	312	0	319	953	1827	981	400	1660	895
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.3	50.4	0.0	53.1	0.0	51.2	46.3	25.8	25.9	40.4	23.5	23.5
Incr Delay (d2), s/veh	0.4	0.1	0.0	0.7	0.0	0.6	18.4	4.3	8.0	0.2	1.3	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.7	0.0	1.8	0.0	1.4	18.2	22.7	25.8	2.1	11.9	13.1
LnGrp Delay(d),s/veh	55.7	50.5	0.0	53.8	0.0	51.8	64.8	30.1	33.9	40.7	24.8	25.9
LnGrp LOS	E	D		D		D	E	C	C	D	C	C
Approach Vol, veh/h		83			95			3142			1483	
Approach Delay, s/veh		54.4			52.9			41.0			26.0	
Approach LOS		D			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	34.6	73.2		22.2	39.6	68.1		22.2
Change Period (Y+Rc), s	* 5	* 5		6.0	4.0	* 5		6.0
Max Green Setting (Gmax), s	* 18	* 70		27.0	36.0	* 52		27.0
Max Q Clear Time (g_c+I1), s	6.3	49.1		11.1	35.3	26.5		8.2
Green Ext Time (p_c), s	0.1	19.1		0.0	0.3	15.8		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	36.8
HCM 2010 LOS	D

Notes

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	120	300	2740	1100	0	1970
Future Volume (veh/h)	120	300	2740	1100	0	1970
Number	7	14	6	16	5	2
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1881	1900	0	1881
Adj Flow Rate, veh/h	130	326	2978	1196	0	2141
Adj No. of Lanes	1	1	3	0	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	1	1	1	0	1
Cap, veh/h	393	348	2660	928	0	2547
Arrive On Green	0.22	0.22	0.71	0.71	0.00	0.71
Sat Flow, veh/h	1810	1599	3902	1302	0	3762
Grp Volume(v), veh/h	130	326	2694	1480	0	2141
Grp Sat Flow(s),veh/h/ln	1810	1599	1712	1612	0	1787
Q Serve(g_s), s	9.1	30.1	106.9	106.9	0.0	64.4
Cycle Q Clear(g_c), s	9.1	30.1	106.9	106.9	0.0	64.4
Prop In Lane	1.00	1.00		0.81	0.00	
Lane Grp Cap(c), veh/h	393	348	2440	1149	0	2547
V/C Ratio(X)	0.33	0.94	1.10	1.29	0.00	0.84
Avail Cap(c_a), veh/h	426	376	2440	1149	0	2547
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	49.5	57.7	21.6	21.6	0.0	15.4
Incr Delay (d2), s/veh	0.5	29.9	53.7	136.6	0.0	3.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	16.2	68.0	90.5	0.0	32.8
LnGrp Delay(d),s/veh	50.0	87.6	75.2	158.1	0.0	19.0
LnGrp LOS	D	F	F	F		B
Approach Vol, veh/h	456		4174			2141
Approach Delay, s/veh	76.9		104.6			19.0
Approach LOS	E		F			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		112.7		37.3		112.7		
Change Period (Y+Rc), s		5.8		* 4.7		5.8		
Max Green Setting (Gmax), s		104.2		* 35		104.2		
Max Q Clear Time (g_c+I1), s		66.4		32.1		108.9		
Green Ext Time (p_c), s		28.0		0.5		0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	75.7
HCM 2010 LOS	E

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	220	220	90	260	140	990	20	2610	230	490	1390	210
Future Volume (veh/h)	220	220	90	260	140	990	20	2610	230	490	1390	210
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		0.98	1.00		1.00	1.00		0.98	1.00		0.99
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	1881	1887	1900	1881	1900	1881	1900	1881	1863	1863	1881	1900
Adj Flow Rate, veh/h	237	237	52	280	151	955	22	2806	193	527	1495	213
Adj No. of Lanes	1	3	0	2	2	2	1	4	1	2	4	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, %	1	1	1	1	0	1	0	1	2	2	1	1
Cap, veh/h	260	345	72	673	501	1156	36	1898	764	937	3194	455
Arrive On Green	0.15	0.08	0.08	0.19	0.14	0.14	0.02	0.29	0.29	0.27	0.55	0.55
Sat Flow, veh/h	1792	4256	889	3476	3610	2814	1810	6471	1560	3442	5757	819
Grp Volume(v), veh/h	237	189	100	280	151	955	22	2806	193	527	1260	448
Grp Sat Flow(s),veh/h/ln	1792	1717	1711	1738	1805	1407	1810	1618	1560	1721	1618	1723
Q Serve(g_s), s	19.5	8.0	8.6	10.6	5.6	13.5	1.8	44.0	0.0	19.7	23.4	23.5
Cycle Q Clear(g_c), s	19.5	8.0	8.6	10.6	5.6	13.5	1.8	44.0	0.0	19.7	23.4	23.5
Prop In Lane	1.00		0.52	1.00		1.00	1.00		1.00	1.00		0.48
Lane Grp Cap(c), veh/h	260	278	139	673	501	1156	36	1898	764	937	2693	956
V/C Ratio(X)	0.91	0.68	0.72	0.42	0.30	0.83	0.61	1.48	0.25	0.56	0.47	0.47
Avail Cap(c_a), veh/h	303	893	445	673	939	1498	125	1898	764	937	2693	956
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	63.2	67.0	67.3	53.1	58.1	16.1	72.9	53.0	22.5	46.9	20.1	20.1
Incr Delay (d2), s/veh	27.6	2.9	6.9	0.4	0.3	3.1	15.3	218.1	0.8	0.8	0.6	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.7	3.9	4.3	5.1	2.8	10.3	1.1	48.4	4.8	9.5	10.5	11.5
LnGrp Delay(d),s/veh	90.8	69.9	74.2	53.5	58.4	19.2	88.2	271.1	23.3	47.7	20.7	21.7
LnGrp LOS	F	E	E	D	E	B	F	F	C	D	C	C
Approach Vol, veh/h		526			1386			3021			2235	
Approach Delay, s/veh		80.1			30.4			253.9			27.2	
Approach LOS		F			C			F			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	46.8	50.0	35.0	18.1	7.6	89.2	26.4	26.8
Change Period (Y+Rc), s	* 6	* 6	* 6	* 6	4.6	* 6	4.6	* 6
Max Green Setting (Gmax), s	* 20	* 44	* 25	* 39	10.4	* 54	25.4	* 39
Max Q Clear Time (g_c+I1), s	21.7	46.0	12.6	10.6	3.8	25.5	21.5	15.5
Green Ext Time (p_c), s	0.0	0.0	0.7	1.6	0.0	19.2	0.2	5.3

Intersection Summary	
HCM 2010 Ctrl Delay	127.3
HCM 2010 LOS	F

Notes

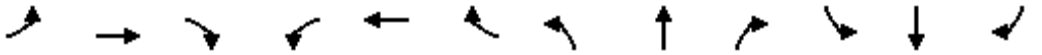
Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1670	265	155	730	0	1100
Future Vol, veh/h	1670	265	155	730	0	1100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Free
Storage Length	-	50	140	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	1777	282	165	777	0	1170

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1777	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.115	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.2095	-	-	-
Pot Cap-1 Maneuver	-	-	351	-	0	0
Stage 1	-	-	-	-	0	0
Stage 2	-	-	-	-	0	0
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	351	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.2	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	351	-
HCM Lane V/C Ratio	-	-	-	0.47	-
HCM Control Delay (s)	0	-	-	24	-
HCM Lane LOS	A	-	-	C	-
HCM 95th %tile Q(veh)	-	-	-	2.4	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	30	860	60	30	70	660	1520	50	50	1620	80
Future Volume (veh/h)	70	30	860	60	30	70	660	1520	50	50	1620	80
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)	0.98		1.00	0.97		0.94	1.00		0.98	1.00		0.98
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	1827	1681	1900	1900	1818	1900	1863	1864	1900	1845	1878	1900
Adj Flow Rate, veh/h	72	31	0	62	31	43	680	1567	49	52	1670	80
Adj No. of Lanes	1	1	1	0	2	0	2	3	0	1	3	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	4	13	0	0	0	0	2	2	2	3	1	1
Cap, veh/h	173	224	215	185	89	130	766	2245	70	528	2648	127
Arrive On Green	0.13	0.13	0.00	0.13	0.13	0.13	0.22	0.44	0.44	0.30	0.53	0.53
Sat Flow, veh/h	1264	1681	1615	1007	668	976	3442	5065	158	1757	5009	240
Grp Volume(v), veh/h	72	31	0	74	0	62	680	1049	567	52	1139	611
Grp Sat Flow(s),veh/h/ln	1264	1681	1615	1236	0	1415	1721	1696	1831	1757	1709	1831
Q Serve(g_s), s	7.1	2.1	0.0	6.0	0.0	5.2	24.9	32.4	32.4	2.8	30.6	30.7
Cycle Q Clear(g_c), s	12.3	2.1	0.0	8.1	0.0	5.2	24.9	32.4	32.4	2.8	30.6	30.7
Prop In Lane	1.00		1.00	0.84		0.69	1.00		0.09	1.00		0.13
Lane Grp Cap(c), veh/h	173	224	215	216	0	188	766	1504	812	528	1807	968
V/C Ratio(X)	0.42	0.14	0.00	0.34	0.00	0.33	0.89	0.70	0.70	0.10	0.63	0.63
Avail Cap(c_a), veh/h	267	349	335	317	0	294	953	1827	986	528	1807	968
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.7	49.8	0.0	53.0	0.0	51.1	49.0	29.2	29.2	32.8	21.7	21.7
Incr Delay (d2), s/veh	0.6	0.1	0.0	0.9	0.0	1.0	8.9	2.7	4.9	0.1	1.7	3.1
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	2.5	1.0	0.0	2.5	0.0	2.1	12.8	15.7	17.5	1.4	14.8	16.3
LnGrp Delay(d),s/veh	57.3	49.9	0.0	53.9	0.0	52.1	57.9	31.9	34.1	32.9	23.3	24.8
LnGrp LOS	E	D		D		D	E	C	C	C	C	C
Approach Vol, veh/h		103			136			2296			1802	
Approach Delay, s/veh		55.0			53.1			40.1			24.1	
Approach LOS		E			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	44.1	62.6		23.3	32.9	73.7		23.3
Change Period (Y+Rc), s	* 5	* 5		6.0	4.0	* 5		6.0
Max Green Setting (Gmax), s	* 18	* 70		27.0	36.0	* 52		27.0
Max Q Clear Time (g_c+I1), s	4.8	34.4		14.3	26.9	32.7		10.1
Green Ext Time (p_c), s	0.1	23.2		0.1	2.1	15.4		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	34.2
HCM 2010 LOS	C

Notes

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	350	260	1970	570	0	2540
Future Volume (veh/h)	350	260	1970	570	0	2540
Number	7	14	6	16	5	2
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1881	1900	0	1881
Adj Flow Rate, veh/h	357	265	2010	582	0	2592
Adj No. of Lanes	1	1	3	0	0	2
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	1	1	1	0	1
Cap, veh/h	386	341	2864	778	0	2562
Arrive On Green	0.21	0.21	0.72	0.72	0.00	0.72
Sat Flow, veh/h	1810	1599	4164	1086	0	3762
Grp Volume(v), veh/h	357	265	1704	888	0	2592
Grp Sat Flow(s),veh/h/ln	1810	1599	1712	1657	0	1787
Q Serve(g_s), s	29.0	23.4	42.1	49.1	0.0	107.5
Cycle Q Clear(g_c), s	29.0	23.4	42.1	49.1	0.0	107.5
Prop In Lane	1.00	1.00		0.66	0.00	
Lane Grp Cap(c), veh/h	386	341	2455	1188	0	2562
V/C Ratio(X)	0.93	0.78	0.69	0.75	0.00	1.01
Avail Cap(c_a), veh/h	426	376	2455	1188	0	2562
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	57.9	55.7	12.0	13.0	0.0	21.2
Incr Delay (d2), s/veh	24.9	9.1	1.6	4.3	0.0	20.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.1	11.2	20.2	23.6	0.0	59.7
LnGrp Delay(d),s/veh	82.8	64.8	13.6	17.3	0.0	41.9
LnGrp LOS	F	E	B	B		F
Approach Vol, veh/h	622		2592			2592
Approach Delay, s/veh	75.1		14.9			41.9
Approach LOS	E		B			D

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		113.3		36.7		113.3		
Change Period (Y+Rc), s		5.8		* 4.7		5.8		
Max Green Setting (Gmax), s		104.2		* 35		104.2		
Max Q Clear Time (g_c+I1), s		109.5		31.0		51.1		
Green Ext Time (p_c), s		0.0		1.0		52.4		

Intersection Summary	
HCM 2010 Ctrl Delay	33.4
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	150	40	550	420	890	30	1490	260	430	1900	560
Future Volume (veh/h)	140	150	40	550	420	890	30	1490	260	430	1900	560
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		0.98	1.00		0.99
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	1881	1885	1900	1881	1900	1881	1900	1881	1863	1863	1881	1900
Adj Flow Rate, veh/h	144	155	-2	567	433	813	31	1536	216	443	1959	565
Adj No. of Lanes	1	3	0	2	2	2	1	4	1	2	4	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	1	0	1	0	1	2	2	1	1
Cap, veh/h	168	343	0	646	606	1326	44	1840	738	1044	2879	820
Arrive On Green	0.09	0.07	0.00	0.19	0.17	0.17	0.02	0.28	0.28	0.30	0.57	0.57
Sat Flow, veh/h	1792	5316	0	3476	3610	2814	1810	6471	1559	3442	5026	1431
Grp Volume(v), veh/h	144	153	0	567	433	813	31	1536	216	443	1891	633
Grp Sat Flow(s),veh/h/ln	1792	1715	0	1738	1805	1407	1810	1618	1559	1721	1618	1604
Q Serve(g_s), s	11.9	4.3	0.0	23.8	17.0	7.6	2.6	33.4	0.0	15.4	40.9	41.8
Cycle Q Clear(g_c), s	11.9	4.3	0.0	23.8	17.0	7.6	2.6	33.4	0.0	15.4	40.9	41.8
Prop In Lane	1.00		0.00	1.00		1.00	1.00		1.00	1.00		0.89
Lane Grp Cap(c), veh/h	168	343	0	646	606	1326	44	1840	738	1044	2780	919
V/C Ratio(X)	0.86	0.45	0.00	0.88	0.71	0.61	0.71	0.83	0.29	0.42	0.68	0.69
Avail Cap(c_a), veh/h	303	1338	0	646	939	1585	125	1898	752	1044	2780	919
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.0	67.4	0.0	59.4	59.0	12.7	72.7	50.4	24.4	41.8	22.4	22.6
Incr Delay (d2), s/veh	11.6	0.9	0.0	13.1	1.6	0.5	18.9	4.6	1.0	0.3	1.4	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	6.4	2.1	0.0	12.6	8.6	7.7	1.5	15.5	5.7	7.4	18.6	19.5
LnGrp Delay(d),s/veh	78.6	68.3	0.0	72.5	60.6	13.2	91.6	55.0	25.4	42.1	23.8	26.8
LnGrp LOS	E	E		E	E	B	F	E	C	D	C	C
Approach Vol, veh/h		297			1813			1783			2967	
Approach Delay, s/veh		73.3			43.1			52.1			27.2	
Approach LOS		E			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	51.5	48.7	33.9	16.0	8.2	91.9	18.7	31.2
Change Period (Y+Rc), s	* 6	* 6	* 6	* 6	4.6	* 6	4.6	* 6
Max Green Setting (Gmax), s	* 20	* 44	* 25	* 39	10.4	* 54	25.4	* 39
Max Q Clear Time (g_c+I1), s	17.4	35.4	25.8	6.3	4.6	43.8	13.9	19.0
Green Ext Time (p_c), s	0.5	7.3	0.0	0.9	0.0	9.7	0.2	6.2

Intersection Summary	
HCM 2010 Ctrl Delay	39.8
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	780	245	365	1090	0	570
Future Vol, veh/h	780	245	365	1090	0	570
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Free
Storage Length	-	50	140	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	813	255	380	1135	0	594

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	813	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.115	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.2095	-	-	-
Pot Cap-1 Maneuver	-	-	817	-	0	0
Stage 1	-	-	-	-	0	0
Stage 2	-	-	-	-	0	0
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	817	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.3	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	817	-
HCM Lane V/C Ratio	-	-	-	0.465	-
HCM Control Delay (s)	0	-	-	13.2	-
HCM Lane LOS	A	-	-	B	-
HCM 95th %tile Q(veh)	-	-	-	2.5	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	20	610	50	30	40	870	2090	90	70	1350	50
Future Volume (veh/h)	60	20	610	50	30	40	870	2090	90	70	1350	50
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)	0.97		1.00	0.97		0.94	1.00		0.98	1.00		0.98
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	1827	1681	1900	1900	1810	1900	1863	1864	1900	1845	1879	1900
Adj Flow Rate, veh/h	61	20	0	51	31	8	888	2133	89	71	1378	49
Adj No. of Lanes	1	1	1	0	2	0	2	3	0	1	3	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	4	13	0	0	0	0	2	2	2	3	1	1
Cap, veh/h	189	210	202	205	156	40	937	2618	109	402	2476	88
Arrive On Green	0.12	0.12	0.00	0.12	0.12	0.12	0.27	0.52	0.52	0.23	0.49	0.49
Sat Flow, veh/h	1298	1681	1615	1195	1245	321	3442	5007	208	1757	5081	181
Grp Volume(v), veh/h	61	20	0	51	0	39	888	1443	779	71	927	500
Grp Sat Flow(s),veh/h/ln	1298	1681	1615	1195	0	1567	1721	1696	1822	1757	1709	1843
Q Serve(g_s), s	5.8	1.4	0.0	4.7	0.0	2.9	32.9	45.9	46.4	4.2	24.8	24.8
Cycle Q Clear(g_c), s	8.7	1.4	0.0	6.1	0.0	2.9	32.9	45.9	46.4	4.2	24.8	24.8
Prop In Lane	1.00		1.00	1.00		0.21	1.00		0.11	1.00		0.10
Lane Grp Cap(c), veh/h	189	210	202	205	0	196	937	1774	953	402	1666	898
V/C Ratio(X)	0.32	0.10	0.00	0.25	0.00	0.20	0.95	0.81	0.82	0.18	0.56	0.56
Avail Cap(c_a), veh/h	296	349	335	313	0	325	953	1827	981	402	1666	898
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.9	50.4	0.0	53.1	0.0	51.0	46.4	25.7	25.9	40.3	23.4	23.4
Incr Delay (d2), s/veh	0.4	0.1	0.0	0.6	0.0	0.5	17.7	4.2	7.8	0.2	1.3	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.6	0.0	1.7	0.0	1.3	18.0	22.5	25.2	2.1	12.0	13.3
LnGrp Delay(d),s/veh	55.3	50.4	0.0	53.7	0.0	51.5	64.1	29.9	33.6	40.5	24.8	25.9
LnGrp LOS	E	D		D		D	E	C	C	D	C	C
Approach Vol, veh/h		81			90			3110			1498	
Approach Delay, s/veh		54.1			52.8			40.6			25.9	
Approach LOS		D			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	34.8	73.0		22.2	39.4	68.4		22.2
Change Period (Y+Rc), s	* 5	* 5		6.0	4.0	* 5		6.0
Max Green Setting (Gmax), s	* 18	* 70		27.0	36.0	* 52		27.0
Max Q Clear Time (g_c+I1), s	6.2	48.4		10.7	34.9	26.8		8.1
Green Ext Time (p_c), s	0.1	19.6		0.0	0.5	15.9		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	36.5
HCM 2010 LOS	D

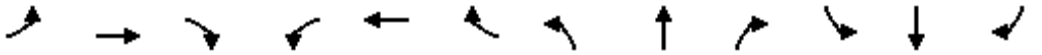
Notes

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	120	310	2740	1100	0	2010
Future Volume (veh/h)	120	310	2740	1100	0	2010
Number	7	14	6	16	5	2
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1881	1900	0	1881
Adj Flow Rate, veh/h	122	316	2796	1122	0	2051
Adj No. of Lanes	1	1	3	0	0	3
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	1	1	1	0	1
Cap, veh/h	383	339	2682	935	0	3689
Arrive On Green	0.21	0.21	0.72	0.72	0.00	0.72
Sat Flow, veh/h	1810	1599	3903	1302	0	5474
Grp Volume(v), veh/h	122	316	2529	1389	0	2051
Grp Sat Flow(s),veh/h/ln	1810	1599	1712	1612	0	1712
Q Serve(g_s), s	8.5	29.1	107.7	107.7	0.0	28.1
Cycle Q Clear(g_c), s	8.5	29.1	107.7	107.7	0.0	28.1
Prop In Lane	1.00	1.00		0.81	0.00	
Lane Grp Cap(c), veh/h	383	339	2459	1158	0	3689
V/C Ratio(X)	0.32	0.93	1.03	1.20	0.00	0.56
Avail Cap(c_a), veh/h	426	376	2459	1158	0	3689
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	50.0	58.1	21.1	21.1	0.0	9.9
Incr Delay (d2), s/veh	0.5	28.6	25.8	98.5	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	15.6	59.0	79.0	0.0	13.3
LnGrp Delay(d),s/veh	50.4	86.7	46.9	119.6	0.0	10.5
LnGrp LOS	D	F	F	F		B
Approach Vol, veh/h	438		3918			2051
Approach Delay, s/veh	76.6		72.7			10.5
Approach LOS	E		E			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		113.5		36.5		113.5		
Change Period (Y+Rc), s		5.8		* 4.7		5.8		
Max Green Setting (Gmax), s		104.2		* 35		104.2		
Max Q Clear Time (g_c+I1), s		30.1		31.1		109.7		
Green Ext Time (p_c), s		35.9		0.6		0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	53.1
HCM 2010 LOS	D

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	210	220	90	260	140	990	20	2610	240	490	1410	230
Future Volume (veh/h)	210	220	90	260	140	990	20	2610	240	490	1410	230
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		0.98	1.00		1.00	1.00		0.98	1.00		0.99
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	1881	1887	1900	1881	1900	1881	1900	1881	1863	1863	1881	1881
Adj Flow Rate, veh/h	212	222	49	263	141	905	20	2636	191	495	1424	180
Adj No. of Lanes	1	3	0	2	2	2	1	4	1	2	3	1
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	1	1	1	1	0	1	0	1	2	2	1	1
Cap, veh/h	236	327	69	587	446	1194	34	1898	725	1036	3003	922
Arrive On Green	0.13	0.08	0.08	0.17	0.12	0.12	0.02	0.29	0.29	0.30	0.58	0.58
Sat Flow, veh/h	1792	4252	892	3476	3610	2814	1810	6471	1560	3442	5136	1576
Grp Volume(v), veh/h	212	177	94	263	141	905	20	2636	191	495	1424	180
Grp Sat Flow(s),veh/h/ln	1792	1717	1710	1738	1805	1407	1810	1618	1560	1721	1712	1576
Q Serve(g_s), s	17.5	7.5	8.1	10.2	5.3	11.5	1.6	44.0	0.0	17.6	23.9	8.0
Cycle Q Clear(g_c), s	17.5	7.5	8.1	10.2	5.3	11.5	1.6	44.0	0.0	17.6	23.9	8.0
Prop In Lane	1.00		0.52	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	236	264	131	587	446	1194	34	1898	725	1036	3003	922
V/C Ratio(X)	0.90	0.67	0.72	0.45	0.32	0.76	0.59	1.39	0.26	0.48	0.47	0.20
Avail Cap(c_a), veh/h	303	893	445	589	939	1579	125	1898	725	1036	3003	922
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	64.1	67.4	67.6	56.0	60.0	15.2	73.0	53.0	24.7	42.8	17.9	14.6
Incr Delay (d2), s/veh	23.6	2.9	7.0	0.5	0.4	1.5	15.0	178.2	0.9	0.3	0.5	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	10.2	3.7	4.1	4.9	2.7	9.3	1.0	43.1	5.0	8.4	11.4	3.6
LnGrp Delay(d),s/veh	87.7	70.3	74.7	56.6	60.4	16.7	88.0	231.2	25.5	43.2	18.4	15.1
LnGrp LOS	F	E	E	E	E	B	F	F	C	D	B	B
Approach Vol, veh/h		483			1309			2847			2099	
Approach Delay, s/veh		78.8			29.4			216.4			24.0	
Approach LOS		E			C			F			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	51.1	50.0	31.3	17.5	7.4	93.7	24.3	24.5
Change Period (Y+Rc), s	* 6	* 6	* 6	* 6	4.6	* 6	4.6	* 6
Max Green Setting (Gmax), s	* 20	* 44	* 25	* 39	10.4	* 54	25.4	* 39
Max Q Clear Time (g_c+I1), s	19.6	46.0	12.2	10.1	3.6	25.9	19.5	13.5
Green Ext Time (p_c), s	0.2	0.0	0.7	1.5	0.0	17.7	0.3	5.0

Intersection Summary	
HCM 2010 Ctrl Delay	110.3
HCM 2010 LOS	F

Notes

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1670	270	160	730	0	1100
Future Vol, veh/h	1670	270	160	730	0	1100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Free
Storage Length	-	50	140	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	1740	281	167	760	0	1146

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1740	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.115	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.2095	-	-	-
Pot Cap-1 Maneuver	-	-	363	-	0	0
Stage 1	-	-	-	-	0	0
Stage 2	-	-	-	-	0	0
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	363	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.1	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	363	-
HCM Lane V/C Ratio	-	-	-	0.459	-
HCM Control Delay (s)	0	-	-	23.1	-
HCM Lane LOS	A	-	-	C	-
HCM 95th %tile Q(veh)	-	-	-	2.3	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	30	910	60	30	70	660	1540	50	50	1710	80
Future Volume (veh/h)	70	30	910	60	30	70	660	1540	50	50	1710	80
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)	0.97		1.00	0.97		0.94	1.00		0.98	1.00		0.98
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	1827	1681	1900	1900	1818	1900	1863	1864	1900	1845	1878	1900
Adj Flow Rate, veh/h	71	31	0	61	31	23	673	1571	48	51	1745	79
Adj No. of Lanes	1	1	1	0	2	0	2	3	0	1	3	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	4	13	0	0	0	0	2	2	2	3	1	1
Cap, veh/h	183	220	212	202	114	86	760	2250	69	531	2677	121
Arrive On Green	0.13	0.13	0.00	0.13	0.13	0.13	0.22	0.44	0.44	0.30	0.53	0.53
Sat Flow, veh/h	1284	1681	1615	1120	872	654	3442	5070	155	1757	5024	227
Grp Volume(v), veh/h	71	31	0	62	0	53	673	1051	568	51	1187	637
Grp Sat Flow(s),veh/h/ln	1284	1681	1615	1153	0	1493	1721	1696	1832	1757	1709	1834
Q Serve(g_s), s	6.9	2.1	0.0	5.7	0.0	4.1	24.6	32.5	32.5	2.7	32.3	32.4
Cycle Q Clear(g_c), s	11.0	2.1	0.0	7.8	0.0	4.1	24.6	32.5	32.5	2.7	32.3	32.4
Prop In Lane	1.00		1.00	0.98		0.44	1.00		0.08	1.00		0.12
Lane Grp Cap(c), veh/h	183	220	212	206	0	196	760	1506	813	531	1821	977
V/C Ratio(X)	0.39	0.14	0.00	0.30	0.00	0.27	0.89	0.70	0.70	0.10	0.65	0.65
Avail Cap(c_a), veh/h	281	349	335	306	0	310	953	1827	987	531	1821	977
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.8	50.0	0.0	53.4	0.0	50.9	49.1	29.1	29.1	32.6	21.7	21.7
Incr Delay (d2), s/veh	0.5	0.1	0.0	0.8	0.0	0.7	8.7	2.7	4.9	0.1	1.8	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	2.5	1.0	0.0	2.1	0.0	1.7	12.6	15.8	17.5	1.3	15.6	17.2
LnGrp Delay(d),s/veh	56.3	50.1	0.0	54.2	0.0	51.6	57.8	31.8	34.1	32.7	23.6	25.1
LnGrp LOS	E	D		D		D	E	C	C	C	C	C
Approach Vol, veh/h		102			115			2292			1875	
Approach Delay, s/veh		54.4			53.0			40.0			24.3	
Approach LOS		D			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	44.3	62.7		23.0	32.7	74.3		23.0
Change Period (Y+Rc), s	* 5	* 5		6.0	4.0	* 5		6.0
Max Green Setting (Gmax), s	* 18	* 70		27.0	36.0	* 52		27.0
Max Q Clear Time (g_c+I1), s	4.7	34.5		13.0	26.6	34.4		9.8
Green Ext Time (p_c), s	0.1	23.2		0.1	2.1	14.6		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	34.0
HCM 2010 LOS	C

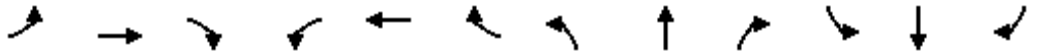
Notes

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	350	270	1980	570	0	2680
Future Volume (veh/h)	350	270	1980	570	0	2680
Number	7	14	6	16	5	2
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1881	1900	0	1881
Adj Flow Rate, veh/h	357	276	2020	582	0	2735
Adj No. of Lanes	1	1	3	0	0	3
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	1	1	1	0	1
Cap, veh/h	386	341	2868	775	0	3681
Arrive On Green	0.21	0.21	0.72	0.72	0.00	0.72
Sat Flow, veh/h	1810	1599	4170	1081	0	5474
Grp Volume(v), veh/h	357	276	1709	893	0	2735
Grp Sat Flow(s),veh/h/ln	1810	1599	1712	1658	0	1712
Q Serve(g_s), s	29.0	24.6	42.4	49.6	0.0	48.4
Cycle Q Clear(g_c), s	29.0	24.6	42.4	49.6	0.0	48.4
Prop In Lane	1.00	1.00		0.65	0.00	
Lane Grp Cap(c), veh/h	386	341	2454	1188	0	3681
V/C Ratio(X)	0.93	0.81	0.70	0.75	0.00	0.74
Avail Cap(c_a), veh/h	426	376	2454	1188	0	3681
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	57.8	56.1	12.0	13.0	0.0	12.9
Incr Delay (d2), s/veh	24.8	11.5	1.7	4.4	0.0	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.1	12.0	20.3	23.8	0.0	23.0
LnGrp Delay(d),s/veh	82.7	67.6	13.7	17.4	0.0	14.3
LnGrp LOS	F	E	B	B		B
Approach Vol, veh/h	633		2602			2735
Approach Delay, s/veh	76.1		15.0			14.3
Approach LOS	E		B			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		113.3		36.7		113.3		
Change Period (Y+Rc), s		5.8		* 4.7		5.8		
Max Green Setting (Gmax), s		104.2		* 35		104.2		
Max Q Clear Time (g_c+I1), s		50.4		31.0		51.6		
Green Ext Time (p_c), s		44.6		1.0		52.0		

Intersection Summary	
HCM 2010 Ctrl Delay	21.1
HCM 2010 LOS	C

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	150	30	550	420	890	30	1490	260	435	1990	605
Future Volume (veh/h)	140	150	30	550	420	890	30	1490	260	435	1990	605
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		0.98	1.00		0.99
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	1881	1884	1900	1881	1900	1881	1900	1881	1863	1863	1881	1881
Adj Flow Rate, veh/h	141	152	-45	556	424	745	30	1505	168	439	2010	524
Adj No. of Lanes	1	3	0	2	2	2	1	4	1	2	3	1
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	1	1	1	1	0	1	0	1	2	2	1	1
Cap, veh/h	165	339	0	626	589	1337	43	1826	725	1073	2976	913
Arrive On Green	0.09	0.07	0.00	0.18	0.16	0.16	0.02	0.28	0.28	0.31	0.58	0.58
Sat Flow, veh/h	1792	5314	0	3476	3610	2814	1810	6471	1559	3442	5136	1576
Grp Volume(v), veh/h	141	107	0	556	424	745	30	1505	168	439	2010	524
Grp Sat Flow(s),veh/h/ln	1792	1715	0	1738	1805	1407	1810	1618	1559	1721	1712	1576
Q Serve(g_s), s	11.6	3.0	0.0	23.4	16.7	6.6	2.5	32.6	0.0	15.1	40.6	31.4
Cycle Q Clear(g_c), s	11.6	3.0	0.0	23.4	16.7	6.6	2.5	32.6	0.0	15.1	40.6	31.4
Prop In Lane	1.00		0.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	165	339	0	626	589	1337	43	1826	725	1073	2976	913
V/C Ratio(X)	0.85	0.32	0.00	0.89	0.72	0.56	0.70	0.82	0.23	0.41	0.68	0.57
Avail Cap(c_a), veh/h	303	1337	0	626	939	1609	125	1898	743	1073	2976	913
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.1	66.8	0.0	60.0	59.5	12.1	72.7	50.4	24.3	40.7	21.8	19.9
Incr Delay (d2), s/veh	11.6	0.5	0.0	14.6	1.7	0.4	18.3	4.4	0.7	0.3	1.2	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	6.3	1.4	0.0	12.5	8.5	6.7	1.5	15.2	4.3	7.2	19.5	14.2
LnGrp Delay(d),s/veh	78.7	67.4	0.0	74.6	61.2	12.5	91.0	54.7	25.0	41.0	23.0	22.5
LnGrp LOS	E	E		E	E	B	F	D	C	D	C	C
Approach Vol, veh/h		248			1725			1703			2973	
Approach Delay, s/veh		73.8			44.5			52.5			25.6	
Approach LOS		E			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	52.8	48.3	33.0	15.9	8.2	92.9	18.4	30.5
Change Period (Y+Rc), s	* 6	* 6	* 6	* 6	4.6	* 6	4.6	* 6
Max Green Setting (Gmax), s	* 20	* 44	* 25	* 39	10.4	* 54	25.4	* 39
Max Q Clear Time (g_c+I1), s	17.1	34.6	25.4	5.0	4.5	42.6	13.6	18.7
Green Ext Time (p_c), s	0.5	7.7	0.0	0.6	0.0	10.8	0.2	5.8

Intersection Summary	
HCM 2010 Ctrl Delay	39.2
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	2

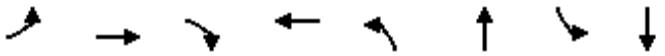
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	790	250	370	1090	0	570
Future Vol, veh/h	790	250	370	1090	0	570
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Free
Storage Length	-	50	140	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	823	260	385	1135	0	594

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	823	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.115	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.2095	-	-	-
Pot Cap-1 Maneuver	-	-	810	-	0	0
Stage 1	-	-	-	-	0	0
Stage 2	-	-	-	-	0	0
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	810	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.4	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	810	-
HCM Lane V/C Ratio	-	-	-	0.476	-
HCM Control Delay (s)	0	-	-	13.4	-
HCM Lane LOS	A	-	-	B	-
HCM 95th %tile Q(veh)	-	-	-	2.6	-

APPENDIX E – OPENING YEAR (2025) QUEUE CALCULATION SHEETS



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	62	21	619	124	897	2248	72	1413
v/c Ratio	0.34	0.08	0.96	0.28	0.95	0.69	0.36	0.61
Control Delay	51.5	43.9	38.4	31.9	66.0	19.6	57.5	29.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.5	43.9	38.4	31.9	66.0	19.6	57.5	29.0
Queue Length 50th (ft)	46	15	130	32	382	500	56	332
Queue Length 95th (ft)	87	38	#352	58	#509	622	104	412
Internal Link Dist (ft)		612		364		482		642
Turn Bay Length (ft)					330			
Base Capacity (vph)	251	349	709	583	950	3238	242	2331
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	0.25	0.06	0.87	0.21	0.94	0.69	0.30	0.61

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	130	326	4174	2141
v/c Ratio	0.33	0.92	1.19	0.84
Control Delay	50.9	87.4	116.7	20.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	50.9	87.4	116.7	20.5
Queue Length 50th (ft)	106	306	~1852	778
Queue Length 95th (ft)	170	#477	m#1612	898
Internal Link Dist (ft)	551		941	912
Turn Bay Length (ft)		275		
Base Capacity (vph)	424	378	3507	2535
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	0.31	0.86	1.19	0.84

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	237	334	280	151	1065	22	2806	247	527	1721
v/c Ratio	0.86	0.66	0.56	0.53	1.47	0.25	0.89	0.24	1.13	0.45
Control Delay	88.8	58.7	64.3	72.8	245.6	74.8	39.6	5.2	133.7	25.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	88.8	58.7	64.3	72.8	245.6	74.8	39.6	5.2	133.7	25.5
Queue Length 50th (ft)	225	93	131	76	~616	21	727	38	~304	350
Queue Length 95th (ft)	#352	128	181	113	#702	52	809	79	m#409	410
Internal Link Dist (ft)		299		669			900			403
Turn Bay Length (ft)	200		440		340	200		210	250	
Base Capacity (vph)	302	1324	587	938	726	125	3156	1080	466	3826
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.25	0.48	0.16	1.47	0.18	0.89	0.23	1.13	0.45

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

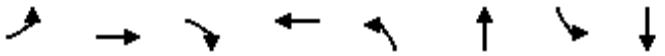
Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1670	265	155	730	0	1100
Future Vol, veh/h	1670	265	155	730	0	1100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Free
Storage Length	-	50	140	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	1777	282	165	777	0	1170

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1777	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.115	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.2095	-	-	-
Pot Cap-1 Maneuver	-	-	351	-	0	0
Stage 1	-	-	-	-	0	0
Stage 2	-	-	-	-	0	0
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	351	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.2	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	351	-
HCM Lane V/C Ratio	-	-	-	0.47	-
HCM Control Delay (s)	0	-	-	24	-
HCM Lane LOS	A	-	-	C	-
HCM 95th %tile Q(veh)	-	-	-	2.4	-



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	72	31	887	165	680	1619	52	1752
v/c Ratio	0.30	0.09	1.26	0.27	0.83	0.58	0.20	0.78
Control Delay	47.5	42.5	147.1	25.4	56.4	21.6	50.0	34.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.5	42.5	147.1	25.4	56.4	21.6	50.0	34.9
Queue Length 50th (ft)	52	21	~600	34	281	356	38	455
Queue Length 95th (ft)	99	50	#856	67	336	372	81	554
Internal Link Dist (ft)		612		364		482		642
Turn Bay Length (ft)					330			
Base Capacity (vph)	241	349	706	602	950	2897	285	2234
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	0.30	0.09	1.26	0.27	0.72	0.56	0.18	0.78

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	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	357	265	2592	2592
v/c Ratio	0.91	0.73	0.73	1.02
Control Delay	83.8	61.8	18.1	45.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	83.8	61.8	18.1	45.0
Queue Length 50th (ft)	336	220	740	~1442
Queue Length 95th (ft)	#498	324	828	#1559
Internal Link Dist (ft)	551		941	912
Turn Bay Length (ft)		275		
Base Capacity (vph)	424	392	3543	2543
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	0.84	0.68	0.73	1.02

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	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	144	196	567	433	918	31	1536	268	443	2536
v/c Ratio	0.70	0.49	0.79	0.73	0.86	0.33	0.55	0.24	0.88	0.73
Control Delay	80.9	57.0	64.0	67.0	33.4	76.7	33.3	1.6	71.0	31.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.9	57.0	64.0	67.0	33.4	76.7	33.3	1.6	71.0	31.2
Queue Length 50th (ft)	138	54	274	216	273	30	310	3	221	521
Queue Length 95th (ft)	207	83	315	266	289	66	402	33	m223	m500
Internal Link Dist (ft)		299		669			900			403
Turn Bay Length (ft)	200		440		340	200		210	250	
Base Capacity (vph)	302	1323	722	938	1073	125	2791	1107	503	3473
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.15	0.79	0.46	0.86	0.25	0.55	0.24	0.88	0.73

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

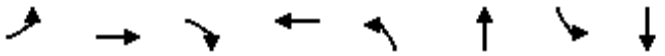
Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	780	245	365	1090	0	570
Future Vol, veh/h	780	245	365	1090	0	570
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Free
Storage Length	-	50	140	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	813	255	380	1135	0	594

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	813	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.115	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.2095	-	-	-
Pot Cap-1 Maneuver	-	-	817	-	0	0
Stage 1	-	-	-	-	0	0
Stage 2	-	-	-	-	0	0
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	817	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.3	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	817	-
HCM Lane V/C Ratio	-	-	-	0.465	-
HCM Control Delay (s)	0	-	-	13.2	-
HCM Lane LOS	A	-	-	B	-
HCM 95th %tile Q(veh)	-	-	-	2.5	-



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	61	20	622	123	888	2225	71	1429
v/c Ratio	0.33	0.08	0.96	0.28	0.95	0.69	0.36	0.61
Control Delay	50.9	43.6	38.9	31.5	65.8	19.7	57.2	29.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.9	43.6	38.9	31.5	65.8	19.7	57.2	29.2
Queue Length 50th (ft)	45	14	134	31	377	501	55	341
Queue Length 95th (ft)	87	37	#359	58	#501	610	103	417
Internal Link Dist (ft)		612		364		482		642
Turn Bay Length (ft)					330			
Base Capacity (vph)	251	349	708	584	950	3223	242	2333
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	0.24	0.06	0.88	0.21	0.93	0.69	0.29	0.61

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	122	316	3918	2051
v/c Ratio	0.31	0.91	1.11	0.56
Control Delay	50.9	85.4	84.0	11.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	50.9	85.4	84.0	11.3
Queue Length 50th (ft)	99	293	~1657	345
Queue Length 95th (ft)	160	#451	m#1483	381
Internal Link Dist (ft)	551		941	912
Turn Bay Length (ft)		275		
Base Capacity (vph)	424	379	3526	3664
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	0.29	0.83	1.11	0.56

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	212	313	263	141	1000	20	2636	242	495	1424	232
v/c Ratio	0.82	0.64	0.56	0.51	1.35	0.23	0.82	0.23	1.06	0.45	0.23
Control Delay	85.7	57.8	65.0	72.7	196.1	74.3	35.1	4.7	110.4	18.8	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.7	57.8	65.0	72.7	196.1	74.3	35.1	4.7	110.4	18.8	9.4
Queue Length 50th (ft)	202	86	125	71	~527	19	627	34	~264	278	43
Queue Length 95th (ft)	292	120	170	107	#613	48	724	72	#382	353	121
Internal Link Dist (ft)		299		669			900			403	
Turn Bay Length (ft)	200		440		340	200		210	250		125
Base Capacity (vph)	302	1324	587	938	740	125	3233	1091	466	3159	1019
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	0.70	0.24	0.45	0.15	1.35	0.16	0.82	0.22	1.06	0.45	0.23

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.

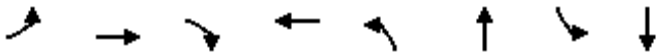
Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1670	270	160	730	0	1100
Future Vol, veh/h	1670	270	160	730	0	1100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Free
Storage Length	-	50	140	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	1740	281	167	760	0	1146

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1740	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.115	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.2095	-	-	-
Pot Cap-1 Maneuver	-	-	363	-	0	0
Stage 1	-	-	-	-	0	0
Stage 2	-	-	-	-	0	0
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	363	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.1	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	363	-
HCM Lane V/C Ratio	-	-	-	0.459	-
HCM Control Delay (s)	0	-	-	23.1	-
HCM Lane LOS	A	-	-	C	-
HCM 95th %tile Q(veh)	-	-	-	2.3	-



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	71	31	929	163	673	1622	51	1827
v/c Ratio	0.29	0.09	1.32	0.27	0.83	0.58	0.19	0.81
Control Delay	47.4	42.5	172.7	25.4	56.3	21.6	50.0	36.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.4	42.5	172.7	25.4	56.3	21.6	50.0	36.0
Queue Length 50th (ft)	51	21	~674	33	278	356	37	483
Queue Length 95th (ft)	99	50	#932	67	332	374	80	590
Internal Link Dist (ft)		612		364		482		642
Turn Bay Length (ft)					330			
Base Capacity (vph)	242	349	706	602	950	2897	284	2242
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	0.29	0.09	1.32	0.27	0.71	0.56	0.18	0.81

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	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	357	276	2602	2735
v/c Ratio	0.91	0.76	0.73	0.75
Control Delay	83.8	64.1	16.2	15.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	83.8	64.1	16.2	15.4
Queue Length 50th (ft)	336	232	735	593
Queue Length 95th (ft)	#498	340	825	643
Internal Link Dist (ft)	551		941	912
Turn Bay Length (ft)		275		
Base Capacity (vph)	424	392	3542	3654
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	0.84	0.70	0.73	0.75

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	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	141	182	556	424	899	30	1505	263	439	2010	611
v/c Ratio	0.69	0.48	0.78	0.72	0.83	0.32	0.54	0.24	0.86	0.70	0.64
Control Delay	81.0	61.3	64.0	66.8	31.0	76.4	33.0	1.5	70.4	27.1	20.6
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	81.0	61.3	64.0	66.8	31.0	76.4	33.0	1.5	70.4	27.1	20.6
Queue Length 50th (ft)	135	54	270	212	262	29	299	2	211	438	245
Queue Length 95th (ft)	203	82	310	261	280	65	389	31	m#322	615	m364
Internal Link Dist (ft)		299		669			900			403	
Turn Bay Length (ft)	200		440		340	200		210	250		125
Base Capacity (vph)	302	1320	714	938	1081	125	2793	1105	512	2860	959
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	0.47	0.14	0.78	0.45	0.83	0.24	0.54	0.24	0.86	0.70	0.64

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.

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	790	250	370	1090	0	570
Future Vol, veh/h	790	250	370	1090	0	570
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Free
Storage Length	-	50	140	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	823	260	385	1135	0	594

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	823	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.115	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.2095	-	-	-
Pot Cap-1 Maneuver	-	-	810	-	0	0
Stage 1	-	-	-	-	0	0
Stage 2	-	-	-	-	0	0
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	810	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.4	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	810	-
HCM Lane V/C Ratio	-	-	-	0.476	-
HCM Control Delay (s)	0	-	-	13.4	-
HCM Lane LOS	A	-	-	B	-
HCM 95th %tile Q(veh)	-	-	-	2.6	-

APPENDIX F – DESIGN YEAR (2045) INTERSECTION LEVEL OF SERVICE (LOS) CALCULATION SHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	30	630	80	40	50	880	2230	110	80	1830	60
Future Volume (veh/h)	70	30	630	80	40	50	880	2230	110	80	1830	60
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)	0.98		1.00	0.97		0.95	1.00		0.98	1.00		0.98
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	1827	1681	1900	1900	1799	1900	1863	1864	1900	1845	1879	1900
Adj Flow Rate, veh/h	72	31	0	82	41	23	907	2299	110	82	1887	60
Adj No. of Lanes	1	1	1	0	2	0	2	3	0	1	3	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	4	13	0	0	0	0	2	2	2	3	1	1
Cap, veh/h	187	237	228	216	136	76	949	2650	126	357	2388	76
Arrive On Green	0.14	0.14	0.00	0.14	0.14	0.14	0.28	0.53	0.53	0.20	0.47	0.47
Sat Flow, veh/h	1276	1681	1615	1142	965	541	3442	4973	236	1757	5104	162
Grp Volume(v), veh/h	72	31	0	82	0	64	907	1563	846	82	1263	684
Grp Sat Flow(s),veh/h/ln	1276	1681	1615	1142	0	1506	1721	1697	1816	1757	1710	1847
Q Serve(g_s), s	7.0	2.1	0.0	7.7	0.0	5.0	33.7	51.9	52.9	5.1	40.5	40.6
Cycle Q Clear(g_c), s	11.9	2.1	0.0	9.8	0.0	5.0	33.7	51.9	52.9	5.1	40.5	40.6
Prop In Lane	1.00		1.00	1.00		0.36	1.00		0.13	1.00		0.09
Lane Grp Cap(c), veh/h	187	237	228	216	0	212	949	1808	968	357	1600	864
V/C Ratio(X)	0.39	0.13	0.00	0.38	0.00	0.30	0.96	0.86	0.87	0.23	0.79	0.79
Avail Cap(c_a), veh/h	272	349	335	302	0	313	953	1827	978	357	1600	864
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.4	48.9	0.0	53.2	0.0	50.1	46.3	26.3	26.6	43.3	29.2	29.2
Incr Delay (d2), s/veh	0.5	0.1	0.0	1.1	0.0	0.8	19.3	5.8	10.8	0.3	4.0	7.3
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	2.5	1.0	0.0	2.8	0.0	2.1	18.5	25.6	29.2	2.5	20.0	22.5
LnGrp Delay(d),s/veh	55.9	49.0	0.0	54.3	0.0	50.9	65.6	32.1	37.4	43.6	33.2	36.5
LnGrp LOS	E	D		D		D	E	C	D	D	C	D
Approach Vol, veh/h		103			146			3316			2029	
Approach Delay, s/veh		53.8			52.8			42.6			34.8	
Approach LOS		D			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	31.4	74.3		24.3	39.8	65.8		24.3
Change Period (Y+Rc), s	* 5	* 5		6.0	4.0	* 5		6.0
Max Green Setting (Gmax), s	* 18	* 70		27.0	36.0	* 52		27.0
Max Q Clear Time (g_c+I1), s	7.1	54.9		13.9	35.7	42.6		11.8
Green Ext Time (p_c), s	0.1	14.3		0.1	0.2	8.5		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	40.2
HCM 2010 LOS	D

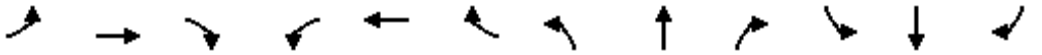
Notes

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	130	350	2870	1110	0	2540
Future Volume (veh/h)	130	350	2870	1110	0	2540
Number	7	14	6	16	5	2
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1881	1900	0	1881
Adj Flow Rate, veh/h	141	380	3120	1207	0	2761
Adj No. of Lanes	1	1	3	0	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	1	1	1	0	1
Cap, veh/h	426	376	2618	884	0	2483
Arrive On Green	0.24	0.24	0.69	0.69	0.00	0.69
Sat Flow, veh/h	1810	1599	3938	1273	0	3762
Grp Volume(v), veh/h	141	380	2793	1534	0	2761
Grp Sat Flow(s),veh/h/ln	1810	1599	1712	1618	0	1787
Q Serve(g_s), s	9.7	35.3	104.2	104.2	0.0	104.2
Cycle Q Clear(g_c), s	9.7	35.3	104.2	104.2	0.0	104.2
Prop In Lane	1.00	1.00		0.79	0.00	
Lane Grp Cap(c), veh/h	426	376	2378	1124	0	2483
V/C Ratio(X)	0.33	1.01	1.17	1.37	0.00	1.11
Avail Cap(c_a), veh/h	426	376	2378	1124	0	2483
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	47.6	57.3	22.9	22.9	0.0	22.9
Incr Delay (d2), s/veh	0.5	48.9	83.2	170.2	0.0	56.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	20.7	76.4	99.3	0.0	70.6
LnGrp Delay(d),s/veh	48.0	106.3	106.1	193.1	0.0	79.7
LnGrp LOS	D	F	F	F		F
Approach Vol, veh/h	521		4327			2761
Approach Delay, s/veh	90.5		136.9			79.7
Approach LOS	F		F			E

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		110.0		40.0		110.0		
Change Period (Y+Rc), s		5.8		* 4.7		5.8		
Max Green Setting (Gmax), s		104.2		* 35		104.2		
Max Q Clear Time (g_c+I1), s		106.2		37.3		106.2		
Green Ext Time (p_c), s		0.0		0.0		0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	113.0
HCM 2010 LOS	F

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	230	230	100	280	170	1060	30	2660	240	565	1875	230
Future Volume (veh/h)	230	230	100	280	170	1060	30	2660	240	565	1875	230
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		0.98	1.00		1.00	1.00		0.98	1.00		0.99
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	1881	1887	1900	1881	1900	1881	1900	1881	1863	1863	1881	1900
Adj Flow Rate, veh/h	247	247	63	301	183	1030	32	2860	204	608	2016	234
Adj No. of Lanes	1	3	0	2	2	2	1	4	1	2	4	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, %	1	1	1	1	0	1	0	1	2	2	1	1
Cap, veh/h	270	356	86	734	565	1141	44	1898	792	857	3119	362
Arrive On Green	0.15	0.09	0.09	0.21	0.16	0.16	0.02	0.29	0.29	0.25	0.53	0.53
Sat Flow, veh/h	1792	4128	996	3476	3610	2814	1810	6471	1560	3442	5916	686
Grp Volume(v), veh/h	247	203	107	301	183	1030	32	2860	204	608	1653	597
Grp Sat Flow(s),veh/h/ln	1792	1717	1691	1738	1805	1407	1810	1618	1560	1721	1618	1748
Q Serve(g_s), s	20.4	8.6	9.2	11.2	6.8	15.7	2.6	44.0	0.0	24.2	36.6	36.7
Cycle Q Clear(g_c), s	20.4	8.6	9.2	11.2	6.8	15.7	2.6	44.0	0.0	24.2	36.6	36.7
Prop In Lane	1.00		0.59	1.00		1.00	1.00		1.00	1.00		0.39
Lane Grp Cap(c), veh/h	270	297	146	734	565	1141	44	1898	792	857	2559	922
V/C Ratio(X)	0.92	0.68	0.73	0.41	0.32	0.90	0.72	1.51	0.26	0.71	0.65	0.65
Avail Cap(c_a), veh/h	303	893	440	734	939	1433	125	1898	792	857	2559	922
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	62.8	66.5	66.8	51.1	56.2	17.0	72.6	53.0	21.1	51.4	25.4	25.5
Incr Delay (d2), s/veh	29.1	2.8	6.9	0.4	0.3	7.0	19.5	230.8	0.8	2.7	1.3	3.5
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	12.3	4.2	4.6	5.4	3.4	12.1	1.6	50.1	5.0	11.8	16.7	18.6
LnGrp Delay(d),s/veh	91.9	69.3	73.7	51.5	56.6	24.1	92.2	283.8	21.9	54.1	26.7	29.0
LnGrp LOS	F	E	E	D	E	C	F	F	C	D	C	C
Approach Vol, veh/h		557			1514			3096			2858	
Approach Delay, s/veh		80.2			33.4			264.5			33.0	
Approach LOS		F			C			F			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	43.4	50.0	37.7	19.0	8.3	85.1	27.2	29.5
Change Period (Y+Rc), s	* 6	* 6	* 6	* 6	4.6	* 6	4.6	* 6
Max Green Setting (Gmax), s	* 20	* 44	* 25	* 39	10.4	* 54	25.4	* 39
Max Q Clear Time (g_c+I1), s	26.2	46.0	13.2	11.2	4.6	38.7	22.4	17.7
Green Ext Time (p_c), s	0.0	0.0	0.8	1.7	0.0	13.7	0.2	5.8

Intersection Summary		
HCM 2010 Ctrl Delay		125.7
HCM 2010 LOS		F

Notes

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1690	310	170	830	0	1110
Future Vol, veh/h	1690	310	170	830	0	1110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Free
Storage Length	-	50	140	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	1798	330	181	883	0	1181

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1798	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.115	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.2095	-	-	-
Pot Cap-1 Maneuver	-	-	345	-	0	0
Stage 1	-	-	-	-	0	0
Stage 2	-	-	-	-	0	0
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	345	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.5	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	345	-
HCM Lane V/C Ratio	-	-	-	0.524	-
HCM Control Delay (s)	0	-	-	26.4	-
HCM Lane LOS	A	-	-	D	-
HCM 95th %tile Q(veh)	-	-	-	2.9	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	40	870	70	40	80	810	1940	80	70	1760	100
Future Volume (veh/h)	80	40	870	70	40	80	810	1940	80	70	1760	100
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)	0.98		1.00	0.97		0.95	1.00		0.98	1.00		0.98
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	1827	1681	1900	1900	1819	1900	1863	1864	1900	1845	1877	1900
Adj Flow Rate, veh/h	82	41	0	72	41	53	835	2000	79	72	1814	101
Adj No. of Lanes	1	1	1	0	2	0	2	3	0	1	3	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	4	13	0	0	0	0	2	2	2	3	1	1
Cap, veh/h	171	240	230	185	101	138	900	2566	101	392	2385	133
Arrive On Green	0.14	0.14	0.00	0.14	0.14	0.14	0.26	0.51	0.51	0.22	0.48	0.48
Sat Flow, veh/h	1245	1681	1615	946	711	972	3442	5019	198	1757	4964	276
Grp Volume(v), veh/h	82	41	0	89	0	77	835	1350	729	72	1247	668
Grp Sat Flow(s),veh/h/ln	1245	1681	1615	1207	0	1421	1721	1696	1824	1757	1708	1823
Q Serve(g_s), s	8.3	2.8	0.0	7.3	0.0	6.4	30.8	42.0	42.3	4.3	38.8	39.0
Cycle Q Clear(g_c), s	14.7	2.8	0.0	10.0	0.0	6.4	30.8	42.0	42.3	4.3	38.8	39.0
Prop In Lane	1.00		1.00	0.81		0.68	1.00		0.11	1.00		0.15
Lane Grp Cap(c), veh/h	171	240	230	222	0	203	900	1734	932	392	1642	876
V/C Ratio(X)	0.48	0.17	0.00	0.40	0.00	0.38	0.93	0.78	0.78	0.18	0.76	0.76
Avail Cap(c_a), veh/h	252	349	335	311	0	295	953	1827	982	392	1642	876
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.2	49.0	0.0	52.9	0.0	50.5	46.8	25.8	25.9	40.9	27.6	27.7
Incr Delay (d2), s/veh	0.8	0.1	0.0	1.2	0.0	1.2	14.4	3.5	6.5	0.2	3.4	6.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	1.3	0.0	3.0	0.0	2.6	16.4	20.4	22.9	2.1	19.0	21.2
LnGrp Delay(d),s/veh	58.0	49.1	0.0	54.1	0.0	51.7	61.2	29.3	32.4	41.1	31.0	33.9
LnGrp LOS	E	D		D		D	E	C	C	D	C	C
Approach Vol, veh/h		123			166			2914			1987	
Approach Delay, s/veh		55.0			53.0			39.2			32.3	
Approach LOS		E			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	34.0	71.5		24.5	38.0	67.5		24.5
Change Period (Y+Rc), s	* 5	* 5		6.0	4.0	* 5		6.0
Max Green Setting (Gmax), s	* 18	* 70		27.0	36.0	* 52		27.0
Max Q Clear Time (g_c+I1), s	6.3	44.3		16.7	32.8	41.0		12.0
Green Ext Time (p_c), s	0.1	22.2		0.1	1.3	9.8		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	37.4
HCM 2010 LOS	D

Notes

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	360	280	2550	620	0	2700
Future Volume (veh/h)	360	280	2550	620	0	2700
Number	7	14	6	16	5	2
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1881	1900	0	1881
Adj Flow Rate, veh/h	367	286	2602	633	0	2755
Adj No. of Lanes	1	1	3	0	0	2
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	1	1	1	0	1
Cap, veh/h	394	349	2977	663	0	2545
Arrive On Green	0.22	0.22	0.71	0.71	0.00	0.71
Sat Flow, veh/h	1810	1599	4350	932	0	3762
Grp Volume(v), veh/h	367	286	2088	1147	0	2755
Grp Sat Flow(s),veh/h/ln	1810	1599	1712	1688	0	1787
Q Serve(g_s), s	29.8	25.6	67.5	91.6	0.0	106.8
Cycle Q Clear(g_c), s	29.8	25.6	67.5	91.6	0.0	106.8
Prop In Lane	1.00	1.00		0.55	0.00	
Lane Grp Cap(c), veh/h	394	349	2438	1202	0	2545
V/C Ratio(X)	0.93	0.82	0.86	0.95	0.00	1.08
Avail Cap(c_a), veh/h	426	376	2438	1202	0	2545
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	57.5	55.9	15.9	19.4	0.0	21.6
Incr Delay (d2), s/veh	26.1	12.7	4.1	17.1	0.0	44.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.8	12.5	33.0	47.8	0.0	67.8
LnGrp Delay(d),s/veh	83.6	68.6	20.1	36.5	0.0	66.4
LnGrp LOS	F	E	C	D		F
Approach Vol, veh/h	653		3235			2755
Approach Delay, s/veh	77.0		25.9			66.4
Approach LOS	E		C			E

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		112.6		37.4		112.6		
Change Period (Y+Rc), s		5.8		* 4.7		5.8		
Max Green Setting (Gmax), s		104.2		* 35		104.2		
Max Q Clear Time (g_c+I1), s		108.8		31.8		93.6		
Green Ext Time (p_c), s		0.0		0.9		10.6		

Intersection Summary	
HCM 2010 Ctrl Delay	47.7
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	190	50	600	430	950	40	1910	250	530	1945	585
Future Volume (veh/h)	280	190	50	600	430	950	40	1910	250	530	1945	585
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		0.98	1.00		1.00	1.00		0.98	1.00		0.99
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	1881	1885	1900	1881	1900	1881	1900	1881	1863	1863	1881	1900
Adj Flow Rate, veh/h	289	196	9	619	443	874	41	1969	206	546	2005	591
Adj No. of Lanes	1	3	0	2	2	2	1	4	1	2	4	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	1	0	1	0	1	2	2	1	1
Cap, veh/h	303	336	15	924	623	1088	53	1898	878	737	2438	707
Arrive On Green	0.17	0.07	0.07	0.27	0.17	0.17	0.03	0.29	0.29	0.21	0.49	0.49
Sat Flow, veh/h	1792	5042	229	3476	3610	2814	1810	6471	1560	3442	5002	1451
Grp Volume(v), veh/h	289	133	72	619	443	874	41	1969	206	546	1944	652
Grp Sat Flow(s),veh/h/ln	1792	1715	1840	1738	1805	1407	1810	1618	1560	1721	1618	1600
Q Serve(g_s), s	24.0	5.6	5.7	23.9	17.4	13.5	3.4	44.0	0.0	22.2	51.4	52.9
Cycle Q Clear(g_c), s	24.0	5.6	5.7	23.9	17.4	13.5	3.4	44.0	0.0	22.2	51.4	52.9
Prop In Lane	1.00		0.12	1.00		1.00	1.00		1.00	1.00		0.91
Lane Grp Cap(c), veh/h	303	229	123	924	623	1088	53	1898	878	737	2366	780
V/C Ratio(X)	0.95	0.58	0.59	0.67	0.71	0.80	0.77	1.04	0.23	0.74	0.82	0.84
Avail Cap(c_a), veh/h	303	892	478	924	939	1334	125	1898	878	737	2366	780
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	61.7	68.0	68.0	49.2	58.5	16.4	72.3	53.0	16.8	55.0	32.9	33.3
Incr Delay (d2), s/veh	39.0	2.3	4.5	1.9	1.5	3.0	20.4	31.0	0.6	4.0	3.4	10.3
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	15.2	2.7	3.1	11.7	8.8	9.1	2.0	23.7	4.4	11.0	23.6	25.6
LnGrp Delay(d),s/veh	100.7	70.3	72.5	51.1	60.1	19.4	92.6	84.0	17.4	59.0	36.2	43.6
LnGrp LOS	F	E	E	D	E	B	F	F	B	E	D	D
Approach Vol, veh/h		494			1936			2216			3142	
Approach Delay, s/veh		88.4			38.8			78.0			41.7	
Approach LOS		F			D			E			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	38.1	50.0	45.9	16.0	9.0	79.1	30.0	31.9
Change Period (Y+Rc), s	* 6	* 6	* 6	* 6	4.6	* 6	4.6	* 6
Max Green Setting (Gmax), s	* 20	* 44	* 25	* 39	10.4	* 54	25.4	* 39
Max Q Clear Time (g_c+I1), s	24.2	46.0	25.9	7.7	5.4	54.9	26.0	19.4
Green Ext Time (p_c), s	0.0	0.0	0.0	1.1	0.0	0.0	0.0	6.5

Intersection Summary	
HCM 2010 Ctrl Delay	54.3
HCM 2010 LOS	D

Notes

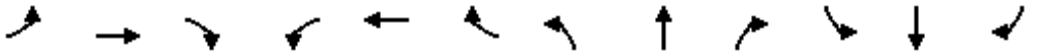
Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	840	255	385	1140	0	620
Future Vol, veh/h	840	255	385	1140	0	620
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Free
Storage Length	-	50	140	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	875	266	401	1188	0	646

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	875	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.115	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.2095	-	-	-
Pot Cap-1 Maneuver	-	-	775	-	0	0
Stage 1	-	-	-	-	0	0
Stage 2	-	-	-	-	0	0
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	775	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.7	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	775	-
HCM Lane V/C Ratio	-	-	-	0.517	-
HCM Control Delay (s)	0	-	-	14.5	-
HCM Lane LOS	A	-	-	B	-
HCM 95th %tile Q(veh)	-	-	-	3	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	30	670	80	40	50	895	2235	110	80	1960	60
Future Volume (veh/h)	70	30	670	80	40	50	895	2235	110	80	1960	60
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)	0.98		1.00	0.97		0.95	1.00		0.98	1.00		0.98
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	1827	1681	1900	1900	1798	1900	1863	1864	1900	1845	1879	1900
Adj Flow Rate, veh/h	71	31	0	82	41	11	913	2281	108	82	2000	59
Adj No. of Lanes	1	1	1	0	2	0	2	3	0	1	3	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	4	13	0	0	0	0	2	2	2	3	1	1
Cap, veh/h	198	236	227	216	173	46	952	2647	124	359	2392	70
Arrive On Green	0.14	0.14	0.00	0.14	0.14	0.14	0.28	0.53	0.53	0.20	0.47	0.47
Sat Flow, veh/h	1288	1681	1615	1142	1227	329	3442	4976	234	1757	5119	151
Grp Volume(v), veh/h	71	31	0	82	0	52	913	1550	839	82	1335	724
Grp Sat Flow(s),veh/h/ln	1288	1681	1615	1142	0	1557	1721	1697	1817	1757	1710	1849
Q Serve(g_s), s	6.7	2.1	0.0	7.7	0.0	3.9	33.9	51.2	52.2	5.1	44.4	44.5
Cycle Q Clear(g_c), s	10.6	2.1	0.0	9.8	0.0	3.9	33.9	51.2	52.2	5.1	44.4	44.5
Prop In Lane	1.00		1.00	1.00		0.21	1.00		0.13	1.00		0.08
Lane Grp Cap(c), veh/h	198	236	227	216	0	219	952	1805	966	359	1598	864
V/C Ratio(X)	0.36	0.13	0.00	0.38	0.00	0.24	0.96	0.86	0.87	0.23	0.84	0.84
Avail Cap(c_a), veh/h	285	349	335	302	0	323	953	1827	978	359	1598	864
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.4	48.9	0.0	53.2	0.0	49.7	46.3	26.2	26.4	43.2	30.3	30.3
Incr Delay (d2), s/veh	0.4	0.1	0.0	1.1	0.0	0.6	19.8	5.6	10.4	0.3	5.3	9.5
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	2.4	1.0	0.0	2.8	0.0	1.7	18.7	25.3	28.9	2.5	22.1	25.0
LnGrp Delay(d),s/veh	54.8	49.0	0.0	54.3	0.0	50.2	66.1	31.8	36.8	43.5	35.6	39.8
LnGrp LOS	D	D		D		D	E	C	D	D	D	D
Approach Vol, veh/h		102			134			3302			2141	
Approach Delay, s/veh		53.0			52.7			42.6			37.3	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	31.6	74.2		24.3	40.0	65.7		24.3
Change Period (Y+Rc), s	* 5	* 5		6.0	4.0	* 5		6.0
Max Green Setting (Gmax), s	* 18	* 70		27.0	36.0	* 52		27.0
Max Q Clear Time (g_c+I1), s	7.1	54.2		12.6	35.9	46.5		11.8
Green Ext Time (p_c), s	0.1	15.0		0.1	0.0	5.1		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	41.0
HCM 2010 LOS	D

Notes

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	170	370	2870	1110	0	2710
Future Volume (veh/h)	170	370	2870	1110	0	2710
Number	7	14	6	16	5	2
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1881	1900	0	1881
Adj Flow Rate, veh/h	173	378	2929	1133	0	2765
Adj No. of Lanes	1	1	3	0	0	3
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	1	1	1	0	1
Cap, veh/h	426	376	2618	884	0	3568
Arrive On Green	0.24	0.24	0.69	0.69	0.00	0.69
Sat Flow, veh/h	1810	1599	3938	1272	0	5474
Grp Volume(v), veh/h	173	378	2622	1440	0	2765
Grp Sat Flow(s),veh/h/ln	1810	1599	1712	1618	0	1712
Q Serve(g_s), s	12.1	35.3	104.2	104.2	0.0	53.4
Cycle Q Clear(g_c), s	12.1	35.3	104.2	104.2	0.0	53.4
Prop In Lane	1.00	1.00		0.79	0.00	
Lane Grp Cap(c), veh/h	426	376	2378	1124	0	3568
V/C Ratio(X)	0.41	1.00	1.10	1.28	0.00	0.78
Avail Cap(c_a), veh/h	426	376	2378	1124	0	3568
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	48.5	57.3	22.9	22.9	0.0	15.1
Incr Delay (d2), s/veh	0.6	47.5	53.1	133.7	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	20.5	66.4	87.9	0.0	25.7
LnGrp Delay(d),s/veh	49.1	104.9	76.0	156.6	0.0	16.9
LnGrp LOS	D	F	F	F		B
Approach Vol, veh/h	551		4062			2765
Approach Delay, s/veh	87.4		104.6			16.9
Approach LOS	F		F			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		110.0		40.0		110.0		
Change Period (Y+Rc), s		5.8		* 4.7		5.8		
Max Green Setting (Gmax), s		104.2		* 35		104.2		
Max Q Clear Time (g_c+I1), s		55.4		37.3		106.2		
Green Ext Time (p_c), s		41.4		0.0		0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	70.4
HCM 2010 LOS	E

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	210	230	100	280	170	1060	30	2660	250	580	1980	320
Future Volume (veh/h)	210	230	100	280	170	1060	30	2660	250	580	1980	320
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		0.98	1.00		1.00	1.00		0.98	1.00		0.99
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	1881	1887	1900	1881	1900	1881	1900	1881	1863	1863	1881	1881
Adj Flow Rate, veh/h	212	232	55	283	172	983	30	2687	201	586	2000	269
Adj No. of Lanes	1	3	0	2	2	2	1	4	1	2	3	1
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	1	1	1	1	0	1	0	1	2	2	1	1
Cap, veh/h	236	339	76	623	497	1194	43	1898	741	986	2904	891
Arrive On Green	0.13	0.08	0.08	0.18	0.14	0.14	0.02	0.29	0.29	0.29	0.57	0.57
Sat Flow, veh/h	1792	4193	942	3476	3610	2814	1810	6471	1560	3442	5136	1576
Grp Volume(v), veh/h	212	188	99	283	172	983	30	2687	201	586	2000	269
Grp Sat Flow(s),veh/h/ln	1792	1717	1701	1738	1805	1407	1810	1618	1560	1721	1712	1576
Q Serve(g_s), s	17.5	8.0	8.5	10.9	6.5	13.1	2.5	44.0	0.0	22.0	41.6	13.4
Cycle Q Clear(g_c), s	17.5	8.0	8.5	10.9	6.5	13.1	2.5	44.0	0.0	22.0	41.6	13.4
Prop In Lane	1.00		0.55	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	236	277	137	623	497	1194	43	1898	741	986	2904	891
V/C Ratio(X)	0.90	0.68	0.72	0.45	0.35	0.82	0.70	1.42	0.27	0.59	0.69	0.30
Avail Cap(c_a), veh/h	303	893	442	623	939	1538	125	1898	741	986	2904	891
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	64.1	67.0	67.3	55.0	58.6	15.8	72.7	53.0	23.9	46.0	23.2	17.1
Incr Delay (d2), s/veh	23.6	2.9	7.0	0.5	0.4	2.9	18.3	190.2	0.9	1.0	1.4	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	10.2	3.9	4.3	5.3	3.3	10.9	1.5	44.7	5.2	10.5	20.0	6.1
LnGrp Delay(d),s/veh	87.7	69.9	74.3	55.5	59.0	18.8	91.0	243.2	24.8	47.0	24.6	17.9
LnGrp LOS	F	E	E	E	E	B	F	F	C	D	C	B
Approach Vol, veh/h		499			1438			2918			2855	
Approach Delay, s/veh		78.3			30.8			226.6			28.5	
Approach LOS		E			C			F			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	49.0	50.0	32.9	18.1	8.2	90.8	24.3	26.7
Change Period (Y+Rc), s	* 6	* 6	* 6	* 6	4.6	* 6	4.6	* 6
Max Green Setting (Gmax), s	* 20	* 44	* 25	* 39	10.4	* 54	25.4	* 39
Max Q Clear Time (g_c+I1), s	24.0	46.0	12.9	10.5	4.5	43.6	19.5	15.1
Green Ext Time (p_c), s	0.0	0.0	0.7	1.6	0.0	9.6	0.3	5.6

Intersection Summary	
HCM 2010 Ctrl Delay	107.1
HCM 2010 LOS	F

Notes

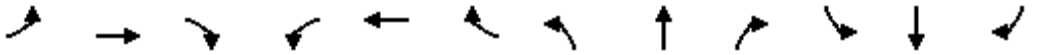
Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1700	340	200	830	0	1110
Future Vol, veh/h	1700	340	200	830	0	1110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Free
Storage Length	-	50	140	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	1771	354	208	865	0	1156

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1771	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.115	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.2095	-	-	-
Pot Cap-1 Maneuver	-	-	353	-	0	0
Stage 1	-	-	-	-	0	0
Stage 2	-	-	-	-	0	0
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	353	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.6	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	353	-
HCM Lane V/C Ratio	-	-	-	0.59	-
HCM Control Delay (s)	0	-	-	28.9	-
HCM Lane LOS	A	-	-	D	-
HCM 95th %tile Q(veh)	-	-	-	3.6	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	40	1090	70	40	80	810	1980	80	70	2120	100
Future Volume (veh/h)	80	40	1090	70	40	80	810	1980	80	70	2120	100
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)	0.98		1.00	0.97		0.95	1.00		0.98	1.00		0.98
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	1827	1681	1900	1900	1820	1900	1863	1864	1900	1845	1878	1900
Adj Flow Rate, veh/h	82	41	0	71	41	26	827	2020	79	71	2163	99
Adj No. of Lanes	1	1	1	0	2	0	2	3	0	1	3	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	4	13	0	0	0	0	2	2	2	3	1	1
Cap, veh/h	184	234	225	203	132	85	894	2576	100	394	2438	111
Arrive On Green	0.14	0.14	0.00	0.14	0.14	0.14	0.26	0.51	0.51	0.22	0.49	0.49
Sat Flow, veh/h	1272	1681	1615	1067	946	609	3442	5021	196	1757	5022	229
Grp Volume(v), veh/h	82	41	0	74	0	64	827	1363	736	71	1469	793
Grp Sat Flow(s),veh/h/ln	1272	1681	1615	1113	0	1508	1721	1696	1824	1757	1709	1833
Q Serve(g_s), s	8.1	2.8	0.0	6.7	0.0	5.0	30.4	42.5	42.8	4.2	50.4	51.1
Cycle Q Clear(g_c), s	13.0	2.8	0.0	9.5	0.0	5.0	30.4	42.5	42.8	4.2	50.4	51.1
Prop In Lane	1.00		1.00	0.96		0.40	1.00		0.11	1.00		0.12
Lane Grp Cap(c), veh/h	184	234	225	210	0	210	894	1741	936	394	1659	890
V/C Ratio(X)	0.45	0.17	0.00	0.35	0.00	0.31	0.92	0.78	0.79	0.18	0.89	0.89
Avail Cap(c_a), veh/h	271	349	335	299	0	313	953	1827	982	394	1659	890
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.1	49.3	0.0	53.5	0.0	50.3	46.9	25.8	25.8	40.7	30.2	30.4
Incr Delay (d2), s/veh	0.6	0.1	0.0	1.0	0.0	0.8	14.0	3.6	6.6	0.2	7.3	13.1
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	2.9	1.3	0.0	2.5	0.0	2.1	16.2	20.7	23.2	2.1	25.4	29.0
LnGrp Delay(d),s/veh	56.8	49.5	0.0	54.5	0.0	51.1	60.9	29.4	32.5	41.0	37.5	43.5
LnGrp LOS	E	D		D		D	E	C	C	D	D	D
Approach Vol, veh/h		123			138			2926			2333	
Approach Delay, s/veh		54.3			52.9			39.1			39.7	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	34.2	71.7		24.1	37.8	68.1		24.1
Change Period (Y+Rc), s	* 5	* 5		6.0	4.0	* 5		6.0
Max Green Setting (Gmax), s	* 18	* 70		27.0	36.0	* 52		27.0
Max Q Clear Time (g_c+I1), s	6.2	44.8		15.0	32.4	53.1		11.5
Green Ext Time (p_c), s	0.1	21.9		0.1	1.3	0.0		0.6

Intersection Summary		
HCM 2010 Ctrl Delay		40.0
HCM 2010 LOS		D

Notes

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	360	280	2590	600	0	3280
Future Volume (veh/h)	360	280	2590	600	0	3280
Number	7	14	6	16	5	2
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1881	1900	0	1881
Adj Flow Rate, veh/h	367	286	2643	612	0	3347
Adj No. of Lanes	1	1	3	0	0	3
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	1	1	1	0	1
Cap, veh/h	394	349	3005	640	0	3657
Arrive On Green	0.22	0.22	0.71	0.71	0.00	0.71
Sat Flow, veh/h	1810	1599	4389	899	0	5474
Grp Volume(v), veh/h	367	286	2101	1154	0	3347
Grp Sat Flow(s),veh/h/ln	1810	1599	1712	1695	0	1712
Q Serve(g_s), s	29.8	25.6	68.6	92.2	0.0	80.8
Cycle Q Clear(g_c), s	29.8	25.6	68.6	92.2	0.0	80.8
Prop In Lane	1.00	1.00		0.53	0.00	
Lane Grp Cap(c), veh/h	394	349	2438	1207	0	3657
V/C Ratio(X)	0.93	0.82	0.86	0.96	0.00	0.92
Avail Cap(c_a), veh/h	426	376	2438	1207	0	3657
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	57.5	55.9	16.1	19.5	0.0	17.9
Incr Delay (d2), s/veh	26.1	12.7	4.3	17.3	0.0	4.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.8	12.5	33.6	48.5	0.0	39.4
LnGrp Delay(d),s/veh	83.6	68.6	20.4	36.8	0.0	22.6
LnGrp LOS	F	E	C	D		C
Approach Vol, veh/h	653		3255			3347
Approach Delay, s/veh	77.0		26.2			22.6
Approach LOS	E		C			C

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		112.6		37.4		112.6		
Change Period (Y+Rc), s		5.8		* 4.7		5.8		
Max Green Setting (Gmax), s		104.2		* 35		104.2		
Max Q Clear Time (g_c+I1), s		82.8		31.8		94.2		
Green Ext Time (p_c), s		20.9		0.9		10.0		

Intersection Summary	
HCM 2010 Ctrl Delay	29.1
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	190	30	600	430	960	40	1910	270	530	2330	780
Future Volume (veh/h)	280	190	30	600	430	960	40	1910	270	530	2330	780
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		0.98	1.00		0.99
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	1881	1884	1900	1881	1900	1881	1900	1881	1863	1863	1881	1881
Adj Flow Rate, veh/h	283	192	-41	606	434	907	40	1929	193	535	2354	683
Adj No. of Lanes	1	3	0	2	2	2	1	4	1	2	3	1
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	1	1	1	1	0	1	0	1	2	2	1	1
Cap, veh/h	303	342	0	919	618	1089	52	1898	876	742	2515	771
Arrive On Green	0.17	0.07	0.00	0.26	0.17	0.17	0.03	0.29	0.29	0.22	0.49	0.49
Sat Flow, veh/h	1792	5312	0	3476	3610	2814	1810	6471	1560	3442	5136	1575
Grp Volume(v), veh/h	283	151	0	606	434	907	40	1929	193	535	2354	683
Grp Sat Flow(s),veh/h/ln	1792	1714	0	1738	1805	1407	1810	1618	1560	1721	1712	1575
Q Serve(g_s), s	23.4	4.2	0.0	23.3	17.0	14.3	3.3	44.0	0.0	21.7	64.8	58.6
Cycle Q Clear(g_c), s	23.4	4.2	0.0	23.3	17.0	14.3	3.3	44.0	0.0	21.7	64.8	58.6
Prop In Lane	1.00		0.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	303	342	0	919	618	1089	52	1898	876	742	2515	771
V/C Ratio(X)	0.93	0.44	0.00	0.66	0.70	0.83	0.77	1.02	0.22	0.72	0.94	0.89
Avail Cap(c_a), veh/h	303	1337	0	919	939	1339	125	1898	876	742	2515	771
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.5	67.3	0.0	49.1	58.6	16.7	72.4	53.0	16.7	54.6	36.1	34.5
Incr Delay (d2), s/veh	34.6	0.9	0.0	1.7	1.5	3.9	20.8	24.8	0.6	3.4	8.2	14.1
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	14.5	2.0	0.0	11.4	8.6	9.8	1.9	22.9	4.2	10.7	32.4	28.4
LnGrp Delay(d),s/veh	96.1	68.2	0.0	50.9	60.0	20.6	93.2	77.8	17.3	58.0	44.2	48.6
LnGrp LOS	F	E		D	E	C	F	F	B	E	D	D
Approach Vol, veh/h		434			1947			2162			3572	
Approach Delay, s/veh		86.4			38.8			72.7			47.1	
Approach LOS		F			D			E			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	38.4	50.0	45.7	16.0	8.9	79.4	30.0	31.7
Change Period (Y+Rc), s	* 6	* 6	* 6	* 6	4.6	* 6	4.6	* 6
Max Green Setting (Gmax), s	* 20	* 44	* 25	* 39	10.4	* 54	25.4	* 39
Max Q Clear Time (g_c+I1), s	23.7	46.0	25.3	6.2	5.3	66.8	25.4	19.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.9	0.0	0.0	0.0	6.7

Intersection Summary	
HCM 2010 Ctrl Delay	54.0
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	2.3

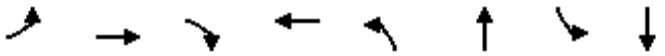
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	890	250	390	1140	0	600
Future Vol, veh/h	890	250	390	1140	0	600
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Free
Storage Length	-	50	140	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	927	260	406	1188	0	625

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	927	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.115	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.2095	-	-	-
Pot Cap-1 Maneuver	-	-	741	-	0	0
Stage 1	-	-	-	-	0	0
Stage 2	-	-	-	-	0	0
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	741	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	741	-
HCM Lane V/C Ratio	-	-	-	0.548	-
HCM Control Delay (s)	0	-	-	15.6	-
HCM Lane LOS	A	-	-	C	-
HCM 95th %tile Q(veh)	-	-	-	3.4	-

APPENDIX G – DESIGN YEAR (2045) QUEUE CALCULATION SHEETS



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	72	31	649	175	907	2412	82	1949
v/c Ratio	0.37	0.11	0.98	0.36	0.96	0.83	0.34	0.87
Control Delay	51.0	43.3	44.0	35.8	67.0	26.7	55.0	39.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.0	43.3	44.0	35.8	67.0	26.7	55.0	39.5
Queue Length 50th (ft)	52	21	166	48	388	632	63	576
Queue Length 95th (ft)	100	50	#416	84	#519	707	116	#690
Internal Link Dist (ft)		612		364		482		642
Turn Bay Length (ft)					330			
Base Capacity (vph)	239	349	705	576	950	2909	242	2236
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	0.30	0.09	0.92	0.30	0.95	0.83	0.34	0.87

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	141	380	4327	2761
v/c Ratio	0.33	1.01	1.26	1.11
Control Delay	50.2	104.1	146.8	80.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	50.2	104.1	146.8	80.9
Queue Length 50th (ft)	116	~377	~1968	~1622
Queue Length 95th (ft)	182	#598	m#1676	#1734
Internal Link Dist (ft)	551		941	912
Turn Bay Length (ft)		275		
Base Capacity (vph)	424	377	3439	2482
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	0.33	1.01	1.26	1.11

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	247	355	301	183	1140	32	2860	258	608	2263
v/c Ratio	0.88	0.67	0.58	0.58	1.54	0.33	0.92	0.25	1.30	0.60
Control Delay	91.3	58.7	63.8	73.2	278.8	77.0	43.2	5.4	192.7	30.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	91.3	58.7	63.8	73.2	278.8	77.0	43.2	5.4	192.7	30.7
Queue Length 50th (ft)	236	100	141	92	~685	31	765	41	~390	507
Queue Length 95th (ft)	#377	135	192	132	#763	68	#900	84	m#334	m459
Internal Link Dist (ft)		299		669			900			403
Turn Bay Length (ft)	200		440		340	200		210	250	
Base Capacity (vph)	302	1324	587	938	738	125	3092	1068	466	3754
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.27	0.51	0.20	1.54	0.26	0.92	0.24	1.30	0.60

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

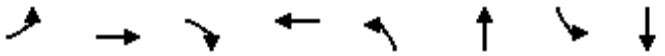
Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1690	310	170	830	0	1110
Future Vol, veh/h	1690	310	170	830	0	1110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Free
Storage Length	-	50	140	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	1798	330	181	883	0	1181

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1798	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.115	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.2095	-	-	-
Pot Cap-1 Maneuver	-	-	345	-	0	0
Stage 1	-	-	-	-	0	0
Stage 2	-	-	-	-	0	0
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	345	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.5	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	345	-
HCM Lane V/C Ratio	-	-	-	0.524	-
HCM Control Delay (s)	0	-	-	26.4	-
HCM Lane LOS	A	-	-	D	-
HCM 95th %tile Q(veh)	-	-	-	2.9	-



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	82	41	897	195	835	2082	72	1917
v/c Ratio	0.35	0.12	1.27	0.32	0.91	0.72	0.33	0.92
Control Delay	49.1	43.0	154.0	26.5	60.9	23.1	55.2	44.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.1	43.0	154.0	26.5	60.9	23.1	55.2	44.7
Queue Length 50th (ft)	60	28	~619	42	347	484	55	561
Queue Length 95th (ft)	111	61	#873	78	#452	546	104	#652
Internal Link Dist (ft)		612		364		482		642
Turn Bay Length (ft)					330			
Base Capacity (vph)	233	349	705	610	950	2894	242	2086
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	0.35	0.12	1.27	0.32	0.88	0.72	0.30	0.92

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	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	367	286	3235	2755
v/c Ratio	0.92	0.80	0.91	1.09
Control Delay	85.3	70.8	23.5	70.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	85.3	70.8	23.5	70.1
Queue Length 50th (ft)	348	257	1145	~1615
Queue Length 95th (ft)	#521	370	m1150	#1727
Internal Link Dist (ft)	551		941	912
Turn Bay Length (ft)		275		
Base Capacity (vph)	424	380	3541	2531
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	0.87	0.75	0.91	1.09

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	289	248	619	443	979	41	1969	258	546	2608
v/c Ratio	0.96	0.57	0.72	0.77	1.07	0.41	0.77	0.24	1.17	0.85
Control Delay	103.3	60.0	56.5	69.6	81.0	79.5	42.7	3.0	136.2	38.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	103.3	60.0	56.5	69.6	81.0	79.5	42.7	3.0	136.2	38.6
Queue Length 50th (ft)	284	72	287	222	~396	39	484	19	~326	536
Queue Length 95th (ft)	#470	103	346	271	#454	82	569	53	m#297	m481
Internal Link Dist (ft)		299		669			900			403
Turn Bay Length (ft)	200		440		340	200		210	250	
Base Capacity (vph)	302	1324	863	938	919	125	2551	1091	466	3060
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.19	0.72	0.47	1.07	0.33	0.77	0.24	1.17	0.85

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

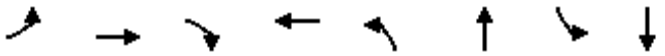
Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	840	255	385	1140	0	620
Future Vol, veh/h	840	255	385	1140	0	620
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Free
Storage Length	-	50	140	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	875	266	401	1188	0	646

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	875	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.115	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.2095	-	-	-
Pot Cap-1 Maneuver	-	-	775	-	0	0
Stage 1	-	-	-	-	0	0
Stage 2	-	-	-	-	0	0
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	775	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.7	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	775	-
HCM Lane V/C Ratio	-	-	-	0.517	-
HCM Control Delay (s)	0	-	-	14.5	-
HCM Lane LOS	A	-	-	B	-
HCM 95th %tile Q(veh)	-	-	-	3	-



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	71	31	684	174	913	2393	82	2061
v/c Ratio	0.32	0.10	0.99	0.32	0.96	0.86	0.34	0.98
Control Delay	48.4	42.6	48.2	34.7	67.6	29.2	55.0	52.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.4	42.6	48.2	34.7	67.6	29.2	55.0	52.3
Queue Length 50th (ft)	51	21	214	48	391	623	63	~640
Queue Length 95th (ft)	99	50	#480	84	#525	697	116	#761
Internal Link Dist (ft)		612		364		482		642
Turn Bay Length (ft)					330			
Base Capacity (vph)	239	349	705	573	950	2789	242	2113
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	0.30	0.09	0.97	0.30	0.96	0.86	0.34	0.98

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	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	173	378	4062	2765
v/c Ratio	0.41	1.00	1.18	0.78
Control Delay	52.0	102.3	114.8	17.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	52.0	102.3	114.8	17.1
Queue Length 50th (ft)	144	371	~1767	607
Queue Length 95th (ft)	220	#594	m#1549	658
Internal Link Dist (ft)	551		941	912
Turn Bay Length (ft)		275		
Base Capacity (vph)	424	378	3439	3567
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	0.41	1.00	1.18	0.78

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	212	333	283	172	1071	30	2687	253	586	2000	323
v/c Ratio	0.82	0.66	0.58	0.56	1.41	0.32	0.84	0.24	1.26	0.64	0.32
Control Delay	85.7	57.9	65.1	73.1	221.3	76.4	36.9	4.9	180.2	30.2	18.2
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	85.7	57.9	65.1	73.1	221.3	76.4	36.9	4.9	180.2	30.2	18.2
Queue Length 50th (ft)	202	92	134	86	~582	29	659	37	~364	513	138
Queue Length 95th (ft)	292	126	181	125	#664	65	764	78	#488	577	m224
Internal Link Dist (ft)		299		669			900			403	
Turn Bay Length (ft)	200		440		340	200		210	250		125
Base Capacity (vph)	302	1326	587	938	759	125	3187	1083	466	3104	1003
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	0.70	0.25	0.48	0.18	1.41	0.24	0.84	0.23	1.26	0.64	0.32

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

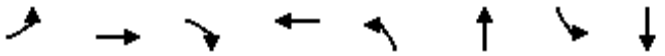
Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1700	340	200	830	0	1110
Future Vol, veh/h	1700	340	200	830	0	1110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Free
Storage Length	-	50	140	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	1771	354	208	865	0	1156

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1771	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.115	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.2095	-	-	-
Pot Cap-1 Maneuver	-	-	353	-	0	0
Stage 1	-	-	-	-	0	0
Stage 2	-	-	-	-	0	0
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	353	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.6	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	353	-
HCM Lane V/C Ratio	-	-	-	0.59	-
HCM Control Delay (s)	0	-	-	28.9	-
HCM Lane LOS	A	-	-	D	-
HCM 95th %tile Q(veh)	-	-	-	3.6	-



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	82	41	1112	194	827	2102	71	2265
v/c Ratio	0.35	0.12	1.58	0.32	0.91	0.73	0.32	1.08
Control Delay	49.1	43.0	288.3	26.4	60.3	23.3	55.0	83.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.1	43.0	288.3	26.4	60.3	23.3	55.0	83.0
Queue Length 50th (ft)	60	28	~1003	41	343	493	55	~800
Queue Length 95th (ft)	111	61	#1267	78	#444	555	103	#893
Internal Link Dist (ft)		612		364		482		642
Turn Bay Length (ft)					330			
Base Capacity (vph)	233	349	704	611	950	2894	242	2092
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	0.35	0.12	1.58	0.32	0.87	0.73	0.29	1.08

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	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	367	286	3255	3347
v/c Ratio	0.92	0.80	0.92	0.92
Control Delay	85.3	70.8	24.5	24.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	85.3	70.8	24.5	24.2
Queue Length 50th (ft)	348	257	1150	973
Queue Length 95th (ft)	#521	370	m1158	1047
Internal Link Dist (ft)	551		941	912
Turn Bay Length (ft)		275		
Base Capacity (vph)	424	380	3543	3638
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	0.87	0.75	0.92	0.92

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.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	283	222	606	434	970	40	1929	273	535	2354	788
v/c Ratio	0.95	0.54	0.71	0.77	1.06	0.40	0.75	0.25	1.15	0.93	0.90
Control Delay	101.5	65.6	56.5	69.6	80.4	79.2	41.6	2.9	133.5	43.0	36.6
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	101.5	65.6	56.5	69.6	80.4	79.2	41.6	2.9	133.5	43.0	36.6
Queue Length 50th (ft)	277	71	280	217	~392	38	468	19	~313	705	444
Queue Length 95th (ft)	#458	101	338	266	#450	80	551	53	m#367	#1025	m#687
Internal Link Dist (ft)		299		669			900			403	
Turn Bay Length (ft)	200		440		340	200		210	250		125
Base Capacity (vph)	302	1321	853	938	913	125	2576	1097	466	2524	878
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	0.94	0.17	0.71	0.46	1.06	0.32	0.75	0.25	1.15	0.93	0.90

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Intersection	
Int Delay, s/veh	2.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	890	250	390	1140	0	600
Future Vol, veh/h	890	250	390	1140	0	600
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Free
Storage Length	-	50	140	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	927	260	406	1188	0	625

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	927	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.115	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.2095	-	-	-
Pot Cap-1 Maneuver	-	-	741	-	0	0
Stage 1	-	-	-	-	0	0
Stage 2	-	-	-	-	0	0
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	741	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	741	-
HCM Lane V/C Ratio	-	-	-	0.548	-
HCM Control Delay (s)	0	-	-	15.6	-
HCM Lane LOS	A	-	-	C	-
HCM 95th %tile Q(veh)	-	-	-	3.4	-