LINSCOTT LAW & GREENSPAN
engineers

TRANSPORTATION IMPACT ANALYSIS

SOUTH COUNTY ANIMAL SHELTER PROJECT

Santee, California
August 19, 2020

LLG Ref. 3-20-3211

Prepared by:
Alejandra Alonso
Engineering Technician II

Under the Supervision of:
John Boarman, P. E.
Principal

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

TABLE OF CONTENTS

SECTION	PAGE
Appendices	**ii**
References	**ii**
List of Figures	**iii**
List of Tables	**iii**
1.0 Introduction	**1**
2.0 Project Description	**2**
2.1 Project Location	2
2.2 Project Description	2
3.0 Existing Conditions	**5**
3.1 Existing Street Network	5
3.2 Existing Traffic Volumes	6
4.0 Analysis Scenarios and Methodology	**9**
4.1 Analysis Scenarios	9
4.2 Analysis Methodology	9
4.2.1 Signalized Intersections	10
4.3 Street Segments	11
5.0 Significance Criteria	**13**
6.0 Section 12 of the report contains the VMT analysis. Both City of Santee and County of San Diego guidelines are discussed. Analysis of Existing Conditions	**14**
6.1 Peak Hour Intersection Levels of Service	14
6.2 Daily Street Segment Levels of Service	14
7.0 Trip Generation/Distribution/Assignment	**17**
7.1 Trip Generation	17
7.2 Trip Distribution/Assignment	17
8.0 Cumulative Projects	**22**
9.0 Analysis of Near-Term Scenarios	**26**
9.1 Existing + Project	26
9.1.1 Intersection Analysis	26
9.1.2 Segment Operations	26

9.2 Existing + Cumulative Projects 26
9.2.1 Intersection Analysis 26
9.2.2 Segment Operations 26
9.3 Existing + Project + Cumulative Projects 30
9.3.1 Intersection Analysis 30
9.3.2 Segment Operations 30

10.0 Active Transportation Review 31
10.1 Pedestrian Traffic Review 31
10.2 Bicycle Traffic Review 31
10.3 Transit Traffic Review 31

11.0 Site Access 32

12.0 Vehicles Miles Traveled (VMT) Assessment 33

13.0 Significant Impacts and Mitigation 34

APPENDICES

APPENDIX

A. Intersection and Segment Manual Count Sheets
B. Peak Hour Intersection Analysis Worksheets – Existing
C. Peak Hour Intersection Analysis Worksheets – Existing + Project
D. Peak Hour Intersection Analysis Worksheets – Existing + Cumulative Projects
E. Peak Hour Intersection Analysis Worksheets – Existing + Project + Cumulative Projects

REFERENCES

A. Santee Mobility Element
B. City of Santee Specific Plan
C. Highway Capacity Manual

LIST OF FIGURES

SECTION—FIGURE #		FOLLOWING PAGE
Figure 2–1	Project Area Map	3
Figure 2–2	Site Plan	4
Figure 3–1	Existing Conditions Diagram	7
Figure 3–2	Existing Traffic Volumes	8
Figure 7–1	Project Traffic Distribution	19
Figure 7–2	Project Traffic Volumes	20
Figure 7–3	Existing + Project Traffic Volumes	21
Figure 8–1	Cumulative Projects Traffic Volumes	24
Figure 8–2	Existing + Project Traffic + Cumulative Projects Volumes	25

LIST OF TABLES

SECTION—TABLE #		PAGE
Table 3–1	Existing Traffic Volumes	6
Table 4–1	Intersection LOS & Delay Ranges	10
Table 4–2	City of Santee Roadway Segment Daily Capacity and Level of Service Standards	12
Table 5–1	Traffic Impact Significant Thresholds	13
Table 6–1	Existing Intersection Operations	15
Table 6–2	Existing Street Segment Operations	16
Table 7-1	Project Trip Generation	18
Table 9–1	Near-Term Intersection Operations	27
Table 9–2	Existing + Project Street Segment Operations	28
Table 9–3	Near-Term Street Segment Operations	29

TRANSPORTATION IMPACT ANALYSIS

SOUTH COUNTY ANIMAL SHELTER PROJECT

Santee, California
August 19, 2020

1.0 INTRODUCTION

The proposed South County Animal Shelter project ("Project") is a proposed Animal Care Facility for the County of San Diego located north of Riverview Parkway and west of North Magnolia Avenue. The project consists of 24,000 square foot facility with 28 staff spaces and 58 public spaces. Various intersections and segments within the study area have been analyzed to determine potential Project related transportation impacts, as set forth in the following sections.

- Project Description
- Existing Conditions Description
- Analysis Scenarios and Methodology
- Significance Criteria
- Analysis of Existing Conditions
- Project Trip Generation / Distribution / Assignment
- Cumulative Projects
- Analysis of Near-Term Scenarios
- Active Transportation Review
- Site Access
- Vehicle Miles Traveled (VMT) Assessment
- Conclusions

2.0 PROJECT DESCRIPTION

2.1 Project Location

The proposed South County Animal Shelter project site is located north of Riverview Parkway and west of Magnolia Avenue in the County of San Diego, adjacent to the City of Santee. Specifically, the project site is located within and is surrounded by land uses within, the City's Town Center Specific Plan Amendment area. The Specific Plan Amendment area established the physical and design framework for the development of approximately 154 acres of County-owned land within the City's 706-acre Town Center Specific Plan area. All study area locations are within the City of Santee.

Figure 2–1 depicts the Project vicinity and ***Figure 2–2*** shows a more detailed Project area map.

2.2 Project Description

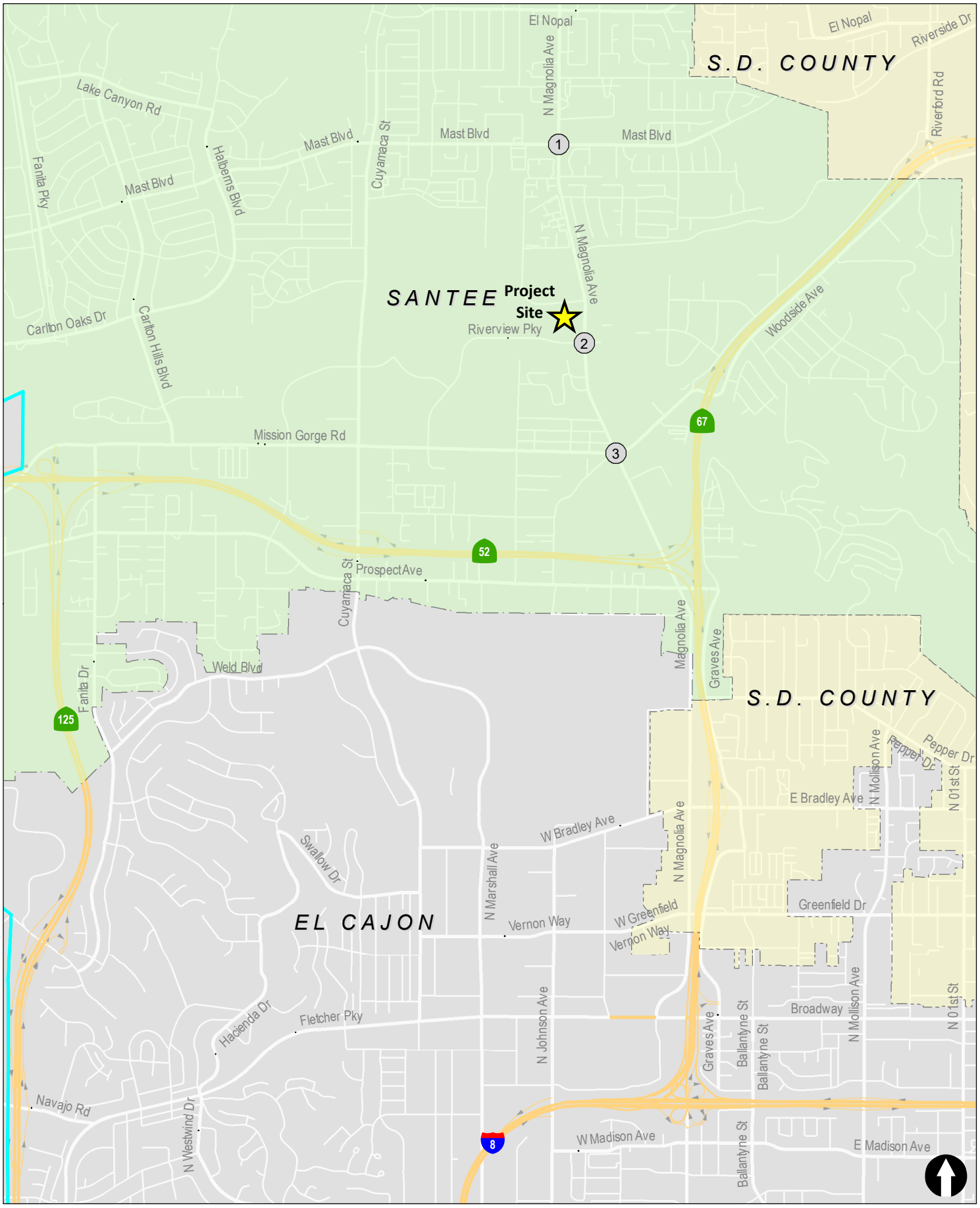
The County proposes the construction of a 24,000 square-foot animal shelter on County-owned land within the boundaries of the City of Santee. The project would consist of four separate buildings with an internal, secure and open courtyard, an outdoor livestock area, an activity yard, a staff parking lot, and a public parking lot. The two parking lots would have separate driveways for ingress and egress from Riverview Parkway. The four buildings would contain medical facilities, administration areas, and boarding areas for dogs, cats, rabbits, and other small animals. Construction is anticipated to begin in November 2021 and end in January 2023.

Currently, the County Department of Animal Services (DAS) owns and operates two animal shelters: one located in the community of Bonita and the other in the city of Carlsbad. However, the animal shelter located in Bonita will be closed and the proposed Project would be constructed to meet the County DAS current and projected needs for the County.

The proposed Santee facility would provide animal services in a modern facility that meets current standards and public expectations and would have the capacity for the transfer of all the Bonita facility animals and services, including all livestock. The proposed Project would also allow for the transfer of livestock from the Carlsbad facility. The Carlsbad facility, which is much newer than the Bonita facility, would remain open and all other services and functions would remain unchanged.

Access to the project site would be from Interstate 8, State Route 52, State Route 67, and State Route 125, as well as major arterial roadways and public transportation services. The nearest trolley station (Santee Town Center) is located approximately 1.5 miles southwest of the project site and the nearest bus stop is located at the intersection of Riverview Parkway and North Magnolia Avenue, approximately 528 feet southeast of the project site.

Figure 2–3 shows the Project site plan.



LINSCOTT LAW & GREENSPAN engineers

N:\3211\Figures
Date: 8/12/2020
Time: 9:13 AM

Figure 2-1

Project Area Map

SOUTH COUNTY ANIMAL SHELTER



LINSCOTT LAW & GREENSPAN engineers

N:\3211\Figures
Date: 08/12/20

Figure 2-2

Site Plan

SOUTH COUNTY ANIMAL SHELTER

3.0 EXISTING CONDITIONS

Effective evaluation of the traffic impacts associated with the Project requires an understanding of the existing transportation system within the project area. ***Figure 3–1*** shows an existing conditions diagram, including signalized intersections and lane configurations.

The study area was determined based on the SANTEC/ITE Regional Guidelines for Traffic Impact Studies which state that a Project study area include all street segments where the Project will add 50 or more peak hour trips in either direction. In addition, the study area locations were selected based on the Project's trip distribution and the most likely locations to be impacted by Project.

The Project study area includes the following locations:

Intersections

1. Mast Boulevard / Magnolia Avenue
2. Riverview Parkway / Magnolia Avenue
3. Mission Gorge Road / Magnolia Avenue

Street Segments

Riverview Parkway

Magnolia Avenue to Town Center Parkway

Magnolia Avenue

Mast Boulevard to Riverview Parkway

Riverview Parkway to Mission Gorge Road

3.1 Existing Street Network

The following is a description of the existing street network in the study area.

Mast Boulevard is classified as a Major Road in the City of Santee Mobility Element. Mast Boulevard is currently constructed as a four-lane divided roadway west of Magnolia Avenue, transitioning to a two-lane roadway with two-way left-turn lane (TWLTL) east of Magnolia Avenue. Within the study area, Class II bike lanes are provided on both sides of the road and parking is permitted along certain parts of the roadway. Curbs, gutters, and sidewalks are partially provided, and the posted speed limit is 35 mph.

Magnolia Avenue is classified as a Major Arterial from Mast Boulevard to Mission Gorge Road on the City of Santee General Plan. It is currently constructed as a four-lane divided roadway with Class II bike lanes. The posted speed limit is 45 mph speed limit and curbside parking is prohibited. Curbs, gutters, and sidewalks are partially provided along both sides of the roadway.

Mission Gorge Road is classified as a Prime Arterial from State Route 125 to Magnolia Avenue on the City of Santee General Plan. It runs from the end of Friars Road in the west to Magnolia Avenue in the east (where it turns into Woodside Avenue). Mission Gorge Road is a 6-lane roadway west of the Santee City Limit. The posted speed limit on Mission Gorge Road varies from 45 mph within the study area. Curbside parking is prohibited. There are Class II bike lanes west of the SR-52 westbound ramps on both sides of the roadway.

Riverview Parkway is classified as a parkway in the City of Santee Mobility Element. It is not specified whether a parkway is 2 lanes or 4 lanes for any of the Santee "Parkway" classified roadways. The specific plan seems to indicate Riverview Parkway is to be built as a 4-lane roadway. The specific plan shows a cross section of Riverview Parkway which states that it will have a 9' wide shared concrete bikeway and pedestrian walkway per City of Santee Guidelines. The assumed speed limit is 25 mph. Curbside parking is prohibited.

3.2 Existing Traffic Volumes

Table 3–1 is a summary of the most recent available average daily traffic volumes (ADTs) from LLG counts when local schools were in session. Traffic counts were conducted on January 30, February 1 and February 6, 2018.

Weekday AM/PM peak hour counts at the study area intersections, including bicycle and pedestrian counts, were also conducted in January and February 2018 when area schools were in session.

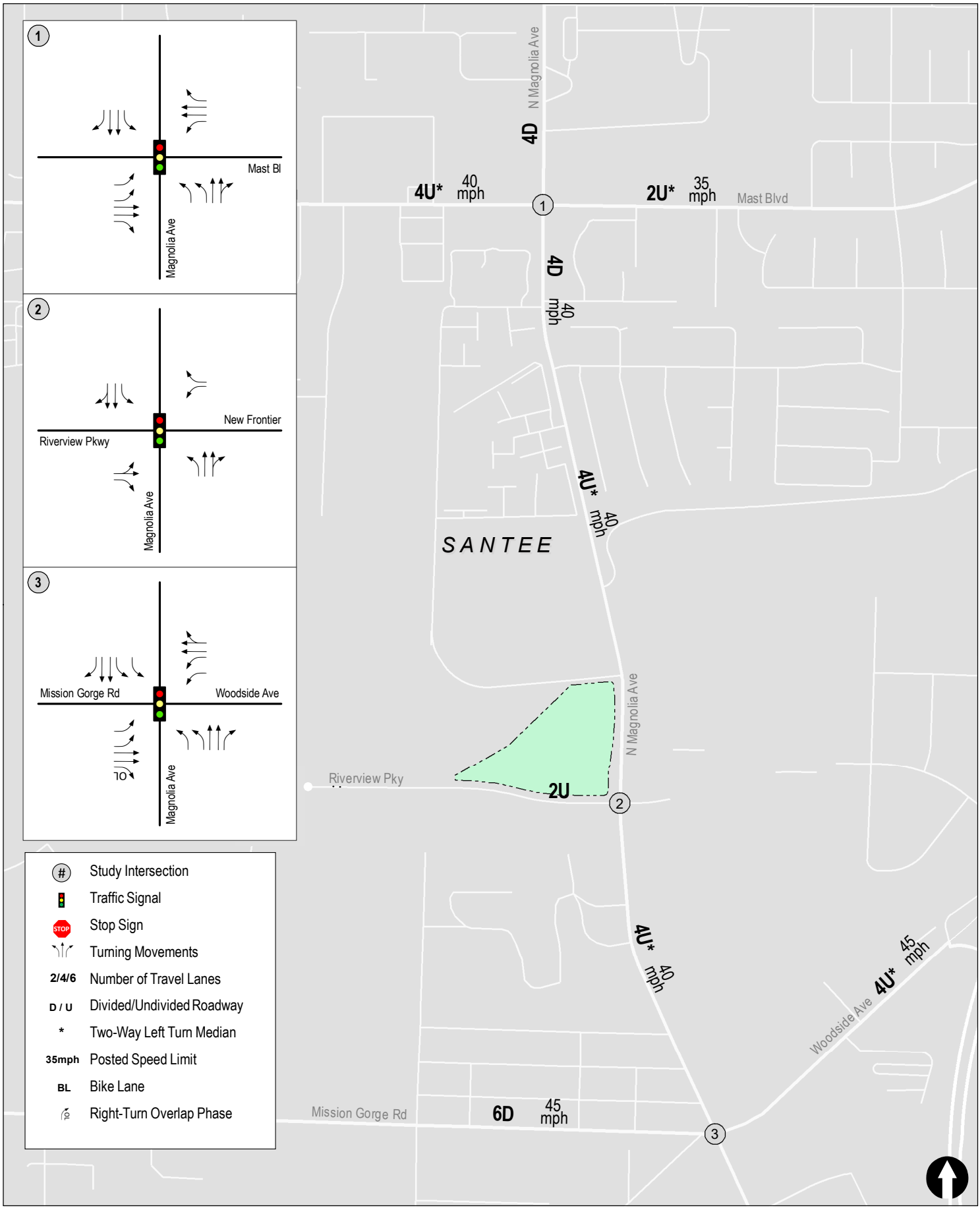
Figure 3–2 shows the Existing Traffic Volumes. ***Appendix A*** contains the traffic count sheets.

TABLE 3–1
EXISTING TRAFFIC VOLUMES

Street Segment	ADT [a]	Date
Magnolia Avenue		
Mast Boulevard to Riverview Parkway	22,440	2018
Riverview Parkway to Mission Gorge Road	25,830	2018
Riverview Parkway		
Magnolia Avenue to Town Center Parkway	1,090	2018

Footnotes:

a. Average Daily Traffic volumes.



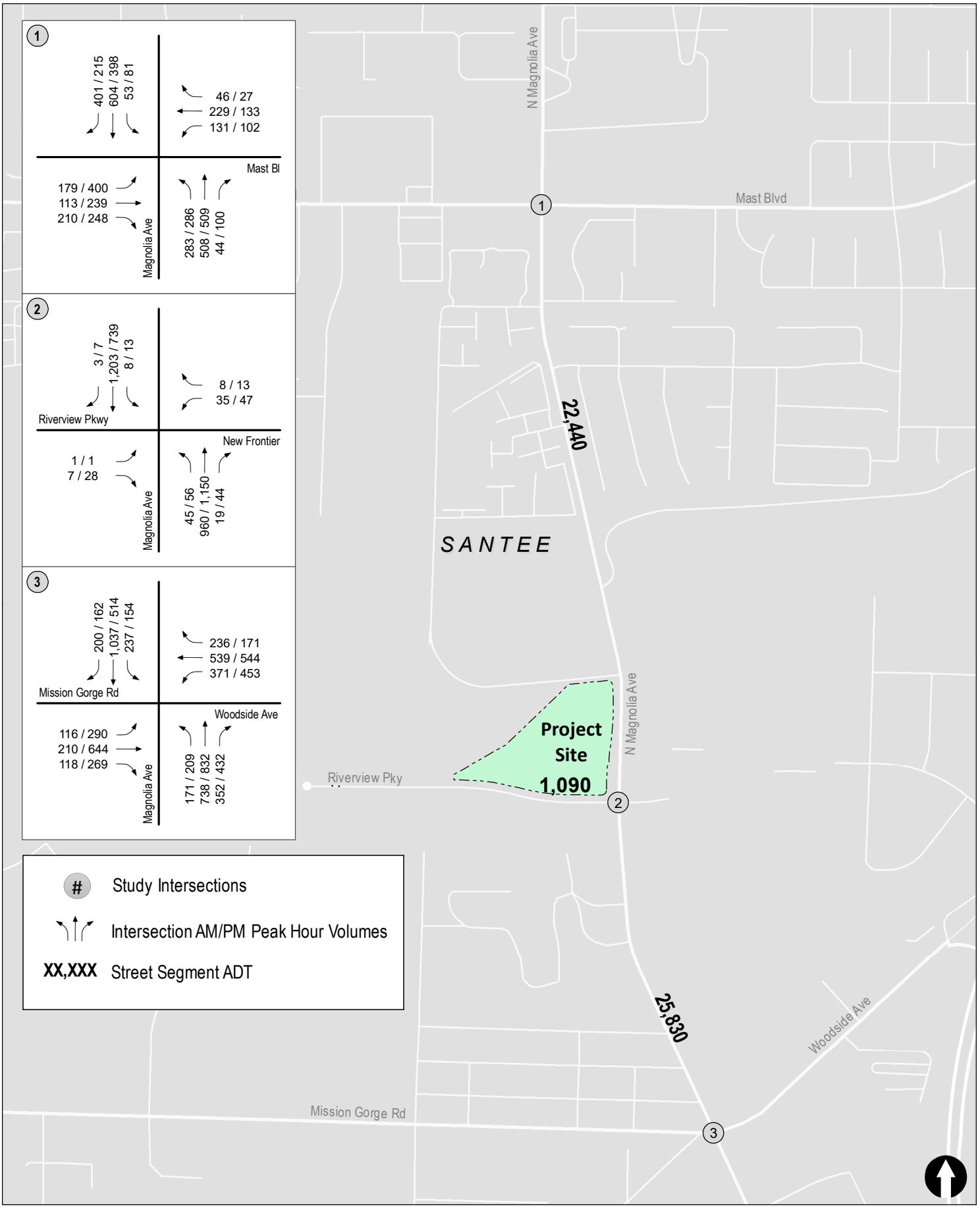
LINSCOTT LAW & GREENSPAN engineers

N:\3211\Figures
Date: 3/11/2020
Time: 3:59 PM

Figure 3-1

Existing Conditions Diagram

SOUTH COUNTY ANIMAL SHELTER



LINSCOTT LAW & GREENSPAN engineers

N:\3211\Figures
Date: 3/18/2020
Time: 12:45 PM

Figure 3-2

Existing Traffic Volumes

SOUTH COUNTY ANIMAL SHELTER

4.0 ANALYSIS SCENARIOS AND METHODOLOGY

4.1 Analysis Scenarios

The following scenarios are analyzed:

- Existing
- Existing + Project
- Existing + Cumulative Projects
- Existing + Project + Cumulative Projects

4.2 Analysis Methodology

Level of service (LOS) is the term used to denote the different operating conditions which occur on a given roadway segment under various traffic volume loads. It is a qualitative measure used to describe a quantitative analysis taking into account factors such as roadway geometries, signal phasing, speed, travel delay, freedom to maneuver, and safety. Level of service provides an index to the operational qualities of a roadway segment or an intersection. Level of service designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. Level of service designation is reported differently for signalized and unsignalized intersections, as well as for roadway segments.

There are various methodologies used to analyze signalized intersections, unsignalized intersections, and street segments. The measure of effectiveness for intersection and segment operations is level of service (LOS), which denotes the operating conditions which occur at a given intersection or on a given roadway segment under various traffic volume loads.

LOS is a qualitative measure used to describe a quantitative analysis taking into account factors such as roadway geometries, signal phasing, speed, travel delay, freedom to maneuver, and safety. Level of service provides an index to the operational qualities of a roadway segment or an intersection. Levels of service designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst. Level of service designation is reported differently for signalized and unsignalized intersections, as well as for roadway segments. In the 2000 Highway Capacity Manual (HCM), Level of Service for signalized intersections is defined in terms of delay. The level of service analysis results in seconds of delay expressed in terms of letters A through F. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time.

Table 4–1 depicts the intersection LOS and corresponding delay ranges, which are based on overall intersection delay (signalized intersections) and the average control delay for any particular minor movement (unsignalized intersections), respectively. LOS relative to signalized and unsignalized intersection is further described below.

TABLE 4–1
INTERSECTION LOS & DELAY RANGES

LOS	Delay (seconds/vehicle)	
	Signalized Intersections	**Unsignalized Intersections**
A	≤ 10.0	≤ 10.0
B	10.1 to 20.0	10.1 to 15.0
C	20.1 to 35.0	15.1 to 25.0
D	35.1 to 55.0	25.1 to 35.0
E	55.1 to 80.0	35.1 to 50.0
F	≥ 80.1	≥ 50.1

Source: 2000 Highway Capacity Manual

4.2.1 *Signalized Intersections*

For signalized intersections, level of service criteria is stated in terms of the average control delay per vehicle for a 15-minute analysis period. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Level of service A describes operations with very low delay, (i.e. less than 10.0 seconds per vehicle). This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

Level of service B describes operations with delay in the range 10.1 seconds and 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of Average delay.

Level of service C describes operations with delay in the range 20.1 seconds and 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.

Level of service D describes operations with delay in the range 35.1 seconds and 55.0 seconds per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or higher volume (demand) / capacity (v/c) ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are frequent.

Level of service E describes operations with delay in the range of 55.1 seconds to 80.0 seconds per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.

Level of service F describes operations with delay in excess of over 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation (i.e., when arrival flow rates exceed the capacity of the intersection). It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

4.3 Street Segments

Street segment analysis is based upon the comparison of daily traffic volumes (ADTs) to the City of Santee's *Roadway Classification, Level of Service, and ADT Table (**Table 4–2**)* for the segments within the City of Santee. This is based on the City of Santee's Mobility Element. The table provide segment capacities for different street classifications, based on traffic volumes and roadway characteristics.

TABLE 4–2
CITY OF SANTEE ROADWAY SEGMENT DAILY CAPACITY AND LEVEL OF SERVICE STANDARDS

Street Classification	Description / Sub-Classification	# of Lanes	LOS / ADT Thresholds				
			A	B	C	D	E
Circulation Element							
Prime Arterial	Median	6 lanes	25,000	35,000	50,000	55,000	60,000
Major Arterial	Median	4 lanes	15,000	21,000	30,000	35,000	40,000
Parkway	Median	4 lanes	15,000	21,000	30,000	35,000	40,000
	w/ TWLTL	2 lanes w/ TWLTL	5,000	7,000	10,000	13,000	15,000
	-	2 lanes	4,000	5,500	7,500	9,000	10,000
Collector	w/ TWLTL	2 lanes w/ TWLTL	5,000	7,000	10,000	13,000	15,000
	Industrial Collector	2 lanes	2,500	3,500	5,000	6,500	8,000
	Residential Collector	2 lanes	2,500	3,500	5,000	6,500	8,000
Non-Circulation Element							
Industrial Local		2 lanes	-	-	2,200*	-	-
Residential Local		2 lanes	-	-	2,200*	-	-
Cul-De-Sac Street		2 lanes	-	-	300*	-	-
Hillside Street		2 lanes	-	-	700*	-	-

Notes:
TWLTL = Two-way left-turn lane.
*represents design capacity of non-CE road. LOS does not apply to non-CE roads.

5.0 SIGNIFICANCE CRITERIA

The traffic study conducts both an analysis of local roadways using the LOS metric and a VMT analysis. The Project study area includes transportation facilities located within the City of Santee. There are no roadways/intersections in the study area within the County of San Diego and therefore City of Santee significance criteria was utilized for the LOS portion of the traffic study.

The City of Santee uses the regionally adopted SANTEC/ITE Guidelines for the purposes of traffic impact analysis. The City of Santee considers LOS D as the minimum acceptable level of service.

A project is considered to have a significant impact if the new project traffic decreases the operations of surrounding roadways by a defined threshold. The defined thresholds shown in ***Table 5–1*** below for freeway segments, roadway segments, intersections, and ramp meter facilities are based on published San Diego Traffic Engineers' Council (SANTEC) guidelines. If the project exceeds the thresholds in *Table 5–1*, then the project may be considered to have a significant project impact. A feasible mitigation measure will need to be identified to return the impact within the thresholds (pre-project + allowable increase) or the impact will be considered significant and unmitigated.

TABLE 5–1
TRAFFIC IMPACT SIGNIFICANT THRESHOLDS

Level of Service with Project [a]	Allowable Increase Due to Project Impacts [b]					
	Freeways		Roadway Segments		Intersections	Ramp Metering
	V/C	Speed (mph)	V/C	Speed (mph)	Delay (sec.)	Delay (min.)
E & F (*or ramp meter delays above 15 minutes*)	0.01	1	0.02	1	2	2[c]

Footnotes:

a. All level of service measurements are based upon HCM procedures for peak-hour conditions. However, V/C ratios for Roadway Segments may be estimated on an ADT/24-hour traffic volume basis (using Table 2 or a similar LOS chart for each jurisdiction). The acceptable LOS for freeways, roadways, and intersections is generally "D" ("C" for undeveloped or not densely developed locations per jurisdiction definitions). For metered freeway ramps, LOS does not apply. However, ramp meter delays above 15 minutes are considered excessive.

b. If a proposed project's traffic causes the values shown in the table to be exceeded, the impacts are deemed to be significant. These impact changes may be measured from appropriate computer programs or expanded manual spreadsheets. The project applicant shall then identify feasible mitigations (within the Traffic Impact Study [TIS] report) that will maintain the traffic facility at an acceptable LOS. If the LOS with the proposed project becomes unacceptable (see note a above), or if the project adds a significant amount of peak hour trips to cause any traffic queues to exceed on- or off-ramp storage capacities, the project applicant shall be responsible for mitigating significant impact changes.

c. The impact is only considered significant if the total delay exceeds 15 minutes.

General Notes:

1. V/C = Volume to Capacity Ratio
2. Speed = Arterial speed measured in miles per hour
3. Delay = Average stopped delay per vehicle measured in seconds for intersections, or minutes for ramp meters.
4. LOS = Level of Service

Section 12.0 of the report contains the VMT analysis. Both City of Santee and County of San Diego guidelines are discussed.

6.0 ANALYSIS OF EXISTING CONDITIONS

The analysis of existing conditions includes the assessment of the study area intersections and segments using the methodologies described in *Section 4.0*.

6.1 Peak Hour Intersection Levels of Service

Table 6–1 summarizes the existing intersection levels of service. As seen in *Table 6–1*, all the study area intersections are calculated to currently operate at LOS D or better.

Appendix B contains the Existing Synchro peak hour intersection analysis worksheets.

6.2 Daily Street Segment Levels of Service

Table 6–2 summarizes the existing roadway segment levels of service. As seen in *Table 6–2*, all study area street segments are calculated to operate at LOS C or better.

TABLE 6–1
EXISTING INTERSECTION OPERATIONS

Intersection	Jurisdiction	Control Type	Peak Hour	Delay [a]	LOS [b]
1. Mast Boulevard / Magnolia Avenue	Santee	Signal	AM	37.9	D
			PM	27.1	C
2. Riverview Parkway / Magnolia Avenue	Santee	Signal	AM	11.2	B
			PM	12.3	B
3. Mission Gorge Road / Magnolia Avenue	Santee	Signal	AM	46.4	D
			PM	48.1	D

Footnotes:
a. Average delay expressed in seconds per vehicle.
b. Level of Service.

SIGNALIZED		UNSIGNALIZED	
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 6–2
EXISTING STREET SEGMENT OPERATIONS

Street Segment	Jurisdiction	Classification	LOS E Capacity [a]	ADT [b]	LOS [c]	V/C [d]
Magnolia Avenue						
Mast Boulevard to Riverview Parkway	Santee	4-lane Major Arterial	40,000	22,440	C	0.561
Riverview Parkway to Mission Gorge Road	Santee	4-lane Major Arterial	40,000	25,830	C	0.646
Riverview Parkway						
Magnolia Avenue to Town Center Parkway	Santee	2-lane Parkway	15,000	1,090	A	0.073

Footnotes:

a. Capacities based on City of Santee Roadway Classification tables (see *Section 4.4*).

b. Average Daily Traffic Volumes.

c. Level of Service.

d. Volume to Capacity.

7.0 TRIP GENERATION/DISTRIBUTION/ASSIGNMENT

The project trip generation was calculated using the trip rates based on Institution of Transportation Engineers (ITE) *Trip Generation Manual 10th Edition for the San Diego Region*. The category of "Animal Hospital/Veterinary Clinic" was utilized. A rate of 21.50 trips per day was utilized.

7.1 Trip Generation

Table 7–1 tabulates the total project traffic generation. The total project is calculated to generate approximately 516 ADT with 88 AM peak hour trips (59 inbound / 29 outbound) and 85 PM peak hour trips (34 inbound / 51 outbound).

7.2 Trip Distribution/Assignment

Trip distribution was developed based on current traffic patterns in the area. Most of the employment, retail and freeways are located south of the Project. Therefore, 67% of the Project traffic was assigned to south and 33% to the north.

Figure 7–1 depicts the project trip distribution and ***Figure 7–2*** depicts the daily and AM / PM peak hour Project traffic assignment. ***Figure 7–3*** depicts the daily and AM / PM peak hour Existing + Project traffic volumes.

TABLE 7-1
PROJECT TRIP GENERATION

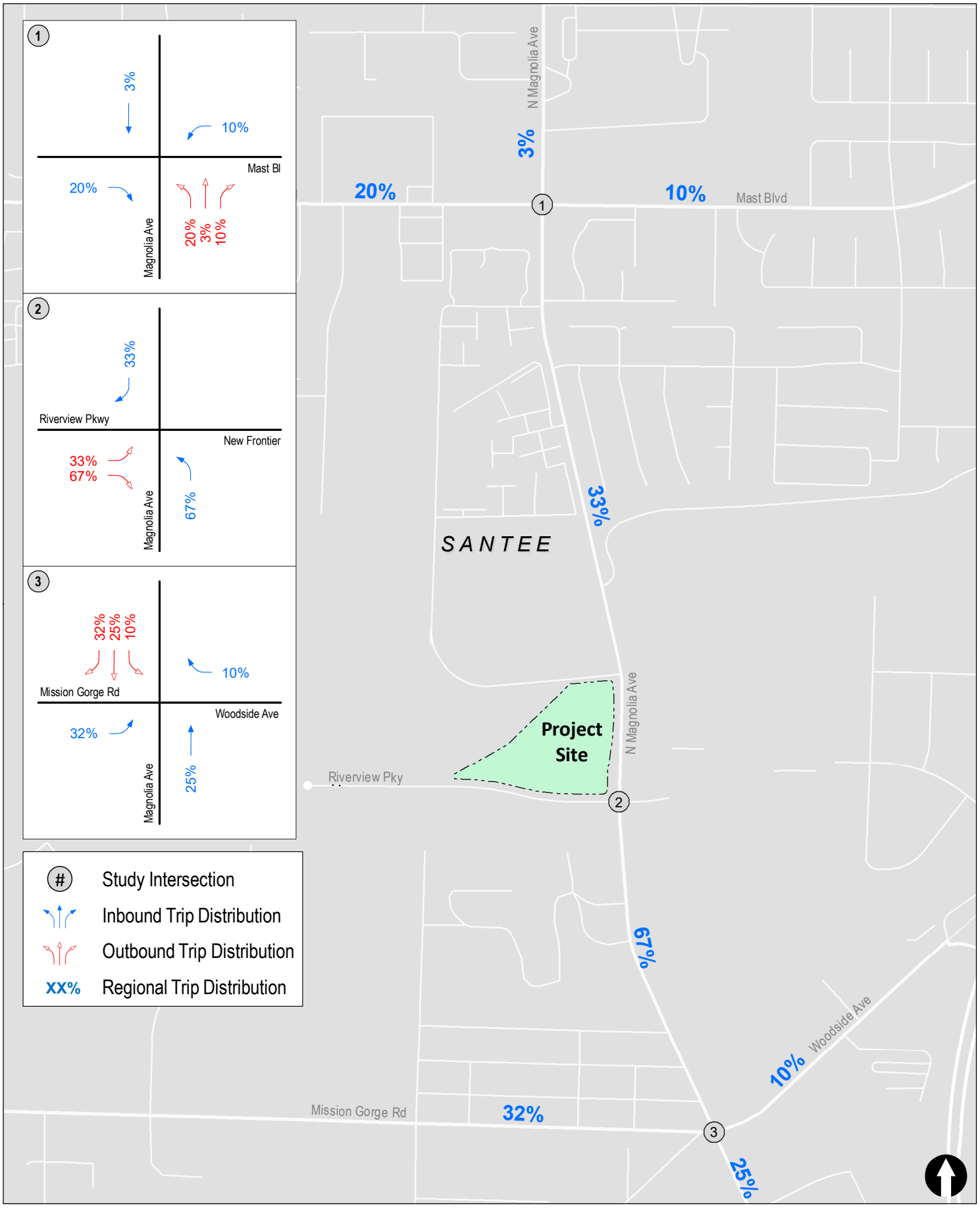
Land Use	Size	Daily Trip Ends (ADTs)		AM Peak Hour					PM Peak Hour				
		Rate [a]	Volume	% of ADT [a]	In:Out Split [a]	Volume			% of ADT [a]	In:Out Split	Volume		
						In	Out	Total[b]			In	Out	Total[c]
Animal Hospital/Veterinary Clinic	24.000 KSF	21.50 /KSF	516	17%	67% : 33%	59	29	88	16%	40% : 60%	34	51	85

Footnotes:

a. Rates are based on Institute of Transportation Engineers (ITE) *Trip Generation Manual 10th Edition for the San Diego Region.*

b. Total was calculated using the AM Peak Hour average rate: 24.000 * 3.64

c. Total was calculated using the PM Peak Hour average rate: 24.000 * 3.53



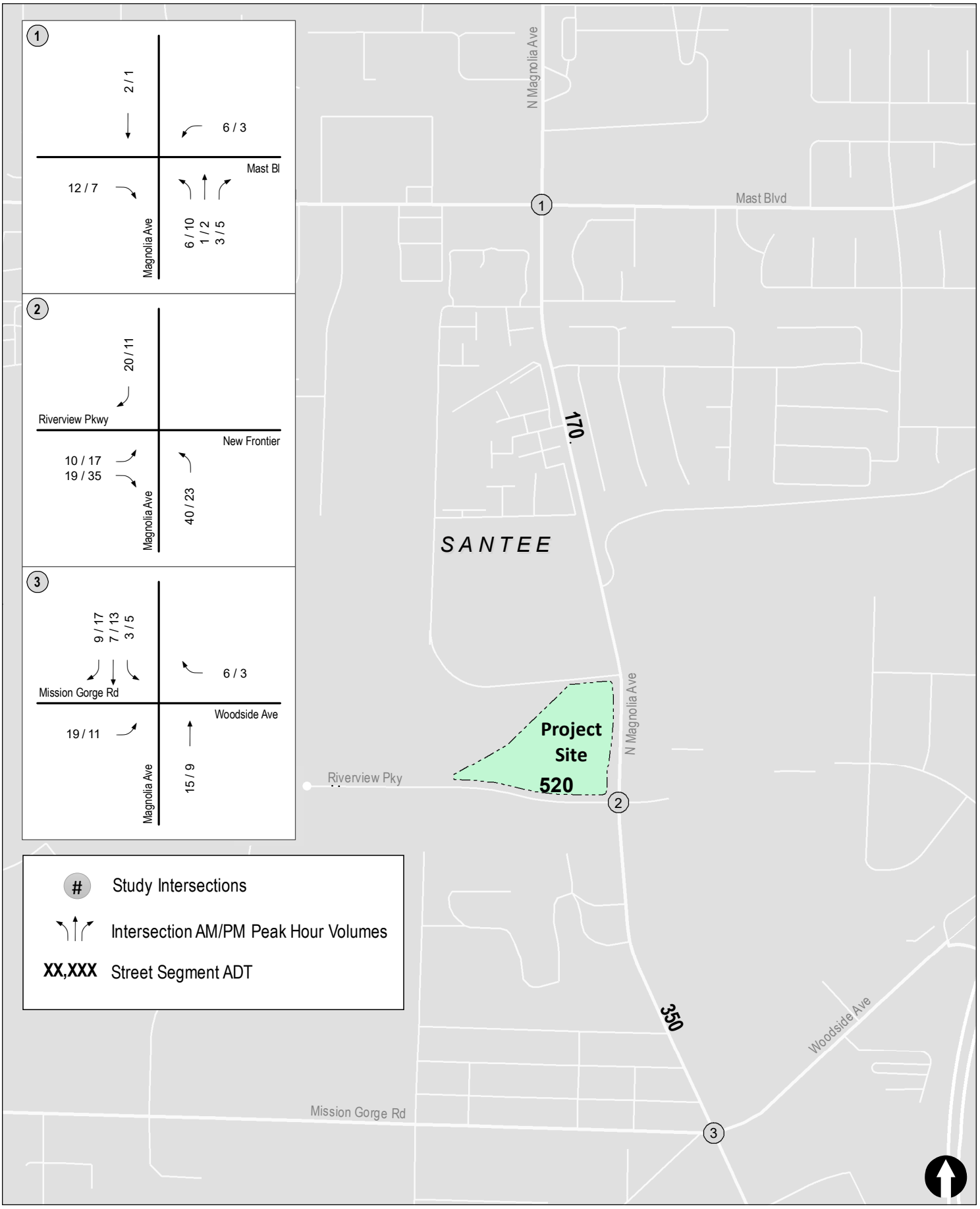
LINSCOTT LAW & GREENSPAN engineers

N:\3211\Figures
Date: 3/11/2020
Time: 4:01 PM

Figure 7-1

Project Traffic Distribution

SOUTH COUNTY ANIMAL SHELTER

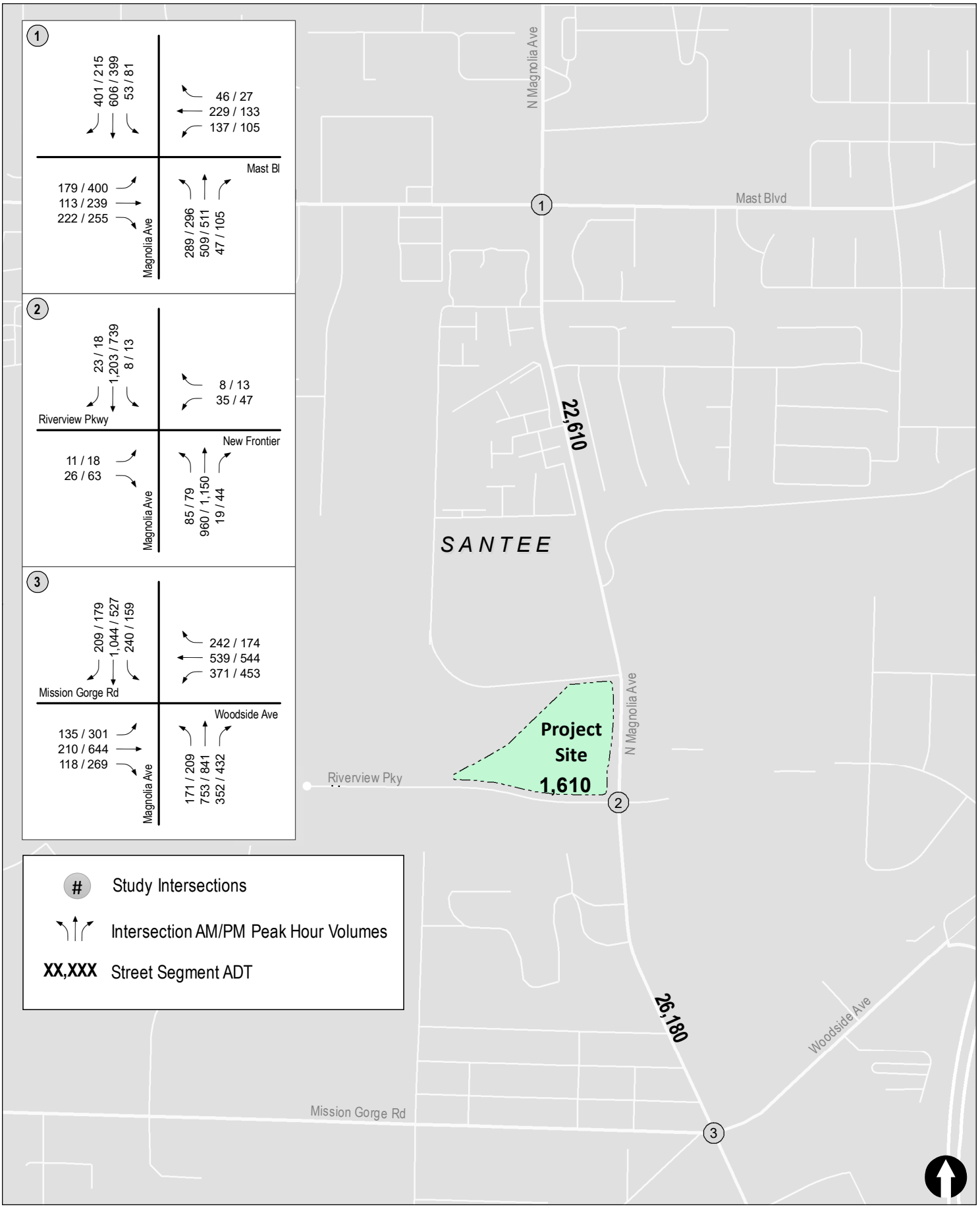


N:\3211\Figures
Date: 3/26/2020
Time: 10:25 AM

Figure 7-2

Project Traffic Volumes

South County Animal Shelter



N:\3211\Figures
Date: 3/26/2020
Time: 10:26 AM

Figure 7-3

Existing + Project Traffic Volumes

South Counrty Animal Shelter

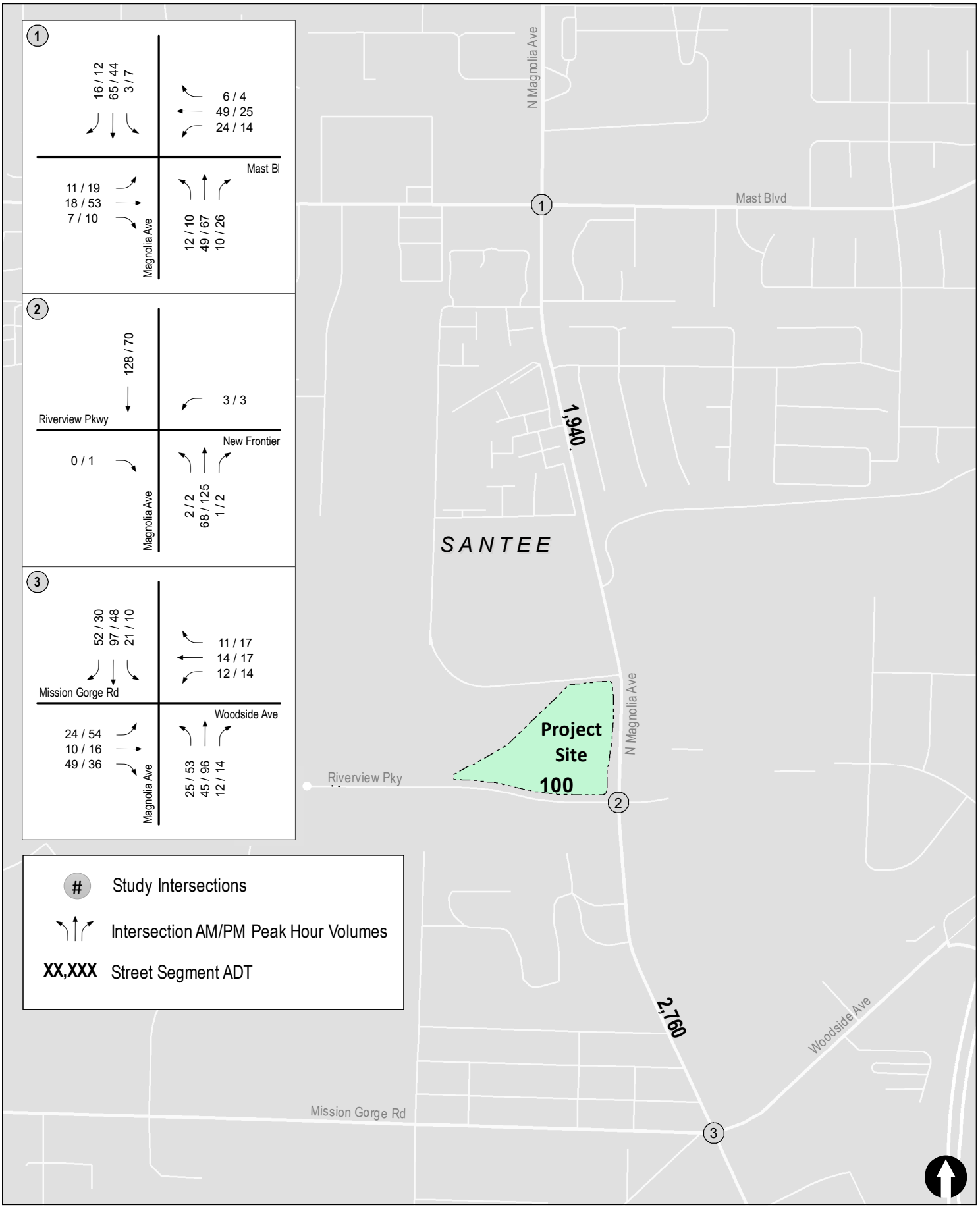
8.0 CUMULATIVE PROJECTS

LLG coordinated with the City of Santee in order to obtain information on development projects that may add trips to the study area street system in the near future.

1. GA Development LLC
2. D'Lazio
3. East County Estates
4. Las Olivitas
5. Santee View Estates
6. Woodside Terrace
7. Parkside
8. Mark and Laurie Miller
9. Cornerstone
10. Santee Townhomes
11. Prospect Fields
12. River Village
13. Infill Development Company
14. Village Run Homes, LLC
15. Karl Strauss
16. Hattie Davison Properties
17. Walker Trails
18. Prospect Estates II
19. Costco and Expanded Food Court
20. Weston (formerly Castlerock)
21. Calvary Chapel
22. Tyler Street Subdivision
23. Carribean Way
24. Talwar
25. Lantern Crest Ridge Phase II
26. Graves/Prospect Commercial
27. Sharp Medical Office Building
28. Hillside Meadows
29. Cuyamaca Service Station
30. Panera Bread
31. Sycamore Landfill
32. Padre Dam / Santee Lakes Expansion
33. Carlton Oaks Country Club
34. Garmo Brothers

35. Fanita Ranch (1/4 of the project)

Traffic from these projects was distributed and assigned to the Project study area locations. Cumulative projects traffic volumes are shown in ***Figure 8–1***. ***Figure 8–2*** depicts the daily and peak hour traffic volumes for the Existing + Project + Cumulative Projects scenario.



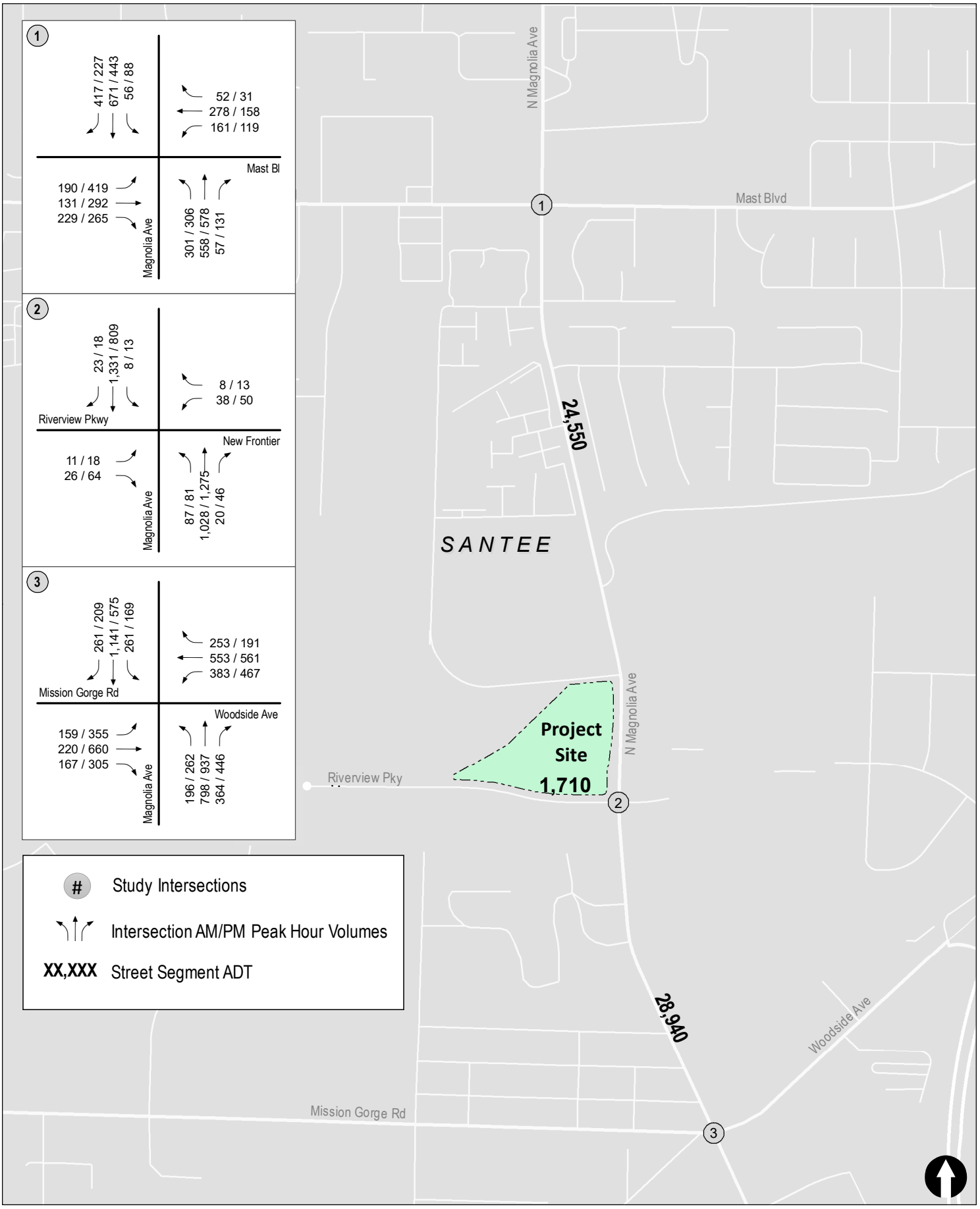
LINSCOTT LAW & GREENSPAN engineers

N:\3211\Figures
Date: 3/18/2020
Time: 12:38 PM

Figure 8-1

Cumulative Projects Traffic Volumes

SOUTH COUNTY ANIMAL SHELTER



LINSCOTT LAW & GREENSPAN engineers

N:\3211\Figures
Date: 3/26/2020
Time: 10:27 AM

Figure 8-2

Existing + Project + Cumulative Projects Traffic Volumes

SOUTH COUNTY ANIMAL SHELTER

9.0 ANALYSIS OF NEAR-TERM SCENARIOS

9.1 Existing + Project

9.1.1 *Intersection Analysis*

Table 9–1 summarizes the Existing + Project intersection levels of service. As seen in *Table 9–1*, all intersections are calculated to continue to operate at LOS D or better.

Appendix C contains the Existing + Project peak hour intersection analysis worksheets.

9.1.2 *Segment Operations*

Table 9–2 summarizes the Existing + Project roadway segment levels of service. As seen in *Table 9–2*, all study area street segments are calculated to continue to operate at LOS C or better.

9.2 Existing + Cumulative Projects

9.2.1 *Intersection Analysis*

Table 9–1 summarizes the Existing + Cumulative Projects intersection levels of service. As seen in *Table 9–1*, the following intersections are calculated to operate at LOS D or better.

Appendix D contains the Existing + Cumulative Projects peak hour intersection analysis worksheets.

9.2.2 *Segment Operations*

Table 9–3 summarizes the Existing + Cumulative Projects roadway segment levels of service. As seen in *Table 9–3*, the following segments are calculated to continue to operate at LOS C or better.

TABLE 9–1
NEAR-TERM INTERSECTION OPERATIONS

Intersection	Jurisdiction	Control Type	Peak Hour	Existing		Existing + Project		Δ[c]	Existing + Cumulative Projects		Existing + Project + Cumulative Projects		Δ[c]	Impact Type
				Delay[a]	LOS[b]	Delay	LOS		Delay	LOS	Delay	LOS		
1. Mast Boulevard / Magnolia Avenue	Santee	Signal	AM	37.9	D	39.5	D	1.6	44.6	D	46.5	D	1.9	None
			PM	27.1	C	27.5	C	0.4	28.8	C	29.5	C	0.7	None
2. Riverview Parkway / Magnolia Avenue	Santee	Signal	AM	11.2	B	13.5	B	2.3	12.6	B	15.8	B	3.2	None
			PM	12.3	B	14.1	B	1.8	13.7	B	15.9	B	2.2	None
3. Mission Gorge Road / Magnolia Avenue	Santee	Signal	AM	46.4	D	47.1	D	0.7	51.9	D	51.9	D	0.0	None
			PM	48.1	D	48.4	D	0.3	49.3	D	49.7	D	0.4	None

Footnotes:

a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. Δ denotes an increase in delay due to project, seconds of delay in the City of Santee.

SIGNALIZED		UNSIGNALIZED	
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 9–2
EXISTING + PROJECT STREET SEGMENT OPERATIONS

Street Segment	Jurisdiction	Functional Classification	LOS E [a] Capacity	Existing			Existing + Project			Δ[e]	Impact Type
				ADT[b]	LOS[c]	V/C[d]	ADT	LOS	V/C		
Magnolia Avenue											
Mast Boulevard to Riverview Parkway	Santee	4-lane Major Arterial	40,000	22,440	C	0.561	22,610	C	0.565	0.004	None
Riverview Parkway to Mission Gorge Road	Santee	4-lane Major Arterial	40,000	25,830	C	0.646	26,180	C	0.655	0.009	None
Riverview Parkway											
Magnolia Avenue to Town Center Parkway	Santee	2-lane Parkway	15,000	1,090	A	0.073	1,610	A	0.107	0.034	None

Footnotes:

a. Capacities based on City of Santee Roadway Classification tables (see *Section 4.4*).

b. Average Daily Traffic

c. Level of Service

d. Volume to Capacity ratio

e. Δ denotes the project-induced increase in the Volume to Capacity ratio for City of Santee segments.

TABLE 9–3
NEAR-TERM STREET SEGMENT OPERATIONS

Street Segment	Jurisdiction	Functional Classification	LOS E [a] Capacity	Existing + Cumulative Projects			Existing + Cumulative Projects + Project			Δ[e]	Impact Type
				ADT[b]	LOS[c]	V/C[d]	ADT	LOS	V/C		
Magnolia Avenue											
Mast Boulevard to Riverview Parkway	Santee	4-lane Major Arterial	40,000	24,380	C	0.610	24,550	C	0.614	0.004	None
Riverview Parkway to Mission Gorge Road	Santee	4-lane Major Arterial	40,000	28,590	C	0.715	28,940	C	0.724	0.009	None
Riverview Parkway											
Magnolia Avenue to Town Center Parkway	Santee	2-lane Parkway	15,000	1,190	A	0.079	1,710	A	0.114	0.035	None

Footnotes:

a. Capacities based on City of Santee Roadway Classification tables (see *Section 4.4*).
b. Average Daily Traffic
c. Level of Service
d. Volume to Capacity ratio
e. Δ denotes the project-induced increase in the Volume to Capacity ratio for City of Santee.

9.3 Existing + Project + Cumulative Projects

9.3.1 *Intersection Analysis*

Table 9–1 summarizes the Existing + Project + Cumulative Projects intersection levels of service. As seen in *Table 9–1*, the following intersections are calculated to operate at LOS D or better.

Appendix E contains the Existing + Project + Cumulative Projects peak hour intersection analysis worksheets.

9.3.2 *Segment Operations*

Table 9–3 summarizes the Near-Term roadway segment levels of service. As seen in *Table 9–3*, all study area street segments are calculated to continue to operate at LOS C or better.

10.0 ACTIVE TRANSPORTATION REVIEW

10.1 Pedestrian Traffic Review

Mission Gorge Road has sidewalks which are separated from the street and designed along landscaped corridors. On some parts of Magnolia Street, sidewalks are provided along both sides of the roadway. Sidewalks are partially provided on both sides of the street on Mast Boulevard. On Riverview Parkway sidewalks are present on both sides of the roadway.

10.2 Bicycle Traffic Review

Mast Boulevard has Class II bike lanes on both sides of the roadway. N. Magnolia Avenue provides Class II bike lanes from Mast Boulevard to Riverview Parkway. Mission Gorge Road provides Class II bike lanes east of Magnolia Street within the study area.

According to the City of Santee Mobility Element, the planned bicycle system will increase the total bicycle network mileage in Santee from approximately 33.8 existing miles to 45.6 miles upon full buildout. The following are the changes in the planned bicycle system:

- Mission Gorge Road between Riverview Parkway and Magnolia Avenue: Recommends this section to be reduced from six lanes to four lanes and provide buffered Class II bike lanes on either side of the road.

- Magnolia Avenue between Mast Boulevard and Mission Gorge Road: Recommends a higher quality bicycle facility (Class IV Cycle Tracks) along this section where there is available pavement width.

10.3 Transit Traffic Review

Transit service in Santee is provided by San Diego Metropolitan Transit Service (MTS). There are currently two (2) bus routes serving Santee.

Route 832 is a loop running clockwise between Santee Town Center and northern Santee via Cuyamaca Street, Woodglen Vista Drive, Magnolia Avenue, and Mission Gorge Road. Route 832 runs seven days a week with service generally 6 AM to 7 PM weekdays and 8 AM to 5 PM Saturday and Sunday. Service is as frequent as every 45 minutes during peak periods and is at 1-hour intervals during off-peak periods and weekends.

Route 833 is a generally north-south route running between Santee Town Center and the El Cajon Transit Center, via Mission Gorge Road, Magnolia Avenue, Graves Avenue, Pepper Drive, Mollison Avenue, E. Bradley Avenue, Fletcher Parkway, Arnele Avenue, and Marshall Avenue. Route 833 runs approximately 6 AM to 6 PM weekdays and 9 AM to 5 PM weekends. Route 833 runs at approximately 45-minute frequency all-day weekdays and 1 –hour frequency on weekends.

The nearest bus stop is located at the intersection of Riverview Parkway and North Magnolia Avenue, approximately 530 feet southeast of the Project site. The nearest trolley station (Santee Town Center) is located approximately 1.5 miles southwest of the site.

11.0 SITE ACCESS

Access to the site is proposed only via Riverview Parkway. Based on the relatively low trip generation, sufficient access is provided.

12.0 VEHICLES MILES TRAVELED (VMT) ASSESSMENT

The project is located within the County of San Diego, directly adjacent to the City of Santee. The County of San Diego has published guidelines dated June 2020 which include guidance on calculating VMT analyses.

The City of Santee does have published guidelines but utilizes the Institute of Traffic Engineers (ITE) guidelines.

County of San Diego Guidelines

County guidelines include screening criteria that are utilized to determine if a VMT analysis is necessary. One category is "Local Serving Public Facilities" defined as facilities that serve the surrounding community or public facilities that are a passive use. Local serving public facilities would redistribute trips and would not create new rips. Thus, trips are generally shortened as longer trips from a regional facility are redistributed to the local serving public facility.

Examples of local serving facilities uses include:

- Transit centers
- Schools
- Libraries
- Post offices
- Park-and-ride lots
- Local health/medical clinics
- Law enforcement and fire facilities
- Local parks and trailheads

This animal shelter falls under this category and is therefore screened out from requiring further VMT analysis.

City of Santee

Page 4.3 of the ITE guidelines states that if a project generates less than 1,000 ADT (and is consistent with the General Plan), a VMT analysis is not necessary. Since the project generates 516 ADT, according to the ITE, a VMT analysis is not required. Therefore, under both sets of guidelines, a VMT analysis is not necessary.

13.0 SIGNIFICANT IMPACTS AND MITIGATION

In terms of Level of Service, Tables 9-1, 9-2, and 9-3 show that acceptable LOS D or better operations are calculated with the addition of project traffic.

In terms of Vehicle Miles Traveled, Section 12 of the report states that a VMT analysis is not necessary under either City of Santee or County of San Diego guidelines.

No significant impacts would occur as a result of the project.

LINSCOTT
LAW &
GREENSPAN
engineers

TECHNICAL APPENDICES

SOUTH COUNTY ANIMAL SHELTER PROJECT

Santee, California
August 19, 2020

LLG Ref. 3-20-3211

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

APPENDIX A

INTERSECTION & SEGMENT MANUAL COUNT SHEETS

Intersection Turning Movement - Peak Hour Vehicle Count

LINSCOTT LAW & GREENSPAN engineers

Location:	#27	File Name:	ITM-18-015-27
Intersection:	Mast Boulevard / Magnolia Avenue	Project:	LLG Ref. 3-15-2462
Date of Count:	Tuesday, January 30, 2018		Fanita Ranch

AM	Magnolia Avenue Southbound			Mast Boulevard Westbound			Magnolia Avenue Northbound			Mast Boulevard Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Total
7:00	1	154	104	18	48	9	54	191	3	67	28	50	727
7:15	24	149	99	22	39	4	67	92	15	33	29	46	619
7:30	19	145	83	54	71	16	91	111	19	36	35	49	729
7:45	9	156	115	37	71	17	71	114	7	43	21	65	726
8:00	12	140	114	19	60	17	75	124	7	46	37	54	705
8:15	5	88	61	10	37	4	77	53	7	43	35	55	475
8:30	3	80	56	18	29	2	59	39	9	44	22	61	422
8:45	7	94	44	15	23	3	58	65	9	31	15	40	404
Total	80	1006	676	193	378	72	552	789	76	343	222	420	4807
Approach%	4.5	57.1	38.4	30.0	58.8	11.2	39.0	55.7	5.4	34.8	22.5	42.6	
Total%	1.7	20.9	14.1	4.0	7.9	1.5	11.5	16.4	1.6	7.1	4.6	8.7	

AM Intersection Peak Hour: **07:00 to 08:00**

Volume	53	604	401	131	229	46	283	508	44	179	113	210	2,801
Approach%	5.0	57.1	37.9	32.3	56.4	11.3	33.9	60.8	5.3	35.7	22.5	41.8	
Total%	1.9	21.6	14.3	4.7	8.2	1.6	10.1	18.1	1.6	6.4	4.0	7.5	
PHF			0.94			0.72			0.84			0.87	

PM	Magnolia Avenue Southbound			Mast Boulevard Westbound			Magnolia Avenue Northbound			Mast Boulevard Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Total
16:00	13	84	59	17	18	2	66	119	23	119	75	64	659
16:15	17	80	56	12	38	8	70	117	21	97	58	55	629
16:30	13	83	45	26	27	12	68	153	21	107	60	58	673
16:45	12	98	52	16	43	8	74	121	21	105	42	63	655
17:00	23	85	53	24	44	11	77	124	21	90	62	84	698
17:15	21	105	47	40	14	1	71	150	32	96	55	42	674
17:30	17	107	62	18	43	8	79	116	15	101	66	49	681
17:45	20	101	53	20	32	7	59	119	32	113	56	73	685
Total	136	743	427	173	259	57	564	1019	186	828	474	488	5354
Approach%	10.4	56.9	32.7	35.4	53.0	11.7	31.9	57.6	10.5	46.3	26.5	27.3	
Total%	2.8	15.5	8.9	3.6	5.4	1.2	11.7	21.2	3.9	17.2	9.9	10.2	

PM Intersection Peak Hour: **17:00 to 18:00**

Volume	81	398	215	102	133	27	286	509	100	400	239	248	2,738
Approach%	11.7	57.3	31.0	38.9	50.8	10.3	32.0	56.9	11.2	45.1	26.9	28.0	
Total%	2.9	14.2	7.7	3.6	4.7	1.0	10.2	18.2	3.6	14.3	8.5	8.9	
PHF			0.93			0.83			0.88			0.92	

Intersection Turning Movement - Bicycle & Pedestrian Count

LINSCOTT LAW & GREENSPAN engineers

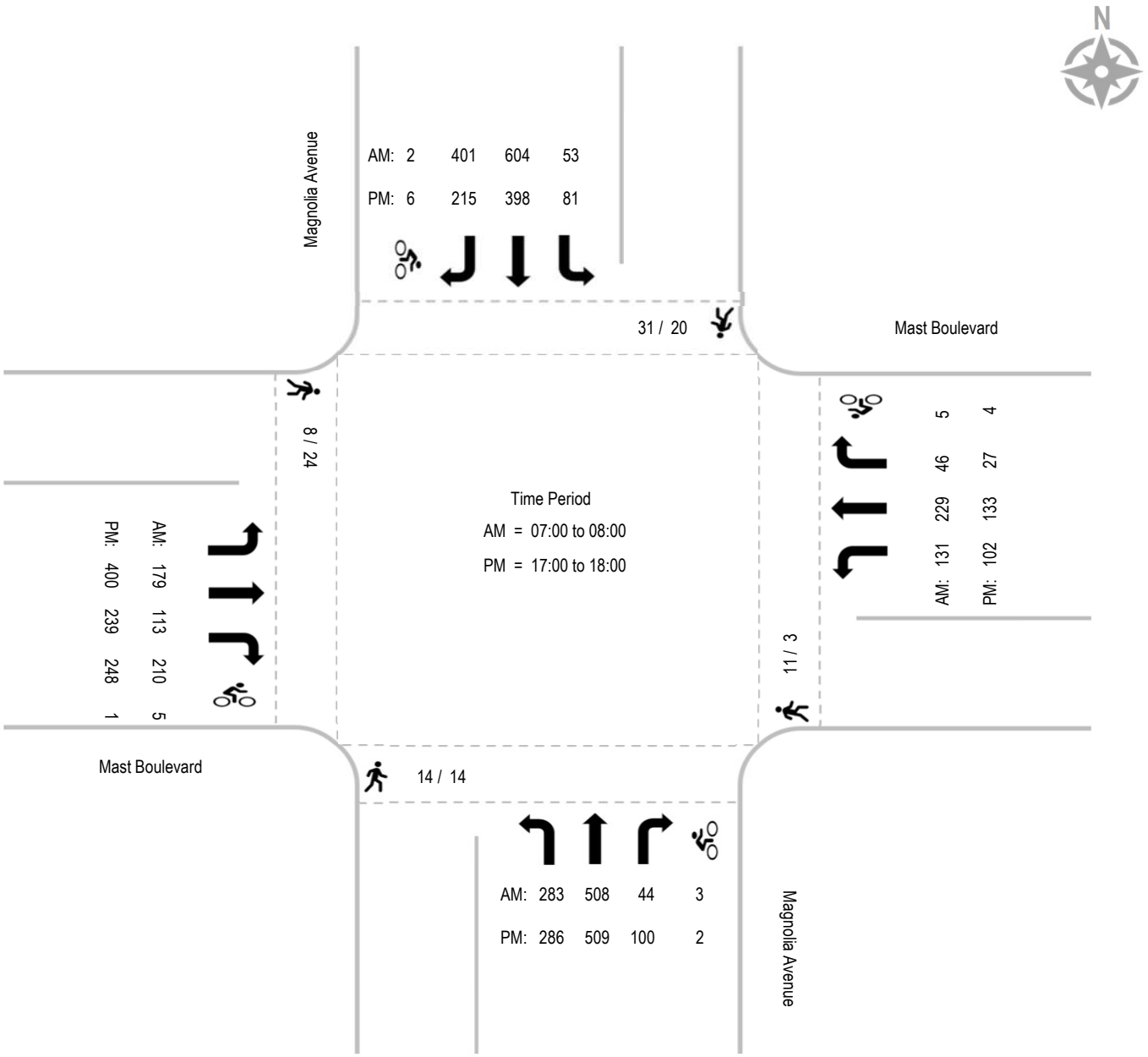
Location:	#27	File Name:	ITM-18-015-27
Intersection:	Mast Boulevard / Magnolia Avenue	Project:	LLG Ref. 3-15-2462
Date of Count:	Tuesday, January 30, 2018		Fanita Ranch

AM	Magnolia Avenue Southbound				Mast Boulevard Westbound				Magnolia Avenue Northbound				Mast Boulevard Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
7:00	4	0	0	0	7	0	0	1	5	0	0	1	1	0	0	0	17	2
7:15	1	0	1	0	0	0	0	0	4	0	2	0	2	0	2	2	7	7
7:30	3	0	0	0	1	0	0	0	3	0	0	0	2	0	0	0	9	0
7:45	14	0	0	1	2	0	1	0	2	0	0	0	1	0	0	0	19	2
8:00	8	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	10	0
8:15	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
8:30	1	0	0	0	0	0	2	0	0	0	0	0	1	0	1	0	2	3
8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Total	31				11				14				8				64	
Bike Total		0	1	1		0	4	1		0	2	1		0	3	2		15

PM	Magnolia Avenue Southbound				Mast Boulevard Westbound				Magnolia Avenue Northbound				Mast Boulevard Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
16:00	2	0	0	0	0	0	0	0	3	0	0	0	2	0	0	0	7	0
16:15	9	0	2	0	0	0	0	0	2	0	1	0	3	0	0	0	14	3
16:30	3	0	1	0	0	0	1	0	2	0	1	0	7	0	0	0	12	3
16:45	2	0	3	0	2	0	0	0	4	0	0	0	3	0	0	0	11	3
17:00	2	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	4	0
17:15	0	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0	3	1
17:30	0	0	0	0	0	0	2	0	0	0	0	0	2	0	1	0	2	3
17:45	2	0	0	0	1	0	0	0	2	0	0	0	3	0	0	0	8	0
Ped Total	20				3				14				24				61	
Bike Total		0	6	0		0	4	0		0	2	0		0	1	0		13

Intersection Turning Movement - Peak Hour Summary

LINSCOTT LAW & GREENSPAN engineers	Location:	#27	File Name:	ITM-18-015-27
	Intersection:	Mast Boulevard / Magnolia Avenue	Project:	LLG Ref. 3-15-2462
	Date of Count:	Tuesday, January 30, 2018		Fanita Ranch



Intersection Turning Movement - Peak Hour Vehicle Count

LINSCOTT LAW & GREENSPAN engineers

Location:	#36	File Name:	ITM-18-015-36
Intersection:	Riverview Parkway / Magnolia Avenue	Project:	LLG Ref. 3-15-2462
Date of Count:	Thursday, February 1, 2018		Fanita Ranch

AM	Magnolia Avenue Southbound			Riverview Parkway Westbound			Magnolia Avenue Northbound			Riverview Parkway Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Total
7:00	2	199	0	2	0	2	6	158	2	1	0	0	372
7:15	1	274	1	10	0	2	6	200	8	0	0	1	503
7:30	2	302	1	10	0	3	15	264	4	0	0	1	602
7:45	4	336	1	9	0	1	17	255	2	1	0	3	629
8:00	1	291	0	6	0	2	7	241	5	0	0	2	555
8:15	0	230	0	7	0	2	11	134	11	0	0	2	397
8:30	0	170	1	8	0	2	3	111	4	0	0	2	301
8:45	2	177	2	12	0	3	3	134	8	1	0	1	343
Total	12	1979	6	64	0	17	68	1497	44	3	0	12	3702
Approach%	0.6	99.1	0.3	79.0	-	21.0	4.2	93.0	2.7	20.0	-	80.0	
Total%	0.3	53.5	0.2	1.7	-	0.5	1.8	40.4	1.2	0.1	-	0.3	

AM Intersection Peak Hour: **07:15 to 08:15**

Volume	8	1,203	3	35	-	8	45	960	19	1	-	7	2,289
Approach%	0.7	99.1	0.2	81.4	-	18.6	4.4	93.8	1.9	12.5	-	87.5	
Total%	0.3	52.6	0.1	1.5	-	0.3	2.0	41.9	0.8	0.0	-	0.3	
PHF			0.89			0.83			0.90			0.50	

PM	Magnolia Avenue Southbound			Riverview Parkway Westbound			Magnolia Avenue Northbound			Riverview Parkway Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Total
16:00	3	178	0	12	0	5	3	249	20	1	0	11	482
16:15	4	169	1	13	0	2	11	278	6	0	0	9	493
16:30	3	200	1	9	0	5	12	297	14	0	0	9	550
16:45	4	173	2	13	0	3	14	299	9	0	0	2	519
17:00	2	197	3	12	0	3	19	276	15	1	0	8	536
17:15	1	187	0	10	0	4	9	241	17	1	0	10	480
17:30	2	210	2	5	0	0	5	265	9	0	0	10	508
17:45	2	174	2	7	0	1	6	234	5	0	0	26	457
Total	21	1488	11	81	0	23	79	2139	95	3	0	85	4025
Approach%	1.4	97.9	0.7	77.9	-	22.1	3.4	92.5	4.1	3.4	-	96.6	
Total%	0.6	40.2	0.3	2.2	-	0.6	2.1	57.8	2.6	0.1	-	2.3	

PM Intersection Peak Hour: **16:15 to 17:15**

Volume	13	739	7	47	-	13	56	1,150	44	1	-	28	2,098
Approach%	1.7	97.4	0.9	78.3	-	21.7	4.5	92.0	3.5	3.4	-	96.6	
Total%	0.6	32.3	0.3	2.1	-	0.6	2.4	50.2	1.9	0.0	-	1.2	
PHF			0.93			0.94			0.97			0.81	

Intersection Turning Movement - Bicycle & Pedestrian Count

LINSCOTT LAW & GREENSPAN engineers

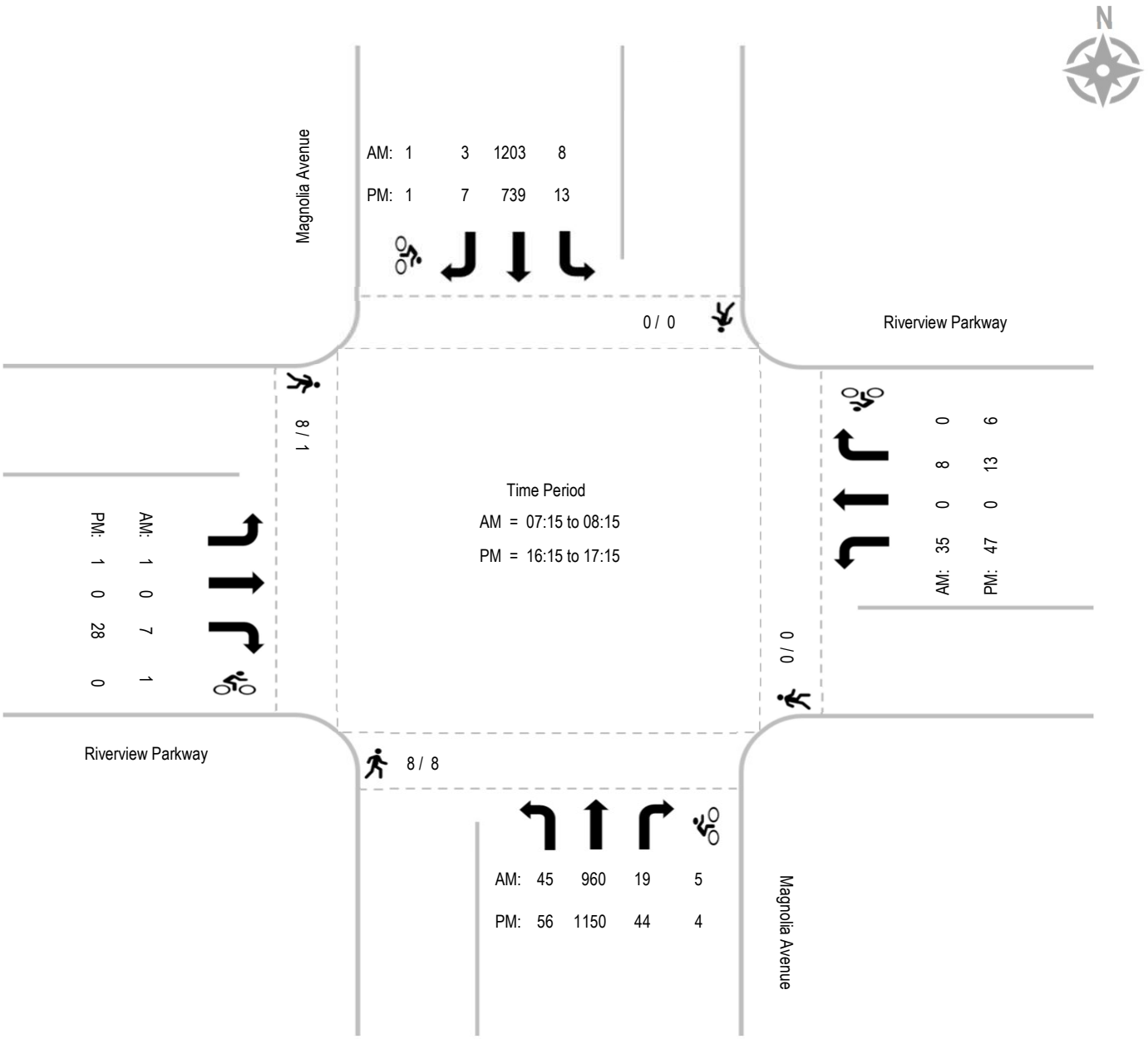
Location:	#36	File Name:	ITM-18-015-36
Intersection:	Riverview Parkway / Magnolia Avenue	Project:	LLG Ref. 3-15-2462
Date of Count:	Thursday, February 1, 2018		Fanita Ranch

AM	Magnolia Avenue Southbound				Riverview Parkway Westbound				Magnolia Avenue Northbound				Riverview Parkway Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
7:00	0	0	0	0	0	0	0	0	5	0	0	0	2	0	0	0	7	0
7:15	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	2	1
7:30	0	0	0	0	0	0	0	0	1	0	1	0	3	0	0	0	4	1
7:45	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2	0
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
8:15	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
8:30	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
8:45	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2
Ped Total	0				0				8				8				16	
Bike Total		0	1	0		0	0	0		3	2	0		0	0	1		7

PM	Magnolia Avenue Southbound				Riverview Parkway Westbound				Magnolia Avenue Northbound				Riverview Parkway Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	6	0	2	0	0	0	0	0	0	0	2	6
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1
17:15	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	2	1
17:30	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	2	2
17:45	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	2	1
Ped Total	0				0				8				1				9	
Bike Total		1	0	0		0	6	0		0	4	0		0	0	0		11

Intersection Turning Movement - Peak Hour Summary

LINSCOTT LAW & GREENSPAN engineers	Location:	#36	File Name:	ITM-18-015-36
	Intersection:	Riverview Parkway / Magnolia Avenue	Project:	LLG Ref. 3-15-2462
	Date of Count:	Thursday, February 1, 2018		Fanita Ranch



Intersection Turning Movement - Peak Hour Vehicle Count

LINSCOTT LAW & GREENSPAN engineers

Location:	#50	File Name:	ITM-18-015-50
Intersection:	Mission Gorge Road / Magnolia Avenue	Project:	LLG Ref. 3-15-2462
Date of Count:	Thursday, February 1, 2018		Fanita Ranch

AM	Magnolia Avenue Southbound			Woodside Avenue Westbound			Magnolia Avenue Northbound			Mission Gorge Road Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Total
7:00	28	161	26	62	125	36	17	113	85	18	43	21	735
7:15	42	226	46	78	133	56	25	148	69	24	55	26	928
7:30	49	221	32	116	131	70	30	171	91	36	39	26	1012
7:45	72	311	88	77	123	65	69	242	111	26	53	20	1257
8:00	74	279	34	100	152	45	47	177	81	30	63	46	1128
8:15	71	175	34	69	134	24	45	124	71	21	59	24	851
8:30	31	137	27	91	121	27	41	68	73	30	65	35	746
8:45	46	140	38	78	135	25	44	89	78	24	57	37	791
Total	413	1650	325	671	1054	348	318	1132	659	209	434	235	7448
Approach%	17.3	69.1	13.6	32.4	50.8	16.8	15.1	53.7	31.2	23.8	49.4	26.8	
Total%	5.5	22.2	4.4	9.0	14.2	4.7	4.3	15.2	8.8	2.8	5.8	3.2	

AM Intersection Peak Hour: **07:15 to 08:15**

Volume	237	1,037	200	371	539	236	171	738	352	116	210	118	4,325
Approach%	16.1	70.4	13.6	32.4	47.0	20.6	13.6	58.5	27.9	26.1	47.3	26.6	
Total%	5.5	24.0	4.6	8.6	12.5	5.5	4.0	17.1	8.1	2.7	4.9	2.7	
PHF			0.78			0.90			0.75			0.80	

PM	Magnolia Avenue Southbound			Woodside Avenue Westbound			Magnolia Avenue Northbound			Mission Gorge Road Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Total
16:00	52	174	24	110	139	30	54	192	111	65	168	71	1190
16:15	34	136	26	92	127	38	57	162	90	46	156	86	1050
16:30	34	160	24	108	128	38	45	226	121	65	153	67	1169
16:45	37	119	44	84	138	55	57	209	100	57	164	64	1128
17:00	40	154	31	156	164	48	42	234	124	106	132	59	1290
17:15	44	126	41	96	126	26	61	147	77	60	180	68	1052
17:30	34	117	58	113	125	40	50	228	128	62	154	80	1189
17:45	36	117	32	88	129	57	56	223	103	62	178	62	1143
Total	311	1103	280	847	1076	332	422	1621	854	523	1285	557	9211
Approach%	18.4	65.1	16.5	37.6	47.7	14.7	14.6	56.0	29.5	22.1	54.3	23.6	
Total%	4.2	14.8	3.8	11.4	14.4	4.5	5.7	21.8	11.5	7.0	17.3	7.5	

PM Intersection Peak Hour: **17:00 to 18:00**

Volume	154	514	162	453	544	171	209	832	432	290	644	269	4,674
Approach%	18.6	61.9	19.5	38.8	46.6	14.6	14.2	56.5	29.3	24.1	53.5	22.4	
Total%	3.6	11.9	3.7	10.5	12.6	4.0	4.8	19.2	10.0	6.7	14.9	6.2	
PHF			0.92			0.79			0.91			0.98	

Intersection Turning Movement - Bicycle & Pedestrian Count

LINSCOTT LAW & GREENSPAN engineers

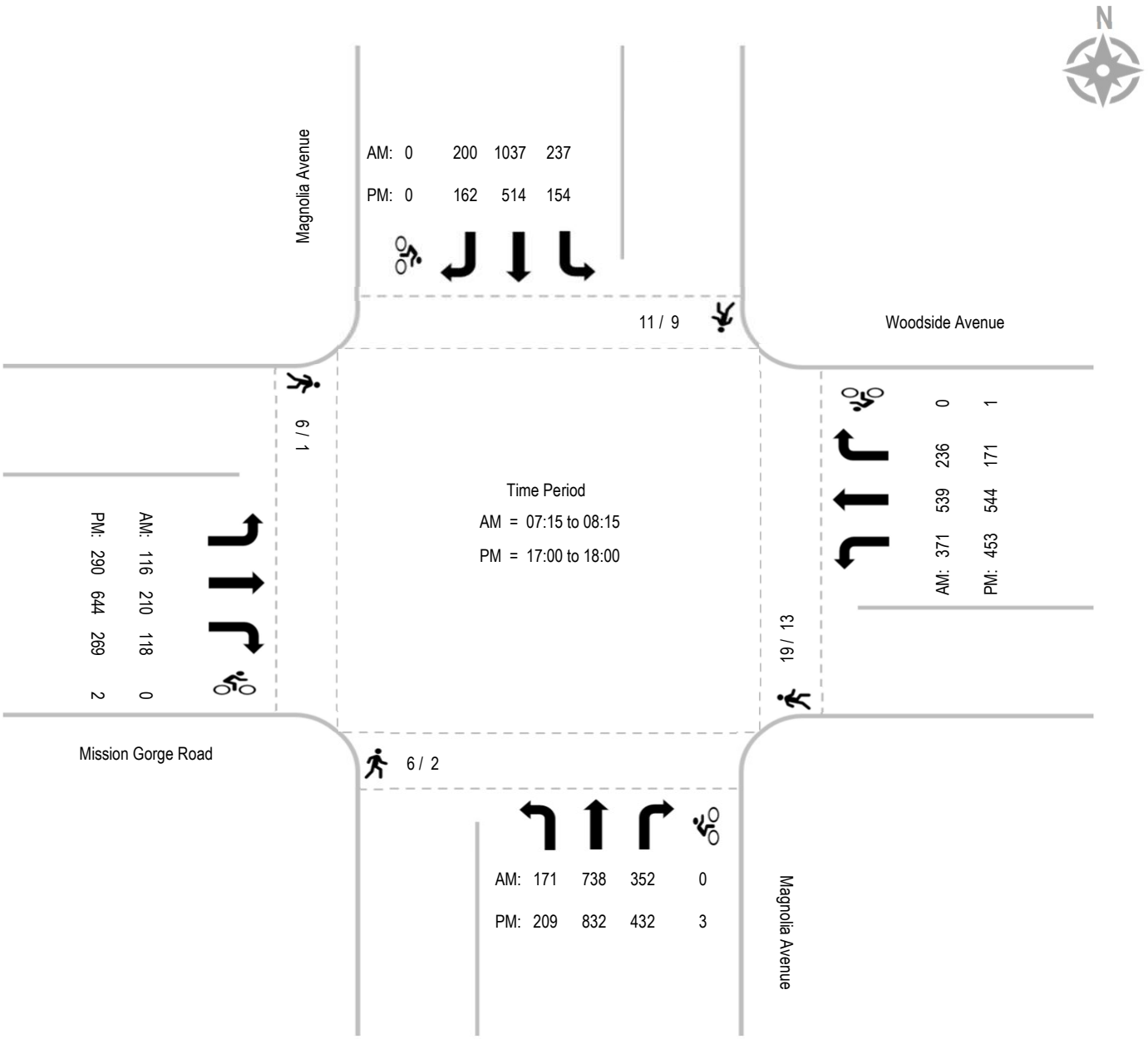
Location:	#50	File Name:	ITM-18-015-50
Intersection:	Mission Gorge Road / Magnolia Avenue	Project:	LLG Ref. 3-15-2462
Date of Count:	Thursday, February 1, 2018		Fanita Ranch

AM	Magnolia Avenue Southbound				Woodside Avenue Westbound				Magnolia Avenue Northbound				Mission Gorge Road Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
7:00	1	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0	5	0
7:15	3	0	0	0	6	0	0	0	1	0	0	0	0	0	0	0	10	0
7:30	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0
7:45	2	0	0	0	5	0	0	0	2	0	0	0	0	0	0	0	9	0
8:00	1	0	0	0	2	0	0	0	1	0	0	0	1	0	0	0	5	0
8:15	2	0	0	0	1	0	0	0	0	0	0	0	3	0	0	0	6	0
8:30	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	3	0
8:45	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Ped Total	11				19				6				6				42	
Bike Total		0	0	0		0	0	0		0	0	0		0	0	0		0

PM	Magnolia Avenue Southbound				Woodside Avenue Westbound				Magnolia Avenue Northbound				Mission Gorge Road Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	1	0	0	0	4	0	0	0	1	0	0	0	0	0	0	0	6	0
16:30	3	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	4	2
16:45	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	1
17:00	3	0	0	0	2	0	1	0	0	0	1	0	1	0	1	0	6	3
17:15	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2	0
17:30	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0
17:45	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	4	0
Ped Total	9				13				2				1				25	
Bike Total		0	0	0		0	1	0		1	2	0		0	2	0		6

Intersection Turning Movement - Peak Hour Summary

LINSCOTT LAW & GREENSPAN engineers	Location:	#50	File Name:	ITM-18-015-50
	Intersection:	Mission Gorge Road / Magnolia Avenue	Project:	LLG Ref. 3-15-2462
	Date of Count:	Thursday, February 1, 2018		Fanita Ranch



Linscott, Law & Greenspan, Engineers

4542 Ruffner Street, Suite 100, San Diego, CA 92111

Average Daily Traffic

Location: **Magnolia Avenue, between Mast Boulevard and Riverview Parkway**

Date: **Tuesday, February 6, 2018** Total Daily Volume: **22438** Description: **Total Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
101	65	51	41	174	543	1140	2263	1546	935	926	975	1050	1274	1455	1809	1760	1892	1468	1067	852	551	303	197
35	22	13	6	16	87	196	544	535	252	233	247	272	270	386	539	435	467	415	282	248	162	92	61
25	15	9	8	30	115	222	573	410	235	220	244	244	282	344	447	420	482	397	305	206	146	90	41
21	15	17	12	51	158	303	560	308	235	223	243	271	322	334	408	446	481	356	261	200	116	76	58
20	13	12	15	77	183	419	586	293	213	250	241	263	400	391	415	459	462	300	219	198	127	45	37

Date: **Tuesday, February 6, 2018** Total Daily Volume: **10482** Description: **Northbound Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
64	40	32	18	30	135	427	834	610	366	407	452	494	623	706	893	979	1017	739	559	444	323	178	112
20	12	7	2	1	18	73	240	226	93	97	106	131	129	160	231	234	260	190	139	117	96	48	33
21	9	7	4	9	23	84	200	153	98	103	119	112	158	172	218	246	260	202	170	112	76	55	25
13	10	10	5	5	34	95	197	113	94	105	119	121	135	179	203	248	244	184	143	109	73	46	29
10	9	8	7	15	60	175	197	118	81	102	108	130	201	195	241	251	253	163	107	106	78	29	25

Date: **Tuesday, February 6, 2018** Total Daily Volume: **11956** Description: **Southbound Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
37	25	19	23	144	408	713	1429	936	569	519	523	556	651	749	916	781	875	729	508	408	228	125	85
15	10	6	4	15	69	123	304	309	159	136	141	141	141	226	308	201	207	225	143	131	66	44	28
4	6	2	4	21	92	138	373	257	137	117	125	132	124	172	229	174	222	195	135	94	70	35	16
8	5	7	7	46	124	208	363	195	141	118	124	150	187	155	205	198	237	172	118	91	43	30	29
10	4	4	8	62	123	244	389	175	132	148	133	133	199	196	174	208	209	137	112	92	49	16	12

Report Generated by "Count Data" all rights reserved

Linscott, Law & Greenspan, Engineers

4542 Ruffner Street, Suite 100, San Diego, CA 92111

Average Daily Traffic

Location: **Riverview Parkway, between Town Center Parkway and Magnolia Avenue**

Date: **Wednesday, February 7, 2018** Total Daily Volume: **1085** Description: **Total Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
15	7	0	24	37	122	86	63	41	30	42	40	43	45	54	40	91	119	82	23	16	32	21	12
5	3	0	1	4	36	30	19	12	8	12	6	7	10	8	7	19	29	43	4	2	6	5	2
6	1	0	2	5	27	18	14	15	6	10	13	10	9	21	13	24	25	22	7	12	6	13	1
1	1	0	8	11	22	14	12	5	8	12	12	7	9	17	12	26	16	14	6	1	11	1	4
3	2	0	13	17	37	24	18	9	8	8	9	19	17	8	8	22	49	3	6	1	9	2	5

Date: **Wednesday, February 7, 2018** Total Daily Volume: **536** Description: **Eastbound Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
7	4	0	14	8	25	57	15	11	14	25	18	24	20	38	34	50	56	54	12	9	18	16	7
4	3	0	0	2	7	22	4	4	2	5	2	4	4	3	7	13	3	32	2	1	4	4	1
2	1	0	0	1	4	12	5	2	6	7	5	6	7	17	10	18	11	13	3	6	5	10	1
1	0	0	8	1	5	12	3	2	3	9	5	4	5	13	12	15	7	7	5	1	3	1	3
0	0	0	6	4	9	11	3	3	3	4	6	10	4	5	5	4	35	2	2	1	6	1	2

Date: **Wednesday, February 7, 2018** Total Daily Volume: **549** Description: **Westbound Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
8	3	0	10	29	97	29	48	30	16	17	22	19	25	16	6	41	63	28	11	7	14	5	5
1	0	0	1	2	29	8	15	8	6	7	4	3	6	5	0	6	26	11	2	1	2	1	1
4	0	0	2	4	23	6	9	13	0	3	8	4	2	4	3	6	14	9	4	6	1	3	0
0	1	0	0	10	17	2	9	3	5	3	7	3	4	4	0	11	9	7	1	0	8	0	1
3	2	0	7	13	28	13	15	6	5	4	3	9	13	3	3	18	14	1	4	0	3	1	3

Report Generated by "Count Data" all rights reserved

Linscott, Law & Greenspan, Engineers

4542 Ruffner Street, Suite 100, San Diego, CA 92111

Average Daily Traffic

Location: **Magnolia Avenue, between Riverview Parkway and Mission Gorge Road**

Date: **Tuesday, February 6, 2018** Total Daily Volume: **25828** Description: **Total Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
127	92	57	66	211	663	1262	2229	1619	1111	1159	1252	1310	1517	1775	2141	2108	2118	1619	1195	955	644	365	233
43	34	17	11	19	120	254	517	544	282	282	307	329	392	467	591	540	570	482	340	269	193	114	54
31	19	11	15	43	153	224	527	437	287	291	324	312	321	451	542	471	515	407	326	238	168	114	68
34	23	15	21	60	171	355	549	313	265	283	315	336	351	410	513	556	525	406	276	217	144	87	59
19	16	14	19	89	219	429	636	325	277	303	306	333	453	447	495	541	508	324	253	231	139	50	52

Date: **Tuesday, February 6, 2018** Total Daily Volume: **12619** Description: **Northbound Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
82	58	33	30	44	188	496	920	646	439	501	586	625	812	897	1077	1223	1186	839	665	536	384	219	133
26	21	8	5	1	30	73	235	238	110	119	136	150	214	190	268	290	331	236	191	141	113	61	32
24	10	8	6	13	43	74	244	158	118	127	147	161	172	222	242	293	298	194	187	134	89	68	37
22	16	10	10	6	44	130	220	115	97	128	158	156	178	220	286	320	289	227	150	132	92	57	33
10	11	7	9	24	71	219	221	135	114	127	145	158	248	265	281	320	268	182	137	129	90	33	31

Date: **Tuesday, February 6, 2018** Total Daily Volume: **13209** Description: **Southbound Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
45	34	24	36	167	475	766	1309	973	672	658	666	685	705	878	1064	885	932	780	530	419	260	146	100
17	13	9	6	18	90	181	282	306	172	163	171	179	178	277	323	250	239	246	149	128	80	53	22
7	9	3	9	30	110	150	283	279	169	164	177	151	149	229	300	178	217	213	139	104	79	46	31
12	7	5	11	54	127	225	329	198	168	155	157	180	173	190	227	236	236	179	126	85	52	30	26
9	5	7	10	65	148	210	415	190	163	176	161	175	205	182	214	221	240	142	116	102	49	17	21

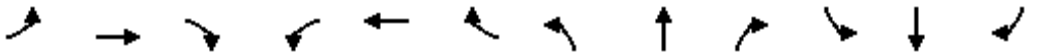
Report Generated by "Count Data" all rights reserved

APPENDIX B

PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS – EXISTING

HCM 6th Signalized Intersection Summary
1: Magnolia Ave & Mast Blvd

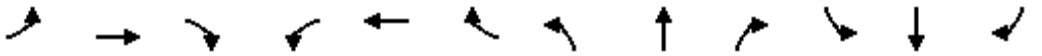
03/25/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	179	113	210	131	229	46	283	508	44	53	604	401
Future Volume (veh/h)	179	113	210	131	229	46	283	508	44	53	604	401
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		0.94	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	195	123	228	142	249	50	308	552	48	58	657	436
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	454	925	399	151	737	309	292	1180	102	111	1191	521
Arrive On Green	0.13	0.26	0.26	0.08	0.21	0.21	0.08	0.36	0.36	0.06	0.34	0.34
Sat Flow, veh/h	3456	3554	1534	1781	3554	1489	3456	3301	286	1781	3554	1553
Grp Volume(v), veh/h	195	123	228	142	249	50	308	296	304	58	657	436
Grp Sat Flow(s),veh/h/ln	1728	1777	1534	1781	1777	1489	1728	1777	1811	1781	1777	1553
Q Serve(g_s), s	4.3	2.2	10.7	6.6	4.9	2.3	7.0	10.7	10.7	2.6	12.5	21.5
Cycle Q Clear(g_c), s	4.3	2.2	10.7	6.6	4.9	2.3	7.0	10.7	10.7	2.6	12.5	21.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.16	1.00		1.00
Lane Grp Cap(c), veh/h	454	925	399	151	737	309	292	635	647	111	1191	521
V/C Ratio(X)	0.43	0.13	0.57	0.94	0.34	0.16	1.05	0.47	0.47	0.52	0.55	0.84
Avail Cap(c_a), veh/h	459	1523	658	151	1330	557	292	665	678	151	1330	581
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.1	23.5	26.6	37.7	28.0	26.9	37.9	20.5	20.5	37.6	22.5	25.4
Incr Delay (d2), s/veh	0.8	0.1	1.6	55.9	0.3	0.3	67.7	0.5	0.5	1.4	0.4	9.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.9	3.8	5.1	2.1	0.8	5.6	4.2	4.3	1.1	4.9	8.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.9	23.5	28.2	93.6	28.3	27.2	105.7	21.1	21.1	39.1	22.9	35.0
LnGrp LOS	C	C	C	F	C	C	F	C	C	D	C	D
Approach Vol, veh/h		546			441			908			1151	
Approach Delay, s/veh		29.2			49.2			49.8			28.3	
Approach LOS		C			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.5	27.1	11.5	32.8	15.9	22.7	9.7	34.6
Change Period (Y+Rc), s	4.5	5.5	4.5	5.0	5.0	5.5	4.5	5.0
Max Green Setting (Gmax), s	7.0	35.5	7.0	31.0	11.0	31.0	7.0	31.0
Max Q Clear Time (g_c+I1), s	8.6	12.7	9.0	23.5	6.3	6.9	4.6	12.7
Green Ext Time (p_c), s	0.0	1.8	0.0	3.5	0.3	2.0	0.0	3.2

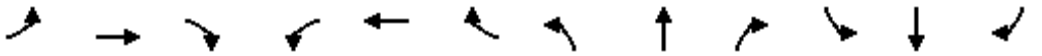
Intersection Summary	
HCM 6th Ctrl Delay	37.9
HCM 6th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	7	35	0	8	45	960	19	8	1203	3
Future Volume (veh/h)	1	0	7	35	0	8	45	960	19	8	1203	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		1.00	1.00		0.98	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	1	0	8	38	0	9	49	1043	21	9	1308	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	52	0	44	71	0	63	73	1796	36	17	1719	4
Arrive On Green	0.03	0.00	0.03	0.04	0.00	0.04	0.04	0.50	0.50	0.01	0.47	0.47
Sat Flow, veh/h	1781	0	1522	1781	0	1585	1781	3561	72	1781	3637	8
Grp Volume(v), veh/h	1	0	8	38	0	9	49	520	544	9	639	672
Grp Sat Flow(s),veh/h/ln	1781	0	1522	1781	0	1585	1781	1777	1855	1781	1777	1869
Q Serve(g_s), s	0.0	0.0	0.2	0.9	0.0	0.2	1.2	8.9	8.9	0.2	12.8	12.8
Cycle Q Clear(g_c), s	0.0	0.0	0.2	0.9	0.0	0.2	1.2	8.9	8.9	0.2	12.8	12.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.04	1.00		0.00
Lane Grp Cap(c), veh/h	52	0	44	71	0	63	73	896	936	17	840	883
V/C Ratio(X)	0.02	0.00	0.18	0.53	0.00	0.14	0.67	0.58	0.58	0.53	0.76	0.76
Avail Cap(c_a), veh/h	830	0	709	830	0	739	293	1017	1062	293	1017	1070
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	20.3	0.0	20.4	20.3	0.0	20.0	20.4	7.5	7.5	21.3	9.4	9.4
Incr Delay (d2), s/veh	0.1	0.0	1.9	6.1	0.0	1.0	10.0	0.6	0.6	23.6	2.8	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.5	0.0	0.1	0.6	2.1	2.1	0.2	3.6	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.5	0.0	22.4	26.4	0.0	21.0	30.4	8.1	8.1	44.9	12.1	12.0
LnGrp LOS	C	A	C	C	A	C	C	A	A	D	B	B
Approach Vol, veh/h		9			47			1113			1320	
Approach Delay, s/veh		22.2			25.4			9.1			12.3	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.9	26.3		5.7	6.3	24.9		6.2				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	7.1	24.7		20.1	7.1	24.7		20.1				
Max Q Clear Time (g_c+I1), s	2.2	10.9		2.2	3.2	14.8		2.9				
Green Ext Time (p_c), s	0.0	5.5		0.0	0.0	5.6		0.1				

Intersection Summary			
HCM 6th Ctrl Delay		11.2	
HCM 6th LOS		B	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	116	210	118	371	539	236	171	738	352	237	1037	200
Future Volume (veh/h)	116	210	118	371	539	236	171	738	352	237	1037	200
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		0.99	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	122	221	124	391	567	248	180	777	371	249	1092	211
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	180	1122	596	434	934	408	214	1068	467	283	1139	505
Arrive On Green	0.05	0.32	0.32	0.13	0.39	0.39	0.06	0.30	0.30	0.08	0.32	0.32
Sat Flow, veh/h	3456	3554	1576	3456	2400	1048	3456	3554	1555	3456	3554	1576
Grp Volume(v), veh/h	122	221	124	391	419	396	180	777	371	249	1092	211
Grp Sat Flow(s),veh/h/ln	1728	1777	1576	1728	1777	1671	1728	1777	1555	1728	1777	1576
Q Serve(g_s), s	3.8	5.0	5.8	12.3	20.8	20.8	5.7	21.5	24.1	7.8	33.2	11.6
Cycle Q Clear(g_c), s	3.8	5.0	5.8	12.3	20.8	20.8	5.7	21.5	24.1	7.8	33.2	11.6
Prop In Lane	1.00		1.00	1.00		0.63	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	180	1122	596	434	691	650	214	1068	467	283	1139	505
V/C Ratio(X)	0.68	0.20	0.21	0.90	0.61	0.61	0.84	0.73	0.79	0.88	0.96	0.42
Avail Cap(c_a), veh/h	261	1122	596	434	691	650	214	1069	468	283	1140	506
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.2	27.5	23.1	47.4	26.9	26.9	51.1	34.4	35.3	50.0	36.7	29.3
Incr Delay (d2), s/veh	4.4	0.4	0.8	21.7	3.9	4.2	25.1	2.5	9.1	25.8	17.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	2.1	2.2	6.5	9.2	8.7	3.1	9.2	9.9	4.3	16.3	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.6	27.8	23.9	69.1	30.8	31.1	76.2	37.0	44.5	75.8	54.2	29.9
LnGrp LOS	E	C	C	E	C	C	E	D	D	E	D	C
Approach Vol, veh/h		467			1206			1328			1552	
Approach Delay, s/veh		34.0			43.3			44.4			54.4	
Approach LOS		C			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	40.0	11.0	41.0	9.9	48.1	13.2	38.8
Change Period (Y+Rc), s	* 4.2	5.3	* 4.2	5.7	* 4.2	5.3	* 4.2	5.7
Max Green Setting (Gmax), s	* 14	34.7	* 6.8	35.3	* 8.3	40.2	* 9	33.1
Max Q Clear Time (g_c+I1), s	14.3	7.8	7.7	35.2	5.8	22.8	9.8	26.1
Green Ext Time (p_c), s	0.0	1.7	0.0	0.1	0.1	4.7	0.0	3.5

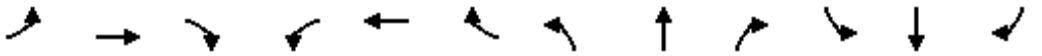
Intersection Summary	
HCM 6th Ctrl Delay	46.4
HCM 6th LOS	D

Notes

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

HCM 6th Signalized Intersection Summary
1: Magnolia Ave & Mast Blvd

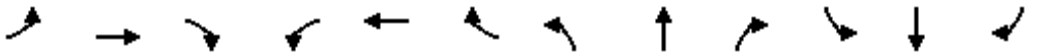
03/25/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	400	239	248	102	133	27	286	509	100	81	398	215
Future Volume (veh/h)	400	239	248	102	133	27	286	509	100	81	398	215
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		0.95	1.00		0.98	1.00		0.96
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	435	260	270	111	145	29	311	553	109	88	433	234
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	558	972	421	151	675	287	406	886	174	141	929	396
Arrive On Green	0.16	0.27	0.27	0.08	0.19	0.19	0.12	0.30	0.30	0.08	0.26	0.26
Sat Flow, veh/h	3456	3554	1541	1781	3554	1510	3456	2952	580	1781	3554	1516
Grp Volume(v), veh/h	435	260	270	111	145	29	311	332	330	88	433	234
Grp Sat Flow(s),veh/h/ln	1728	1777	1541	1781	1777	1510	1728	1777	1755	1781	1777	1516
Q Serve(g_s), s	9.0	4.3	11.5	4.5	2.6	1.2	6.5	11.9	12.0	3.6	7.6	10.0
Cycle Q Clear(g_c), s	9.0	4.3	11.5	4.5	2.6	1.2	6.5	11.9	12.0	3.6	7.6	10.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.33	1.00		1.00
Lane Grp Cap(c), veh/h	558	972	421	151	675	287	406	533	527	141	929	396
V/C Ratio(X)	0.78	0.27	0.64	0.74	0.21	0.10	0.77	0.62	0.63	0.63	0.47	0.59
Avail Cap(c_a), veh/h	791	1795	778	312	1580	671	605	886	875	312	1771	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	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.9	21.1	23.8	33.2	25.4	24.8	31.8	22.4	22.4	33.1	23.1	23.9
Incr Delay (d2), s/veh	3.7	0.2	2.0	2.6	0.2	0.2	1.5	1.2	1.2	1.7	0.4	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	1.7	4.0	2.0	1.0	0.4	2.6	4.7	4.7	1.5	3.0	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.5	21.3	25.7	35.8	25.6	25.0	33.3	23.6	23.6	34.8	23.4	25.3
LnGrp LOS	C	C	C	D	C	C	C	C	C	C	C	C
Approach Vol, veh/h		965			285			973			755	
Approach Delay, s/veh		28.0			29.5			26.7			25.3	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.8	25.8	13.2	24.4	17.0	19.6	10.4	27.3
Change Period (Y+Rc), s	4.5	5.5	4.5	5.0	5.0	5.5	4.5	5.0
Max Green Setting (Gmax), s	13.0	37.5	13.0	37.0	17.0	33.0	13.0	37.0
Max Q Clear Time (g_c+I1), s	6.5	13.5	8.5	12.0	11.0	4.6	5.6	14.0
Green Ext Time (p_c), s	0.1	3.1	0.3	3.6	1.0	1.1	0.0	3.9

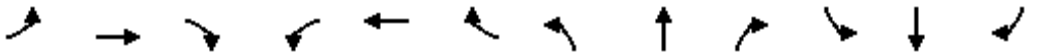
Intersection Summary	
HCM 6th Ctrl Delay	27.1
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	28	47	0	13	56	1150	44	13	739	7
Future Volume (veh/h)	1	0	28	47	0	13	56	1150	44	13	739	7
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		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	1	0	30	51	0	14	61	1250	48	14	803	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	84	0	73	89	0	77	86	1643	63	26	1577	16
Arrive On Green	0.05	0.00	0.05	0.05	0.00	0.05	0.05	0.47	0.47	0.01	0.44	0.44
Sat Flow, veh/h	1781	0	1544	1781	0	1543	1781	3486	134	1781	3604	36
Grp Volume(v), veh/h	1	0	30	51	0	14	61	637	661	14	396	415
Grp Sat Flow(s),veh/h/ln	1781	0	1544	1781	0	1543	1781	1777	1843	1781	1777	1863
Q Serve(g_s), s	0.0	0.0	0.8	1.2	0.0	0.4	1.5	12.7	12.8	0.3	7.0	7.0
Cycle Q Clear(g_c), s	0.0	0.0	0.8	1.2	0.0	0.4	1.5	12.7	12.8	0.3	7.0	7.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.07	1.00		0.02
Lane Grp Cap(c), veh/h	84	0	73	89	0	77	86	838	869	26	778	815
V/C Ratio(X)	0.01	0.00	0.41	0.57	0.00	0.18	0.71	0.76	0.76	0.55	0.51	0.51
Avail Cap(c_a), veh/h	829	0	719	829	0	718	293	1016	1054	293	1016	1066
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	19.6	0.0	20.0	20.1	0.0	19.7	20.3	9.4	9.4	21.1	8.8	8.8
Incr Delay (d2), s/veh	0.1	0.0	3.7	5.6	0.0	1.1	10.4	2.8	2.7	17.1	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	0.0	0.0	0.3	0.6	0.0	0.1	0.8	3.6	3.8	0.2	1.8	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.7	0.0	23.6	25.7	0.0	20.8	30.7	12.2	12.1	38.2	9.3	9.3
LnGrp LOS	B	A	C	C	A	C	C	B	B	D	A	A
Approach Vol, veh/h		31			65			1359			825	
Approach Delay, s/veh		23.5			24.6			13.0			9.8	
Approach LOS		C			C			B			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.1	24.9		6.5	6.6	23.4		6.7				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	7.1	24.7		20.1	7.1	24.7		20.1				
Max Q Clear Time (g_c+I1), s	2.3	14.8		2.8	3.5	9.0		3.2				
Green Ext Time (p_c), s	0.0	5.6		0.0	0.0	4.3		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		12.3	
HCM 6th LOS		B	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	290	644	269	453	544	171	209	832	432	154	514	162
Future Volume (veh/h)	290	644	269	453	544	171	209	832	432	154	514	162
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	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	305	678	283	477	573	180	220	876	455	162	541	171
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	369	1157	636	539	992	311	279	1045	454	217	981	437
Arrive On Green	0.11	0.33	0.33	0.16	0.37	0.37	0.08	0.29	0.29	0.06	0.28	0.28
Sat Flow, veh/h	3456	3554	1561	3456	2649	830	3456	3554	1542	3456	3554	1583
Grp Volume(v), veh/h	305	678	283	477	384	369	220	876	455	162	541	171
Grp Sat Flow(s),veh/h/ln	1728	1777	1561	1728	1777	1701	1728	1777	1542	1728	1777	1583
Q Serve(g_s), s	10.4	19.1	15.8	16.2	20.7	20.8	7.5	27.7	35.3	5.5	15.6	10.5
Cycle Q Clear(g_c), s	10.4	19.1	15.8	16.2	20.7	20.8	7.5	27.7	35.3	5.5	15.6	10.5
Prop In Lane	1.00		1.00	1.00		0.49	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	369	1157	636	539	666	638	279	1045	454	217	981	437
V/C Ratio(X)	0.83	0.59	0.44	0.89	0.58	0.58	0.79	0.84	1.00	0.75	0.55	0.39
Avail Cap(c_a), veh/h	490	1157	636	599	666	638	369	1045	454	233	981	437
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.5	33.7	25.8	49.6	29.9	30.0	54.1	39.7	42.3	55.3	37.1	35.3
Incr Delay (d2), s/veh	8.6	2.2	2.2	13.9	3.6	3.8	8.1	6.1	43.0	11.6	0.7	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	8.3	6.0	7.8	9.1	8.8	3.5	12.5	18.2	2.7	6.7	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.1	35.9	28.1	63.4	33.5	33.8	62.2	45.8	85.4	66.9	37.8	35.8
LnGrp LOS	E	D	C	E	C	C	E	D	F	E	D	D
Approach Vol, veh/h		1266			1230			1551			874	
Approach Delay, s/veh		40.2			45.2			59.7			42.8	
Approach LOS		D			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.9	44.4	13.9	38.8	17.0	50.3	11.7	41.0
Change Period (Y+Rc), s	* 4.2	5.3	* 4.2	5.7	* 4.2	5.3	* 4.2	5.7
Max Green Setting (Gmax), s	* 21	36.4	* 13	30.6	* 17	40.2	* 8.1	35.3
Max Q Clear Time (g_c+I1), s	18.2	21.1	9.5	17.6	12.4	22.8	7.5	37.3
Green Ext Time (p_c), s	0.5	4.7	0.2	3.2	0.4	4.1	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	48.1
HCM 6th LOS	D

Notes

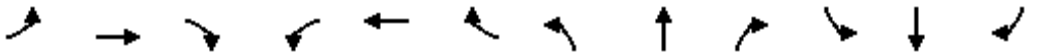
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

APPENDIX C

PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS – EXISTING + PROJECT

HCM 6th Signalized Intersection Summary
1: Magnolia Ave & Mast Blvd

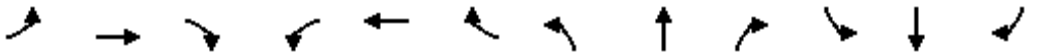
03/25/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	179	113	222	137	229	46	289	509	47	53	606	401
Future Volume (veh/h)	179	113	222	137	229	46	289	509	47	53	606	401
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		0.94	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	195	123	241	149	249	50	314	553	51	58	659	436
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	454	925	399	151	737	309	292	1174	108	111	1191	521
Arrive On Green	0.13	0.26	0.26	0.08	0.21	0.21	0.08	0.36	0.36	0.06	0.34	0.34
Sat Flow, veh/h	3456	3554	1534	1781	3554	1489	3456	3283	302	1781	3554	1553
Grp Volume(v), veh/h	195	123	241	149	249	50	314	299	305	58	659	436
Grp Sat Flow(s),veh/h/ln	1728	1777	1534	1781	1777	1489	1728	1777	1808	1781	1777	1553
Q Serve(g_s), s	4.3	2.2	11.4	6.9	4.9	2.3	7.0	10.8	10.8	2.6	12.5	21.5
Cycle Q Clear(g_c), s	4.3	2.2	11.4	6.9	4.9	2.3	7.0	10.8	10.8	2.6	12.5	21.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.17	1.00		1.00
Lane Grp Cap(c), veh/h	454	925	399	151	737	309	292	635	646	111	1191	521
V/C Ratio(X)	0.43	0.13	0.60	0.99	0.34	0.16	1.08	0.47	0.47	0.52	0.55	0.84
Avail Cap(c_a), veh/h	459	1523	658	151	1330	557	292	665	677	151	1330	581
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.1	23.5	26.9	37.9	28.0	26.9	37.9	20.5	20.6	37.6	22.5	25.4
Incr Delay (d2), s/veh	0.8	0.1	1.8	70.0	0.3	0.3	74.1	0.5	0.5	1.4	0.4	9.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.9	4.1	5.9	2.1	0.8	5.8	4.2	4.3	1.1	4.9	8.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.9	23.6	28.7	107.9	28.3	27.2	112.0	21.1	21.1	39.1	22.9	35.0
LnGrp LOS	C	C	C	F	C	C	F	C	C	D	C	D
Approach Vol, veh/h		559			448			918			1153	
Approach Delay, s/veh		29.4			54.7			52.2			28.3	
Approach LOS		C			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.5	27.1	11.5	32.8	15.9	22.7	9.7	34.6
Change Period (Y+Rc), s	4.5	5.5	4.5	5.0	5.0	5.5	4.5	5.0
Max Green Setting (Gmax), s	7.0	35.5	7.0	31.0	11.0	31.0	7.0	31.0
Max Q Clear Time (g_c+I1), s	8.9	13.4	9.0	23.5	6.3	6.9	4.6	12.8
Green Ext Time (p_c), s	0.0	1.9	0.0	3.5	0.3	2.0	0.0	3.2

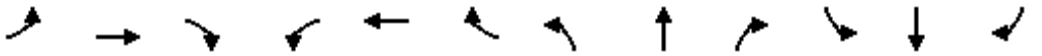
Intersection Summary	
HCM 6th Ctrl Delay	39.5
HCM 6th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	0	26	35	0	8	85	960	19	8	1203	22
Future Volume (veh/h)	11	0	26	35	0	8	85	960	19	8	1203	22
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		1.00	1.00		0.98	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	12	0	28	38	0	9	92	1043	21	9	1308	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	94	0	80	70	0	62	117	1836	37	17	1638	30
Arrive On Green	0.05	0.00	0.05	0.04	0.00	0.04	0.07	0.52	0.52	0.01	0.46	0.46
Sat Flow, veh/h	1781	0	1518	1781	0	1585	1781	3561	72	1781	3568	65
Grp Volume(v), veh/h	12	0	28	38	0	9	92	520	544	9	651	681
Grp Sat Flow(s),veh/h/ln	1781	0	1518	1781	0	1585	1781	1777	1855	1781	1777	1856
Q Serve(g_s), s	0.3	0.0	0.8	1.0	0.0	0.3	2.4	9.4	9.4	0.2	14.7	14.7
Cycle Q Clear(g_c), s	0.3	0.0	0.8	1.0	0.0	0.3	2.4	9.4	9.4	0.2	14.7	14.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.04	1.00		0.04
Lane Grp Cap(c), veh/h	94	0	80	70	0	62	117	916	957	17	816	852
V/C Ratio(X)	0.13	0.00	0.35	0.55	0.00	0.15	0.78	0.57	0.57	0.54	0.80	0.80
Avail Cap(c_a), veh/h	762	0	650	762	0	678	269	934	975	269	934	976
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	21.2	0.0	21.5	22.2	0.0	21.8	21.6	7.8	7.8	23.2	10.8	10.8
Incr Delay (d2), s/veh	0.6	0.0	2.6	6.5	0.0	1.1	10.8	0.8	0.8	23.9	4.4	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.3	0.5	0.0	0.1	1.2	2.4	2.5	0.2	4.8	5.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.8	0.0	24.1	28.7	0.0	22.9	32.4	8.6	8.5	47.1	15.2	15.1
LnGrp LOS	C	A	C	C	A	C	C	A	A	D	B	B
Approach Vol, veh/h		40			47			1156			1341	
Approach Delay, s/veh		23.4			27.6			10.5			15.3	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.9	28.7		7.0	7.6	26.1		6.3				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	7.1	24.7		20.1	7.1	24.7		20.1				
Max Q Clear Time (g_c+I1), s	2.2	11.4		2.8	4.4	16.7		3.0				
Green Ext Time (p_c), s	0.0	5.4		0.1	0.0	4.9		0.1				

Intersection Summary			
HCM 6th Ctrl Delay		13.5	
HCM 6th LOS		B	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	210	118	371	539	242	171	753	352	240	1044	209
Future Volume (veh/h)	135	210	118	371	539	242	171	753	352	240	1044	209
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		0.99	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	142	221	124	391	567	255	180	793	371	253	1099	220
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	202	1121	595	434	909	408	214	1069	468	283	1140	506
Arrive On Green	0.06	0.32	0.32	0.13	0.38	0.38	0.06	0.30	0.30	0.08	0.32	0.32
Sat Flow, veh/h	3456	3554	1576	3456	2377	1067	3456	3554	1555	3456	3554	1576
Grp Volume(v), veh/h	142	221	124	391	424	398	180	793	371	253	1099	220
Grp Sat Flow(s),veh/h/ln	1728	1777	1576	1728	1777	1667	1728	1777	1555	1728	1777	1576
Q Serve(g_s), s	4.4	5.0	5.8	12.3	21.3	21.3	5.7	22.1	24.1	8.0	33.4	12.1
Cycle Q Clear(g_c), s	4.4	5.0	5.8	12.3	21.3	21.3	5.7	22.1	24.1	8.0	33.4	12.1
Prop In Lane	1.00		1.00	1.00		0.64	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	202	1121	595	434	680	638	214	1069	468	283	1140	506
V/C Ratio(X)	0.70	0.20	0.21	0.90	0.62	0.62	0.84	0.74	0.79	0.89	0.96	0.43
Avail Cap(c_a), veh/h	261	1121	595	434	680	638	214	1069	468	283	1140	506
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.9	27.5	23.1	47.4	27.5	27.6	51.1	34.6	35.3	50.0	36.7	29.5
Incr Delay (d2), s/veh	5.8	0.4	0.8	21.7	4.3	4.6	25.1	2.8	9.1	28.3	18.5	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	2.1	2.2	6.5	9.4	8.9	3.1	9.5	9.8	4.4	16.6	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.7	27.9	23.9	69.1	31.8	32.1	76.2	37.4	44.4	78.3	55.2	30.1
LnGrp LOS	E	C	C	E	C	C	E	D	D	E	E	C
Approach Vol, veh/h		487			1213			1344			1572	
Approach Delay, s/veh		35.3			43.9			44.5			55.4	
Approach LOS		D			D			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	40.0	11.0	41.0	10.6	47.4	13.2	38.8
Change Period (Y+Rc), s	* 4.2	5.3	* 4.2	5.7	* 4.2	5.3	* 4.2	5.7
Max Green Setting (Gmax), s	* 14	34.7	* 6.8	35.3	* 8.3	40.2	* 9	33.1
Max Q Clear Time (g_c+I1), s	14.3	7.8	7.7	35.4	6.4	23.3	10.0	26.1
Green Ext Time (p_c), s	0.0	1.7	0.0	0.0	0.1	4.7	0.0	3.5

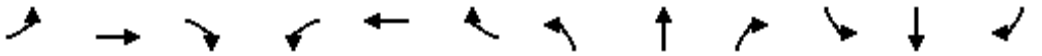
Intersection Summary	
HCM 6th Ctrl Delay	47.1
HCM 6th LOS	D

Notes

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

HCM 6th Signalized Intersection Summary
1: Magnolia Ave & Mast Blvd

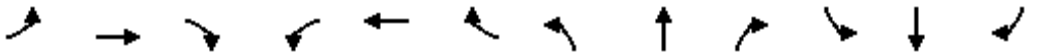
03/25/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	400	239	255	105	133	27	296	511	105	81	399	215
Future Volume (veh/h)	400	239	255	105	133	27	296	511	105	81	399	215
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		0.95	1.00		0.98	1.00		0.96
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	435	260	277	114	145	29	322	555	114	88	434	234
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	556	978	424	151	683	290	416	886	181	139	925	395
Arrive On Green	0.16	0.28	0.28	0.08	0.19	0.19	0.12	0.30	0.30	0.08	0.26	0.26
Sat Flow, veh/h	3456	3554	1541	1781	3554	1511	3456	2929	599	1781	3554	1515
Grp Volume(v), veh/h	435	260	277	114	145	29	322	336	333	88	434	234
Grp Sat Flow(s),veh/h/ln	1728	1777	1541	1781	1777	1511	1728	1777	1751	1781	1777	1515
Q Serve(g_s), s	9.1	4.3	11.9	4.7	2.6	1.2	6.8	12.2	12.3	3.6	7.7	10.2
Cycle Q Clear(g_c), s	9.1	4.3	11.9	4.7	2.6	1.2	6.8	12.2	12.3	3.6	7.7	10.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.34	1.00		1.00
Lane Grp Cap(c), veh/h	556	978	424	151	683	290	416	537	530	139	925	395
V/C Ratio(X)	0.78	0.27	0.65	0.76	0.21	0.10	0.77	0.63	0.63	0.63	0.47	0.59
Avail Cap(c_a), veh/h	782	1773	769	308	1560	663	598	875	862	308	1750	746
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.3	21.3	24.1	33.6	25.6	25.0	32.1	22.6	22.6	33.6	23.4	24.3
Incr Delay (d2), s/veh	3.8	0.2	2.1	2.9	0.2	0.2	2.2	1.2	1.2	1.8	0.4	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	1.7	4.2	2.1	1.1	0.4	2.8	4.8	4.8	1.5	3.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.1	21.5	26.1	36.6	25.7	25.2	34.3	23.8	23.8	35.3	23.8	25.7
LnGrp LOS	C	C	C	D	C	C	C	C	C	D	C	C
Approach Vol, veh/h		972			288			991			756	
Approach Delay, s/veh		28.4			30.0			27.2			25.7	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.9	26.2	13.5	24.6	17.1	19.9	10.4	27.7
Change Period (Y+Rc), s	4.5	5.5	4.5	5.0	5.0	5.5	4.5	5.0
Max Green Setting (Gmax), s	13.0	37.5	13.0	37.0	17.0	33.0	13.0	37.0
Max Q Clear Time (g_c+I1), s	6.7	13.9	8.8	12.2	11.1	4.6	5.6	14.3
Green Ext Time (p_c), s	0.1	3.1	0.3	3.6	1.0	1.1	0.0	3.9

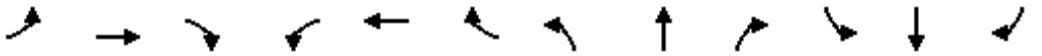
Intersection Summary	
HCM 6th Ctrl Delay	27.5
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	0	62	47	0	13	79	1150	44	13	739	18
Future Volume (veh/h)	18	0	62	47	0	13	79	1150	44	13	739	18
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		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	20	0	67	51	0	14	86	1250	48	14	803	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	138	0	119	88	0	76	109	1608	62	25	1467	37
Arrive On Green	0.08	0.00	0.08	0.05	0.00	0.05	0.06	0.46	0.46	0.01	0.41	0.41
Sat Flow, veh/h	1781	0	1542	1781	0	1542	1781	3486	134	1781	3541	88
Grp Volume(v), veh/h	20	0	67	51	0	14	86	637	661	14	403	420
Grp Sat Flow(s),veh/h/ln	1781	0	1542	1781	0	1542	1781	1777	1843	1781	1777	1852
Q Serve(g_s), s	0.5	0.0	1.9	1.3	0.0	0.4	2.2	13.6	13.6	0.4	7.8	7.8
Cycle Q Clear(g_c), s	0.5	0.0	1.9	1.3	0.0	0.4	2.2	13.6	13.6	0.4	7.8	7.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.07	1.00		0.05
Lane Grp Cap(c), veh/h	138	0	119	88	0	76	109	819	850	25	736	767
V/C Ratio(X)	0.15	0.00	0.56	0.58	0.00	0.18	0.79	0.78	0.78	0.55	0.55	0.55
Avail Cap(c_a), veh/h	791	0	685	791	0	685	280	970	1006	280	970	1011
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	19.5	0.0	20.1	21.0	0.0	20.6	20.9	10.2	10.2	22.2	10.0	10.0
Incr Delay (d2), s/veh	0.5	0.0	4.1	5.9	0.0	1.1	11.8	3.4	3.3	17.3	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.7	0.6	0.0	0.2	1.1	4.2	4.3	0.2	2.2	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.0	0.0	24.2	27.0	0.0	21.8	32.7	13.6	13.6	39.5	10.7	10.7
LnGrp LOS	B	A	C	C	A	C	C	B	B	D	B	B
Approach Vol, veh/h		87			65			1384			837	
Approach Delay, s/veh		23.2			25.9			14.8			11.1	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.1	25.4		8.0	7.3	23.2		6.7				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	7.1	24.7		20.1	7.1	24.7		20.1				
Max Q Clear Time (g_c+I1), s	2.4	15.6		3.9	4.2	9.8		3.3				
Green Ext Time (p_c), s	0.0	5.2		0.2	0.0	4.3		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		14.1	
HCM 6th LOS		B	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	301	644	269	453	544	174	209	841	432	159	527	178
Future Volume (veh/h)	301	644	269	453	544	174	209	841	432	159	527	178
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	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	317	678	283	477	573	183	220	885	455	167	555	187
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	380	1152	634	539	975	311	279	1045	454	222	986	439
Arrive On Green	0.11	0.32	0.32	0.16	0.37	0.37	0.08	0.29	0.29	0.06	0.28	0.28
Sat Flow, veh/h	3456	3554	1561	3456	2637	839	3456	3554	1542	3456	3554	1583
Grp Volume(v), veh/h	317	678	283	477	386	370	220	885	455	167	555	187
Grp Sat Flow(s),veh/h/ln	1728	1777	1561	1728	1777	1699	1728	1777	1542	1728	1777	1583
Q Serve(g_s), s	10.8	19.1	15.8	16.2	21.0	21.1	7.5	28.1	35.3	5.7	16.0	11.6
Cycle Q Clear(g_c), s	10.8	19.1	15.8	16.2	21.0	21.1	7.5	28.1	35.3	5.7	16.0	11.6
Prop In Lane	1.00		1.00	1.00		0.49	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	380	1152	634	539	657	629	279	1045	454	222	986	439
V/C Ratio(X)	0.83	0.59	0.45	0.89	0.59	0.59	0.79	0.85	1.00	0.75	0.56	0.43
Avail Cap(c_a), veh/h	490	1152	634	599	657	629	369	1045	454	233	986	439
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.3	33.9	25.9	49.6	30.4	30.5	54.1	39.8	42.3	55.2	37.1	35.5
Incr Delay (d2), s/veh	9.4	2.2	2.3	13.9	3.8	4.0	8.1	6.6	43.0	12.4	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	8.3	6.0	7.8	9.3	9.0	3.5	12.7	18.2	2.8	6.9	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.7	36.1	28.2	63.4	34.2	34.5	62.2	46.4	85.4	67.6	37.9	36.2
LnGrp LOS	E	D	C	E	C	C	E	D	F	E	D	D
Approach Vol, veh/h		1278			1233			1560			909	
Approach Delay, s/veh		40.7			45.6			60.0			43.0	
Approach LOS		D			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.9	44.2	13.9	39.0	17.4	49.7	11.9	41.0
Change Period (Y+Rc), s	* 4.2	5.3	* 4.2	5.7	* 4.2	5.3	* 4.2	5.7
Max Green Setting (Gmax), s	* 21	36.4	* 13	30.6	* 17	40.2	* 8.1	35.3
Max Q Clear Time (g_c+I1), s	18.2	21.1	9.5	18.0	12.8	23.1	7.7	37.3
Green Ext Time (p_c), s	0.5	4.6	0.2	3.2	0.4	4.1	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	48.4
HCM 6th LOS	D

Notes

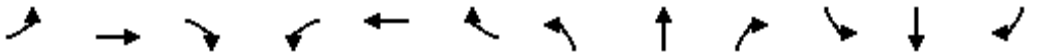
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

APPENDIX D

PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS – EXISTING + CUMULATIVE PROJECTS

HCM 6th Signalized Intersection Summary
1: Magnolia Ave & Mast Blvd

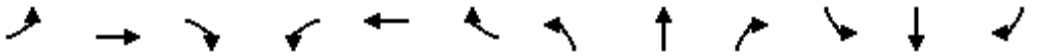
03/25/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	131	217	155	278	52	295	557	54	56	669	417
Future Volume (veh/h)	190	131	217	155	278	52	295	557	54	56	669	417
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		0.94	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	207	142	236	168	302	57	321	605	59	61	727	453
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	443	950	411	147	766	321	284	1169	114	112	1204	526
Arrive On Green	0.13	0.27	0.27	0.08	0.22	0.22	0.08	0.36	0.36	0.06	0.34	0.34
Sat Flow, veh/h	3456	3554	1535	1781	3554	1491	3456	3264	318	1781	3554	1553
Grp Volume(v), veh/h	207	142	236	168	302	57	321	329	335	61	727	453
Grp Sat Flow(s),veh/h/ln	1728	1777	1535	1781	1777	1491	1728	1777	1804	1781	1777	1553
Q Serve(g_s), s	4.7	2.6	11.3	7.0	6.2	2.7	7.0	12.4	12.5	2.8	14.5	23.2
Cycle Q Clear(g_c), s	4.7	2.6	11.3	7.0	6.2	2.7	7.0	12.4	12.5	2.8	14.5	23.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.18	1.00		1.00
Lane Grp Cap(c), veh/h	443	950	411	147	766	321	284	637	647	112	1204	526
V/C Ratio(X)	0.47	0.15	0.57	1.15	0.39	0.18	1.13	0.52	0.52	0.55	0.60	0.86
Avail Cap(c_a), veh/h	447	1483	641	147	1295	543	284	647	657	147	1295	566
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.4	23.8	27.0	39.0	28.6	27.2	39.0	21.5	21.5	38.7	23.4	26.3
Incr Delay (d2), s/veh	0.9	0.1	1.5	119.1	0.4	0.3	92.7	0.7	0.7	1.5	0.7	12.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	1.0	4.1	7.8	2.6	0.9	6.5	4.9	5.0	1.2	5.7	9.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.3	23.9	28.5	158.1	29.0	27.5	131.8	22.2	22.2	40.2	24.1	38.4
LnGrp LOS	D	C	C	F	C	C	F	C	C	D	C	D
Approach Vol, veh/h		585			527			985			1241	
Approach Delay, s/veh		29.8			70.0			57.9			30.1	
Approach LOS		C			E			E			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.5	28.3	11.5	33.8	15.9	23.8	9.8	35.5
Change Period (Y+Rc), s	4.5	5.5	4.5	5.0	5.0	5.5	4.5	5.0
Max Green Setting (Gmax), s	7.0	35.5	7.0	31.0	11.0	31.0	7.0	31.0
Max Q Clear Time (g_c+I1), s	9.0	13.3	9.0	25.2	6.7	8.2	4.8	14.5
Green Ext Time (p_c), s	0.0	2.0	0.0	3.1	0.3	2.5	0.0	3.5

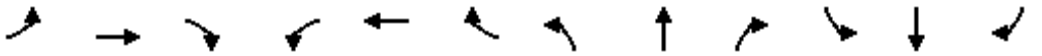
Intersection Summary	
HCM 6th Ctrl Delay	44.6
HCM 6th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	7	38	0	8	47	1028	20	8	1331	3
Future Volume (veh/h)	1	0	7	38	0	8	47	1028	20	8	1331	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		1.00	1.00		0.98	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	1	0	8	41	0	9	51	1117	22	9	1447	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	51	0	44	73	0	65	75	1862	37	17	1784	4
Arrive On Green	0.03	0.00	0.03	0.04	0.00	0.04	0.04	0.52	0.52	0.01	0.49	0.49
Sat Flow, veh/h	1781	0	1520	1781	0	1585	1781	3562	70	1781	3638	8
Grp Volume(v), veh/h	1	0	8	41	0	9	51	557	582	9	707	743
Grp Sat Flow(s),veh/h/ln	1781	0	1520	1781	0	1585	1781	1777	1856	1781	1777	1869
Q Serve(g_s), s	0.0	0.0	0.2	1.0	0.0	0.2	1.3	9.9	9.9	0.2	15.2	15.2
Cycle Q Clear(g_c), s	0.0	0.0	0.2	1.0	0.0	0.2	1.3	9.9	9.9	0.2	15.2	15.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.04	1.00		0.00
Lane Grp Cap(c), veh/h	51	0	44	73	0	65	75	929	970	17	871	917
V/C Ratio(X)	0.02	0.00	0.18	0.56	0.00	0.14	0.68	0.60	0.60	0.53	0.81	0.81
Avail Cap(c_a), veh/h	791	0	675	791	0	704	279	969	1013	279	969	1020
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	21.4	0.0	21.5	21.3	0.0	20.9	21.4	7.5	7.5	22.3	9.8	9.8
Incr Delay (d2), s/veh	0.1	0.0	2.0	6.5	0.0	0.9	10.5	1.0	0.9	23.8	4.8	4.6
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	0.0	0.0	0.1	0.5	0.0	0.1	0.7	2.4	2.5	0.2	4.8	5.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.5	0.0	23.4	27.8	0.0	21.9	31.9	8.5	8.4	46.1	14.6	14.4
LnGrp LOS	C	A	C	C	A	C	C	A	A	D	B	B
Approach Vol, veh/h		9			50			1190			1459	
Approach Delay, s/veh		23.2			26.7			9.5			14.7	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.9	28.2		5.8	6.4	26.7		6.4				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	7.1	24.7		20.1	7.1	24.7		20.1				
Max Q Clear Time (g_c+I1), s	2.2	11.9		2.2	3.3	17.2		3.0				
Green Ext Time (p_c), s	0.0	5.7		0.0	0.0	5.0		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			12.6									
HCM 6th LOS			B									



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	220	167	383	553	247	196	783	364	258	1134	252
Future Volume (veh/h)	140	220	167	383	553	247	196	783	364	258	1134	252
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		0.99	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	147	232	176	403	582	260	206	824	383	272	1194	265
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	208	1089	588	418	875	390	229	1095	479	305	1173	520
Arrive On Green	0.06	0.31	0.31	0.12	0.37	0.37	0.07	0.31	0.31	0.09	0.33	0.33
Sat Flow, veh/h	3456	3554	1576	3456	2382	1063	3456	3554	1556	3456	3554	1576
Grp Volume(v), veh/h	147	232	176	403	434	408	206	824	383	272	1194	265
Grp Sat Flow(s),veh/h/ln	1728	1777	1576	1728	1777	1668	1728	1777	1556	1728	1777	1576
Q Serve(g_s), s	4.6	5.3	8.7	12.8	22.5	22.6	6.5	23.0	24.9	8.6	36.3	14.9
Cycle Q Clear(g_c), s	4.6	5.3	8.7	12.8	22.5	22.6	6.5	23.0	24.9	8.6	36.3	14.9
Prop In Lane	1.00		1.00	1.00		0.64	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	208	1089	588	418	652	612	229	1095	479	305	1173	520
V/C Ratio(X)	0.71	0.21	0.30	0.96	0.67	0.67	0.90	0.75	0.80	0.89	1.02	0.51
Avail Cap(c_a), veh/h	286	1089	588	418	652	612	229	1095	479	305	1173	520
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.7	28.3	24.4	48.1	29.1	29.2	51.0	34.3	34.9	49.6	36.8	29.7
Incr Delay (d2), s/veh	4.8	0.4	1.3	34.8	5.3	5.7	33.6	3.0	9.3	26.4	30.9	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	2.3	3.3	7.4	10.2	9.6	3.8	9.9	10.2	4.7	19.8	5.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.6	28.8	25.7	82.9	34.4	34.8	84.6	37.2	44.2	76.0	67.8	30.5
LnGrp LOS	E	C	C	F	C	C	F	D	D	E	F	C
Approach Vol, veh/h		555			1245			1413			1731	
Approach Delay, s/veh		34.9			50.3			46.0			63.4	
Approach LOS		C			D			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.5	39.0	11.5	42.0	10.8	45.7	13.9	39.6
Change Period (Y+Rc), s	* 4.2	5.3	* 4.2	5.7	* 4.2	5.3	* 4.2	5.7
Max Green Setting (Gmax), s	* 13	33.7	* 7.3	36.3	* 9.1	37.9	* 9.7	33.9
Max Q Clear Time (g_c+I1), s	14.8	10.7	8.5	38.3	6.6	24.6	10.6	26.9
Green Ext Time (p_c), s	0.0	1.9	0.0	0.0	0.1	4.3	0.0	3.7

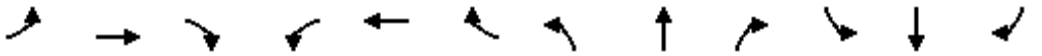
Intersection Summary	
HCM 6th Ctrl Delay	51.9
HCM 6th LOS	D

Notes

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

HCM 6th Signalized Intersection Summary
1: Magnolia Ave & Mast Blvd

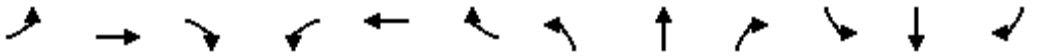
03/25/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	419	292	258	116	158	31	296	576	126	88	442	227
Future Volume (veh/h)	419	292	258	116	158	31	296	576	126	88	442	227
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		0.95	1.00		0.98	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	455	317	280	126	172	34	322	626	137	96	480	247
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	569	981	425	160	691	294	412	884	193	140	943	402
Arrive On Green	0.16	0.28	0.28	0.09	0.19	0.19	0.12	0.31	0.31	0.08	0.27	0.27
Sat Flow, veh/h	3456	3554	1541	1781	3554	1511	3456	2890	631	1781	3554	1516
Grp Volume(v), veh/h	455	317	280	126	172	34	322	384	379	96	480	247
Grp Sat Flow(s),veh/h/ln	1728	1777	1541	1781	1777	1511	1728	1777	1745	1781	1777	1516
Q Serve(g_s), s	9.9	5.5	12.5	5.4	3.2	1.4	7.1	14.9	15.0	4.1	9.0	11.2
Cycle Q Clear(g_c), s	9.9	5.5	12.5	5.4	3.2	1.4	7.1	14.9	15.0	4.1	9.0	11.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.36	1.00		1.00
Lane Grp Cap(c), veh/h	569	981	425	160	691	294	412	544	534	140	943	402
V/C Ratio(X)	0.80	0.32	0.66	0.79	0.25	0.12	0.78	0.71	0.71	0.69	0.51	0.61
Avail Cap(c_a), veh/h	753	1708	741	297	1503	639	576	843	827	297	1685	719
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.4	22.5	25.0	34.8	26.6	25.9	33.4	24.0	24.0	35.0	24.3	25.2
Incr Delay (d2), s/veh	5.0	0.2	2.1	3.3	0.2	0.2	2.9	1.7	1.8	2.2	0.4	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	2.2	4.5	2.4	1.3	0.5	3.0	6.0	5.9	1.8	3.5	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.3	22.7	27.1	38.1	26.8	26.1	36.3	25.7	25.7	37.2	24.8	26.7
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		1052			332			1085			823	
Approach Delay, s/veh		29.8			31.0			28.8			26.8	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.5	27.0	13.8	25.7	17.8	20.7	10.6	28.9
Change Period (Y+Rc), s	4.5	5.5	4.5	5.0	5.0	5.5	4.5	5.0
Max Green Setting (Gmax), s	13.0	37.5	13.0	37.0	17.0	33.0	13.0	37.0
Max Q Clear Time (g_c+I1), s	7.4	14.5	9.1	13.2	11.9	5.2	6.1	17.0
Green Ext Time (p_c), s	0.1	3.6	0.2	4.0	1.0	1.4	0.1	4.5

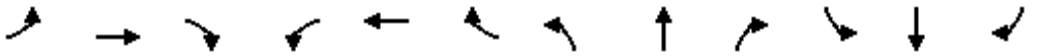
Intersection Summary	
HCM 6th Ctrl Delay	28.8
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	29	50	0	13	58	1275	46	13	809	7
Future Volume (veh/h)	1	0	29	50	0	13	58	1275	46	13	809	7
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		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	1	0	32	54	0	14	63	1386	50	14	879	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	86	0	75	90	0	78	86	1710	62	25	1643	15
Arrive On Green	0.05	0.00	0.05	0.05	0.00	0.05	0.05	0.49	0.49	0.01	0.46	0.46
Sat Flow, veh/h	1781	0	1542	1781	0	1542	1781	3495	126	1781	3608	33
Grp Volume(v), veh/h	1	0	32	54	0	14	63	704	732	14	433	454
Grp Sat Flow(s),veh/h/ln	1781	0	1542	1781	0	1542	1781	1777	1844	1781	1777	1864
Q Serve(g_s), s	0.0	0.0	0.9	1.3	0.0	0.4	1.6	15.2	15.2	0.4	8.0	8.0
Cycle Q Clear(g_c), s	0.0	0.0	0.9	1.3	0.0	0.4	1.6	15.2	15.2	0.4	8.0	8.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.07	1.00		0.02
Lane Grp Cap(c), veh/h	86	0	75	90	0	78	86	870	903	25	809	849
V/C Ratio(X)	0.01	0.00	0.43	0.60	0.00	0.18	0.73	0.81	0.81	0.55	0.54	0.54
Avail Cap(c_a), veh/h	790	0	684	790	0	684	279	968	1005	279	968	1016
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	20.5	0.0	21.0	21.1	0.0	20.6	21.3	9.8	9.8	22.2	8.9	8.9
Incr Delay (d2), s/veh	0.1	0.0	3.9	6.2	0.0	1.1	11.3	4.7	4.7	17.3	0.6	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.4	0.7	0.0	0.2	0.8	4.7	4.9	0.2	2.1	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.6	0.0	24.8	27.2	0.0	21.7	32.5	14.5	14.5	39.5	9.4	9.4
LnGrp LOS	C	A	C	C	A	C	C	B	B	D	A	A
Approach Vol, veh/h		33			68			1499			901	
Approach Delay, s/veh		24.7			26.1			15.3			9.9	
Approach LOS		C			C			B			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.1	26.7		6.7	6.7	25.1		6.8				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	7.1	24.7		20.1	7.1	24.7		20.1				
Max Q Clear Time (g_c+I1), s	2.4	17.2		2.9	3.6	10.0		3.3				
Green Ext Time (p_c), s	0.0	4.9		0.0	0.0	4.6		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		13.7	
HCM 6th LOS		B	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	344	660	305	467	561	188	262	928	446	164	562	192
Future Volume (veh/h)	344	660	305	467	561	188	262	928	446	164	562	192
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	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	362	695	321	492	591	198	276	977	469	173	592	202
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	420	1064	623	552	877	293	339	1113	484	228	1000	445
Arrive On Green	0.12	0.30	0.30	0.16	0.34	0.34	0.10	0.31	0.31	0.07	0.28	0.28
Sat Flow, veh/h	3456	3554	1561	3456	2600	869	3456	3554	1543	3456	3554	1583
Grp Volume(v), veh/h	362	695	321	492	403	386	276	977	469	173	592	202
Grp Sat Flow(s),veh/h/ln	1728	1777	1561	1728	1777	1692	1728	1777	1543	1728	1777	1583
Q Serve(g_s), s	12.3	20.4	18.7	16.7	23.4	23.5	9.4	31.2	36.0	5.9	17.2	12.6
Cycle Q Clear(g_c), s	12.3	20.4	18.7	16.7	23.4	23.5	9.4	31.2	36.0	5.9	17.2	12.6
Prop In Lane	1.00		1.00	1.00		0.51	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	420	1064	623	552	600	571	339	1113	484	228	1000	445
V/C Ratio(X)	0.86	0.65	0.52	0.89	0.67	0.68	0.81	0.88	0.97	0.76	0.59	0.45
Avail Cap(c_a), veh/h	467	1064	623	599	600	571	455	1113	484	248	1000	445
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.7	36.6	27.4	49.4	34.1	34.1	53.1	39.0	40.6	55.1	37.2	35.5
Incr Delay (d2), s/veh	14.1	3.1	3.0	14.8	5.9	6.3	8.2	8.1	33.1	11.8	0.9	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	9.0	7.2	8.2	10.7	10.3	4.4	14.3	17.5	2.9	7.4	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.8	39.7	30.5	64.2	40.0	40.4	61.2	47.2	73.8	66.9	38.1	36.2
LnGrp LOS	E	D	C	E	D	D	E	D	E	E	D	D
Approach Vol, veh/h		1378			1281			1722			967	
Approach Delay, s/veh		44.4			49.4			56.7			42.9	
Approach LOS		D			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.4	41.2	16.0	39.5	18.8	45.8	12.1	43.3
Change Period (Y+Rc), s	* 4.2	5.3	* 4.2	5.7	* 4.2	5.3	* 4.2	5.7
Max Green Setting (Gmax), s	* 21	33.6	* 16	30.4	* 16	38.2	* 8.6	37.6
Max Q Clear Time (g_c+I1), s	18.7	22.4	11.4	19.2	14.3	25.5	7.9	38.0
Green Ext Time (p_c), s	0.4	4.2	0.4	3.3	0.3	3.7	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	49.3
HCM 6th LOS	D

Notes

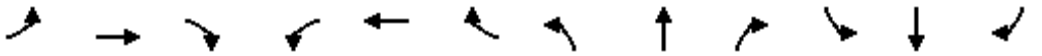
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

APPENDIX E

PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS – EXISTING + PROJECT + CUMULATIVE PROJECTS

HCM 6th Signalized Intersection Summary
1: Magnolia Ave & Mast Blvd

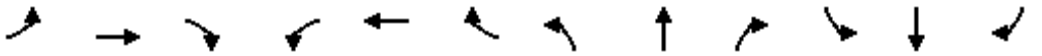
03/25/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	131	229	161	278	52	301	558	57	56	671	417
Future Volume (veh/h)	190	131	229	161	278	52	301	558	57	56	671	417
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		0.94	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	207	142	249	175	302	57	327	607	62	61	729	453
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	443	950	411	147	766	321	284	1164	119	112	1204	526
Arrive On Green	0.13	0.27	0.27	0.08	0.22	0.22	0.08	0.36	0.36	0.06	0.34	0.34
Sat Flow, veh/h	3456	3554	1535	1781	3554	1491	3456	3247	331	1781	3554	1553
Grp Volume(v), veh/h	207	142	249	175	302	57	327	332	337	61	729	453
Grp Sat Flow(s),veh/h/ln	1728	1777	1535	1781	1777	1491	1728	1777	1802	1781	1777	1553
Q Serve(g_s), s	4.7	2.6	12.1	7.0	6.2	2.7	7.0	12.5	12.6	2.8	14.5	23.2
Cycle Q Clear(g_c), s	4.7	2.6	12.1	7.0	6.2	2.7	7.0	12.5	12.6	2.8	14.5	23.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.18	1.00		1.00
Lane Grp Cap(c), veh/h	443	950	411	147	766	321	284	637	646	112	1204	526
V/C Ratio(X)	0.47	0.15	0.61	1.19	0.39	0.18	1.15	0.52	0.52	0.55	0.61	0.86
Avail Cap(c_a), veh/h	447	1483	641	147	1295	543	284	647	656	147	1295	566
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.4	23.8	27.3	39.0	28.6	27.2	39.0	21.5	21.6	38.7	23.4	26.3
Incr Delay (d2), s/veh	0.9	0.1	1.7	135.9	0.4	0.3	100.3	0.7	0.7	1.5	0.7	12.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	1.0	4.4	8.5	2.6	0.9	6.8	4.9	5.0	1.2	5.8	9.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.3	23.9	29.0	175.0	29.0	27.5	139.3	22.3	22.3	40.2	24.1	38.4
LnGrp LOS	D	C	C	F	C	C	F	C	C	D	C	D
Approach Vol, veh/h		598			534			996			1243	
Approach Delay, s/veh		30.0			76.7			60.7			30.1	
Approach LOS		C			E			E			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.5	28.3	11.5	33.8	15.9	23.8	9.8	35.5
Change Period (Y+Rc), s	4.5	5.5	4.5	5.0	5.0	5.5	4.5	5.0
Max Green Setting (Gmax), s	7.0	35.5	7.0	31.0	11.0	31.0	7.0	31.0
Max Q Clear Time (g_c+I1), s	9.0	14.1	9.0	25.2	6.7	8.2	4.8	14.6
Green Ext Time (p_c), s	0.0	2.0	0.0	3.1	0.3	2.5	0.0	3.5

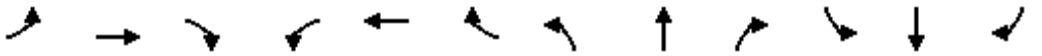
Intersection Summary	
HCM 6th Ctrl Delay	46.5
HCM 6th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	0	26	38	0	8	87	1028	20	8	1331	22
Future Volume (veh/h)	11	0	26	38	0	8	87	1028	20	8	1331	22
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		1.00	1.00		0.98	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	12	0	28	41	0	9	95	1117	22	9	1447	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	93	0	79	72	0	64	122	1895	37	17	1692	28
Arrive On Green	0.05	0.00	0.05	0.04	0.00	0.04	0.07	0.53	0.53	0.01	0.47	0.47
Sat Flow, veh/h	1781	0	1516	1781	0	1585	1781	3562	70	1781	3575	59
Grp Volume(v), veh/h	12	0	28	41	0	9	95	557	582	9	718	753
Grp Sat Flow(s),veh/h/ln	1781	0	1516	1781	0	1585	1781	1777	1856	1781	1777	1858
Q Serve(g_s), s	0.3	0.0	0.9	1.1	0.0	0.3	2.6	10.5	10.5	0.2	17.6	17.6
Cycle Q Clear(g_c), s	0.3	0.0	0.9	1.1	0.0	0.3	2.6	10.5	10.5	0.2	17.6	17.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.04	1.00		0.03
Lane Grp Cap(c), veh/h	93	0	79	72	0	64	122	945	987	17	841	879
V/C Ratio(X)	0.13	0.00	0.35	0.57	0.00	0.14	0.78	0.59	0.59	0.54	0.85	0.86
Avail Cap(c_a), veh/h	728	0	620	728	0	648	257	945	987	257	892	933
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	22.2	0.0	22.5	23.2	0.0	22.8	22.5	7.8	7.8	24.3	11.5	11.5
Incr Delay (d2), s/veh	0.6	0.0	2.7	7.0	0.0	1.0	10.3	1.0	0.9	24.1	7.8	7.6
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	0.1	0.0	0.3	0.6	0.0	0.1	1.3	2.7	2.9	0.2	6.5	6.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.9	0.0	25.2	30.2	0.0	23.8	32.8	8.8	8.8	48.4	19.3	19.1
LnGrp LOS	C	A	C	C	A	C	C	A	A	D	B	B
Approach Vol, veh/h		40			50			1234			1480	
Approach Delay, s/veh		24.5			29.0			10.6			19.3	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.0	30.7		7.1	7.9	27.8		6.5				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	7.1	24.7		20.1	7.1	24.7		20.1				
Max Q Clear Time (g_c+I1), s	2.2	12.5		2.9	4.6	19.6		3.1				
Green Ext Time (p_c), s	0.0	5.5		0.1	0.0	3.6		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			15.8									
HCM 6th LOS			B									



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	159	220	167	383	553	253	196	798	364	261	1141	261
Future Volume (veh/h)	159	220	167	383	553	253	196	798	364	261	1141	261
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		0.99	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	167	232	176	403	582	266	206	840	383	275	1201	275
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	230	1079	584	418	846	386	229	1102	482	308	1182	525
Arrive On Green	0.07	0.30	0.30	0.12	0.36	0.36	0.07	0.31	0.31	0.09	0.33	0.33
Sat Flow, veh/h	3456	3554	1576	3456	2363	1078	3456	3554	1556	3456	3554	1576
Grp Volume(v), veh/h	167	232	176	403	437	411	206	840	383	275	1201	275
Grp Sat Flow(s),veh/h/ln	1728	1777	1576	1728	1777	1664	1728	1777	1556	1728	1777	1576
Q Serve(g_s), s	5.2	5.4	8.7	12.8	23.1	23.1	6.5	23.5	24.8	8.7	36.6	15.5
Cycle Q Clear(g_c), s	5.2	5.4	8.7	12.8	23.1	23.1	6.5	23.5	24.8	8.7	36.6	15.5
Prop In Lane	1.00		1.00	1.00		0.65	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	230	1079	584	418	636	596	229	1102	482	308	1182	525
V/C Ratio(X)	0.73	0.22	0.30	0.96	0.69	0.69	0.90	0.76	0.79	0.89	1.02	0.52
Avail Cap(c_a), veh/h	327	1079	584	418	636	596	229	1102	482	308	1182	525
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.4	28.5	24.6	48.1	30.1	30.1	51.0	34.3	34.7	49.6	36.7	29.7
Incr Delay (d2), s/veh	4.7	0.5	1.3	34.8	6.0	6.4	33.6	3.2	8.9	26.3	30.2	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	2.3	3.3	7.4	10.5	9.9	3.8	10.1	10.1	4.7	19.8	5.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.1	29.0	25.9	82.9	36.0	36.5	84.6	37.5	43.6	75.9	66.9	30.6
LnGrp LOS	E	C	C	F	D	D	F	D	D	E	F	C
Approach Vol, veh/h		575			1251			1429			1751	
Approach Delay, s/veh		35.6			51.3			45.9			62.6	
Approach LOS		D			D			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.5	38.7	11.5	42.3	11.5	44.7	14.0	39.8
Change Period (Y+Rc), s	* 4.2	5.3	* 4.2	5.7	* 4.2	5.3	* 4.2	5.7
Max Green Setting (Gmax), s	* 13	33.4	* 7.3	36.6	* 10	36.3	* 9.8	34.1
Max Q Clear Time (g_c+I1), s	14.8	10.7	8.5	38.6	7.2	25.1	10.7	26.8
Green Ext Time (p_c), s	0.0	1.9	0.0	0.0	0.1	3.9	0.0	3.8

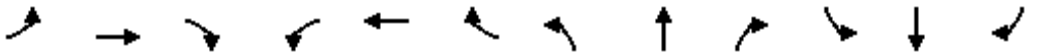
Intersection Summary	
HCM 6th Ctrl Delay	51.9
HCM 6th LOS	D

Notes

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

HCM 6th Signalized Intersection Summary
1: Magnolia Ave & Mast Blvd

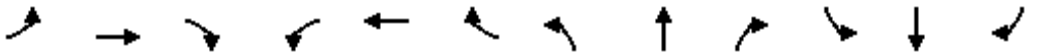
03/25/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	419	292	265	119	158	31	306	578	131	88	443	227
Future Volume (veh/h)	419	292	265	119	158	31	306	578	131	88	443	227
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		0.95	1.00		0.98	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	455	317	288	129	172	34	333	628	142	96	482	247
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	566	986	428	163	706	301	421	884	199	138	937	400
Arrive On Green	0.16	0.28	0.28	0.09	0.20	0.20	0.12	0.31	0.31	0.08	0.26	0.26
Sat Flow, veh/h	3456	3554	1541	1781	3554	1512	3456	2871	648	1781	3554	1516
Grp Volume(v), veh/h	455	317	288	129	172	34	333	388	382	96	482	247
Grp Sat Flow(s),veh/h/ln	1728	1777	1541	1781	1777	1512	1728	1777	1742	1781	1777	1516
Q Serve(g_s), s	10.1	5.6	13.2	5.6	3.2	1.5	7.4	15.4	15.4	4.2	9.2	11.4
Cycle Q Clear(g_c), s	10.1	5.6	13.2	5.6	3.2	1.5	7.4	15.4	15.4	4.2	9.2	11.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.37	1.00		1.00
Lane Grp Cap(c), veh/h	566	986	428	163	706	301	421	547	536	138	937	400
V/C Ratio(X)	0.80	0.32	0.67	0.79	0.24	0.11	0.79	0.71	0.71	0.69	0.51	0.62
Avail Cap(c_a), veh/h	740	1679	728	292	1478	629	566	828	812	292	1657	707
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.0	22.7	25.5	35.3	26.8	26.1	33.9	24.3	24.3	35.7	24.9	25.7
Incr Delay (d2), s/veh	5.3	0.2	2.2	3.3	0.2	0.2	3.8	1.7	1.8	2.3	0.4	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	2.2	4.7	2.5	1.3	0.5	3.2	6.2	6.1	1.8	3.7	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.2	23.0	27.7	38.6	27.0	26.3	37.6	26.0	26.1	38.0	25.3	27.3
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		1060			335			1103			825	
Approach Delay, s/veh		30.4			31.4			29.6			27.4	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.8	27.5	14.2	25.9	18.0	21.3	10.7	29.4
Change Period (Y+Rc), s	4.5	5.5	4.5	5.0	5.0	5.5	4.5	5.0
Max Green Setting (Gmax), s	13.0	37.5	13.0	37.0	17.0	33.0	13.0	37.0
Max Q Clear Time (g_c+I1), s	7.6	15.2	9.4	13.4	12.1	5.2	6.2	17.4
Green Ext Time (p_c), s	0.1	3.6	0.2	4.0	0.9	1.4	0.1	4.5

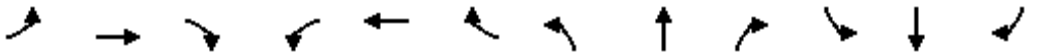
Intersection Summary	
HCM 6th Ctrl Delay	29.5
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	0	63	50	0	13	81	1275	46	13	809	18
Future Volume (veh/h)	18	0	63	50	0	13	81	1275	46	13	809	18
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		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	20	0	68	54	0	14	88	1386	50	14	879	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	139	0	120	89	0	77	112	1671	60	25	1524	35
Arrive On Green	0.08	0.00	0.08	0.05	0.00	0.05	0.06	0.48	0.48	0.01	0.43	0.43
Sat Flow, veh/h	1781	0	1540	1781	0	1541	1781	3495	126	1781	3550	81
Grp Volume(v), veh/h	20	0	68	54	0	14	88	704	732	14	440	459
Grp Sat Flow(s),veh/h/ln	1781	0	1540	1781	0	1541	1781	1777	1844	1781	1777	1854
Q Serve(g_s), s	0.5	0.0	2.0	1.4	0.0	0.4	2.3	16.2	16.3	0.4	8.9	8.9
Cycle Q Clear(g_c), s	0.5	0.0	2.0	1.4	0.0	0.4	2.3	16.2	16.3	0.4	8.9	8.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.07	1.00		0.04
Lane Grp Cap(c), veh/h	139	0	120	89	0	77	112	849	882	25	763	796
V/C Ratio(X)	0.14	0.00	0.57	0.61	0.00	0.18	0.78	0.83	0.83	0.55	0.58	0.58
Avail Cap(c_a), veh/h	756	0	653	756	0	654	267	926	961	267	926	966
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	20.4	0.0	21.1	22.1	0.0	21.6	21.9	10.7	10.7	23.2	10.3	10.3
Incr Delay (d2), s/veh	0.5	0.0	4.1	6.5	0.0	1.1	11.3	5.9	5.8	17.5	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.8	0.7	0.0	0.2	1.2	5.5	5.7	0.3	2.6	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.8	0.0	25.2	28.6	0.0	22.7	33.2	16.6	16.6	40.7	10.9	10.9
LnGrp LOS	C	A	C	C	A	C	C	B	B	D	B	B
Approach Vol, veh/h		88			68			1524			913	
Approach Delay, s/veh		24.2			27.4			17.5			11.4	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.2	27.2		8.2	7.5	24.8		6.9				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	7.1	24.7		20.1	7.1	24.7		20.1				
Max Q Clear Time (g_c+I1), s	2.4	18.3		4.0	4.3	10.9		3.4				
Green Ext Time (p_c), s	0.0	4.4		0.2	0.0	4.5		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		15.9	
HCM 6th LOS		B	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	355	660	305	467	561	191	262	937	446	169	575	208
Future Volume (veh/h)	355	660	305	467	561	191	262	937	446	169	575	208
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	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	374	695	321	492	591	201	276	986	469	178	605	219
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	431	1059	620	552	862	292	339	1113	484	233	1005	448
Arrive On Green	0.12	0.30	0.30	0.16	0.33	0.33	0.10	0.31	0.31	0.07	0.28	0.28
Sat Flow, veh/h	3456	3554	1561	3456	2589	878	3456	3554	1543	3456	3554	1583
Grp Volume(v), veh/h	374	695	321	492	405	387	276	986	469	178	605	219
Grp Sat Flow(s),veh/h/ln	1728	1777	1561	1728	1777	1690	1728	1777	1543	1728	1777	1583
Q Serve(g_s), s	12.7	20.5	18.8	16.7	23.6	23.7	9.4	31.6	36.0	6.1	17.7	13.8
Cycle Q Clear(g_c), s	12.7	20.5	18.8	16.7	23.6	23.7	9.4	31.6	36.0	6.1	17.7	13.8
Prop In Lane	1.00		1.00	1.00		0.52	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	431	1059	620	552	592	563	339	1113	484	233	1005	448
V/C Ratio(X)	0.87	0.66	0.52	0.89	0.68	0.69	0.81	0.89	0.97	0.76	0.60	0.49
Avail Cap(c_a), veh/h	467	1059	620	599	592	563	455	1113	484	248	1005	448
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.5	36.8	27.6	49.4	34.6	34.6	53.1	39.2	40.6	55.0	37.2	35.8
Incr Delay (d2), s/veh	15.1	3.2	3.1	14.8	6.3	6.7	8.2	8.8	33.1	12.5	1.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	9.0	7.2	8.2	10.8	10.4	4.4	14.5	17.5	3.0	7.6	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.6	39.9	30.6	64.2	40.9	41.3	61.2	47.9	73.8	67.6	38.2	36.7
LnGrp LOS	E	D	C	E	D	D	E	D	E	E	D	D
Approach Vol, veh/h		1390			1284			1731			1002	
Approach Delay, s/veh		45.0			50.0			57.0			43.1	
Approach LOS		D			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.4	41.1	16.0	39.6	19.2	45.3	12.3	43.3
Change Period (Y+Rc), s	* 4.2	5.3	* 4.2	5.7	* 4.2	5.3	* 4.2	5.7
Max Green Setting (Gmax), s	* 21	33.6	* 16	30.4	* 16	38.2	* 8.6	37.6
Max Q Clear Time (g_c+I1), s	18.7	22.5	11.4	19.7	14.7	25.7	8.1	38.0
Green Ext Time (p_c), s	0.4	4.2	0.4	3.3	0.2	3.7	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	49.7
HCM 6th LOS	D

Notes

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