Appendix K-2

Local Transportation Analysis for the Pacific Specific Plan Project Alternative

MEMORANDUM

To:	Greg Waite Integral Partners Funding, LLC	Date:	May 20~~February 21~~, 2024
From:	John A. Boarman, PE & Román Lopez, PTP LLG, Engineers	LLG Ref:	3-20-3279
Subject:	Reduced Pacific Specific Plan Project Alternative – Local Transportation Analysis		

LINSCOTT LAW & GREENSPAN engineers

Engineers & Planners
Traffic
Transportation
Parking

Linscott, Law & Greenspan, Engineers
4542 Ruffner Street
Suite 100
San Diego, CA 92111
858.300.8800 T

www.llgengineers.com

Pasadena
Irvine
San Diego

1.0 INTRODUCTION

Linscott, Law & Greenspan, Engineers, has prepared this memo to analyze the local transportation effects of the Reduced Pacific Specific Plan Project Alternative ("Project"). The project proposed a total of 449 residential dwellings ("Original Project"). The reduced project proposes a total of 299 residential dwellings. LLG prepared a Local Transportation Analysis (LTA) for the original project dated February 16, 2023, which was included as an appendix to the project's Draft Environmental Impact Report.

2.0 PROJECT DESCRIPTION

The reduced project consists of 299 residential units, including a mix of rowhomes, villas, and affordable flats on approximately 13.26 acres of the 33.2-acre project site. This is a reduction of 150 residential units and 1.83 acres of developed area within the overall project site compared to the original project.

Project access would be via three (3) driveways on La Mirada Drive and two driveways on Linda Vista Drive. The three access points on La Mirada Drive would serve the residences of the rowhomes and villas, and the two access points on Linda Vista Drive would serve the residences of the affordable flats. Project access is consistent with the February 2023 LTA.

Figure A shows the project area. ***Figure B*** shows the reduced project site plan.

All previously proposed intersection and roadway improvements will continue to be provided as discussed in *Section 7.0* of this memo.

3.0 ANALYSIS APPROACH AND METHODOLOGY

Because the reduced project includes fewer residential units, and therefore generates fewer vehicle trips, and does not substantially change vehicular access, no new substantial project effects would occur beyond those identified in the February 2023 LTA.

This technical memo will quantify the reduced effects of project traffic at previously identified locations substantially affected by project traffic. This memo provides updated analysis for study area intersections and roadway segments that were identified as operating at an unacceptable Level of Service (LOS) and a substantial effect due to project traffic (i.e., increase in average delay of more than 2.0 seconds for study intersections, or increase in volume/capacity (V/C) ratio of more than 0.02).

The analysis provided in this technical memo appends the previously prepared LTA.

Study Scenarios
Near-Term (Interim Year) and Horizon Year conditions are evaluated consistent with City guidelines and the February 2023 LTA.

All existing, Near-Term, and Horizon Year without Project traffic volumes are unchanged from the February 2023 LTA. Reduced project traffic volumes are discussed in the following section.

Methodology
All methodology and Level of Service standards are consistent with the City of San Marcos *Transportation Impact Analysis Guidelines* (November 2020) as used in the February 2023 LTA.

4.0 PROJECT TRIP GENERATION, DISTRIBUTION, AND ASSIGNMENT

Trip Generation

The reduced project trip generation is shown in ***Table 4–1***. As shown in *Table 4–1*, the reduced project is calculated to generate 1,794 daily trips (ADT), with 144 AM peak hour trips (29 in / 115 out) and 161 PM peak hour trips (113 in / 48 out).

The original project as analyzed in the February 2023 LTA was estimated to generate 2,694 ADT with 216 AM peak hour trips (43 in / 173 out) and 242 PM peak hour trips (169 in / 73 out).

Therefore, the reduced project decreases project trip generation by 900 ADT, 72 AM peak hour trips (14 in / 58 out), and 81 PM peak hour trips (56 in / 25 out) as compared to the original project analyzed in the February 2023 LTA.

TABLE 4–1
PROJECT TRIP GENERATION

Land Use	Size	Daily Trip Ends (ADTs) [a]		Peak Hour	% of ADT [b]	In:Out	Volume		
		Rate [b]	Volume			Split [b]	In	Out	Total
Apartment (multi-family > 20 du/acre)	299 DU	6 /DU	1,794	AM	8%	20:80	29	115	144
				PM	9%	70:30	113	48	161

Footnotes:

a. ADT = Average Daily Traffic.

b. Trip generation rate from SANDAG's *(Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region, April 2002* ("SANDAG Brief Guide").

General Notes:

- DU = dwelling units

Trip Distribution & Assignment

The general layout of the project site and access points are unchanged from the February 2023 LTA. Therefore, the project traffic distribution is also unchanged. Project trips as shown in *Table A* were assigned to the street system using the percentages shown in *Figure 7–1a* of the approved LTA.

LINSCOTT LAW & GREENSPAN engineers

5.0 ANALYSIS OF NEAR-TERM SCENARIOS

This section provides analysis of key study area intersections under Near-Term with Reduced (i.e., 299-unit) Project conditions.

Intersection Analysis

Table 5–1 summarizes the operations of previously affected intersections under Near-Term + Project conditions. As shown in *Table 5–1*, the following study intersections are calculated to continue to operate at LOS E or F:

- **Intersection #3. Via Vera Cruz / Grand Avenue / SR-78 EB Ramps (LOS F during the AM/PM peak hours)**
- **Intersection #7. Pacific Street / Linda Vista Drive (LOS F during the PM peak hour)**

The project-related increase in delay at both intersections continues to exceed 2.0 seconds with the reduced Project. Based on the established Level of Service standards, the project continues to result in a substantial effect to both above-listed intersections.

Attachment A contains the Near-Term + Project intersection LOS analysis worksheets.

TABLE 5–1
NEAR-TERM INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Near-Term Without Project		Near-Term + Project		Δ [c]	Substantial Effect?
			Delay [a]	LOS [b]	Delay	LOS		
3. Via Vera Cruz / Grand Ave / SR-78 EB Ramps	Signal	AM	**181.9**	**F**	**183.7**	**F**	**1.8**	**Yes**
		PM	**79.4**	**E**	**83.9**	**F**	**4.5**	
7. Pacific St / Linda Vista Dr	AWSC [d]	AM	~~17.5~~18.3	C	~~18.4~~19.0	C	~~0.9~~0.7	**Yes**
		PM	**~~91.3~~114.5**	**F**	**~~97.4~~117.3**	**F**	**~~6.1~~2.8**	

Footnotes:

a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. Δ denotes the increase in delay due to Project.
d. AWSC = All-Way Stop Controlled intersection. Average delay reported.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

Intersection Queuing

Table 5–2 shows the 95th percentile peak hour queue lengths for study area intersections where the project adds traffic to queues that exceed the available turn pocket length.

The reduced project would continue to cause the eastbound left turn from La Mirada Drive to Las Posas Road during the AM peak hour, which is the only location/peak hour where the project causes a queuing deficiency.

Attachment B contains the Near-Term + Project intersection queue worksheets.

TABLE 5–2
NEAR-TERM INTERSECTION QUEUING

Intersection	Movement	Storage (ft)	Peak Hour	Near-Term without Project	Near-Term + Project
				Queue (ft) [a]	Queue (ft) [a]
1. Las Posas Rd / SR-78 WB Ramps	WBL	340	AM	**470**	**475**
			PM	176	193
3. Via Vera Cruz / SR-78 EB Ramps	SBR	220	AM	**1,052**	**1,060**
			PM	**842**	**877**
	EBL	140	AM	**152**	**160**
			PM	**262**	**267**
5. Las Posas Rd / La Mirada Dr	EBL	110	AM	59	**115**
			PM	**211**	**248**
8. Las Posas Rd / Linda Vista Dr	EBL	170	AM	**176**	**191**
			PM	**419**	**426**
10. Las Posas Rd / San Marcos Blvd	SBR	240	AM	**422**	**422**
			PM	**584**	**593**
	EBR	240	AM	**578**	**586**
			PM	**760**	**785**

Footnotes:

a. 95th percentile queue length.
b. Storage shown at this location is distance to upstream project driveway or public street.

General Notes:

- **BOLD** indicates queue is calculated to exceed available storage.
- Ft = Feet
- SBR = Direction/Turn Lane; e.g. southbound right-turn lane.

Street Segment Analysis

No substantial project effects were identified on study area street segments under Near-Term scenarios.

6.0 ANALYSIS OF LONG-TERM SCENARIOS

This section provides analysis of key study area intersections and street segments under Long-Term with Reduced (i.e., 299-unit) Project conditions.

Intersection Analysis

Table 6–1 summarizes the operations of previously affected intersections under Long-Term + Project conditions. As shown in *Table 6–1*, the following study intersections are calculated to continue to operate at LOS E or F:

- **Intersection #3. Via Vera Cruz / Grand Avenue / SR-78 EB Ramps (LOS F during the AM/PM peak hours)**
- **Intersection #7. Pacific Street / Linda Vista Drive (LOS F during the PM peak hour)**

The project-related increase in delay at both intersections continues to exceed 2.0 seconds during at least one peak hour with the reduced Project. Based on the established Level of Service standards, the project continues to result in a substantial effect to both above-listed intersections.

Attachment C contains the Long-Term + Project intersection LOS analysis worksheets.

TABLE 6–1
LONG-TERM INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Long-Term Without Project		Long-Term + Project		Δ [c]	Substantial Effect?
			Delay [a]	LOS [b]	Delay	LOS		
3. Via Vera Cruz / Grand Ave / SR-78 EB Ramps	Signal	AM	**229.3**	**F**	**231.1**	**F**	**1.8**	**Yes**
		PM	**103.0**	**F**	**107.8**	**F**	**4.8**	
7. Pacific St / Linda Vista Dr	AWSC [d]	AM	~~20.6~~21.2	C	~~21.3~~22.1	C	~~0.7~~0.9	**Yes**
		PM	**~~125.8~~151.9**	**F**	**~~129.2~~155.6**	**F**	**~~3.4~~3.7**	

Footnotes:

a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. Δ denotes the increase in delay due to Project.
d. AWSC = All-Way Stop Controlled intersection.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

Intersection Queuing

Table 6–2 shows the 95th percentile peak hour queue lengths for study area intersections where the project adds traffic to queues that exceed the available turn pocket length under Long-Term scenarios.

The reduced project would continue to cause the eastbound left turn from La Mirada Drive to Las Posas Road during the AM peak hour, which is the only location/peak hour where the project causes a queuing deficiency.

Attachment D contains the Long-Term + Project intersection queue worksheets.

TABLE 6–2
LONG-TERM INTERSECTION QUEUING

Intersection	Movement	Storage (ft)	Peak Hour	Long-Term without Project	Long-Term + Project
				Queue (ft) [a]	Queue (ft) [a]
1. Las Posas Rd / SR-78 WB Ramps	WBL	340	AM	**506**	**510**
			PM	196	212
3. Via Vera Cruz / SR-78 EB Ramps	SBR	220	AM	**1,229**	**1,236**
			PM	**999**	**1,032**
	EBL	140	AM	**164**	**174**
			PM	**299**	**270**
5. Las Posas Rd / La Mirada Dr	EBL	110	AM	59	**115**
			PM	**251**	**291**
8. Las Posas Rd / Linda Vista Dr	EBL	170	AM	**214**	**227**
			PM	**492**	**517**
10. Las Posas Road / San Marcos Blvd	SBR	240	AM	**528**	**546**
			PM	**656**	**664**
	EBR	240	AM	**691**	**697**
			PM	**760**	**785**

Footnotes:

a. 95th percentile queue length.

General Notes:

- **BOLD** indicates queue is calculated to exceed available storage.
- Ft = Feet
- SBR = Direction/Turn Lane, e.g., southbound right-turn lane.

Street Segment Analysis

Table 6–3 summarizes the operations of previously affected street segment under Long-Term + Project conditions. As shown in *Table 6–3*, Pacific Street from La Mirada Drive to Linda Vista is calculated to continue to operate at LOS F with the addition of project traffic.

The project-related increase in V/C ratio at this location continues to exceed 0.02. Based on the established Level of Service standards, the reduced project continues to result in a substantial effect.

TABLE 6–3
LONG-TERM STREET SEGMENT OPERATIONS

Street Segment	Capacity (LOS E) [a]	Long-Term without Project			Long-Term + Project			Δ[e]	Substantial Effect?
		ADT[b]	LOS[c]	V/C[d]	ADT	LOS	V/C		
Pacific Street									
6. La Mirada Dr to Linda Vista Dr	8,000	7,790	E	0.974	**8,095**	**F**	**1.012**	**0.038**	**Yes**

Footnotes:

a. Capacity based on roadway classification operating at LOS E.
b. Average Daily Traffic.
c. Level of Service.
d. Volume to Capacity.
e. Δ denotes a Project-induced increase in the Volume to Capacity (V/C) ratio.

7.0 INTERSECTION AND ROADWAY IMPROVEMENTS

As the reduced project analysis presented in this memo does not result in the elimination of any previously identified substantial effect, the project will continue to provide improvements at the following intersections and street segments to address LOS and/or queueing deficiencies, or provide for active transportation enhancements, as described in *Section 13.4* of the LTA:

Intersections

- Intersection #3. Via Vera Cruz / Grand Avenue / SR-78 EB Ramps
- Intersection #5. Las Posas Road / La Mirada Drive
- Intersection #7. Pacific Street / Linda Vista Drive
- Intersection #8. Las Posas Road / Linda Vista Drive

Street Segments

- Street Segment #10. Linda Vista Drive: Pacific Street to Las Posas Road

Table 7–1 and ***Table 7–2*** show the Near-Term and Long-Term post improvement LOS analysis for each of the four (4) study area intersections where improvements are proposed. As shown in *Tables 7–1* and *7–2*, each intersection would operate at acceptable LOS D or better and/or substantially better than pre-project conditions with the proposed improvements.

Attachment E contains the Near-Term and Long-Term post-improvement LOS analysis worksheets.

LINSCOTT LAW & GREENSPAN engineers

TABLE 7–1
NEAR-TERM POST IMPROVEMENT INTERSECTION ANALYSIS

Intersection	Control Type	Peak Hour	Near-Term Without Project		Near-Term + Project		Near-Term + Project + Improvements	
			Delay[a]	LOS[b]	Delay	LOS	Delay	LOS
3. Via Vera Cruz / Grand Ave / SR-78 EB Ramps	Signal	AM	181.9	F	183.7	F	68.6	E
		PM	79.4	E	83.9	F	54.3	D
5. Las Posas Rd / La Mirada Dr	Signal	AM	18.4	B	20.5	C	20.3	C
		PM	46.0	D	49.6	D	41.2	D
7. Pacific St. / Linda Vista Dr	AWSC [c] */Signal*	AM	~~17.5~~18.3	C	~~18.4~~ 19.0	C	17.~~76~~	B~~C~~
		PM	~~91.3~~ 114.5	F	~~97.4~~ 117.3	F	~~19.6~~ 21.8	C~~B~~
8. Las Posas Rd / Linda Vista Dr	Signal	AM	30.5	C	32.1	C	32.9	C
		PM	45.8	D	47.3	D	48.3	D

Footnotes:

a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. All-Way Stop Control. Average delay reported.

General Notes:

- *Italics* indicates intersection control type with improvements.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

LINSCOTT LAW & GREENSPAN engineers

TABLE 7–2
LONG-TERM POST IMPROVEMENT INTERSECTION ANALYSIS

Intersection	Control Type	Peak Hour	Long-Term Without Project		Long-Term + Project		Long-Term + Project + Improvements	
			Delay[a]	LOS[b]	Delay	LOS	Delay	LOS
3. Via Vera Cruz / Grand Ave / SR-78 EB Ramps	Signal	AM	229.3	F	231.1	F	87.0	F
		PM	103.0	F	107.8	F	62.9	E
5. Las Posas Rd / La Mirada Dr	Signal	AM	19.9	B	22.0	C	21.9	C
		PM	50.0	D	52.4	D	43.5	D
7. Pacific St. / Linda Vista Dr	AWSC [c] */Signal*	AM	~~20.6~~21.2	C	~~21.3~~ 22.1	C	19.~~54~~	B
		PM	~~125.8~~ 151.9	F	~~129.2~~ 155.6	F	~~21.6~~ 24.4	C
8. Las Posas Rd / Linda Vista Dr	Signal	AM	35.8	D	37.5	D	38.9	D
		PM	49.9	D	53.4	D	53.7	D

Footnotes:

a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. All-Way Stop Control. Average delay reported.

General Notes:

- *Italics* indicates intersection control type with improvements.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

Table 7–3 summarizes the reduced queues provided by the proposed improvements at Las Posas Road / La Mirada Drive.

Attachment E also contains the post-improvement queue worksheets.

TABLE 7–3
POST-IMPROVEMENT QUEUING: LAS POSAS RD / LA MIRADA DR

Intersection	Movement	Peak Hour	Near-Term + Project + Improvement	Long-Term + Project + Improvements
			Queue (ft) [a]	Queue (ft) [a]
5. Las Posas Rd / La Mirada Dr	EBL	AM	52	52
		PM	91	107
	EBT/R	AM	37	40
		PM	78	105

Footnotes:
a. 95th percentile queue length.

General Notes:
- Ft = Feet
- SBR = Direction/Turn Lane, e.g., southbound right-turn lane.

Proposed active transportation improvements will reduce the number of westbound travel lanes from two to one on Linda Vista Drive, from Pacific Street to Las Posas Road. Notwithstanding this reduction in vehicular capacity, the street segment is calculated to operate at acceptable LOS D or better under Near-Term and Long-Term conditions as shown in ***Table 7–4*** and ***Table 7–5***.

TABLE 7–4
NEAR-TERM POST-IMPROVEMENT STREET SEGMENT OPERATIONS

Street Segment	Capacity (LOS E) [a]	Near-Term Without Project			Near-Term + Project			Near-Term+ Project + Improvements	
		ADT[b]	LOS[c]	V/C[d]	ADT	LOS	V/C	LOS	V/C
Linda Vista Drive Pacific St to Las Posas Rd	30,000/ *15,000*	9,470	A	0.316	9,775	A	0.326	C	0.652

Footnotes:
a. Capacity based on roadway classification operating at LOS E.
b. Average Daily Traffic.
c. Level of Service.
d. Volume to Capacity.

General Notes:
- *Italics* indicates street segment capacity with proposed improvements.

TABLE 7–5
LONG-TERM POST-IMPROVEMENT STREET SEGMENT OPERATIONS

Street Segment	Capacity (LOS E) [a]	Long-Term Without Project			Long-Term + Project			Long-Term+ Project + Improvements	
		ADT[b]	LOS[c]	V/C[d]	ADT	LOS	V/C	LOS	V/C
Linda Vista Drive Pacific St to Las Posas Rd	30,000 / *15,000*	10,990	B	0.366	11,295	B	0.377	D	0.753

Footnotes:
a. Capacity based on roadway classification operating at LOS E.
b. Average Daily Traffic.
c. Level of Service.
d. Volume to Capacity.

General Notes:
- *Italics* indicates street segment capacity with proposed improvements.

8.0 TRAFFIC SIGNAL WARRANTS

Based on the analysis shown in *Table 7–1*, the Linda Vista Drive / South Pacific Street intersection is calculated to operate at LOS F in Near-Term conditions with the addition of Project traffic. Traffic signal warrant analysis has been completed to determine if a signal would be warranted at that intersection under future conditions.

Warrants were prepared for the Near-Term with Project scenarios. As outlined in Chapter 4C, "Traffic Control Signal Needs Studies," of the 2014 California Manual on Uniform Traffic Control Devices (California MUTCD), the following warrants were analyzed:

- Warrant 1 – Eight-Hour Vehicular Volume
- Warrant 2 – Four-Hour Vehicular Volume

The existing lane configurations at Linda Vista Drive / South Pacific Street are as follows:

- South Pacific Street (southbound): 1 shared left/thru/right-turn lane
- Linda Vista Drive (westbound): 1 left turn lane, 1 thru lane, 1 right turn lane
- South Pacific Street (northbound): 1 shared left/thru/right-turn lane
- Linda Vista Drive (eastbound): 1 left turn lane, 1 shared thru/~~thru lane, 1~~ right turn lane

For the purposes of the analysis, consistent with MUTCD standards, Linda Vista Drive is considered as the "Major" street and S. Pacific Street is considered as the "Minor" street. Based on the existing conditions, Linda Vista Drive (i.e., major street) is considered a two (2) lane approach in each direction and S. Pacific Street (i.e, minor street) is considered as a one (1) lane approach in each direction.

Near-Term with Project Hourly Traffic Volumes

Table 8–1 summarizes the Near-Term with Project hourly approach volumes at the intersection of Linda Vista Drive and South Pacific Street. The hourly approach volumes were estimated for this scenario based on the K and D factors from the 24-hour ADT counts that informed the analysis in this memo and the Near-Term with Project ADT calculated on each leg of this intersection (see *Table 5–3*).

LINSCOTT LAW & GREENSPAN engineers

TABLE 8–1
NEAR-TERM + PROJECT HOURLY APPROACH VOLUMES AT LINDA VISTA DRIVE / S. PACIFIC STREET INTERSECTION

Hour Begin	Linda Vista Drive		Pacific Street	
	Eastbound	Westbound	Northbound	Southbound
Mid-Night	17	10	15	2
1 AM	13	7	14	2
2 AM	14	1	12	14
3 AM	21	12	11	13
4 AM	20	32	12	17
5 AM	70	111	11	71
6 AM	156	205	45	174
7 AM	323	281	83	229
8 AM	387	319	103	237
9 AM	348	227	104	157
10 AM	356	211	125	157
11 AM	437	300	150	220
Noon	517	290	141	223
1 PM	459	247	150	191
2 PM	701	278	198	209
3 PM	789	271	205	221
4 PM	1058	274	306	155
5 PM	745	224	200	190
6 PM	397	174	109	105
7 PM	280	106	79	96
8 PM	172	96	109	60
9 PM	92	48	130	25
10 PM	72	36	75	13
11 PM	52	8	25	6

Signal Warrant Analysis

Warrant 1 – Eight-Hour Vehicular Volume

Per the MUTCD standards, Warrant 1 describes the following:

The need for a traffic signal shall be considered if an engineering study finds that one of the following conditions exist for each of any 8 hours of an average day:

A. *The vehicles per hour given in both of the 100 percent columns of Condition A in MUTCD Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; or*

B. The vehicles per hour given in both of the 100 percent columns of Condition B in MUTCD Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

In applying each condition, the major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of these 8 hours. If the posted or statutory speed limit or the 85th percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 70 percent columns in MUTCD Table 4C-1 may be used in place of the 100 percent columns.

The combination of Conditions A and B is intended for application at locations where Condition A is not satisfied and Condition B is not satisfied and should be applied only after an adequate trial of other alternatives that could lead to less delay and inconvenience to traffic has failed to solve the traffic problems.

The need for a traffic signal shall be considered if an engineering study finds that both of the following conditions exist for each of any 8 hours of an average day:

A. The vehicles per hour given in both of the 80 percent columns of Condition A in MUTCD Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; and

B. The vehicles per hour given in both 80 percent columns of Condition B in MUTCD Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

These major-street and minor-street volumes shall be for the same 8 hours for each condition; however, the 8 hours satisfied in Condition A shall not be required to be the same 8 hours satisfied in Condition B. On the minor street, the higher volume shall not be required to be on the same approach during each of these 8 hours.

If the posted or statutory speed limit or the 85th percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in MUTCD Table 4C-1 may be used in place of the 80 percent columns.

Warrant 1 – Calculations

Table 8–2 shows the 100% volume thresholds for a two–lane approach on the major street and a one-lane approach on the minor street. ***Table 8–3*** shows the 80% volume thresholds for two-lane approach on the major street and a one-lane approach on the minor street.

TABLE 8–2
WARRANT 1: EIGHT – HOUR VEHICULAR VOLUME (100% THRESHOLD)

Warrant 1	Vehicles per hour on major street (Total of both approaches)	Vehicles per hour on higher-volume minor-street approach (One direction only)
Condition A	600	150
Condition B	900	75

TABLE 8–3
WARRANT 1: EIGHT – HOUR VEHICULAR VOLUME (80% THRESHOLD)

Warrant 1	Vehicles per hour on major street (Total of both approaches)	Vehicles per hour on higher-volume minor-street approach (One direction only)
Condition A	480	120
Condition B	720	60

Table 8–4 compares the Near-Term + Project traffic volumes for 24 hours in a day to the 100% volumes (*Table 8–2*) required to satisfy this warrant. As seen in *Table 8–4*, the Condition A warrant volumes are not satisfied for 9 hours of the day, Condition B warrant volumes are satisfied 4 hours of the day, and a combination of Conditions A and B warrant volumes are satisfied at the 80% threshold for 6 hours of the day. Therefore, **Warrant 1 is satisfied**.

LINSCOTT LAW & GREENSPAN engineers

TABLE 8–4
WARRANT 1 ANALYSIS

Hour Begin	Major (Sum of Both Approaches)	Minor (Higher Vol. Approach)	100% Thresholds Met?		Combination of Conditions A and B 80% Thresholds Met?
			Condition A	Condition B	
Mid-Night	27	15	N	N	N
1 AM	20	14	N	N	N
2 AM	15	14	N	N	N
3 AM	33	13	N	N	N
4 AM	52	17	N	N	N
5 AM	181	71	N	N	N
6 AM	361	174	N	N	N
7 AM	604	229	Y	N	N
8 AM	706	237	Y	N	N
9 AM	575	157	N	N	N
10 AM	567	157	N	N	N
11 AM	737	220	Y	N	Y
Noon	807	223	Y	N	Y
1 PM	706	191	Y	N	N
2 PM	979	209	Y	Y	Y
3 PM	1060	221	Y	Y	Y
4 PM	1332	306	Y	Y	Y
5 PM	969	200	Y	Y	Y
6 PM	571	109	N	N	N
7 PM	386	96	N	N	N
8 PM	268	109	N	N	N
9 PM	140	130	N	N	N
10 PM	108	75	N	N	N
11 PM	60	25	N	N	N
TOTAL	**11,264**	**3,212**	**9**	**4**	**6**

Warrant 2 – Four-Hour Vehicular Volume

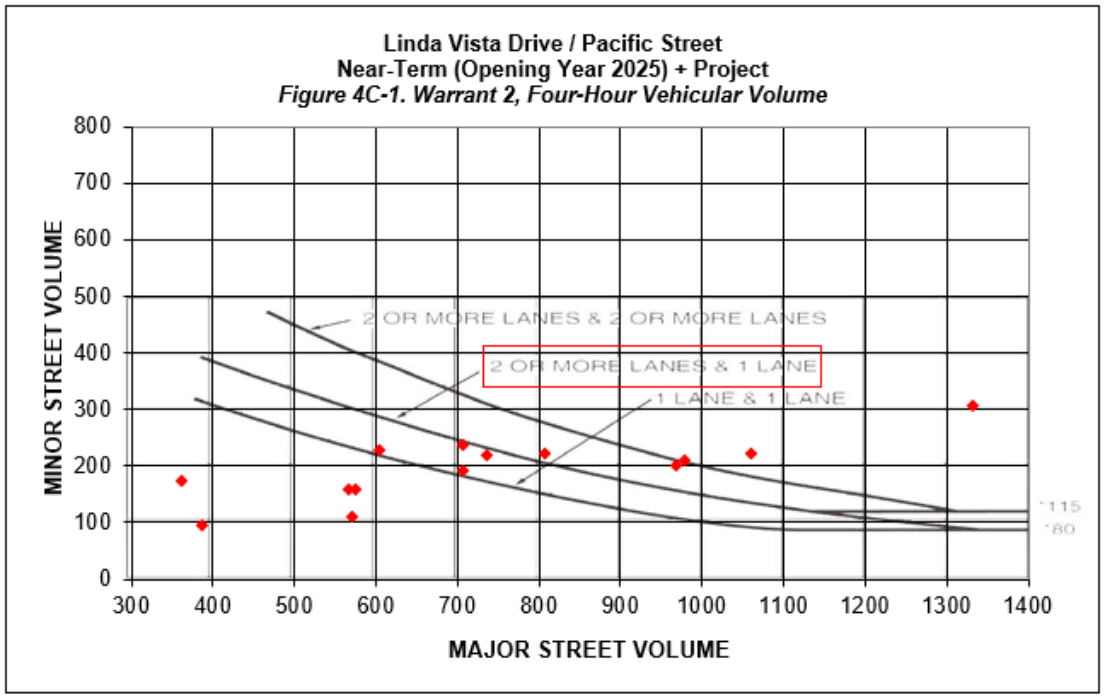
Per the MUTCD standards, Warrant 2 includes the following:

The need for a traffic control signal shall be considered if an engineering study finds that, for each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) all fall above the applicable curve in MUTCD Figure 4C-1 for the existing combination of approach lanes, on the minor street, the higher volume shall not be required to be on the same approach during each of these 4 hours.

If the posted or statutory speed limit or the 85th percentile speed on the major street exceeds 40 mph or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, MUTCD Figure 4C-2 may be used in place of MUTCD Figure 4C-1.

Warrant 2 – Calculations

Each hour for the Near-Term + Project conditions was plotted in MUTCD Figure 4C-1. As seen below**,** there are 5 hours where the volumes on major street approaches and the corresponding volumes on the higher-volume minor street approach fall above the applicable curve (boxed in red) when plotted. Therefore, **Warrant 2 is satisfied**.



LINSCOTT LAW & GREENSPAN engineers

9.0 CONCLUSIONS

The reduced project is calculated to generate 1,794 daily trips (ADT), with 144 AM peak hour trips (29 in / 115 out) and 161 PM peak hour trips (113 in / 48 out).

This is a reduction of 900 ADT, 72 AM peak hour trips (14 in / 58 out), and 81 PM peak hour trips (56 in / 25 out) as compared to the original project analyzed in the February 2023 LTA. Therefore, the reduced project would not result in any new substantial effects on the local transportation system.

As shown in this memo, the reduced project would not result in any previously identified substantial effects being reduced below the level where improvements would be required. All previously identified intersection and street segment improvements will continue to be provided.

LINSCOTT LAW & GREENSPAN engineers

Figures:

A Project Area Map
B Project Site Plan

Attachments:

A Near-Term + Project Intersection LOS Analysis Worksheets
B Near-Term + Project Intersection Queuing Analysis Worksheets
C Long-Term + Project Intersection LOS Analysis Worksheets
D Long-Term + Project Intersection Queueing Analysis Worksheets
E Near-Term & Long-Term + Project Improvements Analysis Worksheets

cc: File

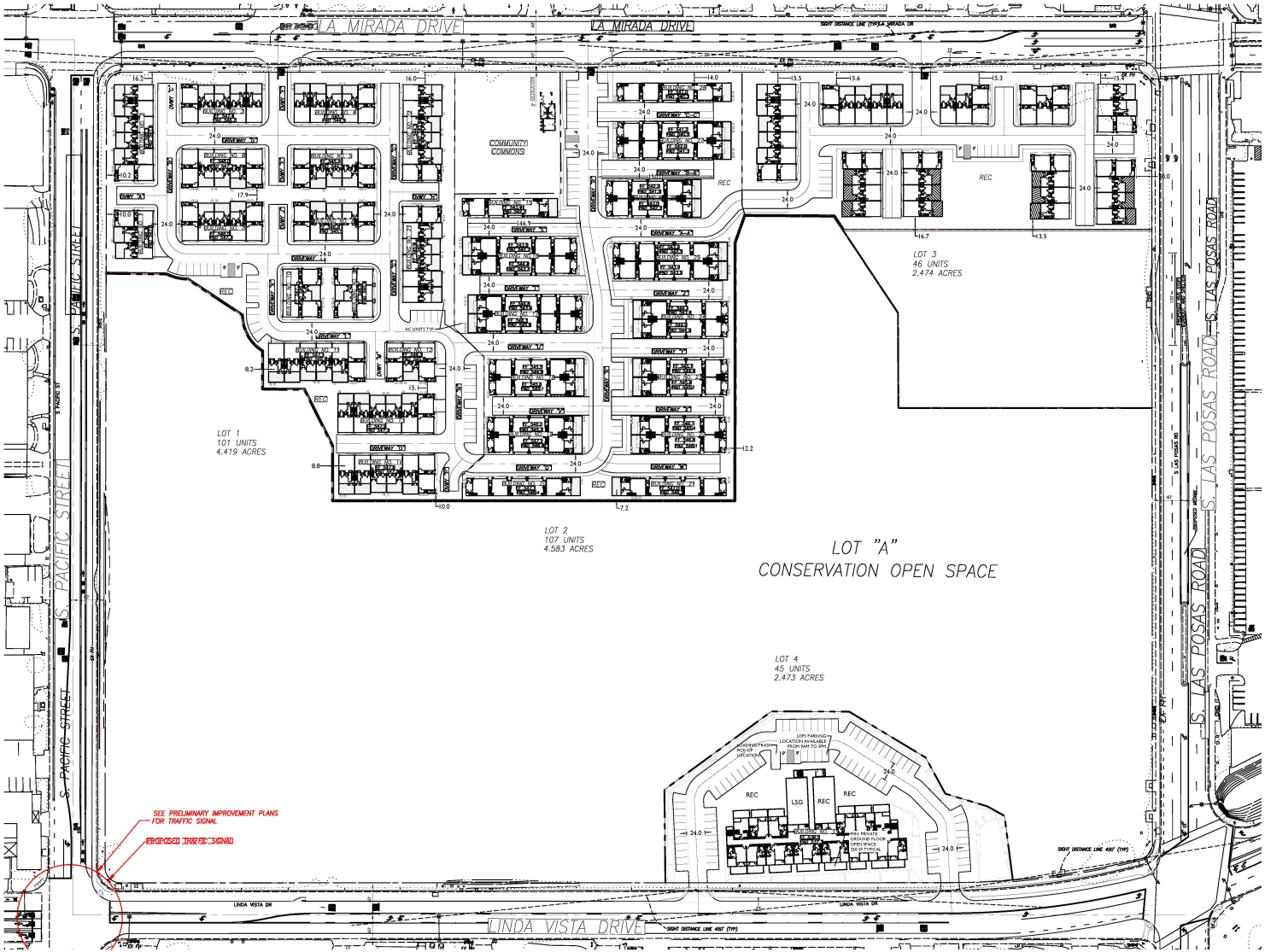
LINSCOTT LAW & GREENSPAN engineers

N:\3279\Figure
Date: 10/30/2023
Time: 1:22 PM

Maxar

Figure A
Project Area Map

Reduced Project Site Plan for the Pacific Specific Plan Project



RESIDENCES	299 HOMES
GROSS SITE AREA	33.229 ACRES (13.257 ACRES NET(39.9%))
GROSS DENSITY	8.99 DU/AC (22.55 DU/AC NET)

ROWHOMES - LOT 1

23	2BD/2BA	1,200 SF	
23	3BD/3BA	1,310 SF	
28	3BD/3.5BA	1,736 SF	
27	4BD/3.5BA	1,890 SF	
101	4.419 AC =	22.86 DU/AC	

PARKING SUMMARY PER CA 65915

2&3 BD	74 X 1.5 =	111 SPACES
4 BD	27 X 2.5 =	68 SPACES
TOTAL REQUIRED		179 SPACES
TOTAL PROVIDED		234 SPACES* (32 OPEN/202 PRIVATE GARAGES)

*NOTE: RECIPROCAL ACCESS & PARKING AGREEMENT BETWEEN LOT 1 & 2
(LOT 1 EV = 234 SP X 5% = 12 EV LEVEL 2 CHARGERS INSTALLED)

PRIVATE OPEN SPACE	REQUIRED	PROVIDED
101 X 50 SF	5,050 SF	6,959 SF
COMMON OPEN SPACE	REQUIRED	PROVIDED
GROUND FLOOR SF X 30%	12,945 SF	
TOT LOT (1:25 DU) 4X400 SF	1,600 SF	
PLAYGROUND	800 SF	
TOTAL	15,345 SF	40,876 SF

VILLAS - LOT 2

58	2BD/2BA	1,272 SF	
24	3BD/2.5BA	1,486 SF	
24	3BD/3BA	1,832 SF	
107	4.583 AC =	23.12 DU/AC	

PARKING SUMMARY PER CA 65915

2&3 BD	107 X 1.5 =	161 SPACES
TOTAL REQUIRED		161 SPACES
TOTAL PROVIDED		246 SPACES* (32 OPEN/214 PRIVATE GARAGES)

*NOTE: RECIPROCAL ACCESS & PARKING AGREEMENT BETWEEN LOT 1 & 2
(LOT 2 EV = 246 SP X 5% = 13 EV LEVEL 2 CHARGERS INSTALLED)

PRIVATE OPEN SPACE	REQUIRED	PROVIDED
107 X 50 SF	5,350 SF	6,180 SF
COMMON OPEN SPACE	REQUIRED	PROVIDED
GROUND FLOOR SF X 30%	16,204 SF	
TOT LOT (1:25 DU) 5X400 SF	2,000 SF	
PLAYGROUND	800 SF	
TOTAL	19,004 SF	29,899 SF

ROWHOMES - LOT 3

10	2BD/2BA	1,200 SF	
10	3BD/3BA	1,310 SF	
15	3BD/3.5BA	1,736 SF	
11	4BD/3.5BA	1,890 SF	
46	2.474 AC =	18.59 DU/AC	

PARKING SUMMARY PER CA 65915

2&3 BD	35 X 1.5 =	53 SPACES
4 BD	11 X 2.5 =	28 SPACES
TOTAL REQUIRED		82 SPACES
TOTAL PROVIDED		106 SPACES* (14 OPEN/ 92 PRIVATE GARAGES)

*NOTE: RECIPROCAL ACCESS & PARKING AGREEMENT BETWEEN LOT 1,2 & 3
(LOT 3 EV = 106 SP X 5% = 6 EV LEVEL 2 CHARGERS INSTALLED)

PRIVATE OPEN SPACE	REQUIRED	PROVIDED
46 X 50 SF	2,300 SF	10,090 SF
COMMON OPEN SPACE	REQUIRED	PROVIDED
GROUND FLOOR SF X 30%	5,815 SF	
TOT LOT (1:25 DU) 2X400 SF	800 SF	
PLAYGROUND	800 SF	
TOTAL	7,415 SF	23,910 SF

AFFORDABLE - LOT 4

UNIT MIX

8	STUDIO/1BA	512 SF
19	1BD/1BA	625 SF
18	2BD/2BA	924 SF
45	1.781 AC =	25.82 DU/AC

PARKING PROVIDED PER CA 65915

27 X 1.0 SP/DU =	27 SPACES
18 X 1.5 SP/DU =	27 SPACES
TOTAL REQUIRED	54 SPACES
TOTAL PROVIDED	60 SPACES

(LOT 4 EV = 60 SP X 5% = 4 EV LEVEL 2 CHARGERS INSTALLED)

PRIVATE OPEN SPACE	REQUIRED	PROVIDED
45 X 50 SF	2,250 SF	6,714 SF
COMMON OPEN SPACE	REQUIRED	PROVIDED
GROUND FLOOR SF X 30%	2,828 SF	
TOT LOT (1:25 DU) 3X400 SF	1,200 SF	
TOTAL	4,028 SF	16,340 SF

TOTAL EV = 60 SP X 5% = 3 EV LEVEL 2 CHARGERS INSTALLED

(PROJECT SHALL MEET THE MINIMUM CGBSC STANDARDS FOR EV CHARGING FOR NEW CONSTRUCTION AT TIME OF PERMIT APPLICATION)

SAN MARCOS, CA

UPHAM PROPERTY

CONCEPTUAL SITE PLAN

INTEGRAL COMMUNITIES
703 Palomar Airport Road, Suite 170
Carlsbad, CA 92011
(760) 944-7511

SEPTEMBER 22, 2023

SCALE: 0 60 120 180

SUMMA ARCHITECTURE
5256 S. Mission Road, Ste 404
Bonsall, CA 92003
760.724.1198 summarch.com

A-SP

LINSCOTT LAW & GREENSPAN engineers

N:\3279\Figure
Date: 10/30/2023
Time: 1:23 PM

Figure B
Project Site Plan

Reduced Project Site Plan for the Pacific Specific Plan Project

LINSCOTT LAW & GREENSPAN
engineers

TECHNICAL APPENDICES – LTA
REDUCED PACIFIC SPECIFIC PLAN PROJECT ALTERNATIVE

San Marcos, California
May 20, 2024

LLG Ref. 3-20-3279

Linscott, Law & Greenspan, Engineers
4542 Ruffner Street
Suite 100
San Diego, CA 92111
858.300.8800 T
858.300.8810 F
www.llgengineers.com

ATTACHMENT A

NEAR-TERM + PROJECT INTERSECTION

LOS ANALYSIS WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	397	150	150	30	200	5	120	60	15	90	290	596
Future Volume (veh/h)	397	150	150	30	200	5	120	60	15	90	290	596
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	418	158	158	32	211	5	94	107	16	95	305	589
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	500	1100	661	115	1179	28	195	205	174	533	171	329
Arrive On Green	0.14	0.31	0.31	0.06	0.23	0.23	0.11	0.11	0.11	0.30	0.30	0.30
Sat Flow, veh/h	3456	3554	1575	1781	5132	121	1781	1870	1585	1781	570	1102
Grp Volume(v), veh/h	418	158	158	32	140	76	94	107	16	95	0	894
Grp Sat Flow(s),veh/h/ln	1728	1777	1575	1781	1702	1849	1781	1870	1585	1781	0	1672
Q Serve(g_s), s	11.8	3.2	6.5	1.7	3.3	3.3	5.0	5.4	0.9	3.9	0.0	29.9
Cycle Q Clear(g_c), s	11.8	3.2	6.5	1.7	3.3	3.3	5.0	5.4	0.9	3.9	0.0	29.9
Prop In Lane	1.00		1.00	1.00		0.07	1.00		1.00	1.00		0.66
Lane Grp Cap(c), veh/h	500	1100	661	115	782	425	195	205	174	533	0	500
V/C Ratio(X)	0.84	0.14	0.24	0.28	0.18	0.18	0.48	0.52	0.09	0.18	0.00	1.79
Avail Cap(c_a), veh/h	636	1100	661	196	782	425	196	206	174	533	0	500
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)	0.60	0.60	0.60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	41.6	24.9	18.7	44.5	30.9	30.9	41.8	42.0	40.0	26.0	0.0	35.1
Incr Delay (d2), s/veh	4.8	0.2	0.5	0.5	0.5	0.9	0.7	1.1	0.1	0.1	0.0	362.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	1.4	3.0	0.8	1.4	1.6	2.2	2.5	0.4	1.7	0.0	62.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.4	25.1	19.3	45.0	31.4	31.9	42.5	43.1	40.1	26.0	0.0	397.7
LnGrp LOS	D	C	B	D	C	C	D	D	D	C	A	F
Approach Vol, veh/h		734			248			217			989	
Approach Delay, s/veh		36.0			33.3			42.7			362.0	
Approach LOS		D			C			D			F	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.2	37.7		35.0	19.2	29.8		16.1
Change Period (Y+Rc), s	* 4.7	6.8		5.1	* 4.7	6.8		5.1
Max Green Setting (Gmax), s	* 11	26.4		29.9	* 18	19.0		11.0
Max Q Clear Time (g_c+I1), s	13.8	8.5		31.9	13.8	5.3		7.4
Green Ext Time (p_c), s	0.0	0.8		0.0	0.7	0.7		0.2

Intersection Summary		
HCM 6th Ctrl Delay	183.7	
HCM 6th LOS	F	

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	19
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	83	220	20	26	381	21	25	31	10	15	65	140
Future Vol, veh/h	83	220	20	26	381	21	25	31	10	15	65	140
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	89	237	22	28	410	23	27	33	11	16	70	151
Number of Lanes	1	1	0	1	1	1	0	1	1	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	3	2
HCM Control Delay	15.3	26.4	12	12.2
HCM LOS	C	D	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	45%	0%	100%	0%	100%	0%	0%	19%	0%
Vol Thru, %	55%	0%	0%	92%	0%	100%	0%	81%	0%
Vol Right, %	0%	100%	0%	8%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	56	10	83	240	26	381	21	80	140
LT Vol	25	0	83	0	26	0	0	15	0
Through Vol	31	0	0	220	0	381	0	65	0
RT Vol	0	10	0	20	0	0	21	0	140
Lane Flow Rate	60	11	89	258	28	410	23	86	151
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.138	0.022	0.186	0.497	0.056	0.769	0.038	0.182	0.284
Departure Headway (Hd)	8.241	7.297	7.505	6.938	7.265	6.758	6.047	7.606	6.799
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	435	490	478	519	496	541	596	471	528
Service Time	6	5.056	5.253	4.685	4.965	4.458	3.747	5.357	4.55
HCM Lane V/C Ratio	0.138	0.022	0.186	0.497	0.056	0.758	0.039	0.183	0.286
HCM Control Delay	12.3	10.2	12	16.4	10.4	28.5	9	12.1	12.2
HCM Lane LOS	B	B	B	C	B	D	A	B	B
HCM 95th-tile Q	0.5	0.1	0.7	2.7	0.2	6.9	0.1	0.7	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	477	400	190	100	510	15	270	160	60	310	290	483
Future Volume (veh/h)	477	400	190	100	510	15	270	160	60	310	290	483
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	482	404	192	101	515	15	218	240	61	313	293	455
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	540	856	564	170	918	27	209	219	186	622	231	358
Arrive On Green	0.16	0.24	0.24	0.10	0.18	0.18	0.12	0.12	0.12	0.35	0.35	0.35
Sat Flow, veh/h	3456	3554	1569	1781	5100	148	1781	1870	1585	1781	660	1025
Grp Volume(v), veh/h	482	404	192	101	343	187	218	240	61	313	0	748
Grp Sat Flow(s),veh/h/ln	1728	1777	1569	1781	1702	1843	1781	1870	1585	1781	0	1686
Q Serve(g_s), s	15.0	10.7	9.8	6.0	10.1	10.2	12.9	12.9	3.9	15.3	0.0	38.4
Cycle Q Clear(g_c), s	15.0	10.7	9.8	6.0	10.1	10.2	12.9	12.9	3.9	15.3	0.0	38.4
Prop In Lane	1.00		1.00	1.00		0.08	1.00		1.00	1.00		0.61
Lane Grp Cap(c), veh/h	540	856	564	170	613	332	209	219	186	622	0	588
V/C Ratio(X)	0.89	0.47	0.34	0.59	0.56	0.56	1.04	1.09	0.33	0.50	0.00	1.27
Avail Cap(c_a), veh/h	556	856	564	180	613	332	209	219	186	622	0	588
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)	0.63	0.63	0.63	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	45.5	35.8	25.8	47.7	41.1	41.1	48.5	48.5	44.6	28.3	0.0	35.8
Incr Delay (d2), s/veh	11.2	1.2	1.0	3.0	3.7	6.8	74.2	88.2	0.4	0.3	0.0	134.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	4.8	4.6	2.8	4.5	5.2	10.0	11.4	1.5	6.5	0.0	37.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.7	36.9	26.8	50.7	44.8	47.9	122.7	136.7	45.0	28.5	0.0	170.7
LnGrp LOS	E	D	C	D	D	D	F	F	D	C	A	F
Approach Vol, veh/h		1078			631			519			1061	
Approach Delay, s/veh		44.0			46.6			120.1			128.8	
Approach LOS		D			D			F			F	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.2	33.3		43.5	21.9	26.6		18.0				
Change Period (Y+Rc), s	* 4.7	6.8		5.1	* 4.7	6.8		5.1				
Max Green Setting (Gmax), s	* 11	25.9		38.4	* 18	19.3		12.9				
Max Q Clear Time (g_c+I1), s	8.0	12.7		40.4	17.0	12.2		14.9				
Green Ext Time (p_c), s	0.0	1.8		0.0	0.1	1.4		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	83.9
HCM 6th LOS	F

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	117.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	230	661	50	30	291	25	40	65	36	22	42	104
Future Vol, veh/h	230	661	50	30	291	25	40	65	36	22	42	104
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	242	696	53	32	306	26	42	68	38	23	44	109
Number of Lanes	1	1	0	1	1	1	0	1	1	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	3	2
HCM Control Delay	185.2	24.3	15.1	14.1
HCM LOS	F	C	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	38%	0%	100%	0%	100%	0%	0%	34%	0%
Vol Thru, %	62%	0%	0%	93%	0%	100%	0%	66%	0%
Vol Right, %	0%	100%	0%	7%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	105	36	230	711	30	291	25	64	104
LT Vol	40	0	230	0	30	0	0	22	0
Through Vol	65	0	0	661	0	291	0	42	0
RT Vol	0	36	0	50	0	0	25	0	104
Lane Flow Rate	111	38	242	748	32	306	26	67	109
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.272	0.084	0.518	1.464	0.073	0.665	0.052	0.164	0.24
Departure Headway (Hd)	9.685	8.766	7.703	7.044	9.057	8.543	7.824	9.585	8.686
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	374	411	472	516	398	426	461	377	416
Service Time	7.385	6.466	5.403	4.843	6.757	6.243	5.524	7.285	6.386
HCM Lane V/C Ratio	0.297	0.092	0.513	1.45	0.08	0.718	0.056	0.178	0.262
HCM Control Delay	16	12.3	18.4	239.2	12.5	26.6	11	14.2	14.1
HCM Lane LOS	C	B	C	F	B	D	B	B	B
HCM 95th-tile Q	1.1	0.3	2.9	36.8	0.2	4.7	0.2	0.6	0.9

ATTACHMENT B

NEAR-TERM + PROJECT INTERSECTION

QUEUING ANALYSIS WORKSHEETS

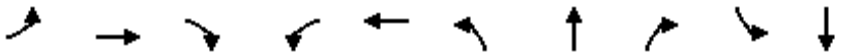
Lane Group	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	395	377	178	1023	1591
v/c Ratio	1.02	0.94	0.86	0.31	0.66
Control Delay	91.3	65.8	76.9	7.7	19.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	91.3	65.8	76.9	7.7	19.8
Queue Length 50th (ft)	~283	222	119	89	255
Queue Length 95th (ft)	#475	#412	m#217	112	307
Internal Link Dist (ft)		267		584	420
Turn Bay Length (ft)			300		
Base Capacity (vph)	386	403	212	3310	2425
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.02	0.94	0.84	0.31	0.66

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.



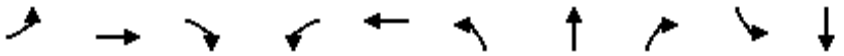
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	418	158	158	32	216	93	96	16	95	932
v/c Ratio	0.74	0.14	0.20	0.16	0.20	0.51	0.50	0.05	0.18	1.62
Control Delay	65.6	20.9	4.1	42.7	33.4	52.3	51.8	0.3	27.1	312.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.6	20.9	4.1	42.7	33.4	52.3	51.8	0.3	27.1	312.4
Queue Length 50th (ft)	138	24	1	19	41	60	62	0	45	~818
Queue Length 95th (ft)	m160	m33	m11	48	65	113	116	0	85	#1060
Internal Link Dist (ft)		279			1051		902			153
Turn Bay Length (ft)	100		160	140		170				
Base Capacity (vph)	631	1156	789	194	1061	184	191	352	529	575
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.14	0.20	0.16	0.20	0.51	0.50	0.05	0.18	1.62

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.

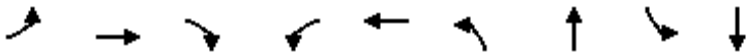
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	88	16	47	21	58	31	461	32	105	835
v/c Ratio	0.34	0.03	0.09	0.08	0.17	0.15	0.33	0.04	0.39	0.45
Control Delay	37.4	20.4	0.3	35.5	13.7	38.2	22.6	0.1	36.1	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.4	20.4	0.3	35.5	13.7	38.2	22.6	0.1	36.1	18.0
Queue Length 50th (ft)	31	4	0	7	6	11	84	0	37	108
Queue Length 95th (ft)	#115	22	0	36	36	49	183	0	119	328
Internal Link Dist (ft)		371			258		1033			1088
Turn Bay Length (ft)	110		110	120		250		250	480	
Base Capacity (vph)	286	1121	1008	286	1005	202	1797	866	353	1926
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	0.31	0.01	0.05	0.07	0.06	0.15	0.26	0.04	0.30	0.43

Intersection Summary

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



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	127	155	52	11	251	77	384	73	815
v/c Ratio	0.90	0.17	0.10	0.07	0.48	0.50	0.23	0.49	0.50
Control Delay	100.6	29.3	0.4	42.9	35.3	56.2	18.2	56.2	16.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	100.6	29.3	0.4	42.9	35.3	56.2	18.2	56.2	16.2
Queue Length 50th (ft)	82	40	0	7	68	47	74	44	135
Queue Length 95th (ft)	#191	65	0	24	87	#127	133	#117	237
Internal Link Dist (ft)		359			1014		1036		1033
Turn Bay Length (ft)	170		60	130		240		130	
Base Capacity (vph)	141	956	549	159	984	154	1641	149	1640
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.16	0.09	0.07	0.26	0.50	0.23	0.49	0.50

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)	350	1225	71	1643	118	31	31	20	95	41	441
v/c Ratio	0.83	0.53	0.62	0.95	0.14	0.16	0.12	0.06	0.47	0.15	0.71
Control Delay	71.2	15.9	91.5	49.9	4.0	52.8	51.4	0.3	63.4	52.1	40.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.2	15.9	91.5	49.9	4.0	52.8	51.4	0.3	63.4	52.1	40.7
Queue Length 50th (ft)	313	274	68	777	0	28	28	0	91	37	326
Queue Length 95th (ft)	#586	472	#132	#1036	36	54	53	0	134	66	417
Internal Link Dist (ft)		868		1062			90			329	
Turn Bay Length (ft)	240		250		670				240		
Base Capacity (vph)	422	2330	123	1725	819	317	434	456	324	440	617
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	0.83	0.53	0.58	0.95	0.14	0.10	0.07	0.04	0.29	0.09	0.71

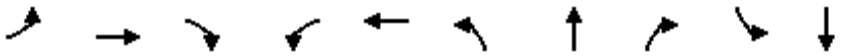
Intersection Summary

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

Lane Group	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	174	199	423	2067	1414
v/c Ratio	0.69	0.81	0.86	0.55	0.68
Control Delay	57.4	64.4	47.8	4.6	27.8
Queue Delay	0.0	0.0	0.0	0.1	0.0
Total Delay	57.4	64.4	47.8	4.7	27.8
Queue Length 50th (ft)	123	130	283	130	280
Queue Length 95th (ft)	193	211	m290	m205	382
Internal Link Dist (ft)		140		584	143
Turn Bay Length (ft)			300		
Base Capacity (vph)	319	304	584	3763	2080
Starvation Cap Reductn	0	0	0	440	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.55	0.65	0.72	0.62	0.68

Intersection Summary

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



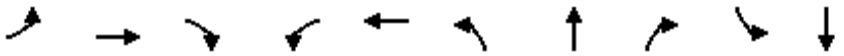
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	482	404	192	101	530	213	222	61	313	781
v/c Ratio	0.89	0.56	0.29	0.57	0.71	1.08	1.09	0.18	0.47	1.13
Control Delay	70.9	39.1	8.0	60.5	49.9	133.9	134.7	1.1	29.2	105.0
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Total Delay	70.9	39.1	8.0	60.5	49.9	133.9	134.7	1.1	29.2	105.1
Queue Length 50th (ft)	189	107	40	69	131	~177	~185	0	164	~601
Queue Length 95th (ft)	m#267	m153	m71	126	166	#335	#346	0	260	#877
Internal Link Dist (ft)		279			1051		902			153
Turn Bay Length (ft)	100		160	140		170				
Base Capacity (vph)	552	833	651	178	890	197	204	345	672	693
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	16	0	0	0	0	12
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.48	0.29	0.57	0.61	1.08	1.09	0.18	0.47	1.15

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.

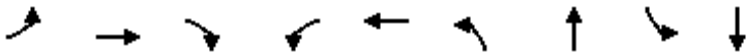
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	163	55	58	143	297	75	1025	88	220	682
v/c Ratio	0.79	0.19	0.14	0.59	0.72	0.62	0.92	0.14	0.80	0.45
Control Delay	69.4	33.8	0.7	53.0	22.9	68.5	45.8	0.5	62.4	21.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.4	33.8	0.7	53.0	22.9	68.5	45.8	0.5	62.4	21.2
Queue Length 50th (ft)	92	28	0	81	52	43	291	0	122	137
Queue Length 95th (ft)	#248	60	0	#223	133	#132	#559	0	#307	256
Internal Link Dist (ft)		313			258		1033			1088
Turn Bay Length (ft)	110		110	120		250		250	480	
Base Capacity (vph)	206	642	682	244	674	120	1117	635	274	1502
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	0.79	0.09	0.09	0.59	0.44	0.63	0.92	0.14	0.80	0.45

Intersection Summary

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



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	294	442	101	38	270	85	823	62	805
v/c Ratio	0.78	0.41	0.17	0.26	0.54	0.52	0.60	0.47	0.67
Control Delay	58.4	33.0	1.5	52.4	30.3	60.8	30.1	61.5	32.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.4	33.0	1.5	52.4	30.3	60.8	30.1	61.5	32.3
Queue Length 50th (ft)	197	145	0	26	58	57	246	42	239
Queue Length 95th (ft)	#426	178	9	60	85	#157	333	#109	315
Internal Link Dist (ft)		359			1014		1036		1033
Turn Bay Length (ft)	170		60	130		240		130	
Base Capacity (vph)	376	1192	631	144	892	162	1363	131	1201
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.37	0.16	0.26	0.30	0.52	0.60	0.47	0.67

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)	511	1657	115	1500	201	42	42	21	146	42	630
v/c Ratio	0.86	0.76	0.72	1.14	0.29	0.19	0.14	0.06	0.65	0.14	0.79
Control Delay	62.3	25.9	90.4	113.8	5.0	52.3	50.7	0.3	70.7	50.2	36.3
Queue Delay	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.3	26.7	90.4	113.8	5.0	52.3	50.7	0.3	70.7	50.2	36.3
Queue Length 50th (ft)	448	564	110	~904	0	37	37	0	139	37	433
Queue Length 95th (ft)	#785	847	180	#1044	54	69	67	0	197	67	593
Internal Link Dist (ft)		868		1062			90			329	
Turn Bay Length (ft)	240		250		670				240		
Base Capacity (vph)	594	2177	182	1320	702	317	434	461	321	440	795
Starvation Cap Reductn	0	245	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	0.86	0.86	0.63	1.14	0.29	0.13	0.10	0.05	0.45	0.10	0.79

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.

ATTACHMENT C

LONG-TERM + PROJECT INTERSECTION

LOS ANALYSIS WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	457	170	170	30	230	0	140	60	20	110	320	686
Future Volume (veh/h)	457	170	170	30	230	0	140	60	20	110	320	686
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	481	179	179	32	242	0	105	122	21	116	337	684
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	557	1099	661	115	1087	0	196	206	174	533	165	334
Arrive On Green	0.16	0.31	0.31	0.06	0.21	0.00	0.11	0.11	0.11	0.30	0.30	0.30
Sat Flow, veh/h	3456	3554	1575	1781	5274	0	1781	1870	1585	1781	551	1118
Grp Volume(v), veh/h	481	179	179	32	242	0	105	122	21	116	0	1021
Grp Sat Flow(s),veh/h/ln	1728	1777	1575	1781	1702	0	1781	1870	1585	1781	0	1669
Q Serve(g_s), s	13.6	3.7	7.4	1.7	3.9	0.0	5.6	6.2	1.2	4.9	0.0	29.9
Cycle Q Clear(g_c), s	13.6	3.7	7.4	1.7	3.9	0.0	5.6	6.2	1.2	4.9	0.0	29.9
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	557	1099	661	115	1087	0	196	206	174	533	0	499
V/C Ratio(X)	0.86	0.16	0.27	0.28	0.22	0.00	0.54	0.59	0.12	0.22	0.00	2.05
Avail Cap(c_a), veh/h	636	1099	661	196	1087	0	196	206	174	533	0	499
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)	0.51	0.51	0.51	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.9	25.1	19.0	44.5	32.5	0.0	42.1	42.4	40.1	26.3	0.0	35.1
Incr Delay (d2), s/veh	5.9	0.2	0.5	0.5	0.5	0.0	1.5	3.2	0.1	0.1	0.0	477.6
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	6.2	1.6	3.4	0.8	1.7	0.0	2.5	3.0	0.5	2.1	0.0	78.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.8	25.3	19.5	45.0	33.0	0.0	43.6	45.5	40.3	26.4	0.0	512.6
LnGrp LOS	D	C	B	D	C	A	D	D	D	C	A	F
Approach Vol, veh/h		839			274			248			1137	
Approach Delay, s/veh		36.4			34.4			44.3			463.0	
Approach LOS		D			C			D			F	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.2	37.7		35.0	20.8	28.1		16.1				
Change Period (Y+Rc), s	* 4.7	6.8		5.1	* 4.7	6.8		5.1				
Max Green Setting (Gmax), s	* 11	26.4		29.9	* 18	19.0		11.0				
Max Q Clear Time (g_c+I1), s	13.7	9.4		31.9	15.6	5.9		8.2				
Green Ext Time (p_c), s	0.0	1.0		0.0	0.6	0.8		0.2				

Intersection Summary		
HCM 6th Ctrl Delay	231.1	
HCM 6th LOS	F	

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	22.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	93	230	20	31	401	21	30	31	10	15	75	150
Future Vol, veh/h	93	230	20	31	401	21	30	31	10	15	75	150
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	100	247	22	33	431	23	32	33	11	16	81	161
Number of Lanes	1	1	0	1	1	1	0	1	1	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	3	2
HCM Control Delay	16.5	32.6	12.6	12.9
HCM LOS	C	D	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	49%	0%	100%	0%	100%	0%	0%	17%	0%
Vol Thru, %	51%	0%	0%	92%	0%	100%	0%	83%	0%
Vol Right, %	0%	100%	0%	8%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	61	10	93	250	31	401	21	90	150
LT Vol	30	0	93	0	31	0	0	15	0
Through Vol	31	0	0	230	0	401	0	75	0
RT Vol	0	10	0	20	0	0	21	0	150
Lane Flow Rate	66	11	100	269	33	431	23	97	161
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.156	0.023	0.216	0.537	0.069	0.832	0.039	0.211	0.316
Departure Headway (Hd)	8.587	7.618	7.758	7.192	7.457	6.949	6.237	7.846	7.048
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	417	469	463	500	480	522	573	457	510
Service Time	6.354	5.383	5.509	4.942	5.204	4.695	3.983	5.599	4.801
HCM Lane V/C Ratio	0.158	0.023	0.216	0.538	0.069	0.826	0.04	0.212	0.316
HCM Control Delay	12.9	10.6	12.6	18	10.8	35.5	9.2	12.7	13
HCM Lane LOS	B	B	B	C	B	E	A	B	B
HCM 95th-tile Q	0.5	0.1	0.8	3.1	0.2	8.4	0.1	0.8	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	547	460	210	110	580	10	300	170	70	350	320	553
Future Volume (veh/h)	547	460	210	110	580	10	300	170	70	350	320	553
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	553	465	212	111	586	10	238	264	71	354	323	526
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	556	852	562	172	907	15	209	219	186	622	223	364
Arrive On Green	0.16	0.24	0.24	0.10	0.18	0.18	0.12	0.12	0.12	0.35	0.35	0.35
Sat Flow, veh/h	3456	3554	1569	1781	5170	88	1781	1870	1585	1781	640	1043
Grp Volume(v), veh/h	553	465	212	111	385	211	238	264	71	354	0	849
Grp Sat Flow(s),veh/h/ln	1728	1777	1569	1781	1702	1854	1781	1870	1585	1781	0	1683
Q Serve(g_s), s	17.6	12.6	11.1	6.6	11.6	11.6	12.9	12.9	4.6	17.8	0.0	38.4
Cycle Q Clear(g_c), s	17.6	12.6	11.1	6.6	11.6	11.6	12.9	12.9	4.6	17.8	0.0	38.4
Prop In Lane	1.00		1.00	1.00		0.05	1.00		1.00	1.00		0.62
Lane Grp Cap(c), veh/h	556	852	562	172	597	325	209	219	186	622	0	587
V/C Ratio(X)	0.99	0.55	0.38	0.64	0.65	0.65	1.14	1.20	0.38	0.57	0.00	1.45
Avail Cap(c_a), veh/h	556	852	562	180	597	325	209	219	186	622	0	587
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)	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	46.1	36.6	26.3	47.9	42.2	42.2	48.5	48.5	44.9	29.1	0.0	35.8
Incr Delay (d2), s/veh	20.6	0.8	0.6	5.4	5.3	9.6	104.8	126.7	0.5	0.8	0.0	209.9
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	9.1	5.5	5.1	3.2	5.3	6.2	11.8	13.7	1.8	7.6	0.0	49.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.7	37.4	26.9	53.3	47.5	51.8	153.4	175.2	45.3	29.9	0.0	245.7
LnGrp LOS	E	D	C	D	D	D	F	F	D	C	A	F
Approach Vol, veh/h		1230			707			573			1203	
Approach Delay, s/veh		48.8			49.7			150.1			182.2	
Approach LOS		D			D			F			F	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	15.3	33.2		43.5	22.4	26.1		18.0
Change Period (Y+Rc), s	* 4.7	6.8		5.1	* 4.7	6.8		5.1
Max Green Setting (Gmax), s	* 11	25.9		38.4	* 18	19.3		12.9
Max Q Clear Time (g_c+I1), s	19.6	14.6		40.4	19.6	13.6		14.9
Green Ext Time (p_c), s	0.0	2.0		0.0	0.0	1.3		0.0

Intersection Summary	
HCM 6th Ctrl Delay	107.8
HCM 6th LOS	F

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	155.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	250	711	50	30	321	25	40	75	41	22	52	104
Future Vol, veh/h	250	711	50	30	321	25	40	75	41	22	52	104
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	263	748	53	32	338	26	42	79	43	23	55	109
Number of Lanes	1	1	0	1	1	1	0	1	1	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	3	2
HCM Control Delay	247.9	31.8	16.2	15
HCM LOS	F	D	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	35%	0%	100%	0%	100%	0%	0%	30%	0%
Vol Thru, %	65%	0%	0%	93%	0%	100%	0%	70%	0%
Vol Right, %	0%	100%	0%	7%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	115	41	250	761	30	321	25	74	104
LT Vol	40	0	250	0	30	0	0	22	0
Through Vol	75	0	0	711	0	321	0	52	0
RT Vol	0	41	0	50	0	0	25	0	104
Lane Flow Rate	121	43	263	801	32	338	26	78	109
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.308	0.1	0.584	1.654	0.076	0.762	0.054	0.197	0.251
Departure Headway (Hd)	10.163	9.257	7.994	7.435	9.479	8.964	8.243	10.074	9.195
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	356	390	453	497	380	405	437	358	393
Service Time	7.863	6.957	5.733	5.174	7.179	6.664	5.943	7.774	6.895
HCM Lane V/C Ratio	0.34	0.11	0.581	1.612	0.084	0.835	0.059	0.218	0.277
HCM Control Delay	17.3	13	21.4	322.3	13	35.2	11.4	15.2	14.9
HCM Lane LOS	C	B	C	F	B	E	B	C	B
HCM 95th-tile Q	1.3	0.3	3.6	45.9	0.2	6.3	0.2	0.7	1

ATTACHMENT D

LONG-TERM + PROJECT INTERSECTION

QUEUING ANALYSIS WORKSHEETS

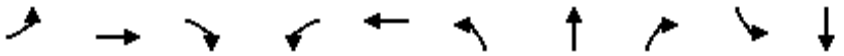
Lane Group	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	417	397	209	1126	1797
v/c Ratio	1.08	0.99	0.99	0.34	0.74
Control Delay	107.1	79.2	99.8	8.1	22.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	107.1	79.2	99.8	8.1	22.0
Queue Length 50th (ft)	~313	243	141	105	310
Queue Length 95th (ft)	#510	#450	m#255	128	370
Internal Link Dist (ft)		267		584	420
Turn Bay Length (ft)			300		
Base Capacity (vph)	386	400	212	3310	2414
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.08	0.99	0.99	0.34	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.

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



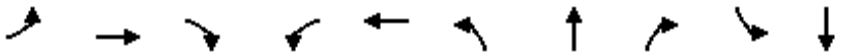
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	481	179	179	32	242	103	107	21	116	1059
v/c Ratio	0.81	0.15	0.22	0.16	0.24	0.56	0.56	0.06	0.22	1.84
Control Delay	65.6	20.8	3.8	42.7	34.7	54.7	54.5	0.3	27.7	405.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.6	20.8	3.8	42.7	34.7	54.7	54.5	0.3	27.7	405.9
Queue Length 50th (ft)	152	28	2	19	48	66	69	0	55	~987
Queue Length 95th (ft)	m174	m36	m12	48	72	124	128	0	100	#1236
Internal Link Dist (ft)		279			1051		902			153
Turn Bay Length (ft)	100		160	140		170				
Base Capacity (vph)	631	1156	801	194	1018	184	190	352	529	577
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	0.76	0.15	0.22	0.16	0.24	0.56	0.56	0.06	0.22	1.84

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.

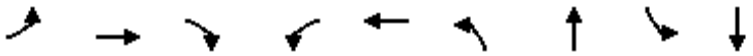
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	88	21	47	42	74	31	566	42	116	982
v/c Ratio	0.38	0.05	0.10	0.18	0.23	0.18	0.39	0.06	0.45	0.53
Control Delay	40.1	26.6	0.4	36.7	13.9	39.4	24.1	0.1	39.6	20.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.1	26.6	0.4	36.7	13.9	39.4	24.1	0.1	39.6	20.2
Queue Length 50th (ft)	34	8	0	16	8	12	109	0	44	135
Queue Length 95th (ft)	#115	26	0	59	41	49	227	0	#141	#450
Internal Link Dist (ft)		323			258		1033			1088
Turn Bay Length (ft)	110		110	120		250		250	480	
Base Capacity (vph)	251	997	915	251	905	177	1652	810	310	1737
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	0.35	0.02	0.05	0.17	0.08	0.18	0.34	0.05	0.37	0.57

Intersection Summary

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



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	148	187	84	32	305	99	567	84	987
v/c Ratio	1.05	0.26	0.18	0.20	0.55	0.53	0.38	0.52	0.68
Control Delay	135.9	34.8	0.9	45.5	36.9	54.9	21.6	56.2	22.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	135.9	34.8	0.9	45.5	36.9	54.9	21.6	56.2	22.9
Queue Length 50th (ft)	~103	58	0	19	86	59	124	51	213
Queue Length 95th (ft)	#227	77	0	49	107	#165	199	#139	330
Internal Link Dist (ft)		359			1014		1036		1033
Turn Bay Length (ft)	170		60	130		240		130	
Base Capacity (vph)	141	955	549	159	984	188	1481	163	1457
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.05	0.20	0.15	0.20	0.31	0.53	0.38	0.52	0.68

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	SBR
Lane Group Flow (vph)	401	1398	184	1735	220	102	102	82	136	173	533
v/c Ratio	0.89	0.71	0.74	1.08	0.27	0.76	0.34	0.23	0.67	0.57	0.80
Control Delay	75.0	25.5	78.1	87.2	3.6	90.2	56.4	3.6	73.6	63.3	43.7
Queue Delay	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.0	25.9	78.1	87.2	3.6	90.2	56.4	3.6	73.6	63.3	43.7
Queue Length 50th (ft)	369	496	171	~995	0	99	92	0	130	162	397
Queue Length 95th (ft)	#697	579	#413	#1133	48	155	137	15	188	219	546
Internal Link Dist (ft)		868		1062			90			329	
Turn Bay Length (ft)	240		250		670				240		
Base Capacity (vph)	452	1982	248	1604	824	196	434	456	291	440	670
Starvation Cap Reductn	0	197	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	0.89	0.78	0.74	1.08	0.27	0.52	0.24	0.18	0.47	0.39	0.80

Intersection Summary

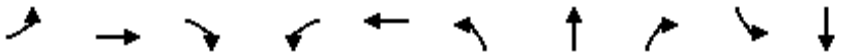
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Lane Group	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	192	212	474	2304	1599
v/c Ratio	0.71	0.83	0.89	0.62	0.83
Control Delay	58.0	68.1	42.4	4.8	34.5
Queue Delay	0.0	0.0	0.0	0.1	0.0
Total Delay	58.0	68.1	42.4	5.0	34.5
Queue Length 50th (ft)	134	144	302	211	369
Queue Length 95th (ft)	212	#248	m287	m210	#497
Internal Link Dist (ft)		140		584	143
Turn Bay Length (ft)			300		
Base Capacity (vph)	319	299	584	3715	1935
Starvation Cap Reductn	0	0	0	428	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.60	0.71	0.81	0.70	0.83

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.



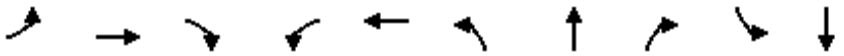
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	553	465	212	111	596	233	242	71	354	882
v/c Ratio	1.00	0.61	0.31	0.62	0.76	1.18	1.19	0.21	0.54	1.30
Control Delay	83.8	37.1	7.4	63.8	50.7	165.1	165.2	1.3	31.8	175.6
Queue Delay	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2
Total Delay	83.8	37.1	7.4	63.8	50.9	165.1	165.2	1.3	31.8	175.8
Queue Length 50th (ft)	~218	129	44	76	147	~208	~216	0	198	~774
Queue Length 95th (ft)	m#270	m151	m56	#147	187	#372	#382	0	298	#1032
Internal Link Dist (ft)		279			1051		902			153
Turn Bay Length (ft)	100		160	140		170				
Base Capacity (vph)	552	833	678	178	891	197	204	345	653	677
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	33	0	0	0	0	22
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.56	0.31	0.62	0.69	1.18	1.19	0.21	0.54	1.35

Intersection Summary

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

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

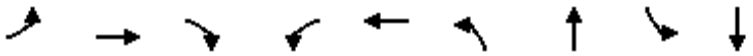
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	168	53	67	170	319	78	1163	106	234	756
v/c Ratio	0.90	0.19	0.17	0.69	0.83	0.61	0.89	0.15	0.87	0.46
Control Delay	97.9	42.8	0.9	66.0	42.7	75.2	45.2	0.5	78.9	22.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	97.9	42.8	0.9	66.0	42.7	75.2	45.2	0.5	78.9	22.9
Queue Length 50th (ft)	126	35	0	126	127	57	423	0	172	196
Queue Length 95th (ft)	#291	70	0	#285	232	#138	#657	0	#358	301
Internal Link Dist (ft)		349			258		1033			1088
Turn Bay Length (ft)	110		110	120		250		250	480	
Base Capacity (vph)	186	514	565	247	566	133	1305	684	270	1645
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	0.90	0.10	0.12	0.69	0.56	0.59	0.89	0.15	0.87	0.46

Intersection Summary

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



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	337	506	155	43	313	117	985	78	924
v/c Ratio	0.98	0.47	0.27	0.34	0.50	0.66	0.74	0.62	0.77
Control Delay	94.0	37.3	7.4	62.9	29.2	72.8	38.4	78.2	40.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	94.0	37.3	7.4	62.9	29.2	72.8	38.4	78.2	40.5
Queue Length 50th (ft)	~295	199	10	34	76	90	332	60	315
Queue Length 95th (ft)	#517	212	55	73	103	#227	478	#160	443
Internal Link Dist (ft)		359			1014		1036		1033
Turn Bay Length (ft)	170		60	130		240		130	
Base Capacity (vph)	345	1256	644	127	965	178	1330	125	1205
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.40	0.24	0.34	0.32	0.66	0.74	0.62	0.77

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	SBR
Lane Group Flow (vph)	511	1875	333	1510	336	135	135	83	219	188	672
v/c Ratio	0.99	1.00	1.47	1.16	0.44	0.73	0.35	0.20	0.92	0.48	0.84
Control Delay	88.7	56.5	278.0	122.4	6.8	77.0	52.3	3.2	97.5	55.3	39.2
Queue Delay	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	88.7	76.5	278.0	122.4	6.8	77.0	52.3	3.2	97.5	55.3	39.2
Queue Length 50th (ft)	~547	~953	~482	~915	19	121	111	0	206	159	485
Queue Length 95th (ft)	#785	#1140	#691	#1055	94	203	175	15	#346	236	664
Internal Link Dist (ft)		868		1062			90			329	
Turn Bay Length (ft)	240		250		670				240		
Base Capacity (vph)	518	1866	226	1304	763	208	434	461	266	440	801
Starvation Cap Reductn	0	101	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	0.99	1.06	1.47	1.16	0.44	0.65	0.31	0.18	0.82	0.43	0.84

Intersection Summary

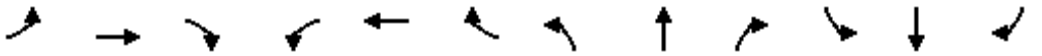
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

ATTACHMENT E

NEAR-TERM & LONG-TERM + PROJECT

IMPROVEMENTS ANALYSIS WORKSHEETS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	397	150	150	30	200	5	120	60	15	90	290	596
Future Volume (veh/h)	397	150	150	30	200	5	120	60	15	90	290	596
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	418	158	158	32	211	5	94	107	16	95	305	589
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	502	1100	661	115	1174	28	195	205	174	533	559	474
Arrive On Green	0.15	0.31	0.31	0.06	0.23	0.23	0.11	0.11	0.11	0.30	0.30	0.30
Sat Flow, veh/h	3456	3554	1575	1781	5132	121	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	418	158	158	32	140	76	94	107	16	95	305	589
Grp Sat Flow(s),veh/h/ln	1728	1777	1575	1781	1702	1849	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	11.8	3.2	6.5	1.7	3.3	3.3	5.0	5.4	0.9	3.9	13.7	29.9
Cycle Q Clear(g_c), s	11.8	3.2	6.5	1.7	3.3	3.3	5.0	5.4	0.9	3.9	13.7	29.9
Prop In Lane	1.00		1.00	1.00		0.07	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	502	1100	661	115	779	423	195	205	174	533	559	474
V/C Ratio(X)	0.83	0.14	0.24	0.28	0.18	0.18	0.48	0.52	0.09	0.18	0.55	1.24
Avail Cap(c_a), veh/h	667	1100	661	196	779	423	198	208	176	533	559	474
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)	0.60	0.60	0.60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.5	24.9	18.7	44.5	31.0	31.0	41.8	42.0	40.0	26.0	29.4	35.0
Incr Delay (d2), s/veh	4.2	0.2	0.5	0.5	0.5	0.9	0.7	1.0	0.1	0.1	0.6	126.1
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	5.2	1.4	3.0	0.8	1.4	1.6	2.2	2.5	0.4	1.7	6.1	27.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.7	25.1	19.3	45.0	31.5	32.0	42.5	43.1	40.1	26.0	30.0	161.2
LnGrp LOS	D	C	B	D	C	C	D	D	D	C	C	F
Approach Vol, veh/h		734			248			217			989	
Approach Delay, s/veh		35.6			33.4			42.6			107.7	
Approach LOS		D			C			D			F	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.2	37.7		35.0	19.2	29.7		16.1				
Change Period (Y+Rc), s	* 4.7	6.8		5.1	* 4.7	6.8		5.1				
Max Green Setting (Gmax), s	* 11	26.3		29.9	* 19	18.0		11.1				
Max Q Clear Time (g_c+I1), s	3.7	8.5		31.9	13.8	5.3		7.4				
Green Ext Time (p_c), s	0.0	0.8		0.0	0.8	0.6		0.2				

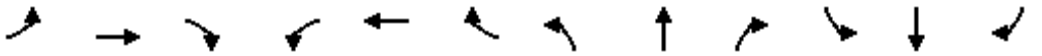
Intersection Summary		
HCM 6th Ctrl Delay		68.6
HCM 6th LOS		E

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

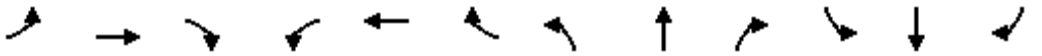
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	84	15	45	20	15	40	29	438	30	100	702	91
Future Volume (veh/h)	84	15	45	20	15	40	29	438	30	100	702	91
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	88	16	47	21	16	42	31	461	32	105	739	96
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	317	73	215	71	56	146	73	982	435	151	1012	131
Arrive On Green	0.09	0.17	0.17	0.04	0.12	0.12	0.04	0.28	0.28	0.08	0.32	0.32
Sat Flow, veh/h	3456	418	1229	1781	454	1192	1781	3554	1576	1781	3162	411
Grp Volume(v), veh/h	88	0	63	21	0	58	31	461	32	105	415	420
Grp Sat Flow(s),veh/h/ln	1728	0	1647	1781	0	1645	1781	1777	1576	1781	1777	1796
Q Serve(g_s), s	1.4	0.0	1.9	0.7	0.0	1.8	1.0	6.2	0.9	3.3	12.0	12.0
Cycle Q Clear(g_c), s	1.4	0.0	1.9	0.7	0.0	1.8	1.0	6.2	0.9	3.3	12.0	12.0
Prop In Lane	1.00		0.75	1.00		0.72	1.00		1.00	1.00		0.23
Lane Grp Cap(c), veh/h	317	0	288	71	0	202	73	982	435	151	569	575
V/C Ratio(X)	0.28	0.00	0.22	0.30	0.00	0.29	0.43	0.47	0.07	0.70	0.73	0.73
Avail Cap(c_a), veh/h	509	0	914	262	0	913	188	1571	697	293	890	900
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.4	0.0	20.4	26.9	0.0	23.0	27.0	17.4	15.4	25.7	17.4	17.4
Incr Delay (d2), s/veh	0.5	0.0	0.4	2.3	0.0	0.8	3.9	0.4	0.1	5.7	1.8	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.7	0.3	0.0	0.7	0.5	2.2	0.3	1.5	4.3	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.9	0.0	20.8	29.2	0.0	23.8	31.0	17.7	15.5	31.3	19.2	19.2
LnGrp LOS	C	A	C	C	A	C	C	B	B	C	B	B
Approach Vol, veh/h		151			79			524			940	
Approach Delay, s/veh		23.2			25.2			18.4			20.6	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.4	21.9	8.3	16.1	8.8	24.5	11.3	13.1
Change Period (Y+Rc), s	6.5	6.0	6.0	6.0	6.5	6.0	6.0	6.0
Max Green Setting (Gmax), s	9.5	25.5	8.5	32.0	6.1	28.9	8.5	32.0
Max Q Clear Time (g_c+I1), s	5.3	8.2	2.7	3.9	3.0	14.0	3.4	3.8
Green Ext Time (p_c), s	0.1	2.6	0.0	0.3	0.0	4.2	0.1	0.3

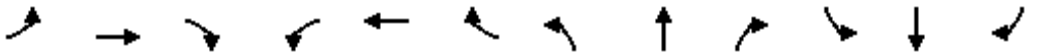
Intersection Summary	
HCM 6th Ctrl Delay	20.3
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	83	220	20	26	381	21	25	31	10	15	65	140
Future Volume (veh/h)	83	220	20	26	381	21	25	31	10	15	65	140
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	89	237	22	28	410	23	27	33	11	16	70	151
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	134	572	53	59	521	29	57	265	88	36	98	211
Arrive On Green	0.08	0.34	0.34	0.03	0.30	0.30	0.03	0.20	0.20	0.02	0.19	0.19
Sat Flow, veh/h	1781	1685	156	1781	1754	98	1781	1342	447	1781	527	1136
Grp Volume(v), veh/h	89	0	259	28	0	433	27	0	44	16	0	221
Grp Sat Flow(s),veh/h/ln	1781	0	1842	1781	0	1853	1781	0	1790	1781	0	1662
Q Serve(g_s), s	2.1	0.0	4.7	0.7	0.0	9.4	0.7	0.0	0.9	0.4	0.0	5.5
Cycle Q Clear(g_c), s	2.1	0.0	4.7	0.7	0.0	9.4	0.7	0.0	0.9	0.4	0.0	5.5
Prop In Lane	1.00		0.08	1.00		0.05	1.00		0.25	1.00		0.68
Lane Grp Cap(c), veh/h	134	0	625	59	0	550	57	0	353	36	0	308
V/C Ratio(X)	0.66	0.00	0.41	0.48	0.00	0.79	0.47	0.00	0.12	0.44	0.00	0.72
Avail Cap(c_a), veh/h	207	0	793	207	0	798	203	0	734	203	0	682
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.7	0.0	11.1	20.8	0.0	14.2	20.9	0.0	14.5	21.3	0.0	16.8
Incr Delay (d2), s/veh	5.5	0.0	0.4	5.9	0.0	3.3	6.0	0.0	0.2	8.4	0.0	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	1.0	0.0	1.6	0.3	0.0	3.7	0.3	0.0	0.3	0.2	0.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.2	0.0	11.6	26.7	0.0	17.5	26.9	0.0	14.7	29.6	0.0	19.9
LnGrp LOS	C	A	B	C	A	B	C	A	B	C	A	B
Approach Vol, veh/h		348			461			71			237	
Approach Delay, s/veh		15.1			18.0			19.3			20.6	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.9	19.4	5.9	12.6	7.8	17.5	5.4	13.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	18.9	5.0	18.0	5.1	18.9	5.0	18.0
Max Q Clear Time (g_c+I1), s	2.7	6.7	2.7	7.5	4.1	11.4	2.4	2.9
Green Ext Time (p_c), s	0.0	1.1	0.0	0.9	0.0	1.6	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	17.7
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	118	144	48	10	181	52	72	327	30	68	416	342
Future Volume (veh/h)	118	144	48	10	181	52	72	327	30	68	416	342
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		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	127	155	52	11	195	56	77	352	32	73	447	368
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	143	496	161	42	246	209	99	1599	144	94	884	725
Arrive On Green	0.08	0.19	0.19	0.02	0.13	0.13	0.06	0.49	0.49	0.05	0.48	0.48
Sat Flow, veh/h	1781	2638	854	1781	1870	1585	1781	3291	297	1781	1831	1501
Grp Volume(v), veh/h	127	103	104	11	195	56	77	189	195	73	434	381
Grp Sat Flow(s),veh/h/ln	1781	1777	1715	1781	1870	1585	1781	1777	1812	1781	1777	1556
Q Serve(g_s), s	7.1	5.0	5.3	0.6	10.1	3.2	4.3	6.1	6.2	4.0	16.7	16.8
Cycle Q Clear(g_c), s	7.1	5.0	5.3	0.6	10.1	3.2	4.3	6.1	6.2	4.0	16.7	16.8
Prop In Lane	1.00		0.50	1.00		1.00	1.00		0.16	1.00		0.97
Lane Grp Cap(c), veh/h	143	334	323	42	246	209	99	863	880	94	858	751
V/C Ratio(X)	0.89	0.31	0.32	0.26	0.79	0.27	0.78	0.22	0.22	0.78	0.51	0.51
Avail Cap(c_a), veh/h	143	480	463	160	524	444	107	863	880	107	858	751
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	0.90	0.90	0.90
Uniform Delay (d), s/veh	45.6	35.0	35.1	48.0	42.1	39.1	46.6	14.8	14.8	46.8	17.7	17.7
Incr Delay (d2), s/veh	44.8	0.5	0.6	3.2	5.6	0.7	28.5	0.6	0.6	24.7	1.9	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	2.2	2.2	0.3	5.0	1.3	2.6	2.4	2.5	2.4	6.6	5.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	90.4	35.5	35.7	51.2	47.7	39.8	75.1	15.4	15.4	71.5	19.6	19.9
LnGrp LOS	F	D	D	D	D	D	E	B	B	E	B	B
Approach Vol, veh/h		334			262			461			888	
Approach Delay, s/veh		56.4			46.2			25.4			24.0	
Approach LOS		E			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.8	55.1	8.4	24.8	12.0	54.8	14.0	19.2
Change Period (Y+Rc), s	6.5	6.5	6.0	6.0	6.5	6.5	6.0	6.0
Max Green Setting (Gmax), s	6.0	33.0	9.0	27.0	6.0	33.0	8.0	28.0
Max Q Clear Time (g_c+I1), s	6.0	8.2	2.6	7.3	6.3	18.8	9.1	12.1
Green Ext Time (p_c), s	0.0	2.0	0.0	1.1	0.0	4.2	0.0	1.1

Intersection Summary	
HCM 6th Ctrl Delay	32.9
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	477	400	190	100	510	15	270	160	60	310	290	483
Future Volume (veh/h)	477	400	190	100	510	15	270	160	60	310	290	483
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	482	404	192	101	515	15	218	240	61	313	293	455
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	540	994	625	170	1116	32	209	219	186	553	580	492
Arrive On Green	0.16	0.28	0.28	0.10	0.22	0.22	0.12	0.12	0.12	0.31	0.31	0.31
Sat Flow, veh/h	3456	3554	1571	1781	5100	148	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	482	404	192	101	343	187	218	240	61	313	293	455
Grp Sat Flow(s),veh/h/ln	1728	1777	1571	1781	1702	1843	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	15.0	10.2	9.2	6.0	9.6	9.7	12.9	12.9	3.9	16.2	14.1	30.5
Cycle Q Clear(g_c), s	15.0	10.2	9.2	6.0	9.6	9.7	12.9	12.9	3.9	16.2	14.1	30.5
Prop In Lane	1.00		1.00	1.00		0.08	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	540	994	625	170	745	404	209	219	186	553	580	492
V/C Ratio(X)	0.89	0.41	0.31	0.59	0.46	0.46	1.04	1.09	0.33	0.57	0.50	0.93
Avail Cap(c_a), veh/h	556	994	625	180	745	404	209	219	186	622	653	553
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)	0.63	0.63	0.63	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.5	32.2	22.8	47.7	37.3	37.3	48.5	48.5	44.6	31.7	31.0	36.7
Incr Delay (d2), s/veh	11.2	0.8	0.8	3.0	2.0	3.8	74.2	88.2	0.4	0.4	0.3	19.4
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	7.3	4.5	4.3	2.8	4.2	4.8	10.0	11.4	1.5	7.0	6.4	14.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.7	33.0	23.6	50.7	39.4	41.1	122.7	136.7	45.0	32.1	31.3	56.1
LnGrp LOS	E	C	C	D	D	D	F	F	D	C	C	E
Approach Vol, veh/h		1078			631			519			1061	
Approach Delay, s/veh		41.9			41.7			120.1			42.2	
Approach LOS		D			D			F			D	

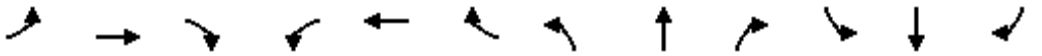
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.2	37.6		39.2	21.9	30.9		18.0				
Change Period (Y+Rc), s	* 4.7	6.8		5.1	* 4.7	6.8		5.1				
Max Green Setting (Gmax), s	* 11	25.9		38.4	* 18	19.3		12.9				
Max Q Clear Time (g_c+I1), s	8.0	12.2		32.5	17.0	11.7		14.9				
Green Ext Time (p_c), s	0.0	1.8		1.6	0.1	1.4		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		54.3	
HCM 6th LOS		D	

Notes

User approved volume balancing among the lanes for turning movement.

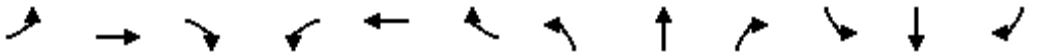
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	148	50	53	130	50	220	68	933	80	200	488	133
Future Volume (veh/h)	148	50	53	130	50	220	68	933	80	200	488	133
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	163	55	58	143	55	242	75	1025	88	220	536	146
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	254	159	167	174	65	285	98	1096	487	254	1094	297
Arrive On Green	0.07	0.19	0.19	0.10	0.21	0.21	0.05	0.31	0.31	0.14	0.40	0.40
Sat Flow, veh/h	3456	833	878	1781	302	1328	1781	3554	1577	1781	2763	749
Grp Volume(v), veh/h	163	0	113	143	0	297	75	1025	88	220	344	338
Grp Sat Flow(s),veh/h/ln	1728	0	1711	1781	0	1629	1781	1777	1577	1781	1777	1735
Q Serve(g_s), s	4.3	0.0	5.4	7.4	0.0	16.4	3.9	26.3	3.8	11.3	13.6	13.7
Cycle Q Clear(g_c), s	4.3	0.0	5.4	7.4	0.0	16.4	3.9	26.3	3.8	11.3	13.6	13.7
Prop In Lane	1.00		0.51	1.00		0.81	1.00		1.00	1.00		0.43
Lane Grp Cap(c), veh/h	254	0	326	174	0	350	98	1096	487	254	704	687
V/C Ratio(X)	0.64	0.00	0.35	0.82	0.00	0.85	0.77	0.93	0.18	0.87	0.49	0.49
Avail Cap(c_a), veh/h	397	0	583	186	0	538	120	1109	492	273	708	691
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.3	0.0	33.0	41.5	0.0	35.4	43.8	31.5	23.8	39.4	21.2	21.3
Incr Delay (d2), s/veh	2.7	0.0	0.6	23.4	0.0	7.7	21.0	14.0	0.2	23.2	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	1.9	0.0	2.2	4.3	0.0	7.1	2.2	12.6	1.4	6.4	5.3	5.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.0	0.0	33.6	65.0	0.0	43.2	64.8	45.6	23.9	62.6	21.8	21.8
LnGrp LOS	D	A	C	E	A	D	E	D	C	E	C	C
Approach Vol, veh/h		276			440			1188			902	
Approach Delay, s/veh		40.3			50.2			45.2			31.7	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.9	35.0	15.2	23.9	11.7	43.2	12.9	26.2
Change Period (Y+Rc), s	6.5	6.0	6.0	6.0	6.5	6.0	6.0	6.0
Max Green Setting (Gmax), s	14.4	29.3	9.8	32.0	6.3	37.4	10.8	31.0
Max Q Clear Time (g_c+I1), s	13.3	28.3	9.4	7.4	5.9	15.7	6.3	18.4
Green Ext Time (p_c), s	0.1	0.7	0.0	0.6	0.0	3.8	0.2	1.4

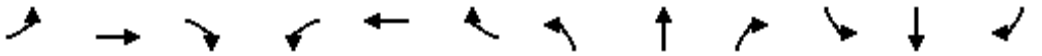
Intersection Summary	
HCM 6th Ctrl Delay	41.2
HCM 6th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	230	661	50	30	291	25	40	65	36	22	42	104
Future Volume (veh/h)	230	661	50	30	291	25	40	65	36	22	42	104
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		1.00	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	242	696	53	32	306	26	42	68	38	23	44	109
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	300	805	61	62	573	49	76	169	95	48	64	157
Arrive On Green	0.17	0.47	0.47	0.03	0.34	0.34	0.04	0.15	0.15	0.03	0.14	0.14
Sat Flow, veh/h	1781	1712	130	1781	1700	144	1781	1114	623	1781	467	1158
Grp Volume(v), veh/h	242	0	749	32	0	332	42	0	106	23	0	153
Grp Sat Flow(s),veh/h/ln	1781	0	1842	1781	0	1844	1781	0	1737	1781	0	1625
Q Serve(g_s), s	7.4	0.0	20.7	1.0	0.0	8.3	1.3	0.0	3.1	0.7	0.0	5.1
Cycle Q Clear(g_c), s	7.4	0.0	20.7	1.0	0.0	8.3	1.3	0.0	3.1	0.7	0.0	5.1
Prop In Lane	1.00		0.07	1.00		0.08	1.00		0.36	1.00		0.71
Lane Grp Cap(c), veh/h	300	0	866	62	0	622	76	0	264	48	0	221
V/C Ratio(X)	0.81	0.00	0.86	0.52	0.00	0.53	0.55	0.00	0.40	0.48	0.00	0.69
Avail Cap(c_a), veh/h	472	0	1100	156	0	774	156	0	549	156	0	514
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.8	0.0	13.5	27.0	0.0	15.3	26.7	0.0	21.8	27.3	0.0	23.5
Incr Delay (d2), s/veh	5.6	0.0	6.0	6.5	0.0	0.7	6.2	0.0	1.0	7.4	0.0	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.0	8.4	0.5	0.0	3.2	0.6	0.0	1.2	0.4	0.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.4	0.0	19.5	33.5	0.0	16.0	32.9	0.0	22.8	34.7	0.0	27.3
LnGrp LOS	C	A	B	C	A	B	C	A	C	C	A	C
Approach Vol, veh/h		991			364			148			176	
Approach Delay, s/veh		21.7			17.5			25.7			28.3	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.5	31.3	6.9	12.2	14.1	23.7	6.0	13.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	34.0	5.0	18.0	15.1	23.9	5.0	18.0
Max Q Clear Time (g_c+I1), s	3.0	22.7	3.3	7.1	9.4	10.3	2.7	5.1
Green Ext Time (p_c), s	0.0	4.1	0.0	0.6	0.3	1.6	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	21.8
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	273	411	94	35	153	98	79	736	30	58	571	178
Future Volume (veh/h)	273	411	94	35	153	98	79	736	30	58	571	178
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	294	442	101	38	165	92	85	791	32	62	614	191
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	243	572	130	100	222	187	97	1639	66	83	1228	381
Arrive On Green	0.14	0.20	0.20	0.06	0.12	0.12	0.05	0.47	0.47	0.05	0.46	0.46
Sat Flow, veh/h	1781	2876	652	1781	1870	1573	1781	3479	141	1781	2653	824
Grp Volume(v), veh/h	294	272	271	38	165	92	85	404	419	62	411	394
Grp Sat Flow(s),veh/h/ln	1781	1777	1751	1781	1870	1573	1781	1777	1843	1781	1777	1700
Q Serve(g_s), s	15.0	15.9	16.2	2.3	9.4	6.0	5.2	17.1	17.1	3.8	17.8	17.8
Cycle Q Clear(g_c), s	15.0	15.9	16.2	2.3	9.4	6.0	5.2	17.1	17.1	3.8	17.8	17.8
Prop In Lane	1.00		0.37	1.00		1.00	1.00		0.08	1.00		0.48
Lane Grp Cap(c), veh/h	243	354	348	100	222	187	97	837	868	83	823	787
V/C Ratio(X)	1.21	0.77	0.78	0.38	0.74	0.49	0.87	0.48	0.48	0.75	0.50	0.50
Avail Cap(c_a), veh/h	243	533	525	146	459	386	97	837	868	97	823	787
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Uniform Delay (d), s/veh	47.5	41.7	41.8	50.1	46.8	45.4	51.6	19.9	19.9	51.8	20.6	20.7
Incr Delay (d2), s/veh	126.6	3.8	4.2	2.4	4.8	2.0	53.4	2.0	1.9	20.7	1.9	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.1	7.3	7.3	1.1	4.6	2.5	3.7	7.0	7.3	2.1	7.3	7.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	174.1	45.4	46.0	52.4	51.7	47.4	105.0	21.9	21.8	72.5	22.5	22.6
LnGrp LOS	F	D	D	D	D	D	F	C	C	E	C	C
Approach Vol, veh/h		837			295			908			867	
Approach Delay, s/veh		90.8			50.4			29.6			26.1	
Approach LOS		F			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.6	58.3	12.2	27.9	12.5	57.4	21.0	19.1
Change Period (Y+Rc), s	6.5	6.5	6.0	6.0	6.5	6.5	6.0	6.0
Max Green Setting (Gmax), s	6.0	37.0	9.0	33.0	6.0	37.0	15.0	27.0
Max Q Clear Time (g_c+I1), s	5.8	19.1	4.3	18.2	7.2	19.8	17.0	11.4
Green Ext Time (p_c), s	0.0	4.4	0.0	2.9	0.0	4.4	0.0	1.0

Intersection Summary	
HCM 6th Ctrl Delay	48.3
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	457	170	170	30	230	0	140	60	20	110	320	686
Future Volume (veh/h)	457	170	170	30	230	0	140	60	20	110	320	686
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	481	179	179	32	242	0	105	122	21	116	337	684
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	570	1064	645	115	1017	0	196	206	174	550	578	490
Arrive On Green	0.16	0.30	0.30	0.06	0.20	0.00	0.11	0.11	0.11	0.31	0.31	0.31
Sat Flow, veh/h	3456	3554	1574	1781	5274	0	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	481	179	179	32	242	0	105	122	21	116	337	684
Grp Sat Flow(s),veh/h/ln	1728	1777	1574	1781	1702	0	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	13.5	3.7	7.6	1.7	4.0	0.0	5.6	6.2	1.2	4.8	15.2	30.9
Cycle Q Clear(g_c), s	13.5	3.7	7.6	1.7	4.0	0.0	5.6	6.2	1.2	4.8	15.2	30.9
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	570	1064	645	115	1017	0	196	206	174	550	578	490
V/C Ratio(X)	0.84	0.17	0.28	0.28	0.24	0.00	0.54	0.59	0.12	0.21	0.58	1.40
Avail Cap(c_a), veh/h	743	1064	645	196	1017	0	196	206	174	550	578	490
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)	0.51	0.51	0.51	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.5	25.8	19.7	44.5	33.7	0.0	42.1	42.4	40.1	25.5	29.1	34.5
Incr Delay (d2), s/veh	3.7	0.2	0.5	0.5	0.6	0.0	1.5	3.2	0.1	0.1	1.0	190.6
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	6.0	1.6	3.4	0.8	1.7	0.0	2.5	3.0	0.5	2.0	6.9	37.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.2	26.0	20.2	45.0	34.2	0.0	43.6	45.5	40.3	25.6	30.1	225.1
LnGrp LOS	D	C	C	D	C	A	D	D	D	C	C	F
Approach Vol, veh/h		839			274			248			1137	
Approach Delay, s/veh		35.2			35.5			44.3			147.0	
Approach LOS		D			D			D			F	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.2	36.7		36.0	21.2	26.7		16.1				
Change Period (Y+Rc), s	* 4.7	6.8		5.1	* 4.7	6.8		5.1				
Max Green Setting (Gmax), s	* 11	25.4		30.9	* 22	14.9		11.0				
Max Q Clear Time (g_c+I1), s	3.7	9.6		32.9	15.5	6.0		8.2				
Green Ext Time (p_c), s	0.0	0.9		0.0	1.0	0.7		0.2				

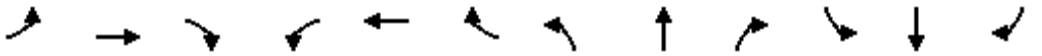
Intersection Summary		
HCM 6th Ctrl Delay		87.0
HCM 6th LOS		F

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

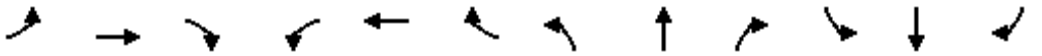
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	84	20	45	40	20	50	29	538	40	110	832	101
Future Volume (veh/h)	84	20	45	40	20	50	29	538	40	110	832	101
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	88	21	47	42	21	53	31	566	42	116	876	106
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	305	74	165	118	57	144	71	1098	487	150	1127	136
Arrive On Green	0.09	0.14	0.14	0.07	0.12	0.12	0.04	0.31	0.31	0.08	0.35	0.35
Sat Flow, veh/h	3456	513	1148	1781	468	1180	1781	3554	1577	1781	3191	386
Grp Volume(v), veh/h	88	0	68	42	0	74	31	566	42	116	488	494
Grp Sat Flow(s),veh/h/ln	1728	0	1661	1781	0	1648	1781	1777	1577	1781	1777	1800
Q Serve(g_s), s	1.5	0.0	2.3	1.4	0.0	2.6	1.1	8.1	1.2	3.9	15.1	15.1
Cycle Q Clear(g_c), s	1.5	0.0	2.3	1.4	0.0	2.6	1.1	8.1	1.2	3.9	15.1	15.1
Prop In Lane	1.00		0.69	1.00		0.72	1.00		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	305	0	239	118	0	201	71	1098	487	150	627	636
V/C Ratio(X)	0.29	0.00	0.28	0.35	0.00	0.37	0.43	0.52	0.09	0.77	0.78	0.78
Avail Cap(c_a), veh/h	475	0	860	245	0	853	176	1455	646	280	831	842
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.3	0.0	23.6	27.6	0.0	24.9	29.0	17.5	15.2	27.7	17.8	17.8
Incr Delay (d2), s/veh	0.5	0.0	0.6	1.8	0.0	1.1	4.1	0.4	0.1	8.2	3.4	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	0.6	0.0	0.9	0.6	0.0	1.0	0.5	2.8	0.4	1.8	5.7	5.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.9	0.0	24.3	29.4	0.0	26.1	33.1	17.9	15.2	35.9	21.2	21.2
LnGrp LOS	C	A	C	C	A	C	C	B	B	D	C	C
Approach Vol, veh/h		156			116			639			1098	
Approach Delay, s/veh		25.7			27.3			18.5			22.8	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.7	25.1	10.1	14.9	9.0	27.8	11.5	13.5
Change Period (Y+Rc), s	6.5	6.0	6.0	6.0	6.5	6.0	6.0	6.0
Max Green Setting (Gmax), s	9.7	25.3	8.5	32.0	6.1	28.9	8.5	32.0
Max Q Clear Time (g_c+I1), s	5.9	10.1	3.4	4.3	3.1	17.1	3.5	4.6
Green Ext Time (p_c), s	0.1	3.1	0.0	0.3	0.0	4.5	0.1	0.4

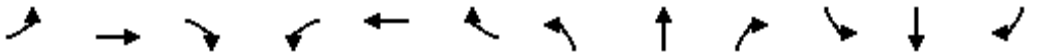
Intersection Summary	
HCM 6th Ctrl Delay	21.9
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	230	20	31	401	21	30	31	10	15	75	150
Future Volume (veh/h)	93	230	20	31	401	21	30	31	10	15	75	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	100	247	22	33	431	23	32	33	11	16	81	161
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	139	580	52	66	532	28	65	286	95	36	110	218
Arrive On Green	0.08	0.34	0.34	0.04	0.30	0.30	0.04	0.21	0.21	0.02	0.20	0.20
Sat Flow, veh/h	1781	1692	151	1781	1760	94	1781	1342	447	1781	558	1109
Grp Volume(v), veh/h	100	0	269	33	0	454	32	0	44	16	0	242
Grp Sat Flow(s),veh/h/ln	1781	0	1843	1781	0	1853	1781	0	1790	1781	0	1667
Q Serve(g_s), s	2.6	0.0	5.2	0.8	0.0	10.5	0.8	0.0	0.9	0.4	0.0	6.3
Cycle Q Clear(g_c), s	2.6	0.0	5.2	0.8	0.0	10.5	0.8	0.0	0.9	0.4	0.0	6.3
Prop In Lane	1.00		0.08	1.00		0.05	1.00		0.25	1.00		0.67
Lane Grp Cap(c), veh/h	139	0	632	66	0	560	65	0	381	36	0	328
V/C Ratio(X)	0.72	0.00	0.43	0.50	0.00	0.81	0.49	0.00	0.12	0.45	0.00	0.74
Avail Cap(c_a), veh/h	195	0	749	195	0	753	191	0	693	191	0	645
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.0	0.0	11.8	22.0	0.0	15.0	22.0	0.0	14.8	22.5	0.0	17.6
Incr Delay (d2), s/veh	7.4	0.0	0.5	5.6	0.0	4.9	5.7	0.0	0.1	8.5	0.0	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	1.8	0.4	0.0	4.4	0.4	0.0	0.3	0.2	0.0	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.4	0.0	12.2	27.6	0.0	19.9	27.7	0.0	14.9	31.1	0.0	20.8
LnGrp LOS	C	A	B	C	A	B	C	A	B	C	A	C
Approach Vol, veh/h		369			487			76			258	
Approach Delay, s/veh		16.6			20.4			20.3			21.5	
Approach LOS		B			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.2	20.5	6.2	13.6	8.1	18.6	5.4	14.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	18.9	5.0	18.0	5.1	18.9	5.0	18.0
Max Q Clear Time (g_c+I1), s	2.8	7.2	2.8	8.3	4.6	12.5	2.4	2.9
Green Ext Time (p_c), s	0.0	1.2	0.0	0.9	0.0	1.5	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	19.5
HCM 6th LOS	B



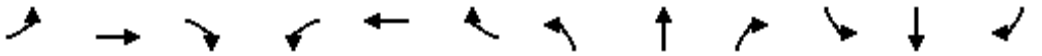
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	138	174	78	30	221	62	92	477	50	78	536	382
Future Volume (veh/h)	138	174	78	30	221	62	92	477	50	78	536	382
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	148	187	84	32	238	67	99	513	54	84	576	411
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	143	442	191	94	292	247	107	1471	154	107	889	634
Arrive On Green	0.08	0.18	0.18	0.05	0.16	0.16	0.06	0.45	0.45	0.06	0.45	0.45
Sat Flow, veh/h	1781	2415	1043	1781	1870	1585	1781	3240	340	1781	1957	1397
Grp Volume(v), veh/h	148	136	135	32	238	67	99	281	286	84	523	464
Grp Sat Flow(s),veh/h/ln	1781	1777	1681	1781	1870	1585	1781	1777	1803	1781	1777	1577
Q Serve(g_s), s	8.0	6.8	7.2	1.7	12.3	3.7	5.5	10.2	10.3	4.7	22.8	22.8
Cycle Q Clear(g_c), s	8.0	6.8	7.2	1.7	12.3	3.7	5.5	10.2	10.3	4.7	22.8	22.8
Prop In Lane	1.00		0.62	1.00		1.00	1.00		0.19	1.00		0.89
Lane Grp Cap(c), veh/h	143	325	307	94	292	247	107	807	819	107	807	716
V/C Ratio(X)	1.04	0.42	0.44	0.34	0.82	0.27	0.93	0.35	0.35	0.79	0.65	0.65
Avail Cap(c_a), veh/h	143	480	454	160	524	444	107	807	819	107	807	716
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	0.84	0.84	0.84
Uniform Delay (d), s/veh	46.0	36.1	36.3	45.7	40.8	37.2	46.8	17.7	17.7	46.4	21.1	21.1
Incr Delay (d2), s/veh	86.0	0.9	1.0	2.1	5.5	0.6	63.9	1.2	1.2	27.0	3.4	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.9	3.0	3.0	0.8	6.1	1.5	4.3	4.1	4.2	2.8	9.4	8.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	132.0	37.0	37.3	47.8	46.4	37.8	110.7	18.9	18.9	73.3	24.5	24.9
LnGrp LOS	F	D	D	D	D	D	F	B	B	E	C	C
Approach Vol, veh/h		419			337			666			1071	
Approach Delay, s/veh		70.6			44.8			32.5			28.5	
Approach LOS		E			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.5	51.9	11.3	24.3	12.5	51.9	14.0	21.6
Change Period (Y+Rc), s	6.5	6.5	6.0	6.0	6.5	6.5	6.0	6.0
Max Green Setting (Gmax), s	6.0	33.0	9.0	27.0	6.0	33.0	8.0	28.0
Max Q Clear Time (g_c+I1), s	6.7	12.3	3.7	9.2	7.5	24.8	10.0	14.3
Green Ext Time (p_c), s	0.0	3.0	0.0	1.4	0.0	3.8	0.0	1.3

Intersection Summary	
HCM 6th Ctrl Delay	38.9
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	547	460	210	110	580	10	300	170	70	350	320	553
Future Volume (veh/h)	547	460	210	110	580	10	300	170	70	350	320	553
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	553	465	212	111	586	10	238	264	71	354	323	526
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	556	864	567	172	924	16	209	219	186	616	647	548
Arrive On Green	0.16	0.24	0.24	0.10	0.18	0.18	0.12	0.12	0.12	0.35	0.35	0.35
Sat Flow, veh/h	3456	3554	1569	1781	5170	88	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	553	465	212	111	385	211	238	264	71	354	323	526
Grp Sat Flow(s),veh/h/ln	1728	1777	1569	1781	1702	1854	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	17.6	12.5	11.0	6.6	11.5	11.6	12.9	12.9	4.6	17.8	15.0	35.7
Cycle Q Clear(g_c), s	17.6	12.5	11.0	6.6	11.5	11.6	12.9	12.9	4.6	17.8	15.0	35.7
Prop In Lane	1.00		1.00	1.00		0.05	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	556	864	567	172	608	331	209	219	186	616	647	548
V/C Ratio(X)	0.99	0.54	0.37	0.64	0.63	0.64	1.14	1.20	0.38	0.57	0.50	0.96
Avail Cap(c_a), veh/h	556	864	567	180	608	331	209	219	186	622	653	553
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)	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.1	36.3	26.0	47.9	41.8	41.8	48.5	48.5	44.9	29.4	28.5	35.2
Incr Delay (d2), s/veh	20.6	0.8	0.6	5.4	5.0	9.0	104.8	126.7	0.5	0.8	0.2	28.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.1	5.5	5.1	3.2	5.2	6.1	11.8	13.7	1.8	7.7	6.7	17.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.7	37.1	26.6	53.3	46.8	50.8	153.4	175.2	45.3	30.2	28.7	63.2
LnGrp LOS	E	D	C	D	D	D	F	F	D	C	C	E
Approach Vol, veh/h		1230			707			573			1203	
Approach Delay, s/veh		48.6			49.0			150.1			44.2	
Approach LOS		D			D			F			D	

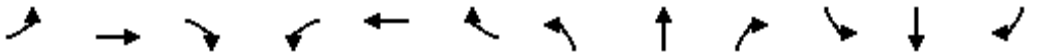
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.3	33.5		43.1	22.4	26.5		18.0				
Change Period (Y+Rc), s	* 4.7	6.8		5.1	* 4.7	6.8		5.1				
Max Green Setting (Gmax), s	* 11	25.9		38.4	* 18	19.3		12.9				
Max Q Clear Time (g_c+I1), s	8.6	14.5		37.7	19.6	13.6		14.9				
Green Ext Time (p_c), s	0.0	2.0		0.3	0.0	1.4		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		62.9	
HCM 6th LOS		E	

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	158	50	63	160	60	240	73	1093	100	220	568	143
Future Volume (veh/h)	158	50	63	160	60	240	73	1093	100	220	568	143
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	168	53	67	170	64	229	78	1163	106	234	604	152
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	231	121	153	198	73	263	100	1286	571	262	1275	320
Arrive On Green	0.07	0.16	0.16	0.11	0.21	0.21	0.06	0.36	0.36	0.15	0.45	0.45
Sat Flow, veh/h	3456	750	948	1781	358	1280	1781	3554	1578	1781	2814	707
Grp Volume(v), veh/h	168	0	120	170	0	293	78	1163	106	234	381	375
Grp Sat Flow(s),veh/h/ln	1728	0	1698	1781	0	1638	1781	1777	1578	1781	1777	1743
Q Serve(g_s), s	5.3	0.0	7.2	10.5	0.0	19.4	4.8	34.8	5.1	14.5	16.7	16.8
Cycle Q Clear(g_c), s	5.3	0.0	7.2	10.5	0.0	19.4	4.8	34.8	5.1	14.5	16.7	16.8
Prop In Lane	1.00		0.56	1.00		0.78	1.00		1.00	1.00		0.41
Lane Grp Cap(c), veh/h	231	0	273	198	0	336	100	1286	571	262	805	790
V/C Ratio(X)	0.73	0.00	0.44	0.86	0.00	0.87	0.78	0.90	0.19	0.89	0.47	0.47
Avail Cap(c_a), veh/h	364	0	484	207	0	485	234	1363	605	278	805	790
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.3	0.0	42.5	49.0	0.0	43.1	52.2	33.9	24.5	46.9	21.4	21.4
Incr Delay (d2), s/veh	4.3	0.0	1.1	27.7	0.0	11.5	12.1	8.5	0.2	27.2	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	3.1	6.1	0.0	8.8	2.4	15.6	1.9	8.2	6.6	6.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.6	0.0	43.6	76.6	0.0	54.6	64.3	42.4	24.6	74.2	21.8	21.8
LnGrp LOS	E	A	D	E	A	D	E	D	C	E	C	C
Approach Vol, veh/h		288			463			1347			990	
Approach Delay, s/veh		50.6			62.7			42.3			34.2	
Approach LOS		D			E			D			C	

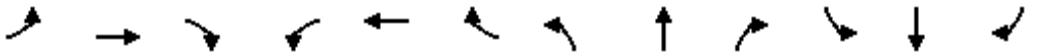
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.0	46.6	18.5	24.0	12.8	56.8	13.5	29.0
Change Period (Y+Rc), s	6.5	6.0	6.0	6.0	6.5	6.0	6.0	6.0
Max Green Setting (Gmax), s	17.5	43.0	13.0	32.0	14.7	45.8	11.8	33.2
Max Q Clear Time (g_c+I1), s	16.5	36.8	12.5	9.2	6.8	18.8	7.3	21.4
Green Ext Time (p_c), s	0.1	3.8	0.0	0.6	0.1	4.6	0.2	1.3

Intersection Summary	
HCM 6th Ctrl Delay	43.5
HCM 6th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	711	50	30	321	25	40	75	41	22	52	104
Future Volume (veh/h)	250	711	50	30	321	25	40	75	41	22	52	104
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		1.00	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	263	748	53	32	338	26	42	79	43	23	55	109
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	319	838	59	61	586	45	75	175	95	47	77	153
Arrive On Green	0.18	0.49	0.49	0.03	0.34	0.34	0.04	0.16	0.16	0.03	0.14	0.14
Sat Flow, veh/h	1781	1722	122	1781	1715	132	1781	1126	613	1781	550	1090
Grp Volume(v), veh/h	263	0	801	32	0	364	42	0	122	23	0	164
Grp Sat Flow(s),veh/h/ln	1781	0	1844	1781	0	1846	1781	0	1739	1781	0	1640
Q Serve(g_s), s	8.6	0.0	23.9	1.1	0.0	9.8	1.4	0.0	3.9	0.8	0.0	5.8
Cycle Q Clear(g_c), s	8.6	0.0	23.9	1.1	0.0	9.8	1.4	0.0	3.9	0.8	0.0	5.8
Prop In Lane	1.00		0.07	1.00		0.07	1.00		0.35	1.00		0.66
Lane Grp Cap(c), veh/h	319	0	897	61	0	631	75	0	270	47	0	230
V/C Ratio(X)	0.82	0.00	0.89	0.52	0.00	0.58	0.56	0.00	0.45	0.49	0.00	0.71
Avail Cap(c_a), veh/h	474	0	1035	147	0	698	147	0	517	147	0	487
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.9	0.0	14.1	28.7	0.0	16.3	28.5	0.0	23.2	29.1	0.0	24.9
Incr Delay (d2), s/veh	7.3	0.0	9.1	6.7	0.0	1.0	6.5	0.0	1.2	7.6	0.0	4.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.0	10.4	0.5	0.0	3.9	0.7	0.0	1.5	0.4	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.2	0.0	23.2	35.5	0.0	17.3	35.0	0.0	24.4	36.7	0.0	29.0
LnGrp LOS	C	A	C	D	A	B	C	A	C	D	A	C
Approach Vol, veh/h		1064			396			164			187	
Approach Delay, s/veh		25.2			18.8			27.1			29.9	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	34.0	7.0	13.0	15.4	25.2	6.1	13.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	34.0	5.0	18.0	16.1	22.9	5.0	18.0
Max Q Clear Time (g_c+I1), s	3.1	25.9	3.4	7.8	10.6	11.8	2.8	5.9
Green Ext Time (p_c), s	0.0	3.6	0.0	0.6	0.4	1.6	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	24.4
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	313	471	144	40	173	118	109	866	50	73	661	198
Future Volume (veh/h)	313	471	144	40	173	118	109	866	50	73	661	198
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	337	506	155	43	186	114	117	931	54	78	711	213
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	292	638	194	99	243	204	113	1555	90	90	1187	355
Arrive On Green	0.16	0.24	0.24	0.06	0.13	0.13	0.06	0.46	0.46	0.05	0.44	0.44
Sat Flow, veh/h	1781	2681	817	1781	1870	1574	1781	3410	198	1781	2678	802
Grp Volume(v), veh/h	337	334	327	43	186	114	117	485	500	78	472	452
Grp Sat Flow(s),veh/h/ln	1781	1777	1721	1781	1870	1574	1781	1777	1831	1781	1777	1704
Q Serve(g_s), s	20.5	22.1	22.3	2.9	12.0	8.5	7.9	25.5	25.5	5.4	25.2	25.2
Cycle Q Clear(g_c), s	20.5	22.1	22.3	2.9	12.0	8.5	7.9	25.5	25.5	5.4	25.2	25.2
Prop In Lane	1.00		0.47	1.00		1.00	1.00		0.11	1.00		0.47
Lane Grp Cap(c), veh/h	292	423	409	99	243	204	113	810	835	90	787	755
V/C Ratio(X)	1.15	0.79	0.80	0.43	0.77	0.56	1.04	0.60	0.60	0.87	0.60	0.60
Avail Cap(c_a), veh/h	292	625	606	128	486	409	113	810	835	90	787	755
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	0.82	0.82	0.82
Uniform Delay (d), s/veh	52.3	44.7	44.8	57.1	52.6	51.0	58.6	25.4	25.4	58.9	26.4	26.4
Incr Delay (d2), s/veh	100.8	4.2	4.6	2.9	5.0	2.4	95.8	3.3	3.2	47.8	2.8	2.9
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	17.3	10.2	10.0	1.4	6.0	3.5	6.5	11.0	11.3	3.6	10.7	10.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	153.1	48.9	49.4	60.0	57.6	53.4	154.3	28.7	28.6	106.7	29.1	29.3
LnGrp LOS	F	D	D	E	E	D	F	C	C	F	C	C
Approach Vol, veh/h		998			343			1102			1002	
Approach Delay, s/veh		84.2			56.5			42.0			35.2	
Approach LOS		F			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.8	63.5	13.0	35.7	14.4	61.9	26.5	22.2
Change Period (Y+Rc), s	6.5	6.5	6.0	6.0	6.5	6.5	6.0	6.0
Max Green Setting (Gmax), s	6.3	40.7	9.0	44.0	7.9	39.1	20.5	32.5
Max Q Clear Time (g_c+I1), s	7.4	27.5	4.9	24.3	9.9	27.2	22.5	14.0
Green Ext Time (p_c), s	0.0	4.8	0.0	4.1	0.0	4.3	0.0	1.3

Intersection Summary	
HCM 6th Ctrl Delay	53.7
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	418	158	158	32	216	93	96	16	95	305	627
v/c Ratio	0.72	0.11	0.18	0.16	0.15	0.50	0.50	0.05	0.24	0.72	0.82
Control Delay	62.0	18.9	3.8	42.7	29.9	51.7	51.3	0.3	31.0	44.7	15.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.0	18.9	3.8	42.7	29.9	51.7	51.3	0.3	31.0	44.7	15.9
Queue Length 50th (ft)	147	24	0	19	38	60	62	0	49	179	54
Queue Length 95th (ft)	m152	m33	m11	48	66	113	116	0	85	248	189
Internal Link Dist (ft)		279			1051		902			153	
Turn Bay Length (ft)	100		160	140		170					
Base Capacity (vph)	662	1401	888	194	1397	188	195	354	529	557	841
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	0.63	0.11	0.18	0.16	0.15	0.49	0.49	0.05	0.18	0.55	0.75

Intersection Summary

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

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	482	404	192	101	530	213	222	61	313	293	488
v/c Ratio	0.84	0.42	0.23	0.57	0.51	0.68	0.68	0.14	0.72	0.64	0.76
Control Delay	63.9	33.5	5.5	60.5	41.9	54.8	54.5	0.7	47.2	42.9	19.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	63.9	33.5	5.5	60.5	41.9	54.8	54.5	0.7	47.2	42.9	19.2
Queue Length 50th (ft)	187	106	40	69	129	145	150	0	204	187	98
Queue Length 95th (ft)	m#267	m153	m71	126	166	#320	#330	0	265	244	200
Internal Link Dist (ft)		279			1051		902			153	
Turn Bay Length (ft)	100		160	140		170					
Base Capacity (vph)	584	967	837	178	1059	314	326	442	617	650	771
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	12
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	0.42	0.23	0.57	0.50	0.68	0.68	0.14	0.51	0.45	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.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	481	179	179	32	242	103	107	21	116	337	722
v/c Ratio	0.75	0.14	0.21	0.16	0.21	0.56	0.56	0.06	0.26	0.71	0.91
Control Delay	55.0	19.9	3.7	42.7	34.2	54.7	54.5	0.3	29.4	41.6	26.3
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	55.0	19.9	3.7	42.7	34.2	54.7	54.5	0.3	29.4	41.6	26.3
Queue Length 50th (ft)	158	28	2	19	47	66	69	0	57	188	129
Queue Length 95th (ft)	m141	m36	m12	48	77	124	128	0	99	272	#368
Internal Link Dist (ft)		279			1051		902			153	
Turn Bay Length (ft)	100		160	140		170					
Base Capacity (vph)	738	1309	859	194	1174	184	190	352	546	575	849
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	0.65	0.14	0.21	0.16	0.21	0.56	0.56	0.06	0.21	0.59	0.85

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	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	553	465	212	111	596	233	242	71	354	323	559
v/c Ratio	0.91	0.55	0.26	0.62	0.73	0.72	0.72	0.16	0.74	0.64	0.84
Control Delay	67.1	35.4	5.9	63.8	49.3	57.4	56.9	0.7	45.4	40.5	26.4
Queue Delay	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.3
Total Delay	67.1	35.4	5.9	63.8	49.5	57.4	56.9	0.7	45.4	40.5	26.7
Queue Length 50th (ft)	~218	129	44	76	147	161	167	0	228	202	163
Queue Length 95th (ft)	m#270	m151	m56	#147	187	#372	#382	0	298	265	283
Internal Link Dist (ft)		279			1051		902			153	
Turn Bay Length (ft)	100		160	140		170					
Base Capacity (vph)	606	850	812	178	891	325	337	452	617	650	766
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	33	0	0	0	0	0	22
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.91	0.55	0.26	0.62	0.69	0.72	0.72	0.16	0.57	0.50	0.75

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.

ATTACHMENT F

SIGNAL WARRANT WORKSHEETS

Peak Hour	Opening Year 2025 + Project			
	Major Street *(both approaches)*	**Minor Street** *(higher approach)*	**Minor Street** *(lower approach)*	**Total Entering**
AM	751	220	66	1,037
PM	1,287	168	141	1,596

Warrant 3 Part A - Peak Hour Delay Warrant

Linda Vista Drive / S. Pacific Street
Opening Year 2025 + Project AM

Intersection Information

Delay on stop-controlled approach:	25.9	sec/veh
Total entering volumes:	1037	vehicles
Vehicles on stop-controlled approach:	220	vehicles
Number of lanes on stop-controlled approach:	1	Lanes
Total number of approaches:	4	approaches

PART 1

Do total vehicle hours of delay equal or exceed four hours for a one lane approach or five hours for a two or more lane approach?

Vehicle Hours of Delay:	**1.6**	hours
Part Satisfied?	**No**	

PART 2

Volume on minor street equals or exceeds 100 vph for a one lane approach or 150 vph for a two lane approach?

Vehicles on stop controlled approach:	**220**	vehicles
Part Satisfied?	**Yes**	

PART 3

Volume entering intersection equals or exceeds 650 vph for intersections with three approaches or 800 vph for intersections with four or more approaches?

Total entering volumes:	**1037**	vehicles
Part Satisfied?	**Yes**	

Warrant Satisfied? No

Warrant 3 Part A - Peak Hour Delay Warrant

Linda Vista Drive / S. Pacific Street
Opening Year 2025 + Project PM

Intersection Information

Delay on stop-controlled approach:	151.6	sec/veh
Total entering volumes:	1596	vehicles
Vehicles on stop-controlled approach:	168	vehicles
Number of lanes on stop-controlled approach:	1	Lanes
Total number of approaches:	4	approaches

PART 1

Do total vehicle hours of delay equal or exceed four hours for a one lane approach or five hours for a two or more lane approach?

Vehicle Hours of Delay:	**7.1**	hours
Part Satisfied?	**Yes**	

PART 2

Volume on minor street equals or exceeds 100 vph for a one lane approach or 150 vph for a two lane approach?

Vehicles on stop controlled approach:	**168**	vehicles
Part Satisfied?	**Yes**	

PART 3

Volume entering intersection equals or exceeds 650 vph for intersections with three approaches or 800 vph for intersections with four or more approaches?

Total entering volumes:	**1596**	vehicles
Part Satisfied?	**Yes**	

Warrant Satisfied? Yes

Linda Vista Drive / S. Pacific Street
Figure 4C-3, Warrant 3, Peak Hour
Opening Year 2025 + Project Volumes