



4542 Ruffner Street
Suite 100
San Diego, CA 92111
858.300.8800 T
www.llgengineers.com

Pasadena
Irvine
San Diego

LOCAL TRANSPORTATION ANALYSIS

OAKCREST SPECIFIC PLAN

San Marcos, California
January 2026

LLG Ref. 3-25-4059

Prepared by:
Amelia Giacalone
Senior Transportation Planner
&
Zahira Chayeb
Transportation Engineer II

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

EXECUTIVE SUMMARY

Linscott, Law & Greenspan, Engineers (LLG) has prepared the following Local Transportation Analysis (LTA) to determine and evaluate the potential effects to the local roadway system due to the proposed Oakcrest Specific Plan (proposed Project). The Project site is located on the west side of North Twin Oaks Valley Road, north of Legacy Drive, and south of Deer Brook Drive in the City of San Marcos. The Project site is currently primarily undeveloped.

The Project consists of 257 residential units (112 detached airspace condos and 145 single-family residential), 6.22 acres of public parks, and preserved open space on a 137-acre site. The Project proposes a Specific Plan, General Plan Amendment/Rezone, Conditional Use Permit, and a possible Ridge Overlay Zone/Grading variance. The General Plan Amendment and Rezone would change the General Plan designation and Zoning from Residential (R-1-20) to Specific Plan Area (SPA).

The Project is calculated to generate a total of 2,393 ADT with 194 AM peak hour trips (52 inbound / 142 outbound) and 239 PM peak hour trips (167 inbound and 72 outbound).

Transportation impact analyses within the City of San Marcos includes two sets of requirements:

- **CEQA Analysis** primarily consisting of vehicle miles traveled (VMT) analysis.
- **Non-CEQA Local Transportation Analysis** to evaluate the effects of a development project on the circulation network

While Level of Service (LOS) analysis is not used to determine CEQA significance, the intersection and segment analysis provided in this study shows that the Project will have a substantial effect on study area facilities, including two (2) study area intersection and two (2) study area street segment, according to the City of San Marcos LOS Standards.

The Project is calculated to result in substantial transportation-related effect at the following locations during the Opening Year (Interim Year 2028) with Project, and Horizon Year (Horizon Year 2050) with Project scenarios:

- Intersection #2. Twin Oaks Valley Rd & Buena Creek Rd (Horizon Year only)
- Intersection #12. Twin Oaks Valley Rd & San Marcos Blvd (Opening Year and Horizon Year)
- Segment #3. N Twin Oaks Valley Road: Buena Creek Road to Olive Street (Opening Year only)
- Segment #4. N Twin Oaks Valley Road: Olive Street to Cassou Road (Opening Year only)

CEQA VMT analysis is provided under separate cover.

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LOCAL TRANSPORTATION ANALYSIS

OAKCREST SPECIFIC PLAN

San Marcos, California

January 2026

1.0 INTRODUCTION

Linscott, Law & Greenspan, Engineers (LLG) has prepared the following Local Transportation Analysis (LTA) for the proposed Oakcrest Specific Plan (proposed Project) located on the west side of North Twin Oaks Valley Road, north of Legacy Drive, and south of Deer Brook Drive in the City of San Marcos.

Transportation impact analyses within the City of San Marcos includes two sets of requirements:

- **CEQA Analysis** primarily consisting of vehicle miles traveled (VMT) analysis.
- **Non-CEQA Local Transportation Analysis** to evaluate the effects of a development project on the circulation network.

CEQA VMT analysis is provided under separate cover.

The following items are included in this transportation study:

- Project Description
- Existing Conditions Discussion
- Local Transportation Analysis Approach and Methodology
- Analysis of Existing Conditions
- Opening Year Conditions Discussion
- Trip Generation, Distribution, and Assignment
- Analysis of Opening Year Scenarios
- Horizon Year Conditions Discussion
- Analysis of Horizon Year Scenarios
- Site Access, Circulation, and Parking Review
- Active Transportation Review
- Post-Mitigation Analysis
- Conclusions

2.0 PROJECT DESCRIPTION

2.1 Project Location

The Project site is located on the west side of North Twin Oaks Valley Road, north of Legacy Drive, and south of Deer Brook Drive.

The Project site encompasses the following Assessor's Parcel Numbers (APNs): 218-110-02-00, 218-110-03-00, 218-330-05-00, 218-330-08-00, 218-330-09-00, 218-330-13-00, 218-330-26-00, 218-330-27-00, and 218-330-28-00.

2.2 Project Description

The Project is proposing to construct 257 residential units (112 detached airspace condos and 145 single-family residential), 6.22 acres of public park and preserved open space on a 137-acre site in the City of San Marcos.

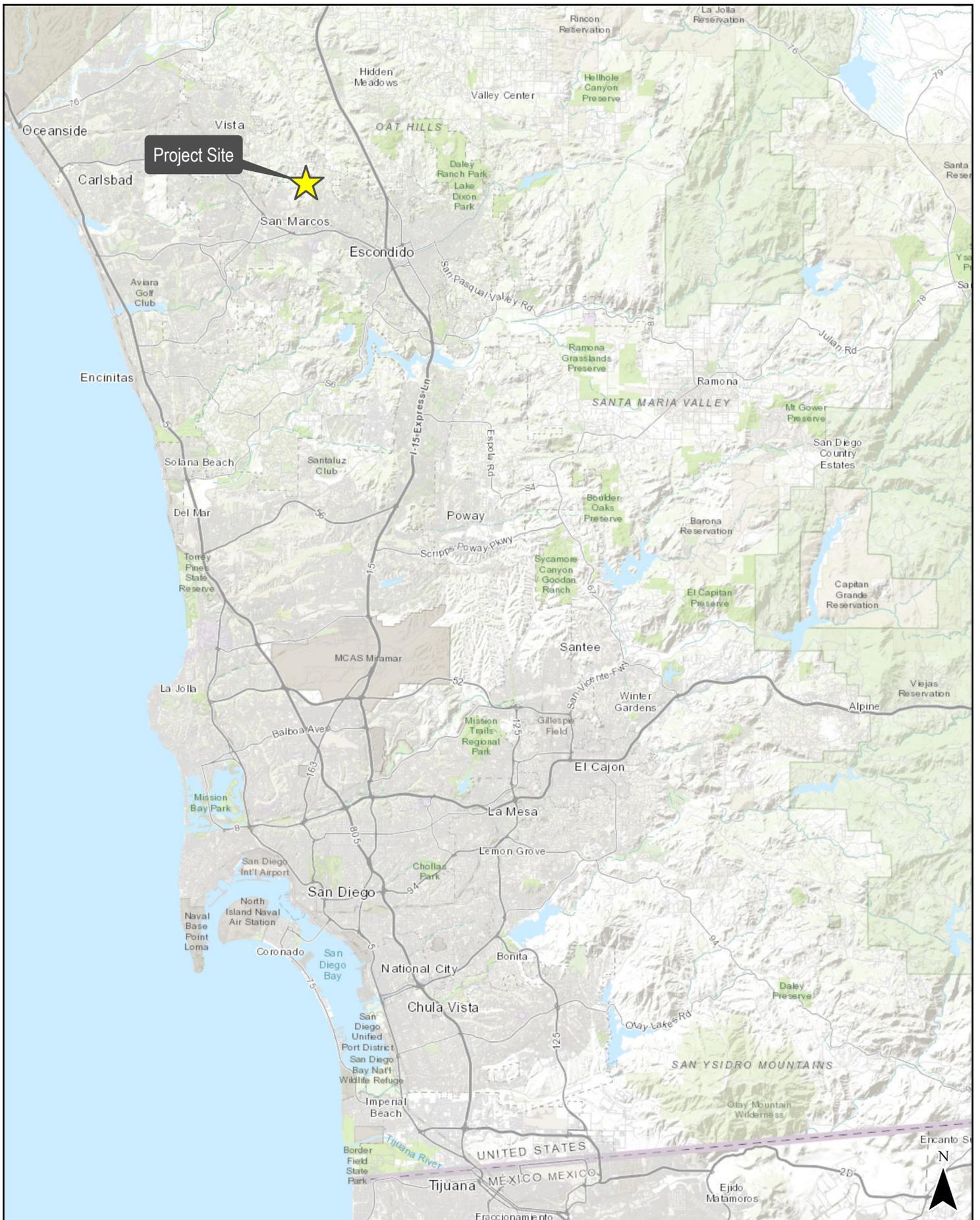
The project proposes a Specific Plan, General Plan Amendment/Rezone, Conditional Use Permit, and a possible Ridge Overlay Zone/Grading variance.

The General Plan Amendment and Rezone would change the General Plan designation and Zoning from Residential (R-1-20) to Specific Plan Area (SPA). The Specific Plan has been prepared with the intent to provide a comprehensive plan to ensure the efficient development of a new residential community. The Specific Plan serves as both a policy document and a regulatory document for the systematic implementation of the policies and goals of the General Plan.

2.3 Project Access

Access to the site is proposed via one driveway from North Twin Oaks Valley Road ("Street A"). The driveway is proposed to be signalized with a northbound left-turn lane into the site as a Project feature. An enhanced pedestrian landing in the median, designed to protect pedestrians and equestrians, is proposed. A second emergency-only access point to North Twin Oaks Valley Road would be provided to the south.

Figure 2-1 shows the vicinity map. *Figure 2-2* shows a more detailed project area map. *Figure 2-3* shows the conceptual site plan for the Project



Project Site

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Figure 2-1
Vicinity Map



SanGIS, Bureau of Land Management, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS

OAKCREST SP

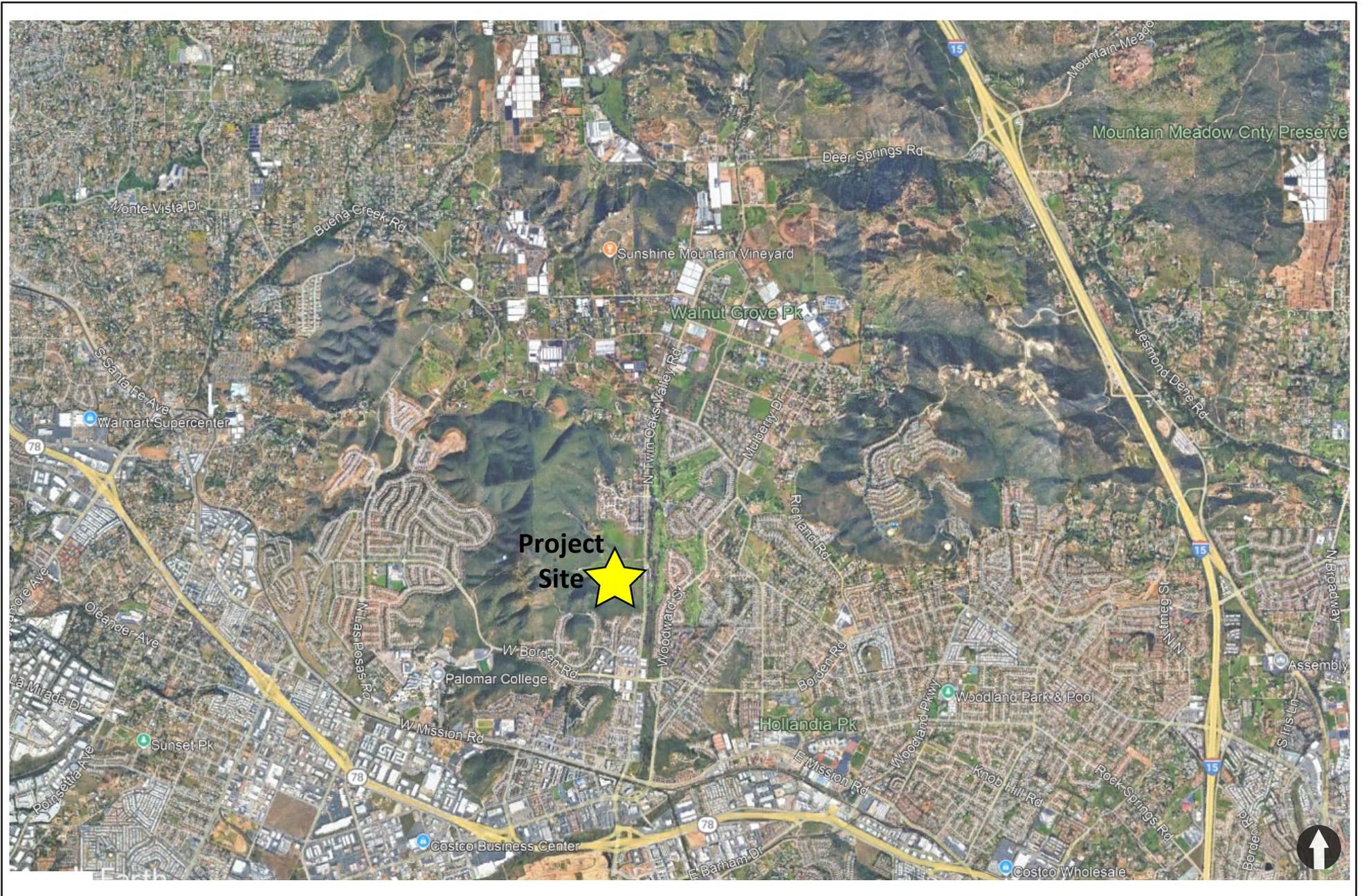


Figure 2-2
Project Area Map



3.0 EXISTING CONDITIONS

Effective evaluation of the traffic impacts associated with the proposed 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 includes the following intersections and street segments based on the anticipated distribution of the project traffic:

Intersections

1. Twin Oaks Valley Rd & Deer Springs Rd
2. Twin Oaks Valley Rd & Buena Creek Rd
3. Twin Oaks Valley Rd & Olive Street
4. Twin Oaks Valley Rd & E. La Cienega Road
5. Twin Oaks Valley Rd & Del Roy Dr
6. Twin Oaks Valley Rd & Project Driveway
7. Twin Oaks Valley Rd & Windy Wy
8. Twin Oaks Valley Rd & Borden Rd
9. Woodward St & Borden Rd
10. Twin Oaks Valley Rd & Richmar Road
11. San Marcos Blvd & E. Mission Road
12. Twin Oaks Valley Rd & San Marcos Blvd
13. Twin Oaks Valley Rd & SR 78 WB Ramps
14. Twin Oaks Valley Rd & SR 78 EB Ramps

Segments

Deer Springs Road

1. Sycamore Drive to Twin Oaks Valley Road

N Twin Oaks Valley Road

2. Deer Springs Road to Buena Creek Road
3. Buena Creek Road to Olive Street
4. Olive Street to Cassou Road
5. Cassou Road to E La Cienega Rd
6. E La Cienega Rd to Del Roy Drive
7. Del Roy Drive to Project Driveway
8. Project Driveway to Windy Way
9. Windy Way to Borden Road
10. Borden Road to Richmar Avenue
11. Richmar Avenue to San Marcos Boulevard
12. San Marcos Boulevard to SR-78 Ramps

13. SR-78 Ramps to N City Drive
Buena Creek Road
14. West of N Twin Oaks Valley Road

Borden Road

15. Windy Point Road to N Twin Oaks Valley Road
16. N Twin Oaks Valley Road to Woodward Street

Woodward Street

17. Borden Road to E Mission Road

3.1 Existing Street Network

The principal roadways in the project study area are described briefly below. Roadway classification was determined from a review of the *City of San Marcos Mobility Element*, the *County of San Diego Mobility Element* and information gathered from field observations.

Deer Springs Road is currently constructed as a two-lane roadway within the project study area. Parking is generally prohibited. The shoulders are unimproved. Deer Springs Road has both horizontal and vertical curves. The posted speed limit is 45 mph from Twin Oaks Valley Road to Sarver Lane and 55 mph from Sarver Lane to I-15. No bike lanes are currently provided. The southern terminus of Deer Springs Road is at Twin Oaks Valley Road. Deer Springs Road is classified as a 6.2 Prime Arterial between San Marcos City Limits and I-15 NB Ramps and a 4.1B Major Road with Intermittent turn lanes between I-15 NB Ramps and Centre City Parkway, on the *County of San Diego Mobility Element* and is therefore not constructed to its ultimate Mobility Element classification.

Twin Oaks Valley Road (TOVR), north of Borden Road, is classified as 4-Lane (Rural) Arterial with Enhanced Bicycle/Pedestrian facilities in the *City of San Marcos Mobility Element*. South of Borden Road, TOVR is classified as 4-Lane Arterial with Class II or III Bicycle Facilities and Sidewalks in the *City of San Marcos Mobility Element*.

The configuration of the study segments of TOVR are described below:

- Between Twin Oaks Crest Drive and Deer Springs Road, TOVR is constructed as a two-lane roadway. Pedestrian and bicycle facilities are not provided. There is no shoulder nor curbside parking along this segment. There is no posted speed limit.
- Between Deer Springs Road and Buena Creek Road, TOVR is constructed as a two-lane roadway with a two-way left-turn lane. Curb, gutter and sidewalk are generally provided on the east side, and dirt shoulder on the west side of TVOR. The posted speed limit is 45-mph. Curbside parking is generally not permitted. Trucks over 7 tons are prohibited. This segment is classified as a 4-Lane (Rural) Arterial with Enhanced Bicycle/Pedestrian facilities on the *City of San Marcos Mobility Element* and is therefore not constructed to its ultimate Mobility Element classification.

- Between Buena Creek Road and Cassou Road, TOVR is constructed as a two-lane roadway with a two-way left-turn lane. Curb, gutter and sidewalk are generally provided on the east side, and dirt shoulder on the west side of TOVR. The posted speed limit is 45 mph. Curbside parking is generally not permitted. Trucks over 7 tons are prohibited. This segment is classified as a 4-Lane (Rural) Arterial with Enhanced Bicycle/Pedestrian facilities on the *City of San Marcos Mobility Element* and is therefore not constructed to its ultimate Mobility Element classification.
- Between Cassou Road and La Cienega Road, TOVR is constructed as a four-lane divided roadway with a two-way left-turn lane. Curb and gutter are generally provided. No sidewalks are provided. The posted speed limit is 45-mph. Curbside parking is generally not permitted. Trucks over 7 tons are prohibited.
- Between La Cienega Road and Windy Way, TOVR is constructed as a four-lane divided roadway with a raised median and a 50-mph speed limit. Curb and gutter are provided on the east side but not on the west side. Curbside parking is not permitted.
- Between Windy Way and Borden Road, TOVR is constructed as a four-lane undivided roadway with a center two-wayleft-turn lane. Curb, gutter and sidewalk are provided on the west side but not on the east side. Curbside parking is not permitted. Bike Lanes are provided.
- Between Borden Road and Richmar Avenue, TOVR is constructed as four-lane undivided roadway with a center two-wayleft-turn lane. Curb, gutter and sidewalk are provided on the west side but not on the east side. Curbside parking is not permitted. Bike Lanes are provided.
- Between Richmar Avenue and San Marcos Boulevard, TOVR is constructed as four-lane divided roadway with a raised median and a 45-mph speed limit. Bike Lanes are provided.
- Between San Marcos Boulevard and Barham Drive, TOVR is constructed as a six-to-eight-lane divided roadway with a raised median and a 45-mph speed limit. Bike lanes are provided in both directions of travel on TOVR, and parking is generally prohibited. TOVR is grade-separated at Mission Road.

North of Deer Springs Road, TOVR is within the jurisdiction of San Diego County. TOVR is designated as a 2.2C Light Collector with intermittent turn lanes on the *San Diego County Mobility Element*. Currently, TOVR north of Deer Springs Road is a public road up to approximately 1,900 feet north of Par Valley Drive. A gate located at this point restricts access on TOVR for a distance of approximately 7,000 feet. Further north, TOVR continues as a public road to Gopher Canyon Road.

Buena Creek Road is currently built as a rural two-lane roadway with fronting farmland and residential property and a 45-mph posted speed limit. Curb, gutter and sidewalks are generally not provided. This segment is classified as a 4.1B Major Road with intermittent turn lanes on the *County of San Diego Mobility Element* and is therefore not constructed to its ultimate Mobility Element classification.

Borden Road is classified as a 4-Lane Arterial in the *City of San Marcos Mobility Element*. Borden Road is constructed as a two-lane divided roadway west of Woodward Street, and as a four-lane undivided roadway with a two-way left-turn lane between Woodward Street and Vineyard Street. The posted speed limit is 35-40 mph. Curb, gutter and sidewalks are generally provided.

Woodward Street is constructed as a two-lane roadway with a two-way left-turn lane between Kentfield Drive (located approximately 0.3 miles north of Borden Road) and Vineyard Road, and is constructed as a four-lane divided road with a striped median between Vineyard Street and San Marcos Boulevard. Woodward Street is unclassified in the *City of San Marcos Mobility Element*. The posted speed limit is 35-40 mph. Curb, gutter and sidewalks are generally provided.

State Route 78 is generally a six-lane east/west freeway connecting I-15 and I-5. Ramp interchanges are provided at Sycamore Avenue, San Marcos Boulevard and Twin Oaks Valley Road within the study area.

3.2 Existing Traffic Volumes

Peak hour traffic counts at the study area intersections, including bicycle and pedestrian counts, were conducted on Tuesday, December 2, 2025, between the hours of 7:00-9:00 AM and 4:00-6:00 PM while San Marcos Unified School District schools and CSU San Marcos were in session. Daily traffic volumes at the study area segments were also conducted on Tuesday, December 2, 2025.

Table 3-1 summarizes the Existing ADTs. *Table 3-2* summarizes the roadway geometry. *Figure 3-2* shows the Existing daily traffic volumes. *Appendix A* contains the existing count sheets.

**TABLE 3-1
EXISTING TRAFFIC VOLUMES**

Street Segment	ADT^a	Date^b
Deer Springs Road		
1. Sycamore Drive to Twin Oaks Valley Road	19,410	Tuesday, December 2, 2025
N Twin Oaks Valley Road		
2. Deer Springs Road to Buena Creek Road	22,010	Tuesday, December 2, 2025
3. Buena Creek Road to Olive Street	16,690	Tuesday, December 2, 2025
4. Olive Street to Cassou Road	16,330	Tuesday, December 2, 2025
5. Cassou Road to E La Cienega Rd	16,330	Tuesday, December 2, 2025
6. E La Cienega Rd to Del Roy Drive	16,720	Tuesday, December 2, 2025
7. Del Roy Drive to Project Driveway	17,960	Tuesday, December 2, 2025
8. Project Driveway to Windy Way	17,960	Tuesday, December 2, 2025
9. Windy Way to Borden Road	18,980	Tuesday, December 2, 2025
10. Borden Road to Richmar Avenue	25,620	Tuesday, December 2, 2025
11. Richmar Avenue to San Marcos Boulevard	26,100	Tuesday, December 2, 2025
12. San Marcos Boulevard to SR-78 Ramps	34,370	Tuesday, December 2, 2025
13. SR-78 Ramps to N City Drive	54,840	Tuesday, December 2, 2025
Buena Creek Road		
14. West of N Twin Oaks Valley Road	11,510	Tuesday, December 2, 2025
Borden Road		
15. Windy Point Road to N Twin Oaks Valley Road	13,600	Tuesday, December 2, 2025
16. N Twin Oaks Valley Road to Woodward Street	12,160	Tuesday, December 2, 2025
Woodward Street		
17. Borden Road to E Mission Road	3,230	Tuesday, December 2, 2025

Footnotes:

a. ADT = Average Daily Traffic Volumes, rounded to the nearest 10.

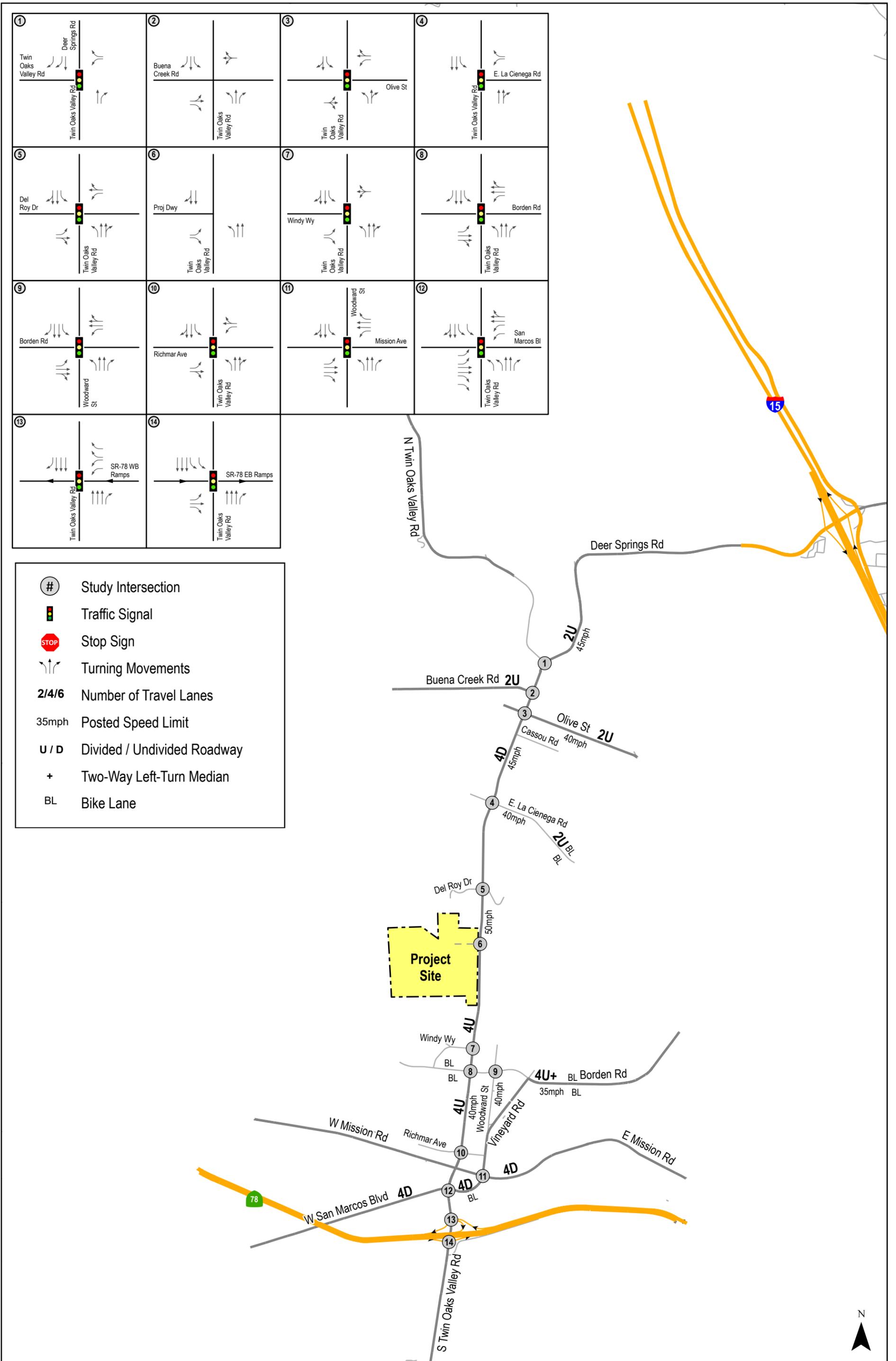
**TABLE 3-2
EXISTING ROADWAY GEOMETRY**

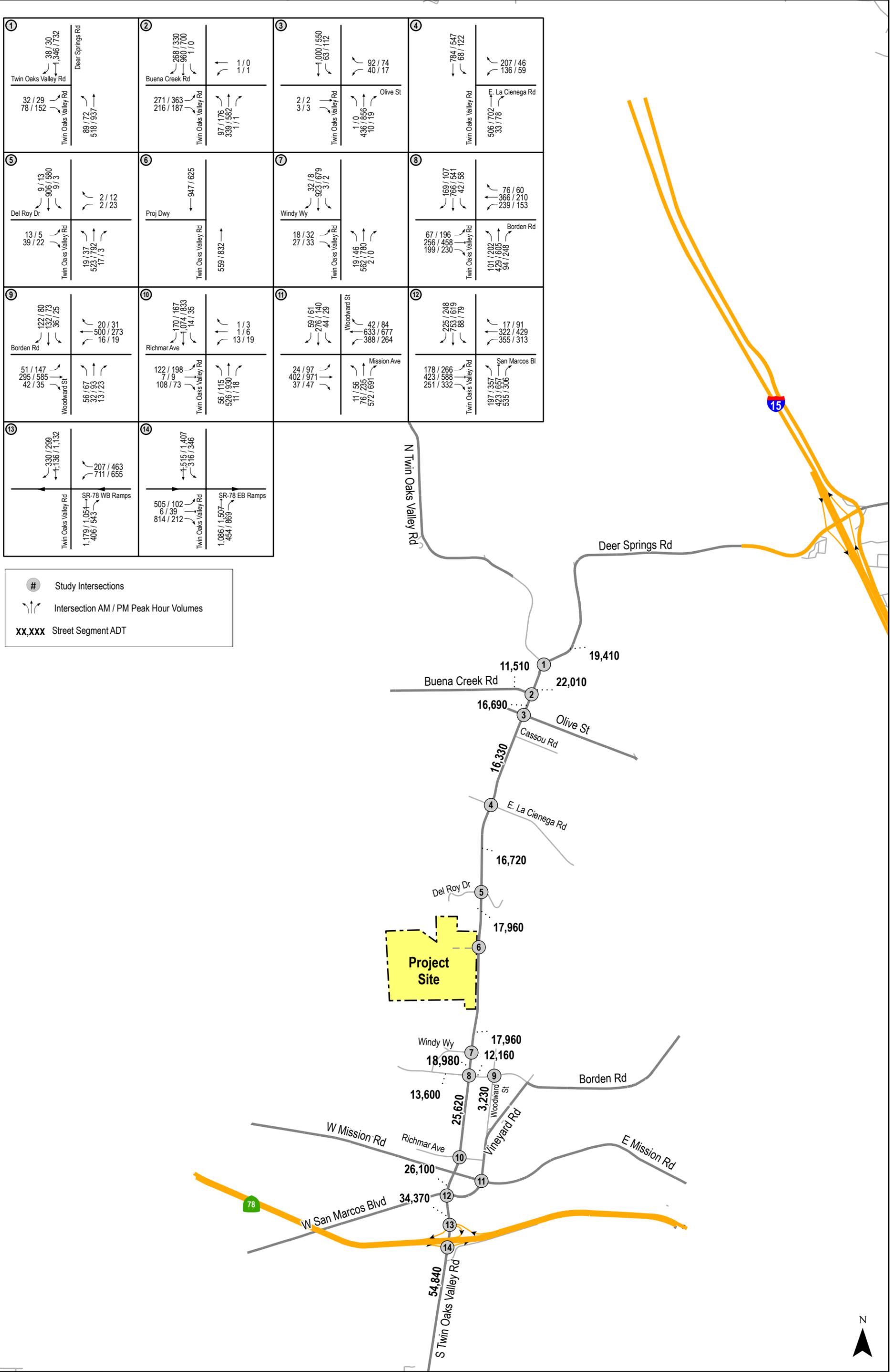
Street Segment	Number of Lanes	Lane Width	Bike Lanes	Median Type	Posted Speed
Deer Springs Road					
1. Sycamore Drive to Twin Oaks Valley Road	2	25'	None	None	45 MPH
N Twin Oaks Valley Road					
2. Deer Springs Road to Buena Creek Road	2	50'	None	TWLTL	45 MPH
3. Buena Creek Road to Olive Street	2	50'	None	TWLTL	45 MPH
4. Olive Street to Cassou Road	2	50'	None	TWLTL	45 MPH
5. Cassou Road to E La Cienega Rd	4	75'	Class II	TWLTL	45 MPH
6. E La Cienega Rd to Del Roy Drive	4	80'	Class II	Raised	50 MPH
7. Del Roy Drive to Project Driveway	4	80'	Class II	Raised	50 MPH
8. Project Driveway to Windy Way	4	75'	Class II	Raised	50 MPH
9. Windy Way to Borden Road	4	65'	Class II	TWLTL	45 MPH
10. Borden Road to Richmar Avenue	4	65'	Class II	TWLTL	45 MPH
11. Richmar Avenue to San Marcos Boulevard	4	70'	Class II	Raised	45 MPH
12. San Marcos Boulevard to SR-78 Ramps	6	115'	Class II	Raised	45 MPH
13. SR-78 Ramps to N City Drive	7-8	120'	Class II	Raised	45 MPH
Buena Creek Road					
14. West of N Twin Oaks Valley Road	2	24'	None	None	45 MPH
Borden Road					
15. Windy Point Road to N Twin Oaks Valley Road	4	70'	Class II	Raised	40 MPH
16. N Twin Oaks Valley Road to Woodward Street	4	60'	Class II	Striped	35 MPH
Woodward Street					
17. Borden Road to E Mission Road	2	45'	Noner	TWLTL	40 MPH

Footnotes:

TWLTL = Two-Way Left-Turn Lane

MPH = Miles Per Hour





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Figure 3-2
Existing Traffic Volumes

4.0 LOCAL TRANSPORTATION ANALYSIS APPROACH AND METHODOLOGY

Based on City of San Marcos guidelines, a Local Transportation Analysis (LTA) is required for projects generating more than 1,000 daily vehicle trips or more than 100 peak hour vehicle trips (if consistent with the latest version of the City's General Plan), or generating at least 500 daily vehicle trips or at least 50 peak hour vehicle trips if inconsistent with the City's latest General Plan.

The Project is estimated to generate 2,393 ADT (see *Section 7.1*) and is part of a proposed amendment to the City's General Plan. Therefore, a local transportation analysis is required.

A scoping memo was prepared and reviewed by City staff. The draft scoping memo and City review comments are included in *Appendix B*.

4.1 Study Scenarios

- *Existing Conditions*
- *Opening Year (Interim Year) Conditions* are based on the SANDAG pre-established interim year scenario closest to the Project's anticipated opening year. The Project's Opening Year is 2028.
- *Opening Year (Interim Year) Plus Project Conditions* include Project-generated traffic added to interim year volumes.
- *Horizon Year Conditions* based on the Regional Transportation Plan (RTP) year, currently 2050.
- *Horizon Year Plus Project Conditions* include Project-generated traffic added to horizon year traffic volumes.

4.2 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.

4.2.1 Intersections

Signalized intersections were analyzed under AM and PM peak hour conditions. Average vehicle delay was determined utilizing the methodology found in Chapter 19 of the *Highway Capacity Manual 7th Edition (HCM 7)*, with the assistance of the *Synchro 12* computer software. The delay values (represented in seconds) were qualified with a corresponding intersection Level of Service (LOS).

Unsignalized intersections were analyzed under AM and PM peak hour conditions. Average vehicle delay and LOS was determined based upon the procedures found in Chapter 20 and Chapter 21 of the *HCM 7* with the assistance of the *Synchro 12* computer software.

Sprinter Rail Crossings

The Sprinter Hybrid Rail line passes through the E. Mission Road / San Marcos Boulevard / Woodward Street intersection (intersection #11). Various movements at these intersections are stopped during gate closures, thereby causing increased delay. Increased delay was accounted for in the intersection analysis by assuming a reduced saturation flow in the Synchro analysis computer software. A saturation flow reduction of 6.67% was applied to movements impacted by the train gate closures.

The saturation flow reduction was calculated in part per information provided by the North County Transit District Rider's Guide. The Sprinter operates 30-minute headways in each direction during most weekdays. Consequently, during each peak hour, it's expected that a total of 2 trains pass by the intersections in either direction. A total of 4 gate closures per hour were assumed for the analysis.

The following values are derived from field observations at the affected intersections. As such, the total increased delay during a single hour was calculated as follows:

- Number of gate closures at the intersection (N_t) = 4
- Average time of gate closure (G_c) = 60 seconds
- Total gate closure time per hour (L_{gc}) = $N_t * G_c = 240$ seconds
- Saturation flow reduction = $240 \text{ seconds} / 3,600 \text{ seconds} = 6.67\%$

In the analysis conducted using the Synchro computer software, a saturation flow reduction of 6.67% or a saturation flow rate of 1,770 vehicles per hour was assumed for the movements impacted by the train gate closures. This reduction in saturation flow represents the additional delay caused by the rail crossings.

This added delay was apportioned among the affected movements at the intersections based on the proportion of the overall hourly capacity by adjusting the movement capacity within the Synchro software using an appropriate adjustment factor.

4.2.2 Street Segments

Street segment analysis is based upon the comparison of daily traffic volumes (ADTs) to the City of San Marcos's *Roadway Classification, Level of Service, and ADT Table*. This table provides segment capacities for different street classifications, based on traffic volumes and roadway characteristics. The City of San Marcos's *Roadway Classification, Level of Service, and ADT Table* is attached in **Appendix C**.

Additionally, two street segments (segments #1 and #13) are under the County of San Diego jurisdiction. Therefore, the street segment analysis for these segments is based upon the comparison of daily traffic volumes (ADTs) to the *County of San Diego Department of Public Works Public*

Roads Standards Average Daily Vehicle Trips Table. This table identifies specific road classifications and their normal expected carrying capacity in terms of vehicles per day at different levels of service. The County of San Diego's *Department of Public Works Public Roads Standards Average Daily Vehicle Trips Table* is attached in **Appendix C**.

4.3 Level of Service Standards

The City of San Marcos strives to maintain intersection and roadway segment operations based on LOS standards outlined in the General Plan Mobility Element. If the addition of the traffic generated from a proposed project results in any one of the following, improvements should be identified to increase performance to acceptable or pre-project conditions under each scenario:

- Triggers an intersection operating at acceptable LOS to operate at unacceptable LOS and increases the delay by more than 2.0 seconds.
- Increases the delay for a study intersection that is already operating at unacceptable LOS by more than 2.0 seconds.
- Triggers a roadway segment operating at acceptable LOS to operate at unacceptable LOS and increases the volume/capacity (V/C) ratio by more than 0.02.
- Increases the V/C ratio for a study roadway segment that is already operating at unacceptable LOS by more than 0.02.

5.0 ANALYSIS OF EXISTING CONDITIONS

5.1 Peak Hour Intersection Levels of Service

Table 5-1 summarizes the peak hour intersection operations under Existing conditions. As seen in *Table 5-1*, all study intersections are calculated to operate acceptably at LOS D or better with the exception of Intersection #12. Twin Oaks Valley Rd & San Marcos Blvd, which is calculated to operate at LOS F/F during the AM/PM peak hours.

Appendix D contains the Existing intersection analysis worksheets.

5.2 Daily Street Segment Levels of Service

Table 5-2 summarizes the segment operations under Existing conditions. As seen in *Table 5-2*, the following study segments are calculated to currently operate at LOS E or F:

- Segment #1. Deer Springs Road: Sycamore Drive to Twin Oaks Valley Road (LOS F)
- Segment #2. N Twin Oaks Valley Road: Deer Springs Road to Buena Creek Road (LOS F)
- Segment #3. N Twin Oaks Valley Road: Buena Creek Road to Olive Street (LOS F)
- Segment #4. N Twin Oaks Valley Road: Olive Street to Cassou Road (LOS F)
- Segment #14. Buena Creek Road: West of Twin Oaks Valley Road (LOS E)

**TABLE 5-1
EXISTING INTERSECTION OPERATIONS**

Intersection	Control Type	Peak Hour	Existing	
			Delay ^a	LOS ^b
1. Twin Oaks Valley Rd & Deer Springs Rd	Signal	AM	32.0	C
		PM	16.3	B
2. Twin Oaks Valley Rd & Buena Creek Rd	Signal	AM	46.0	D
		PM	31.5	C
3. Twin Oaks Valley Rd & Olive Street	Signal	AM	25.2	C
		PM	22.9	C
4. Twin Oaks Valley Rd & E. La Cienega Road	Signal	AM	13.7	B
		PM	13.1	B
5. Twin Oaks Valley Rd & Del Roy Dr	Signal	AM	15.5	B
		PM	16.3	B
6. Twin Oaks Valley Rd & Project Driveway	- ^c	AM	-	-
		PM	-	-
7. Twin Oaks Valley Rd & Windy Wy	Signal	AM	6.4	A
		PM	8.8	A
8. Twin Oaks Valley Rd & Borden Rd	Signal	AM	48.4	D
		PM	49.6	D
9. Woodward St & Borden Rd	Signal	AM	22.5	C
		PM	21.3	C
10. Twin Oaks Valley Rd & Richmar Road	Signal	AM	26.7	C
		PM	36.6	D
11. San Marcos Blvd & E. Mission Road	Signal	AM	19.6	B
		PM	22.2	C
12. Twin Oaks Valley Rd & San Marcos Blvd	Signal	AM	84.2	F
		PM	89.9	F
13. Twin Oaks Valley Rd & SR 78 WB Ramps	Signal	AM	15.4	B
		PM	16.1	B
14. Twin Oaks Valley Rd & SR 78 EB Ramps	Signal	AM	36.5	D
		PM	18.6	B

Footnotes:

- a. Average delay expressed in seconds per vehicle.
- b. Level of Service.
- c. Driveway does not exist under Existing conditions.

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

**TABLE 5-2
EXISTING STREET SEGMENT OPERATIONS**

Street Segment	Classification	Capacity (LOS E) ^a	ADT ^b	LOS ^c	V/C ^d
Deer Springs Road					
1. Sycamore Drive to Twin Oaks Valley Road	2-Lane Undivided Collector (2.2 E) ^e	16,200	19,410	F	1.198
N Twin Oaks Valley Road					
2. Deer Springs Road to Buena Creek Road	2-Lane with TWLTL ^f Collector	15,000	22,010	F	1.467
3. Buena Creek Road to Olive Street	2-Lane with TWLTL Collector	15,000	16,690	F	1.113
4. Olive Street to Cassou Road	2-Lane with TWLTL Collector	15,000	16,330	F	1.089
5. Cassou Road to E La Cienega Rd	4-Lane with TWLTL Major Arterial	40,000	16,330	B	0.408
6. E La Cienega Rd to Del Roy Drive	4-Lane Divided Major Arterial	40,000	16,720	B	0.418
7. Del Roy Drive to Project Driveway	4-Lane Divided Major Arterial	40,000	17,960	B	0.449
8. Project Driveway to Windy Way	4-Lane Divided Major Arterial	40,000	17,960	B	0.449
9. Windy Way to Borden Road	4-Lane with TWLTL Major Arterial	40,000	18,980	B	0.475
10. Borden Road to Richmar Avenue	4-Lane with TWLTL Major Arterial	40,000	25,620	C	0.641
11. Richmar Avenue to San Marcos Boulevard	4-Lane Divided Major Arterial	40,000	26,100	C	0.653
12. San Marcos Boulevard to SR-78 Ramps	6-Lane Major Arterial	50,000	34,370	C	0.687
13. SR-78 Ramps to N City Drive	8-Lane Prime Arterial ^g	70,000	54,840	C	0.783
Buena Creek Road					
14. West of N Twin Oaks Valley Road	2-Lane Undivided Collector (2.2E) ^e	16,200	11,510	E	0.710
Borden Road					
15. Windy Point Road to N Twin Oaks Valley Road	4-Lane Divided Major Arterial	40,000	13,600	A	0.340
16. N Twin Oaks Valley Road to Woodward Street	4-Lane Undivided Major Arterial	40,000	12,160	A	0.304
Woodward Street					
17. Borden Road to E Mission Road	2-Lane with TWLTL Collector	15,000	3,230	A	0.215

Footnotes:

- a. Capacities based on the City of San Marcos' *Roadway Classifications, Capacity, and LOS* (see Appendix C).
- b. Average Daily Traffic Volumes.
- c. Level of Service.
- d. Volume to Capacity.
- e. Capacities based on the County of San Diego's *Average Daily Vehicle Trips Table* (see Appendix C).
- f. TWLTL = Two-Way Left-Turn Lane
- g. Capacity for an 8-Lane Prime Arterial was interpolated between the capacities of a 6-Lane Prime Arterial and an Expressway.

6.0 OPENING YEAR (INTERIM YEAR 2028) CONDITIONS

This section describes Opening Year (Interim Year 2028) roadway network and traffic volume conditions.

6.1 Network Conditions

The existing street system as illustrated in *Figure 3-1* is assumed for Opening Year (Interim Year 2028) conditions with no assumed improvements within the study area.

6.2 Opening Year (Interim Year 2028) Traffic Volumes

To forecast future traffic volumes for Opening Year (Interim Year 2028) conditions, the SANDAG ABM2+ model was first utilized to forecast Year 2050 volumes. Year 2028 traffic volumes were then developed based on an interpolation between Existing and Year 2050 traffic volumes. The forecasted ADT volumes were then used to calculate peak hour volumes based partially on the existing relationship between ADT and peak hour volumes.

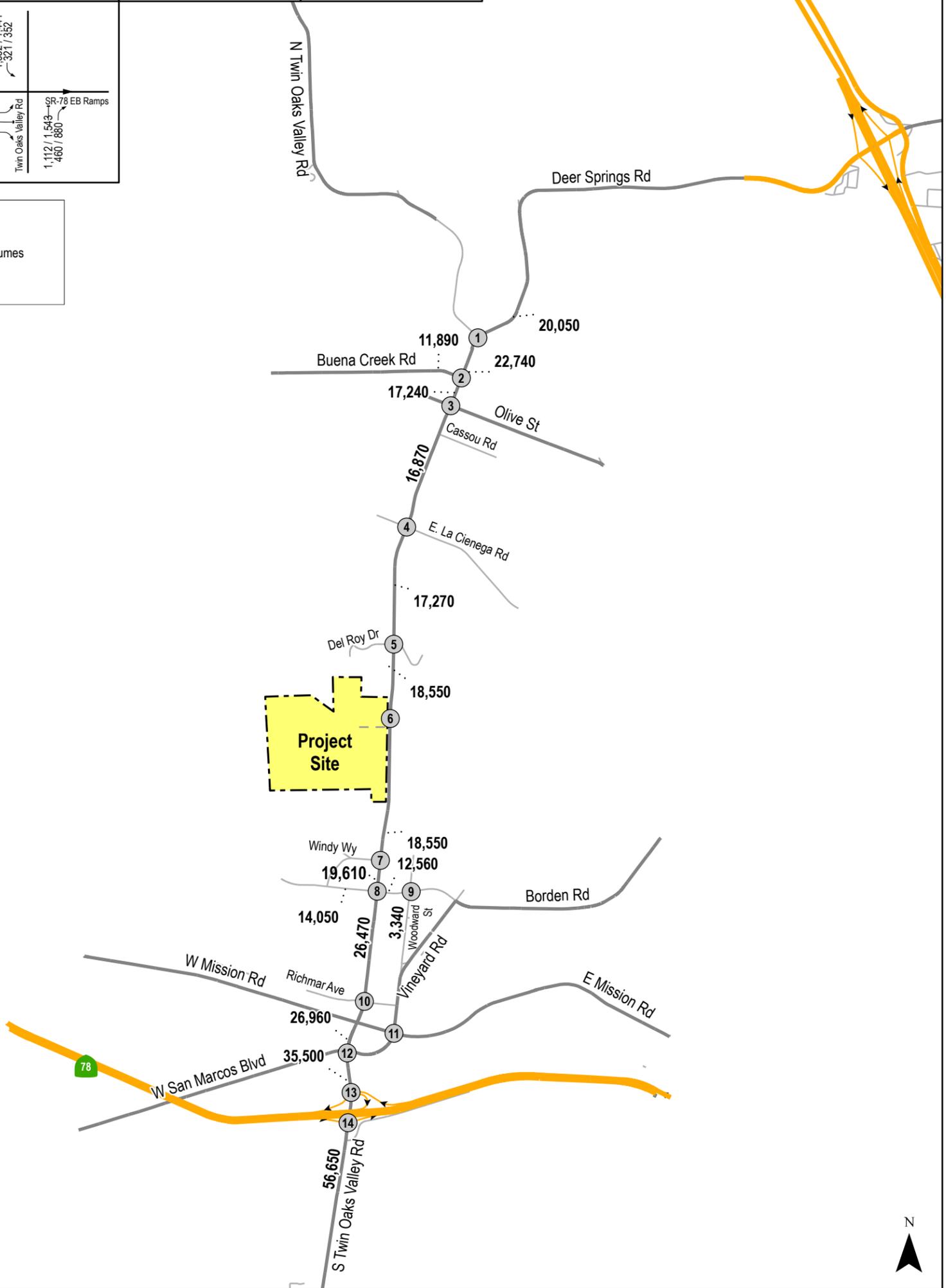
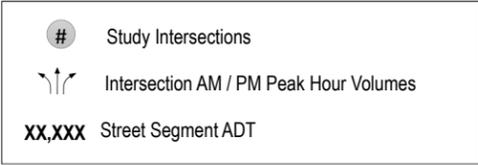
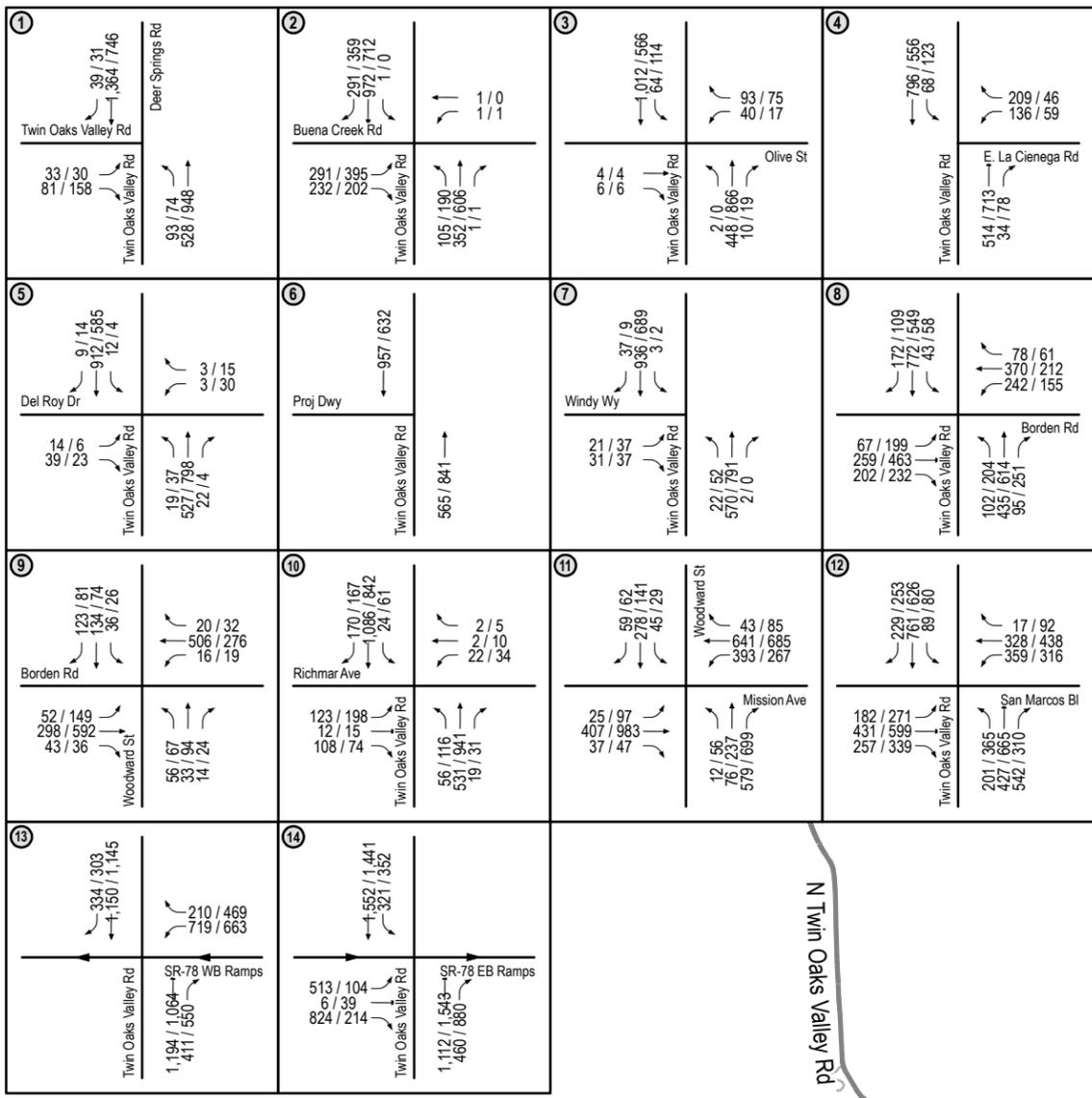
Several other traffic engineering principles and factors such as the K-factor (the proportion of daily volume that occurs during the peak period) and D-factor (the directional split of the traffic volumes) were also considered in the forecast analysis (see *Appendix E* for definitions). The forecast volumes were also checked for consistency between intersections, where no driveways or roadways exist between intersections, and were compared to existing volumes for accuracy.

The use of interpolated SANDAG ABM2+ model forecasts, along with applied K- and D-factors and internal consistency checks, incorporates the regional growth assumptions that account for cumulative development activity within the study area. In addition, the amount of anticipated growth in the area has decreased somewhat substantially over the past 15 years as described below, and therefore, it can be concluded that the forecast volumes, which were developed assuming a greater density than is now proposed, adequately account for regional and local growth in the area.

- For example, in 2009, the City of San Marcos (City) approved the University District Specific Plan and certified the FEIR (SCH No. 2008101083). In 2011 a Conditional Use Permit (CUP) for use of a rock crusher and modified grading operations at the site was approved and a Mitigated Negative Declaration (MND) was adopted for the CUP (SCH No. 2011081083). In 2014, an Addendum to the certified FEIR was prepared for a Specific Plan Amendment to refine land uses, development intensities and the circulation network within the specific plan area, which resulted in an overall reduction in development intensities. In 2017 an Addendum to the certified FEIR was prepared for an Administrative Amendment and Conditional Use Permit (CUP 17-0005) to construct a 6-story mixed use building consisting of classrooms, offices, and retail space, a parking structure and pedestrian facilities. In 2019 a Substantial Conformance document was prepared for the Mesa Rim Climbing Center. In 2022 an Addendum to the certified FEIR was prepared for a General Plan Amendment, two Specific Plan Amendments, tentative subdivision map and a site development plan to modify the development intensities and increase building heights in some areas, which resulted in an overall reduction in

development intensities. The 2022 FEIR Addendum also addressed adding two parcels APN 220-201-90-00 (Zirpolo) and APN 220-202-18-00 (NCTD) to the UDSP planning area. Cumulatively, these amendments to the UDSP have resulted in an overall reduction in development intensity and trip generation (114,697 ADT vs. 58,517 ADT, a 48% reduction).

Figure 6-1 illustrates the peak hour and ADT segment volumes under the Opening Year scenario.



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Figure 6-1
Opening Year without Project Traffic Volumes

7.0 TRIP GENERATION/DISTRIBUTION/ASSIGNMENT

As described in *Section 2.2*, the proposed Project would provide 257 residential dwelling units (112 detached airspace condos and 145 single-family residential). Additionally, 6.22 acres of public park, and preserved open space on a 137-acre site is proposed.

The following is a discussion of the traffic expected to be generated by the Project.

7.1 Trip Generation

7.1.1 Trip Rates

Trip generation for the Project was estimated using trip rates from SANDAG's *(Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region, April 2002*. The trip generation rates for "Condominium (or any multi-family units more than 6-20 DU/acre)", "Single Family Detached (average 3-6 DU/acre), and "Neighborhood Park" were used.

The proposed park may generate trips above those of a typical park. Therefore, in order to be conservative, a 50% increase to the SANDAG "Neighborhood Park" rate was applied.

7.1.2 Project Trips

Table 7-1 tabulates the total Project traffic generation. The Project is calculated to generate a total of 2,393 ADT with 194 AM peak hour trips (52 inbound / 142 outbound) and 239 PM peak hour trips (167 inbound and 72 outbound).

7.2 Trip Distribution and Assignment

The traffic generated by the Project was distributed and assigned based on anticipated traffic patterns to and from the site and the Project site's proximity to state highways and arterials. **Figure 7-1** shows the Project traffic distribution. **Figure 7-2** shows the Project traffic volumes. **Figure 7-3** shows the Opening Year + Project traffic volumes.

**TABLE 7-1
PROJECT TRIP GENERATION**

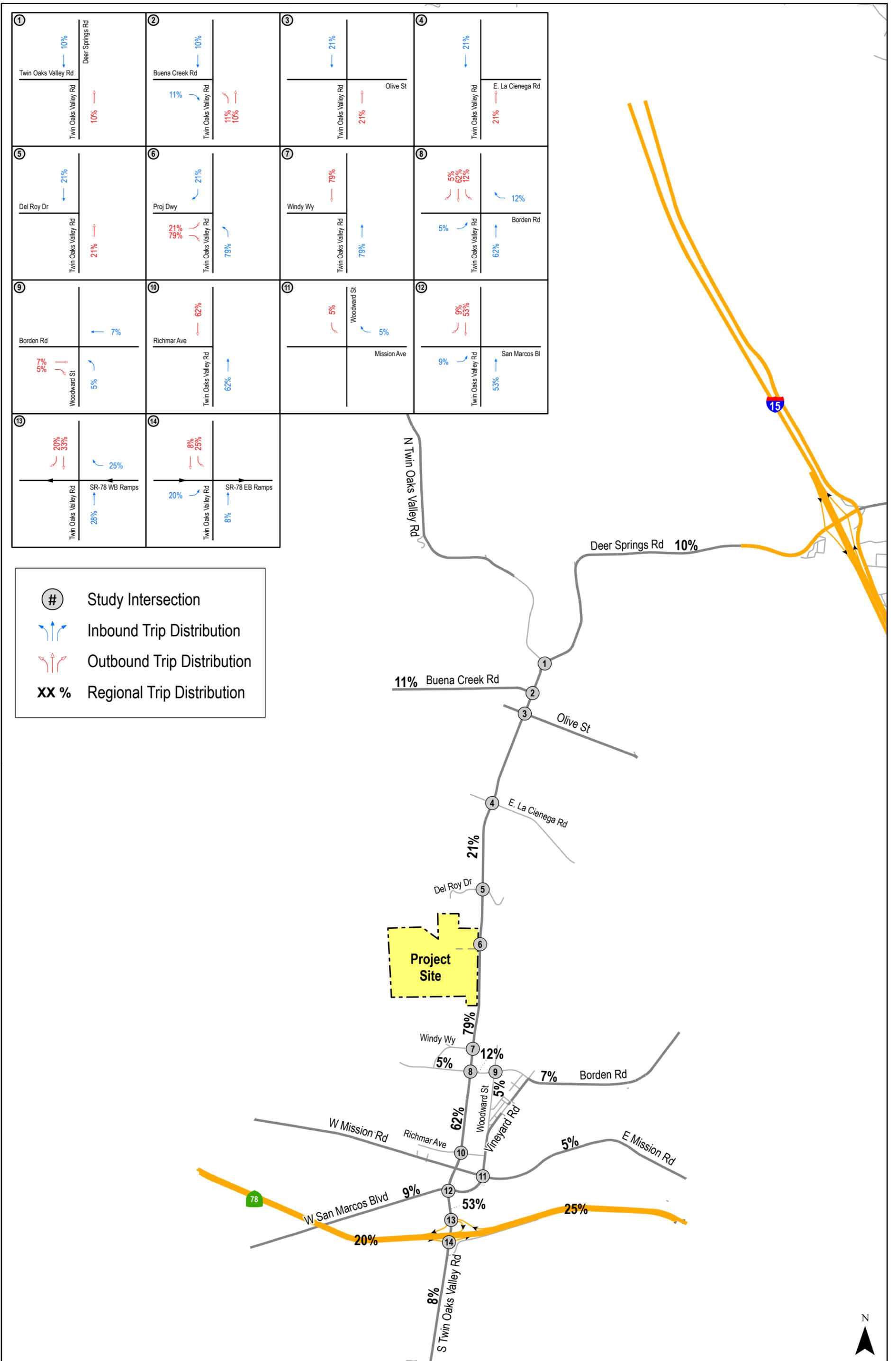
Land Use	Size	Daily Trip Ends (ADTs)		AM Peak Hour					PM Peak Hour				
		Rate ^a	ADT	Rate	In:Out Split	Volume			Rate	In:Out Split	Volume		
						In	Out	Total			In	Out	Total
Residential Component													
Condominium	112 DU	8 / DU	896	8%	20:80	14	58	72	10%	70:30	63	27	90
Single Family Residential	145 DU	10 / DU	1,450	8%	30:70	35	81	116	10%	70:30	102	43	145
<i>Residential Subtotal</i>			2,346			49	139	188			165	70	235
Park Component													
Neighborhood Park	6.2 Acres	5 / Acre	31	13%	50:50	2	2	4	9%	50:50	1	2	3
50% Park Trip Rate Increase			16			1	1	2			1	1	2
<i>Park Subtotal</i>			47			3	3	6			2	3	5
TOTAL			2,393			52	142	194			167	72	239

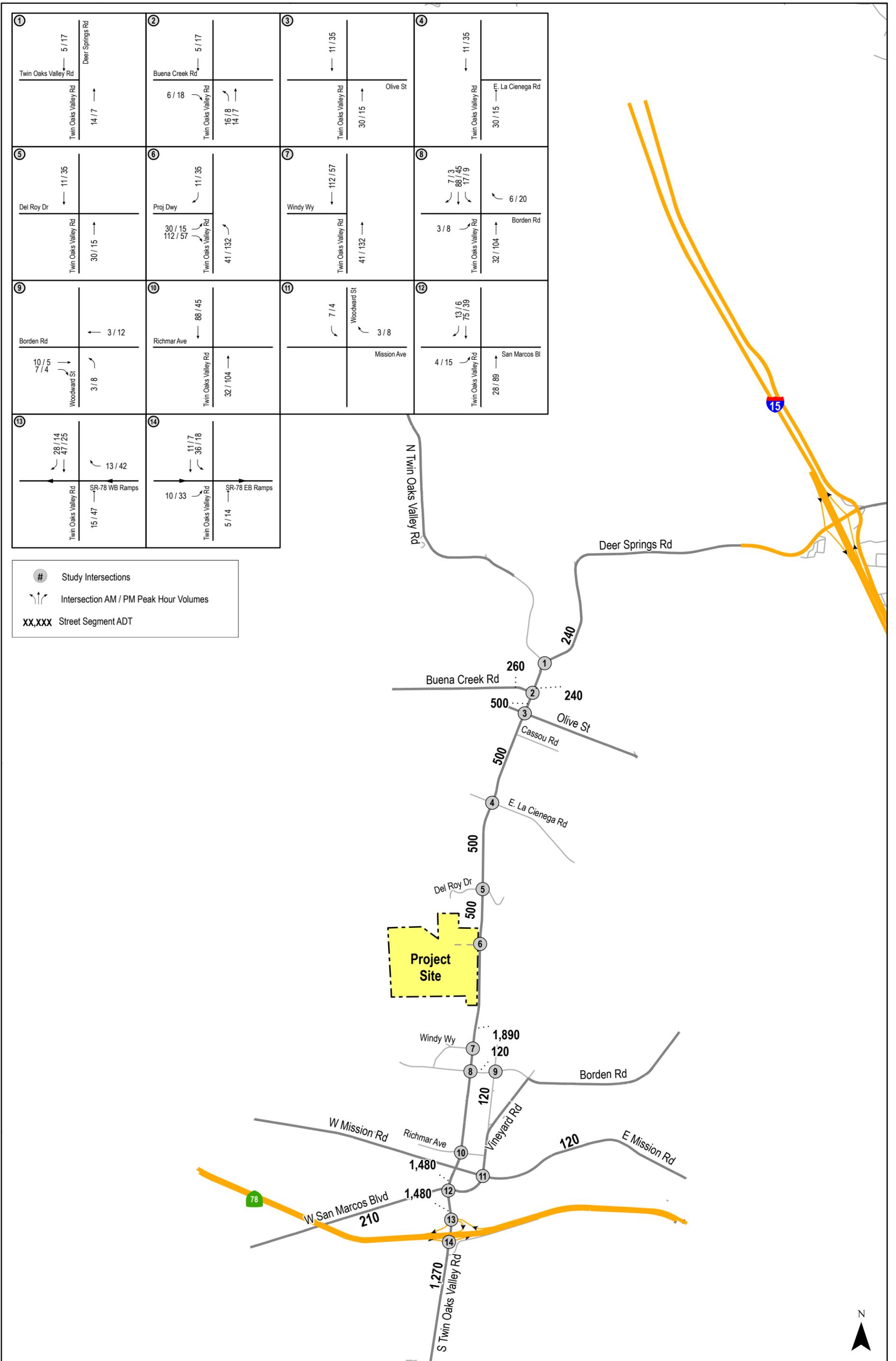
Footnotes:

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

General Note:

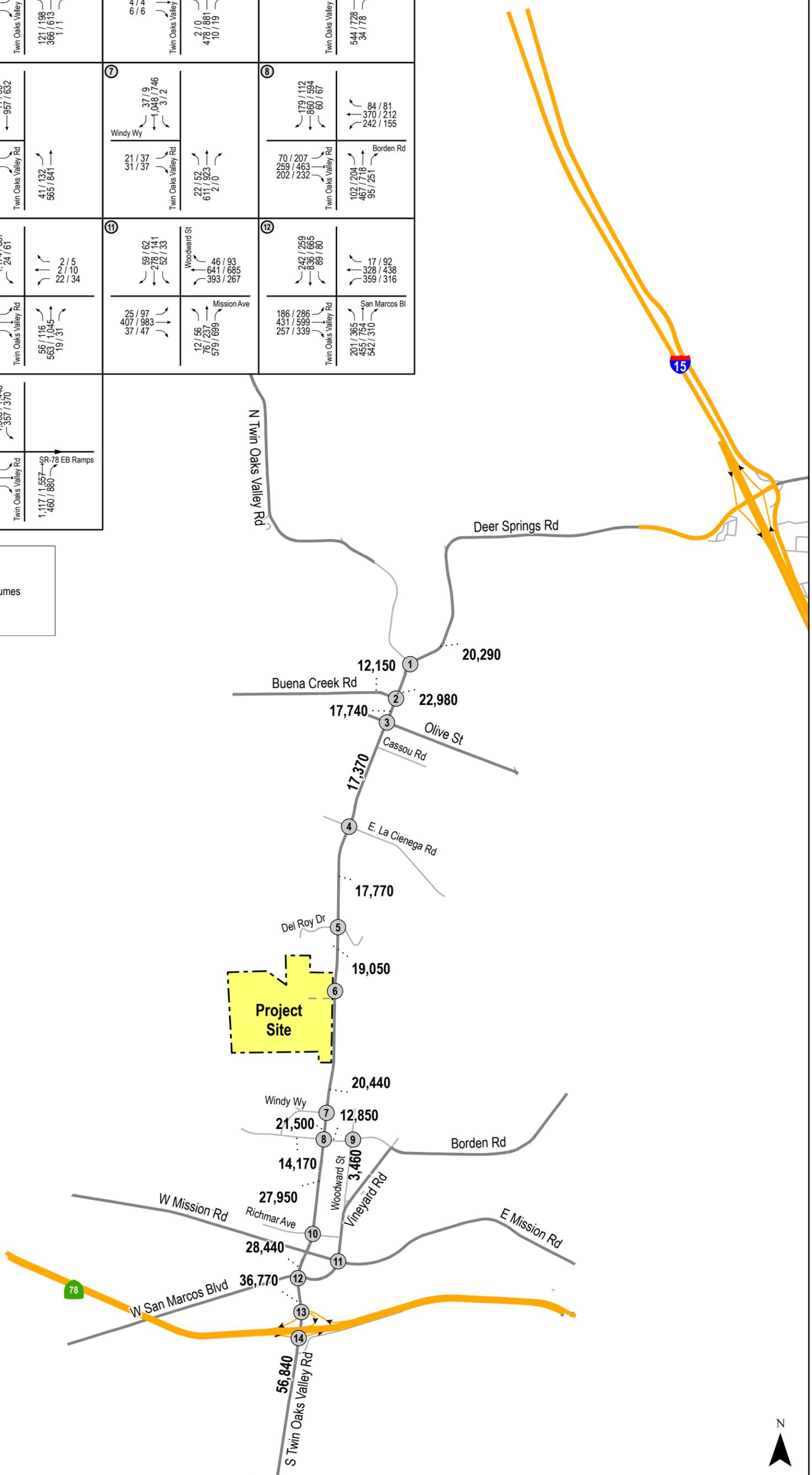
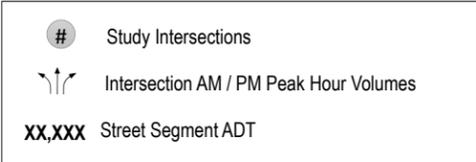
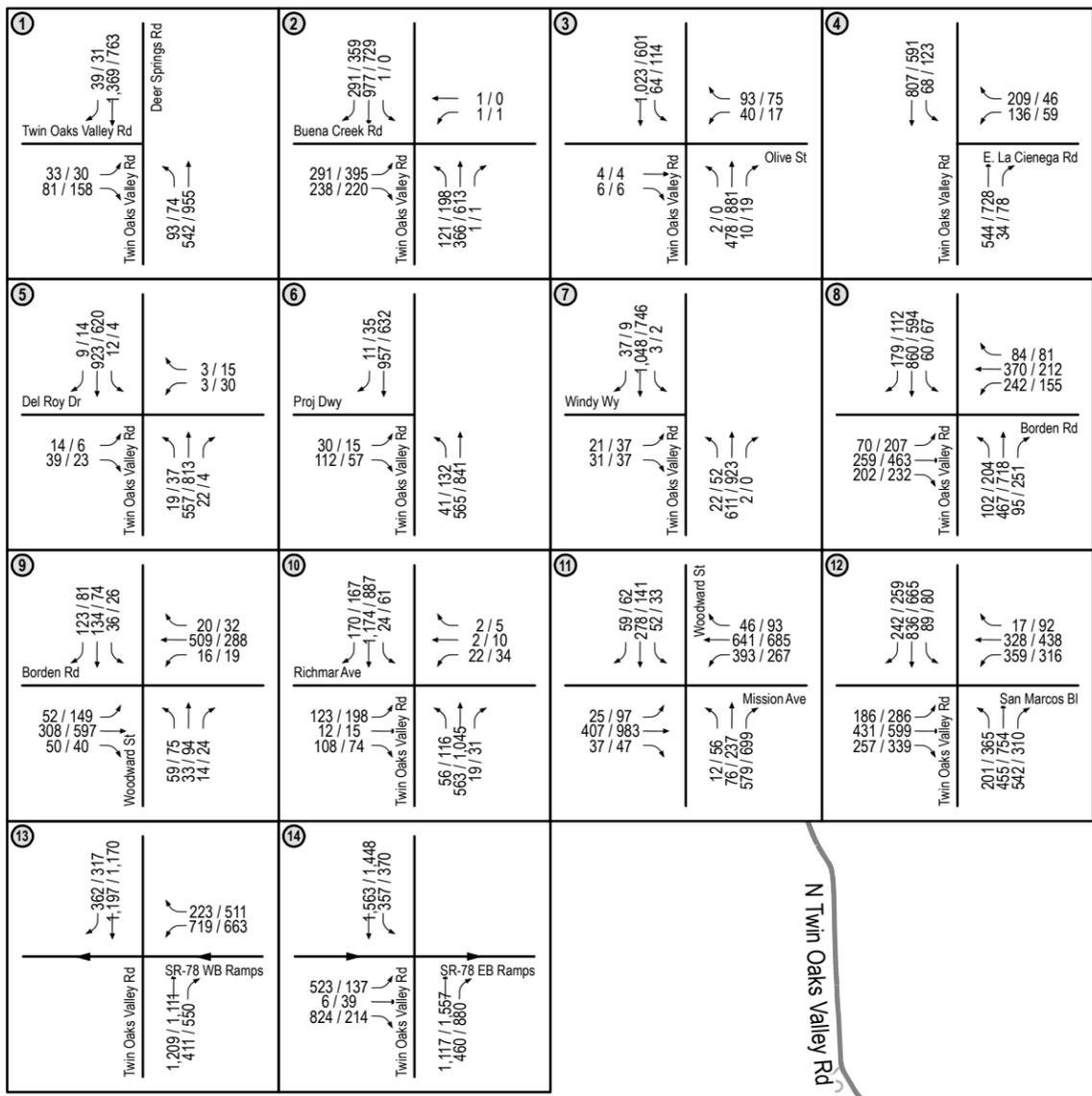
- DU = Dwelling Unit





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Figure 7-2
Project Traffic Volumes



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Figure 7-3
Opening Year + Project Traffic Volumes

8.0 ANALYSIS OF OPENING YEAR SCENARIOS

The following section presents the analysis of study area intersections and street segments under Opening Year conditions without and with the Project.

8.1 Opening Year Without Project

8.1.1 Intersection Analysis

Table 8–1 summarizes the intersection operations under the Opening Year without Project condition. As seen in *Table 8–1*, all study intersections are calculated to operate acceptably at LOS D or better with the exception of Intersection #12. Twin Oaks Valley Rd & San Marcos Blvd, which is calculated to operate at LOS F/E during the AM/PM peak hours.

Appendix F contains the Opening Year without Project intersection analysis calculation worksheets.

8.1.2 Segment Operations

Table 8–2 summarizes the segment operations under the Opening Year without Project condition. As seen in *Table 8–2*, the following study segments are calculated to operate at LOS E or F:

- Segment #1. Deer Springs Road: Sycamore Drive to Twin Oaks Valley Road (LOS F)
- Segment #2. N Twin Oaks Valley Road: Deer Springs Road to Buena Creek Road (LOS F)
- Segment #3. N Twin Oaks Valley Road: Buena Creek Road to Olive Street (LOS F)
- Segment #4. N Twin Oaks Valley Road: Olive Street to Cassou Road (LOS F)
- Segment #14. Buena Creek Road: West of Twin Oaks Valley Road (LOS E)

8.2 Opening Year + Project

8.2.1 Intersection Analysis

Table 8–1 summarizes the intersection operations under the Opening Year + Project condition. As seen in *Table 8–1*, with the addition of Project traffic, all study intersections are calculated to operate acceptably at LOS D or better with the exception of Intersection #12. Twin Oaks Valley Rd & San Marcos Blvd, which is calculated to continue to operate at LOS F/E during the AM/PM peak hours.

Based on the established Level of Service Standards outlined in *Section 4.3*, the Project is calculated to result in a substantial effect to Intersection #12. Twin Oaks Valley Rd & San Marcos Blvd during the AM peak hour. This intersection operates at LOS F during the AM peak hour under existing (without Project) conditions and is fully built-out. Additionally, the Project's contribution to the overall traffic volumes at the intersection is approximately 3.5%. Improvements to this intersection are further discussed in *Section 13.0*. A substantial effect to Intersection #12 is not calculated during the PM peak hour since the Project induced increase in delay is less than 2.0 seconds.

Appendix G contains the Opening Year + Project intersection analysis calculation worksheets.

8.2.2 Segment Operations

Table 8–2 summarizes the segment operations under the Opening Year + Project condition. As seen in *Table 8–2*, with the addition of Project traffic, the following study segments are calculated to continue to operate at LOS E or F:

- Segment #1. Deer Springs Road: Sycamore Drive to Twin Oaks Valley Road (LOS F)
- Segment #2. N Twin Oaks Valley Road: Deer Springs Road to Buena Creek Road (LOS F)
- Segment #3. N Twin Oaks Valley Road: Buena Creek Road to Olive Street (LOS F)
- Segment #4. N Twin Oaks Valley Road: Olive Street to Cassou Road (LOS F)
- Segment #14. Buena Creek Road: West of Twin Oaks Valley Road (LOS E)

Based on the established Level of Service Standards outlined in *Section 4.3*, the Project is calculated to result in a substantial effect to *Segment #3. N Twin Oaks Valley Road: Buena Creek Road to Olive Street* and *Segment #4. N Twin Oaks Valley Road: Olive Street to Cassou Road*. It should be noted, these two segments are currently constructed as a two-lane roadway and classified as a 4-Lane (Rural) Arterial with Enhanced Bicycle/Pedestrian facilities on the *City of San Marcos Mobility Element* and are therefore not constructed to their ultimate Mobility Element classification. Improvements to this segment are further discussed in *Section 13.0*

The Project induced increase in the V/C ratio at the remaining segments operating at LOS E or F is below 0.02 and therefore these segments are not considered substantially effected by the Project.

**TABLE 8-1
OPENING YEAR INTERSECTION OPERATIONS**

Intersection	Control Type	Peak Hour	Opening Year Without Project		Opening Year + Project		Δ ^c	Substantial Effect?
			Delay ^a	LOS ^b	Delay	LOS		
1. Twin Oaks Valley Rd & Deer Springs Rd	Signal	AM	35.5	D	36.0	D	0.5	No
		PM	17.4	B	18.1	B	0.7	No
2. Twin Oaks Valley Rd & Buena Creek Rd	Signal	AM	53.0	B	54.8	D	1.8	No
		PM	36.4	D	39.5	D	3.1	No
3. Twin Oaks Valley Rd & Olive Street	Signal	AM	28.1	C	28.7	C	0.6	No
		PM	25.8	C	26.5	C	0.7	No
4. Twin Oaks Valley Rd & E. La Cienega Road	Signal	AM	13.8	B	13.9	B	0.1	No
		PM	13.2	B	13.1	B	-. ^d	No
5. Twin Oaks Valley Rd & Del Roy Dr	Signal	AM	15.9	B	16.0	B	0.1	No
		PM	16.9	B	17.1	B	0.2	No
6. Twin Oaks Valley Rd & Project Driveway	Signal ^e	AM	-	-	8.3	A	-	No
		PM	-	-	7.7	A	-	No
7. Twin Oaks Valley Rd & Windy Wy	Signal	AM	6.9	A	6.8	A	-. ^d	No
		PM	9.6	A	9.1	A	-. ^d	No
8. Twin Oaks Valley Rd & Borden Rd	Signal	AM	48.6	D	51.2	D	2.6	No
		PM	50.0	D	51.1	D	1.1	No
9. Woodward St & Borden Rd	Signal	AM	22.6	C	22.6	C	0.0	No
		PM	21.3	C	21.4	C	0.1	No
10. Twin Oaks Valley Rd & Richmar Road	Signal	AM	28.1	C	28.0	C	-. ^d	No
		PM	38.8	D	38.6	D	-. ^d	No
11. San Marcos Blvd & E. Mission Road	Signal	AM	19.8	B	20.0	B	0.2	No
		PM	22.5	C	22.5	C	0.0	No
12. Twin Oaks Valley Rd & San Marcos Blvd	Signal	AM	85.9	F	88.6	F	2.7	YES
		PM	91.8	F	91.6	F	-. ^d	No
13. Twin Oaks Valley Rd & SR 78 WB Ramps	Signal	AM	15.4	B	15.4	B	0.0	No
		PM	16.1	B	16.4	B	0.3	No

Continued on Next Page

**TABLE 8-1
OPENING YEAR INTERSECTION OPERATIONS**

Intersection	Control Type	Peak Hour	Opening Year Without Project		Opening Year + Project		Δ^c	Substantial Effect?
			Delay ^a	LOS ^b	Delay	LOS		
<i>Continued from Previous Page</i>								
14. Twin Oaks Valley Rd & SR 78 EB Ramps	Signal	AM	37.6	D	38.4	D	0.8	No
		PM	18.9	B	19.9	B	1.0	No

Footnotes:

- a. Average delay expressed in seconds per vehicle.
- b. Level of Service.
- c. Δ denotes the increase in delay due to Project.
- d. A decrease in delay was calculated as a result of the addition of Project traffic. *Appendix H* includes additional explanation.
- e. Project driveway does not exist under “without Project” conditions and is assumed to be signalized as a Project feature.

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

**TABLE 8-2
OPENING YEAR STREET SEGMENT OPERATIONS**

Street Segment	Capacity (LOS E) ^a	Opening Year Without Project			Opening Year + Project			Δ^e	Substantial Effect?
		ADT ^b	LOS ^c	V/C ^d	ADT	LOS	V/C		
Deer Springs Road									
1. Sycamore Drive to Twin Oaks Valley Road	16,200 ^f	20,050	F	1.238	20,290	F	1.252	0.014	No
N Twin Oaks Valley Road									
2. Deer Springs Road to Buena Creek Road	15,000	22,740	F	1.516	22,980	F	1.532	0.016	No
3. Buena Creek Road to Olive Street	15,000	17,240	F	1.149	17,740	F	1.183	0.034	YES
4. Olive Street to Cassou Road	15,000	16,870	F	1.125	17,370	F	1.158	0.033	YES
5. Cassou Road to E La Cienega Rd	40,000	16,870	B	0.422	17,370	B	0.434	0.012	No
6. E La Cienega Rd to Del Roy Drive	40,000	17,270	B	0.432	17,770	B	0.444	0.012	No
7. Del Roy Drive to Project Driveway	40,000	18,550	B	0.464	19,050	B	0.476	0.012	No
8. Project Driveway to Windy Way	40,000	18,550	B	0.464	20,440	B	0.511	0.047	No
9. Windy Way to Borden Road	40,000	19,610	B	0.490	21,500	C	0.538	0.048	No
10. Borden Road to Richmar Avenue	40,000	26,470	C	0.662	27,950	C	0.699	0.037	No
11. Richmar Avenue to San Marcos Boulevard	40,000	26,960	C	0.674	28,440	C	0.711	0.037	No
12. San Marcos Boulevard to SR-78 Ramps	50,000	35,500	C	0.710	36,770	C	0.735	0.025	No
13. SR-78 Ramps to N City Drive	70,000 ^g	56,650	C	0.809	56,840	C	0.812	0.003	No
Buena Creek Road									
14. West of N Twin Oaks Valley Road	16,200 ^f	11,890	E	0.734	12,150	E	0.750	0.016	No
Borden Road									
15. Windy Point Road to N Twin Oaks Valley Road	40,000	14,050	A	0.351	14,170	A	0.354	0.003	No
16. N Twin Oaks Valley Road to Woodward Street	40,000	12,560	A	0.314	12,850	A	0.321	0.007	No
Woodward Street									
17. Borden Road to E Mission Road	15,000	3,340	A	0.223	3,460	A	0.231	0.008	No

Footnotes:

- a. Capacities based on the City of San Marcos' *Roadway Classifications, Capacity, and LOS* (see Appendix C).
- b. Average Daily Traffic Volumes.
- c. Level of Service.
- d. Volume to Capacity.
- e. Δ denotes a Project-induced increase in the Volume to Capacity (V/C) ratio.
- f. Capacities based on based on the County of San Diego's *Average Daily Vehicle Trips Table* (see Appendix C).
- g. Capacity for an 8-Lane Prime Arterial was interpolated between the capacities of a 6-Lane Prime Arterial and an Expressway.

9.0 HORIZON YEAR (YEAR 2050) CONDITIONS

9.1 Horizon Year (Year 2050) Network Conditions

As noted in *Section 3.1*, various study segments are not built to their ultimate classification based on the *City of San Marcos Mobility Element* and the *County of San Diego Mobility Element*. For the purposes of this traffic study, the roadway geometry for the Horizon Year (Year 2050) conditions assumes all roadways are built to their ultimate classification.

The following study segments are not currently built to their ultimate classification:

- Segment #1. Deer Springs Road: Sycamore Drive to Twin Oaks Valley Road
 - Functional Classification (Existing): 2-Lane Undivided Collector (2.2 E)
 - Ultimate Classification (Future): 6-Lane Prime Arterial (6.2)
- Segment #2. N Twin Oaks Valley Road: Deer Springs Road to Buena Creek Road
 - Functional Classification (Existing): 2-Lane with two-way left- turn lane (TWLTL) Collector
 - Ultimate Classification (Future): 4-Lane Major Arterial
- Segment #3. N Twin Oaks Valley Road: Buena Creek Road to Olive Street
 - Functional Classification (Existing): 2-Lane with TWLTL Collector
 - Ultimate Classification (Future): 4-Lane Major Arterial
- Segment #4. N Twin Oaks Valley Road: Olive Street to Cassou Road
 - Functional Classification (Existing): 2-Lane with TWLTL Collector
 - Ultimate Classification (Future): 4-Lane Major Arterial
- Segment #13. Buena Creek Road: West of Twin Oaks Valley Road
 - Functional Classification (Existing): 2-Lane Undivided Collector (2.2 E)
 - Ultimate Classification (Future): 4-Lane Major Road (4.1B)

9.2 Horizon Year (Year 2050) Traffic Volumes

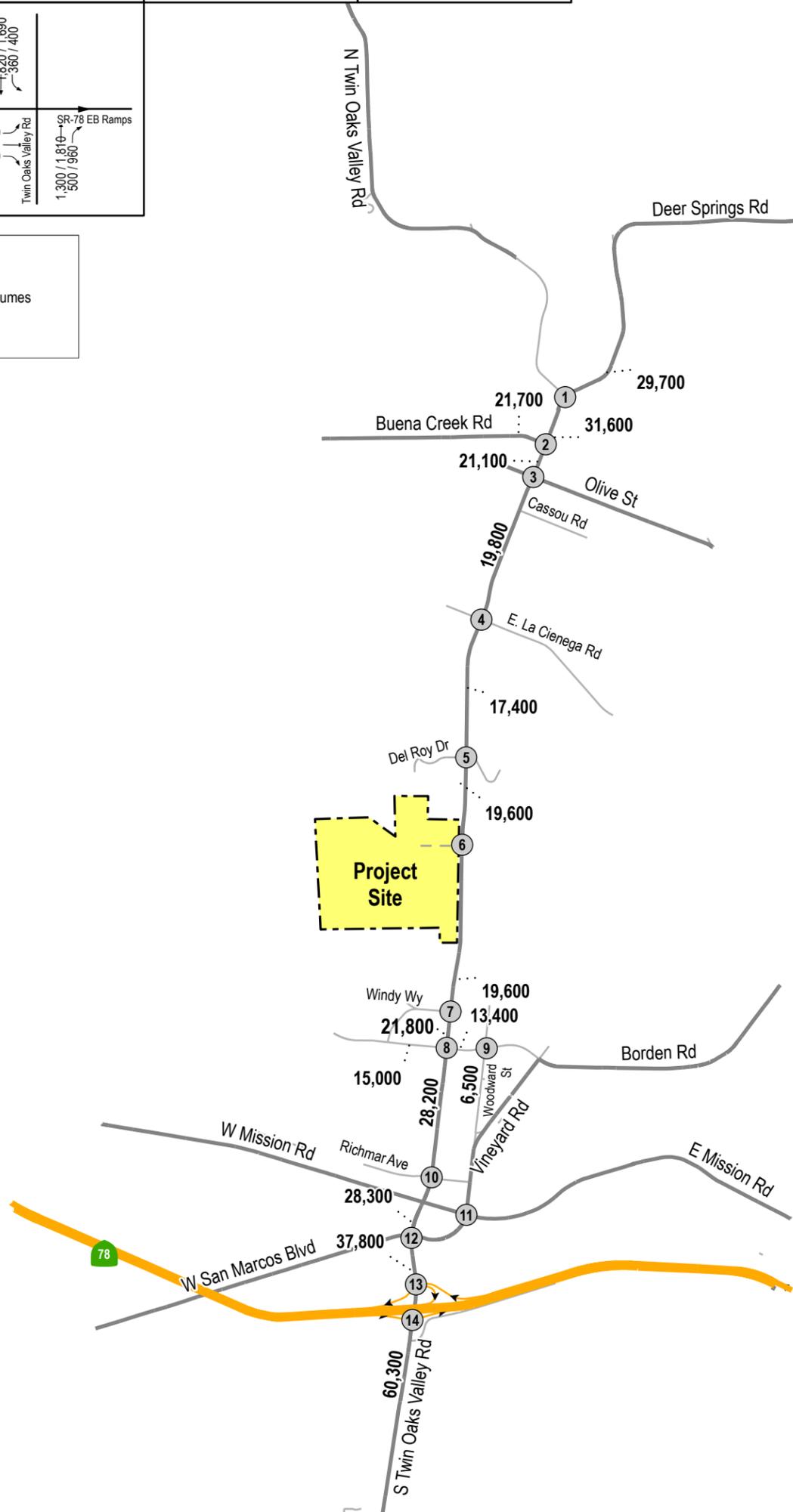
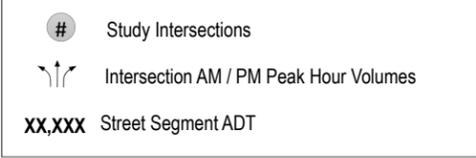
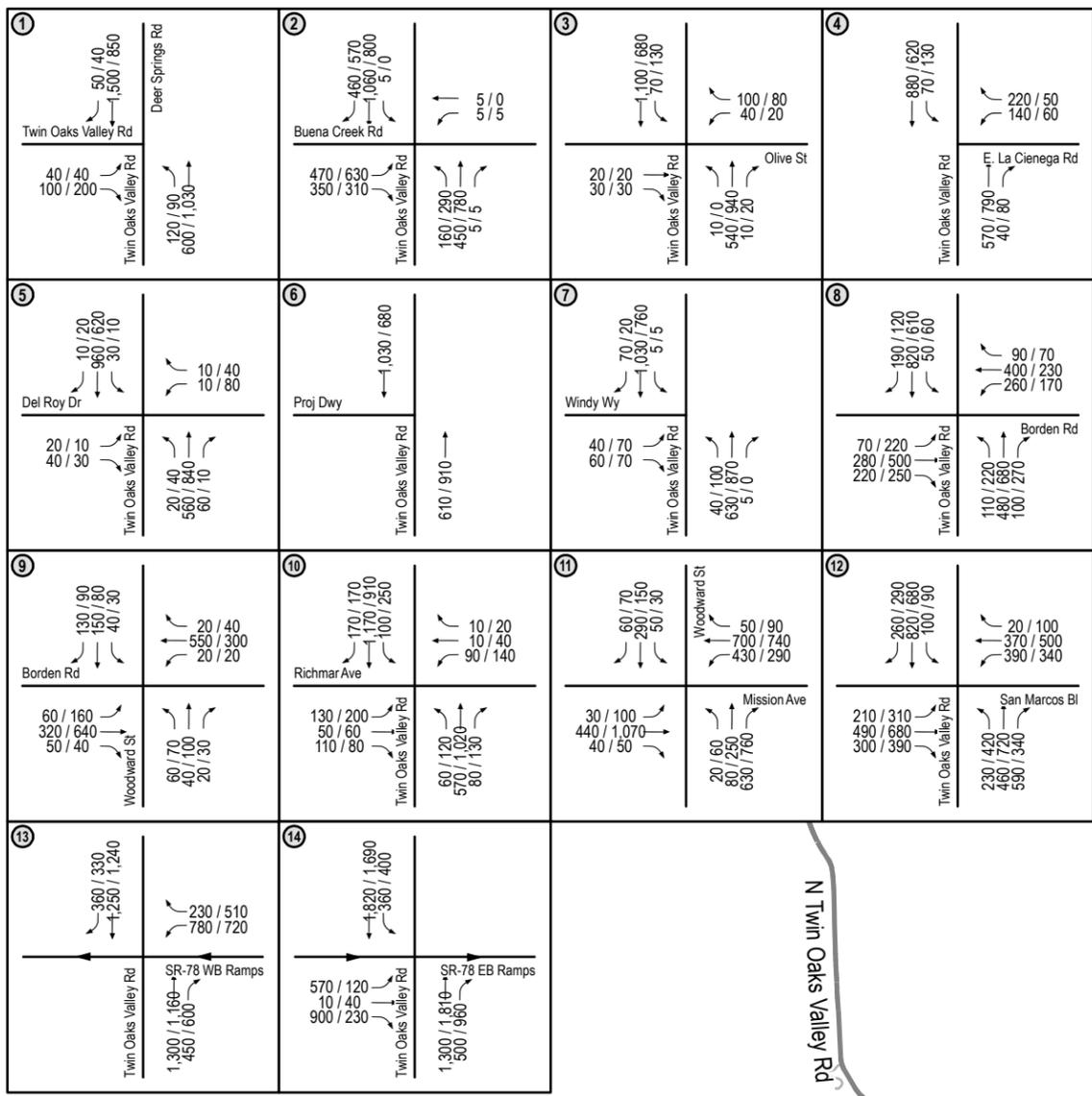
To forecast future traffic volumes for Horizon Year (Year 2050) conditions, the SANDAG ABM2+ Model was utilized. The forecasted ADT volumes were then used to calculate peak hour volumes based partially on the existing relationship between ADT and peak hour volumes.

Several other traffic engineering principles and factors such as the K-factor (the proportion of daily volume that occurs during the peak period) and D-factor (the directional split of the traffic volumes) were also considered in the forecast analysis (see *Appendix E* for definitions). The forecast volumes were also checked for consistency between intersections, where no driveways or roadways exist between intersections, and were compared to existing volumes for accuracy.

Figure 9–1 shows the Horizon Year (Year 2050) without Project traffic volumes. **Figure 9–2** shows the Horizon Year (Year 2050) + Project traffic volumes.

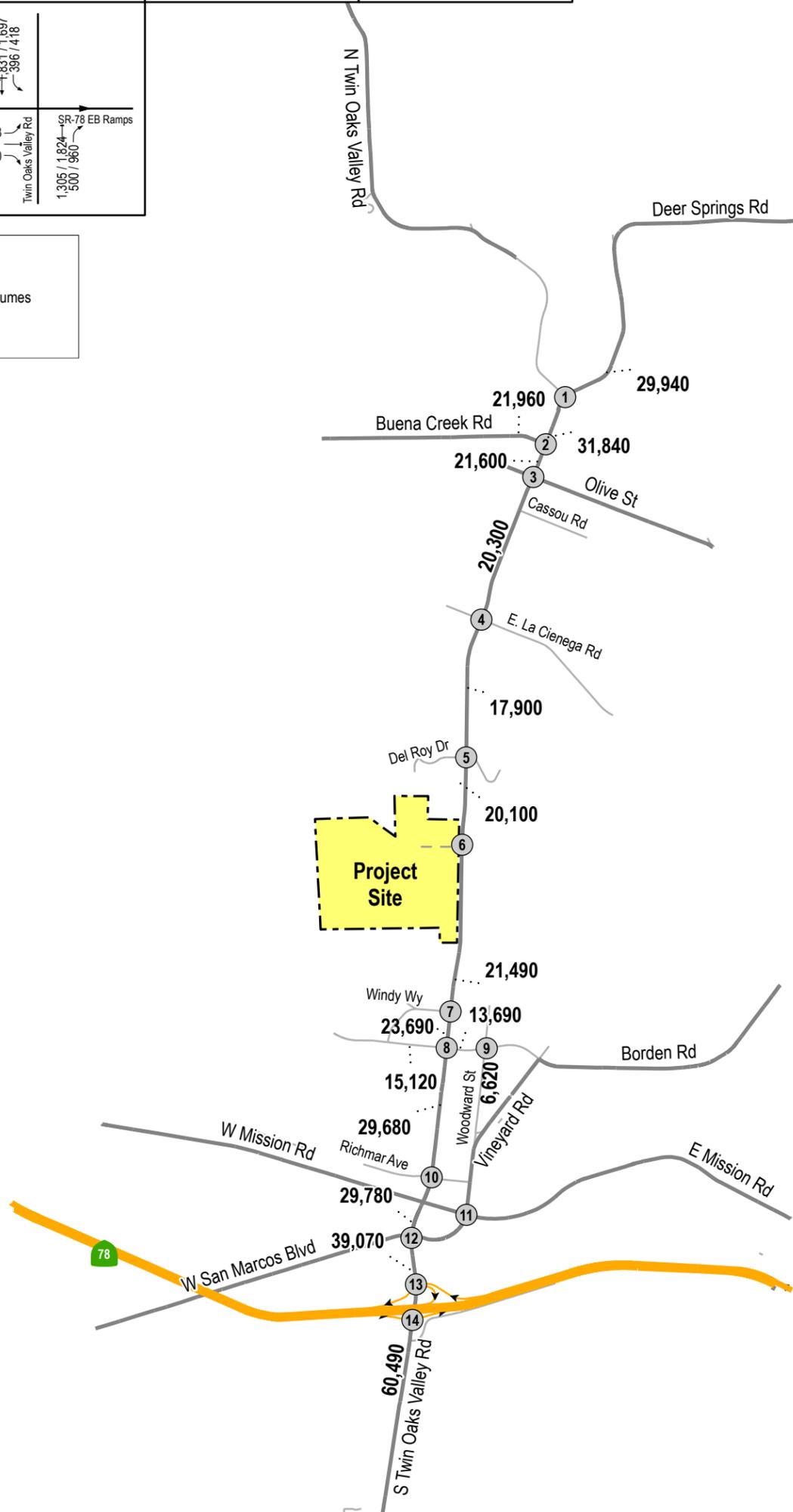
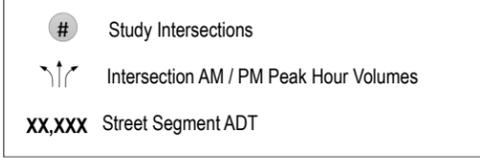
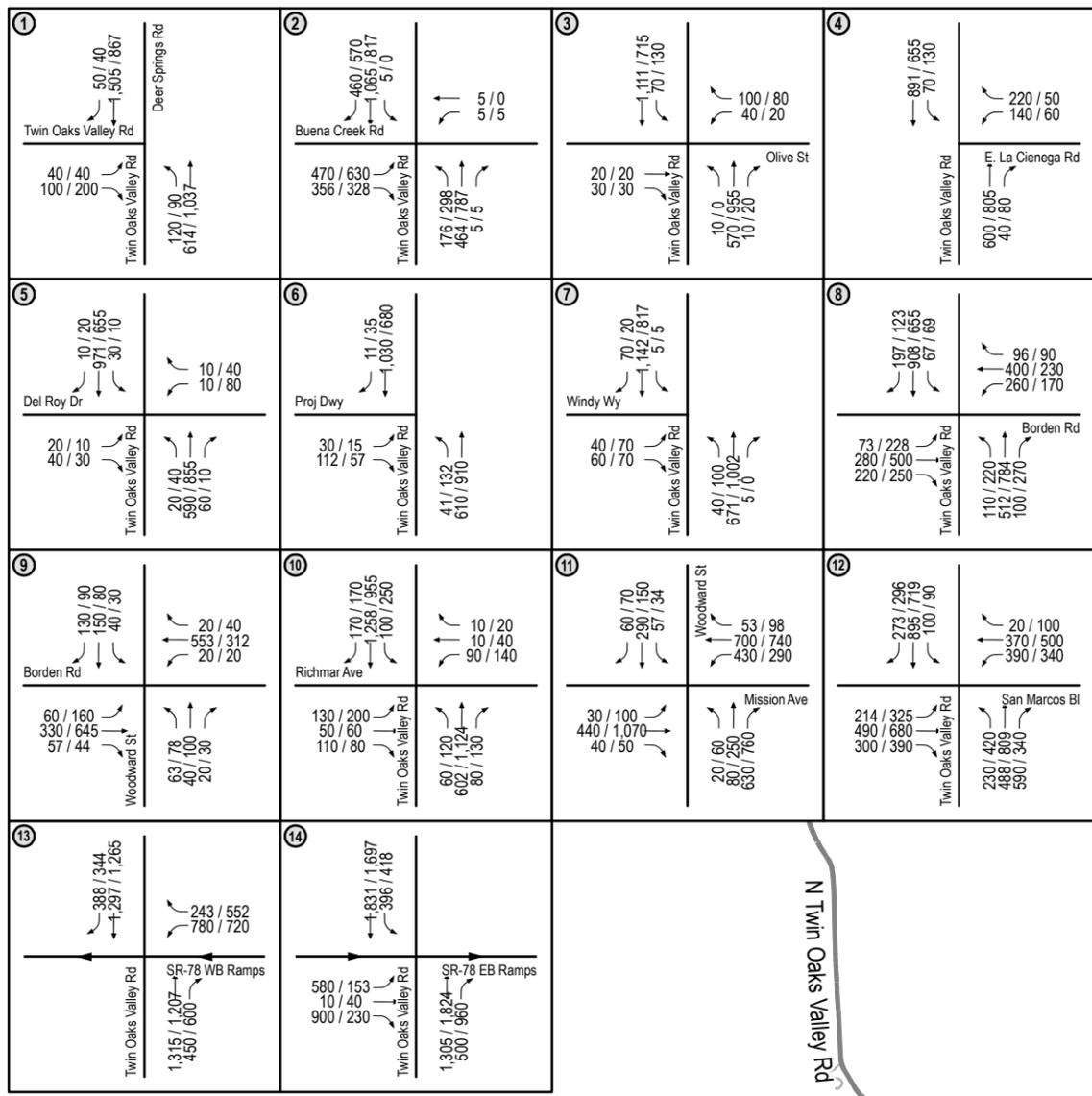
The SANDAG ABM2+ model outputs, along with the applied K- and D-factors and internal consistency checks, inherently account for regional growth patterns and cumulative development

activity within the study area. In addition, the amount of anticipated growth in the area has decreased somewhat substantially over the past 15 years, and therefore, it can be concluded that the forecast volumes, which were developed assuming a greater density than is now proposed, adequately account for regional and local growth in the area. Additional discussion is included in *Section 6.2*.



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Figure 9-1
Horizon Year without Project Traffic Volumes



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Figure 9-2
Horizon Year + Project Traffic Volumes

10.0 ANALYSIS OF HORIZON YEAR SCENARIOS

10.1 Horizon Year Without Project

10.1.1 Intersection Analysis

Table 10–1 summarizes the intersection operations under the Horizon Year without Project condition. As seen in *Table 10–1*, all study intersections are calculated to operate acceptably at LOS D or better with the exception of

- Intersection #1. Twin Oaks Valley Rd & Deer Springs Rd; LOS E (AM peak hour)
- Intersection #2. Twin Oaks Valley Rd & Buena Creek Rd; LOS F/F (AM/PM peak hours)
- Intersection #10. Twin Oaks Valley Rd & Richmar Rd; LOS F (PM peak hour)
- Intersection #12. Twin Oaks Valley Rd & San Marcos Blvd; LOS F/F (AM/PM peak hours)

Appendix I contains the Horizon Year without Project intersection analysis calculation worksheets.

10.1.2 Segment Operations

Table 10–2 summarizes the segment operations under the Horizon Year without Project condition. As seen in *Table 10–2*, all study segments are calculated to operate at LOS D or better.

10.2 Horizon Year + Project

10.2.1 Intersection Analysis

Table 10–1 summarizes the intersection operations under the Horizon Year + Project condition. As seen in *Table 10–1*, with the addition of Project traffic, all study intersections are calculated to operate acceptably at LOS D or better with the exception of the following which are calculated to continue to operate at LOS F/E during the AM/PM peak hours:

- Intersection #1. Twin Oaks Valley Rd & Deer Springs Rd; LOS E (AM peak hour)
- Intersection #2. Twin Oaks Valley Rd & Buena Creek Rd; LOS F/F (AM/PM peak hours)
- Intersection #10. Twin Oaks Valley Rd & Richmar Rd; LOS F (PM peak hour)
- Intersection #12. Twin Oaks Valley Rd & San Marcos Blvd; LOS F/F (AM/PM peak hours) .

Based on the established Level of Service Standards outlined in *Section 4.3*, the Project is calculated to result in a substantial effect to Intersection #2. Twin Oaks Valley Rd & Buena Creek Rd and Intersection #12. Twin Oaks Valley Rd & San Marcos Blvd during the AM and PM peak hours. Therefore, improvements to these intersections are discussed further in *Section 13*.

Appendix J contains the Horizon Year + Project intersection analysis calculation worksheets.

10.2.2 Segment Operations

Table 10–2 summarizes the segment operations under the Horizon Year + Project condition. As seen in *Table 10–2*, with the addition of Project traffic, the all study segments are calculated to continue to operate at LOS D or better.

Based on the established Level of Service Standards outlined in *Section 4.3*, the Project is not calculated to result in a substantial effect to any segment in the Horizon Year.

**TABLE 10-1
HORIZON YEAR INTERSECTION OPERATIONS**

Intersection	Control Type	Peak Hour	Horizon Year Without Project		Horizon Year + Project		Δ ^c	Substantial Effect?
			Delay ^a	LOS ^b	Delay	LOS		
1. Twin Oaks Valley Rd & Deer Springs Rd	Signal	AM	64.9	E	65.4	E	0.5	No
		PM	32.2	C	34.6	C	2.4	No
2. Twin Oaks Valley Rd & Buena Creek Rd	Signal	AM	132.0	F	136.9	F	4.9	YES
		PM	90.1	F	94.6	F	4.5	YES
3. Twin Oaks Valley Rd & Olive Street	Signal	AM	50.4	D	51.9	D	1.5	No
		PM	51.4	D	53.5	D	2.1	No
4. Twin Oaks Valley Rd & E. La Cienega Road	Signal	AM	14.3	B	14.5	B	0.2	No
		PM	14.1	B	14.1	B	0.0	No
5. Twin Oaks Valley Rd & Del Roy Dr	Signal	AM	18.6	B	18.7	B	0.1	No
		PM	20.6	C	20.9	C	0.3	No
6. Twin Oaks Valley Rd & Project Driveway	Signal ^e	AM	-	-	8.5	A	-	No
		PM	-	-	7.8	A	-	No
7. Twin Oaks Valley Rd & Windy Wy	Signal	AM	10.0	A	9.9	A	^{-d}	No
		PM	14.7	B	14.0	B	^{-d}	No
8. Twin Oaks Valley Rd & Borden Rd	Signal	AM	51.8	D	54.4	D	2.6	No
		PM	53.6	D	54.9	D	1.3	No
9. Woodward St & Borden Rd	Signal	AM	23.4	C	23.4	C	0.0	No
		PM	21.9	C	22.0	C	0.1	No
10. Twin Oaks Valley Rd & Richmar Road	Signal	AM	43.0	D	42.8	D	^{-d}	No
		PM	125.9	F	122.8	F	^{-d}	No
11. San Marcos Blvd & E. Mission Road	Signal	AM	21.3	C	21.3	C	0.0	No
		PM	24.9	C	24.9	C	0.0	No
12. Twin Oaks Valley Rd & San Marcos Blvd	Signal	AM	100.1	F	105.6	F	5.5	YES
		PM	108.0	F	108.1	F	0.1	YES
13. Twin Oaks Valley Rd & SR 78 WB Ramps	Signal	AM	15.7	B	15.7	B	0.0	No
		PM	16.0	B	16.2	B	0.2	No

Continued on Next Page

**TABLE 10-1
HORIZON YEAR INTERSECTION OPERATIONS**

Intersection	Control Type	Peak Hour	Horizon Year Without Project		Horizon Year + Project		Δ^c	Substantial Effect?
			Delay ^a	LOS ^b	Delay	LOS		
<i>Continued from Previous Page</i>								
14. Twin Oaks Valley Rd & SR 78 EB Ramps	Signal	AM	46.3	D	47.2	D	0.9	No
		PM	21.9	C	23.1	C	1.2	No

Footnotes:

- a. Average delay expressed in seconds per vehicle.
- b. Level of Service.
- c. Δ denotes the increase in delay due to Project.
- d. A decrease in delay was calculated as a result of the addition of Project traffic. **Appendix H** includes additional explanation.
- e. Project driveway does not exist under “without Project” conditions and is assumed to be signalized as a Project feature.

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

**TABLE 10-2
HORIZON YEAR STREET SEGMENT OPERATIONS**

Street Segment	Capacity (LOS E) ^a	Horizon Year without Project			Horizon Year + Project			Δ^e	Substantial Effect?
		ADT ^b	LOS ^c	V/C ^d	ADT	LOS	V/C		
Deer Springs Road									
1. Sycamore Drive to Twin Oaks Valley Road	57,000 ^f	29,700	B	0.521	29,940	B	0.525	0.004	No
N Twin Oaks Valley Road									
2. Deer Springs Road to Buena Creek Road	40,000	31,600	D	0.790	31,840	D	0.796	0.006	No
3. Buena Creek Road to Olive Street	40,000	21,100	C	0.528	21,600	C	0.540	0.012	No
4. Olive Street to Cassou Road	40,000	19,800	B	0.495	20,300	B	0.508	0.013	No
5. Cassou Road to E La Cienega Rd	40,000	19,800	B	0.495	20,300	B	0.508	0.013	No
6. E La Cienega Rd to Del Roy Drive	40,000	17,400	B	0.435	17,900	B	0.448	0.013	No
7. Del Roy Drive to Project Driveway	40,000	19,600	B	0.490	20,100	B	0.503	0.013	No
8. Project Driveway to Windy Way	40,000	19,600	B	0.490	21,490	C	0.537	0.047	No
9. Windy Way to Borden Road	40,000	21,800	C	0.545	23,690	C	0.592	0.047	No
10. Borden Road to Richmar Avenue	40,000	28,200	C	0.658	29,680	C	0.742	0.037	No
11. Richmar Avenue to San Marcos Boulevard	40,000	28,300	C	0.708	29,780	C	0.745	0.037	No
12. San Marcos Boulevard to SR-78 Ramps	50,000	37,800	C	0.740	39,070	C	0.781	0.025	No
13. SR-78 Ramps to N City Drive	70,000 ^g	60,300	D	0.861	60,490	D	0.864	0.003	No
Buena Creek Road									
14. West of N Twin Oaks Valley Road	34,200 ^f	21,700	B	0.635	21,960	B	0.642	0.007	No
Borden Road									
15. Windy Point Road to N Twin Oaks Valley Road	40,000	15,00	A	0.270	15,120	A	0.378	0.003	No
16. N Twin Oaks Valley Road to Woodward Street	40,000	13,400	A	0.260	13,690	A	0.342	0.007	No
Woodward Street									
17. Borden Road to E Mission Road	15,000	6,500	B	0.433	6,620	B	0.441	0.008	No

Footnotes:

- a. Capacity based on based on the City of San Marcos' *Roadway Classifications, Capacity, and LOS* (see *Appendix C*).
- b. Average Daily Traffic.
- c. Level of Service.
- d. Volume to Capacity.
- e. Δ denotes a Project-induced increase in the Volume to Capacity (V/C) ratio.
- f. Capacities based on the County of San Diego's *Average Daily Vehicle Trips Table* (see *Appendix C*).
- g. Capacity for an 8-Lane Prime Arterial was interpolated between the capacities of a 6-Lane Prime Arterial and an Expressway.

11.0 SITE ACCESS, ON-SITE CIRCULATION, AND PARKING

11.1 Site Access

Access will be provided via one driveway from North Twin Oaks Valley Road ("Street A"). The driveway will be signalized with a northbound left-turn lane into the site as a Project feature. An enhanced pedestrian landing in the median, designed to protect pedestrians and equestrians, is proposed. A second emergency-only access point to North Twin Oaks Valley Road would be provided to the south.

11.2 On-Site Circulation

The Project will provide adequate on-site circulation for passenger vehicles, heavy vehicles, bicyclists and pedestrians and any issues identified should be addressed in the site design and improvements.

11.3 Parking

The Project is proposing to construct 257 residential units (112 detached airspace condos and 145 single-family residential), and 6.22 acres of public park.

Per the *City of San Marcos Municipal Code Chapter 20.340 – Off-Street Parking and Loading*, multifamily land uses (for 2+ bedroom units) are required to provide 2 spaces per unit (with at least 1 covered space) with additional guest parking at a rate of 1 space per 3 units, and single-family attached land uses are required to provide 2 spaces per unit (with at least 1 covered space). The *Municipal Code* also states that the parking requirement of public parks is “to be determined by the Director during SDP or CUP review process”.

It is important to note that the detached airspace condo (multifamily) component with the public park is considered a “cluster” or “mixed-use”. Per the *City of San Marcos Municipal Code*, a Multifamily Residential within Mixed Use Development must provide at least one (1) space for each residential unit located on-site and other required parking spaces may be located off-site.

Therefore, the 112 detached airspace condo units are required to provide 224 parking spaces and 38 guest parking spaces, for a total of 262 spaces (with a minimum of 112 required on-site and 150 permitted off-site). The 145 single-family units are required to provide 290 off-street parking spaces.

The Project will provide a 2-car garage (covered) for every single-family unit, for a total of 290 off-street (on-site) parking spaces. Therefore, the parking requirements are met for the single-family component of the Project.

The Project will provide a 2-car garage (covered) for every condo (multi-family) unit, for a total of 224 off-street (on-site) garage parking spaces. Additionally, the Project will provide 54 on-street spaces and 24 at-parks spaces, for a total of 302 parking spaces for the “cluster” component of the Project. Therefore, the Project is providing an excess of 40 spaces ($302 - 262 = 40$) for the detached airspace condo (multifamily) and public park land uses.

11.4 Queuing

11.4.1 Driveway Queuing

Table 11-1 summarizes the calculated peak hour queues at the Twin Oaks Valley Road / Project Driveway intersection for the Opening Year and Horizon Year analysis scenarios. As seen in *Table 11-1*, the 95th percentile inbound and outbound queues at the Project driveway are calculated to be fully contained within the proposed storage lengths.

Appendix K contains queue analysis calculation worksheets.

**TABLE 11-1
95TH PERCENTILE QUEUE RESULTS**

Intersection	Critical Movement	Peak Hour	Storage Length (ft)	Queue Length (ft)	
				Opening Year + Project	Horizon Year + Project
1. Twin Oaks Valley Road / Project Driveway	NBL	AM	150'	60'	65'
		PM		97'	100'

General Notes:

- a. 95th Percentile Queue. Analysis performed on SIM Traffic software. 15-minute seeding, 60-minute recording.

12.0 ACTIVE TRANSPORTATION REVIEW

12.1 Existing Bicycle Network

Currently, Class II bike lanes are provided on the following study street segments:

- Twin Oaks Valley Road, from Olive Street to San Marcos Boulevard (both sides)
- Borden Road, from Windy Point Drive to Woodward Street (both sides)

12.2 Proposed Bicycle Network

In the City of San Marcos *Active Transportation Plan*, June 2024, bike facilities are recommended on the following study street segments:

- Twin Oaks Valley Road, from La Cienega Road to Del Roy Drive (west side) (Class I: Multi-Use Path)
- Woodward Street, north of Borden Road (both sides) (Class IV Bikeway)

12.3 Existing Pedestrian Conditions

Pedestrian facilities are generally provided throughout the study area. A Class I Multi-Use Path is provided along Twin Oaks Valley Road on the east side of the roadway between Cassou Road and Windy Way. However, sidewalks are missing on the west side of Twin Oaks Valley Road north of Legacy Drive.

Pedestrian crossings are provided in all directions at the following intersections:

- Twin Oaks Valley Rd & Del Roy Dr
- Twin Oaks Valley Rd & Borden Rd
- Woodward St & Borden Rd
- Twin Oaks Valley Rd & San Marcos Blvd

Pedestrian crossings are prohibited at the following locations:

- Twin Oaks Valley Rd & Deer Springs Rd (across the north leg)
- Twin Oaks Valley Rd & Buena Creek Rd (across the north and west legs)
- Twin Oaks Valley Rd & Olive Street (across the north leg)
- Twin Oaks Valley Rd & E. La Cienega Road (across the south leg)
- Twin Oaks Valley Rd & Windy Wy (across the south leg)
- Twin Oaks Valley Rd & Richmar Road (across the south leg)
- Woodward Street & E. Mission Road (across the east leg)
- Twin Oaks Valley Rd & SR 78 WB Ramps (across the north and south legs)
- Twin Oaks Valley Rd & SR 78 EB Ramps (across the north leg)

12.4 Proposed Pedestrian Conditions

In the City of San Marcos *Active Transportation Plan*, June 2024, pedestrian facilities are recommended on the following study street segments:

- Twin Oaks Valley Road, from northern City limits to La Cienega Road (west side) (Add New Sidewalk)

- Twin Oaks Valley Road, from Borden Road to Richmar Street (both sides) (Enhance Pedestrian Environment (Widen Sidewalk, Placemaking))
- Borden Road, west of Twin Oaks Valley Road (north side) (Class I Multi-Use Path)
- Woodward Street, between Borden Road and Mission Road (west side) (Enhance Pedestrian Environment (Widen Sidewalk, Placemaking))

12.5 Existing Transit Conditions

No transit service is provided within a half-mile of the Project site. Transit service nearest to the Project site is provided via the Route 305 Bus Route and the Sprinter. The San Marcos Civic Center Station, which serves the Sprinter, is located on the southwest corner of the Mission Road / Woodward Street intersection. A description of the nearest transit service is shown below:

Bus Route 305 provides bus service to the area via Mission Road and South Santa Fe Avenue, connecting Escondido to Vista. During weekdays, headways are 30 minutes for the duration of the day. During weekends, headways are 30 minutes for the duration of the day. Route 305 has one bus stop near the project site located just west of the Mission Road / Mulberry Drive intersection.

The **SPRINTER** runs between Escondido and Oceanside. There are fifteen (15) stops along this route. SPRINTER service provides thirty-four (34) daily trips on the weekdays with an additional six (6) trips on Friday nights. It also provides twenty-five (25) daily weekend trips with an additional three (3) trips on Saturday nights.

Appendix L contains the bus route schedule and map.

13.0 POST-MITIGATION ANALYSIS

The Project is calculated to result in substantial transportation-related effects at two (2) intersections and two (2) street segments during the Opening Year (Interim Year 2028) with Project, and/or Horizon Year (Horizon Year 2050) with Project scenarios:

- Intersection #2. Twin Oaks Valley Rd & Buena Creek Rd (Horizon Year only)
- Intersection #12. Twin Oaks Valley Rd & San Marcos Blvd (Opening Year and Horizon Year)
- Segment #3. N Twin Oaks Valley Road: Buena Creek Road to Olive Street (Opening Year only)
- Segment #4. N Twin Oaks Valley Road: Olive Street to Cassou Road (Opening Year only)

13.1 Intersection Improvements

To address the intersection effects at the two noted locations, LLG recommends optimization of the intersection signal timing and coordination with adjacent signalized intersections, including the signal at the future Project driveway to the satisfaction of the City of San Marcos. **Tables 13-1** and **Table 13-2** summarize the intersection operations under Opening Year and Horizon Year with the recommended mitigation. As shown in these tables, operations are calculated to improve to better than pre-Project conditions with implementation of signal optimization and coordination, and are therefore “mitigated”.

Appendix M contains the Post-Mitigation intersection analysis calculation worksheets.

13.2 Segment Improvements

The segment of Twin Oaks Valley Road between Buena Creek Road and Cassou Road is currently constructed as a two-lane roadway and is classified as a 4-Lane (Rural) Arterial with Enhanced Bicycle/Pedestrian facilities on the *City of San Marcos Mobility Element*. Therefore, this segment is not constructed to its ultimate Mobility Element classification. Construction of the roadway to its ultimate 4-lane classification would reduce the Project’s effect to less than substantial, as shown in the Horizon Year (2050) segment analysis **Table 10-1**. Such an improvement is beyond the scope of a singular development.

Therefore, to address the segment impact at the noted location, LLG recommends that the Project conduct a corridor signal optimization plan and implement the results for the Twin Oaks Valley Road corridor between Buena Creek Road and San Marcos Boulevard, including the new traffic signal planned at the Project driveway, to the satisfaction of the City of San Marcos. **Table 13-3** summarizes the arterial analysis conducted on the “impacted” segments of Twin Oaks Valley Road between Buena Creek Road and Cassou Road, assuming corridor signal optimization. As shown in this table, operations are calculated to generally improve delay, travel time, and speed to better than pre-Project conditions with the implementation of signal optimization and coordination.

Appendix N contains the Post-Mitigation arterial analysis calculation worksheets.

**TABLE 13-1
OPENING YEAR (POST-MITIGATION) INTERSECTION OPERATIONS**

Intersection	Control Type	Peak Hour	Opening Year without Project		Opening Year + Project + Mitigation		Δ^c
			Delay ^a	LOS ^b	Delay	LOS	
12. Twin Oaks Valley Rd & San Marcos Blvd	Signal	AM	85.9	F	68.4	F	-20.2
		PM	91.8	F	66.3	F	-25.3

Footnotes:

- a. Average delay expressed in seconds per vehicle.
- b. Level of Service.
- c. Δ denotes the increase in delay due to Project.

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

**TABLE 13-2
HORIZON YEAR (POST MITIGATION) INTERSECTION OPERATIONS**

Intersection	Control Type	Peak Hour	Horizon Year without Project		Horizon Year + Project + Mitigation		Δ^c
			Delay ^a	LOS ^b	Delay	LOS	
2. Twin Oaks Valley Rd & Buena Creek Rd	Signal	AM	132.0	F	99.1	F	-37.8
		PM	90.1	F	43.7	D	-50.9
12. Twin Oaks Valley Rd & San Marcos Blvd	Signal	AM	100.1	F	82.8	F	-22.8
		PM	108	F	79.3	E	-28.8

Footnotes:

- a. Average delay expressed in seconds per vehicle.
- b. Level of Service.
- c. Δ denotes the increase in delay due to Project.

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

**TABLE 13-3
OPENING YEAR (POST-MITIGATION) ARTERIAL OPERATIONS**

Segment	Peak Hour	Opening Year without Project						Opening Year + Project + Mitigation					
		NB Delay (S/Veh)	SB Delay (S/Veh)	NB Travel Time (s)	SB Travel Time (s)	NB Arterial Speed	SB Arterial Speed	NB Delay (S/Veh)	SB Delay (S/Veh)	NB Travel Time (s)	SB Travel Time (s)	NB Arterial Speed	SB Arterial Speed
3. N Twin Oaks Valley Road: Buena Creek Road to Olive Street	AM	14.8	12.3	24.3	21.8	19	21	16.1	9.3	25.6	18.9	18	24
	PM	32.6	6.9	41.8	15.4	11	30	31.2	13.6	40.5	22.7	11	20
4. N Twin Oaks Valley Road: Olive Street to Cassou Rd	AM	7.5	4.6	16.1	14.4	29	33	6.2	3.0	14.9	18.9	32	24
	PM	19.4	1.7	29.6	11.5	16	41	17.3	2.5	27.4	12.3	18	38

General Notes:

1. Analysis conducted on SIM Traffic
2. Green highlight indicates improvement

14.0 CONCLUSIONS

LOCAL TRANSPORTATION ANALYSIS

The Project is calculated to result in substantial transportation-related effect at two (2) intersections and two (2) street segments during the Opening Year (Interim Year 2028) with Project and/or Horizon Year (Horizon Year 2050) with Project scenarios:

- Intersection #2. Twin Oaks Valley Rd & Buena Creek Rd (Horizon Year only)
- Intersection #12. Twin Oaks Valley Rd & San Marcos Blvd (Opening Year and Horizon Year)
- Segment #3. N Twin Oaks Valley Road: Buena Creek Road to Olive Street (Opening Year only)
- Segment #4. N Twin Oaks Valley Road: Olive Street to Cassou Road (Opening Year only)

Intersection Improvements:

To address the intersection effects at the two noted locations, LLG recommends optimization of the intersection signal timing and coordination with adjacent signalized intersections, including the signal at the future Project driveway, to the satisfaction of the City of San Marcos.

Segment Improvements:

The segment of Twin Oaks Valley Road between Buena Creek Road and Cassou Road is currently constructed as a two-lane roadway and is classified as a 4-Lane (Rural) Arterial with Enhanced Bicycle/Pedestrian facilities on the *City of San Marcos Mobility Element*. Therefore, this segment is not constructed to its ultimate Mobility Element classification. Construction of the roadway to its ultimate 4-lane classification would reduce the Project's effect to less than substantial, as shown in the Horizon Year (2050) segment analysis *Table 10-1*. Such an improvement is beyond the scope of a singular development.

Therefore, to address the segment impact at the noted location, LLG recommends that the Project conduct a corridor signal optimization plan and implementing the results for the Twin Oaks Valley Road corridor between Buena Creek Road and San Marcos Boulevard, including the new traffic signal planned at the Project driveway, to the satisfaction of the City of San Marcos..

Project Access

Access will be provided via one driveway from North Twin Oaks Valley Road ("Street A"). The driveway is proposed to be signalized with a northbound left-turn lane into the site as a Project feature. As shown in *Table 8-1* and *Table 10-1*, the Project driveway is calculated to operate at LOS A during the AM and PM peak hours. The following recommendations with respect to the site access are noted:

- Access point shall provide adequate driveway sight distance.

- A 150-foot northbound left-turn pocket shall be provided on Twin Oaks Valley Road to allow for left-turn access to the Project site.

Conditions of Approval:

The following conditions of approval should be included as a part of the Project’s entitlement process:

1. Project Driveway Traffic Signal Installation and Interconnection
 - a. Prior to issuance of the first occupancy permit, the Project shall fully install, activate, and place into operation a new traffic signal at the Project driveway. The signal shall be interconnected with the City’s existing traffic signal network in a manner satisfactory to the City Engineer.
2. Preliminary Signal Timing and Optimization (Pre-Occupancy)
 - a. Prior to issuance of the first occupancy permit, the Project shall:
 - i. Prepare and implement a preliminary signal timing plan for the Project driveway traffic signal and the two adjacent impacted intersections, subject to review and approval by the City Engineer
3. Post-Occupancy Signal Timing Update (Stabilized Conditions)
 - a. Upon issuance of the final occupancy permit and once traffic conditions have stabilized, the Project shall provide sufficient funding, as determined by the City Engineer, for City staff to re-evaluate and update the signal timing plans for the Project driveway signal and the adjacent intersections to reflect full Project buildout conditions.



4542 Ruffner Street
Suite 100
San Diego, CA 92111
858.300.8800 T
www.llgengineers.com

Pasadena
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TECHNICAL APPENDICES
OAK CREST SPECIFIC PLAN
San Marcos, California
January 2026

LLG Ref. 3-25-4059

APPENDICES

APPENDIX

- A. Intersection and Segment Count Sheets
- B. Scoping Memo and City Review
- C. City of San Marcos Roadway Classification Table & County of San Diego Roadway Classification Table
- D. Existing Analysis Worksheets
- E. K&D Factors Definitions
- F. Opening Year Analysis Worksheets
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- I. Horizon Year Analysis Worksheets
- J. Horizon Year + Project Analysis Worksheets
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APPENDIX A
INTERSECTION AND SEGMENT COUNT SHEETS

Intersection Turning Movement - Peak Hour Vehicle Count



Location: #01	File Name: ITM-25-066-01
Intersection: North Twin Oaks Valley Road & Deer Springs Road	Project: LLG Ref. 3-25-4059
Date of Count: Tuesday, December 02, 2025	Growth & Twin Oaks

AM	Deer Springs Road Southbound			- Westbound			N Twin Oaks Valley Road Northbound			N Twin Oaks Valley Road Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
7:00	0	312	8	0	0	0	30	97	0	7	0	15	469
7:15	0	339	14	0	0	0	24	123	0	7	0	20	527
7:30	0	341	10	0	0	0	17	131	0	11	0	18	528
7:45	0	331	10	0	0	0	28	126	0	10	0	23	528
8:00	0	335	4	0	0	0	20	138	0	4	0	17	518
8:15	0	321	15	0	0	0	16	122	0	8	0	17	499
8:30	0	306	10	0	0	0	21	132	0	11	0	19	499
8:45	0	267	7	0	0	0	23	117	0	9	0	12	435
Total	0	2552	78	0	0	0	179	986	0	67	0	141	4003
Approach%	-	97.0	3.0	-	-	-	15.4	84.6	-	32.2	-	67.8	
Total%	-	63.8	1.9	-	-	-	4.5	24.6	-	1.7	-	3.5	

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

Volume	-	1,346	38	-	-	-	89	518	-	32	-	78	2,101
Approach%	-	97.3	2.7	-	-	-	14.7	85.3	-	29.1	-	70.9	
Total%	-	64.1	1.8	-	-	-	4.2	24.7	-	1.5	-	3.7	
PHF			0.98			#DIV/0!			0.96			0.83	0.99

PM	Deer Springs Road Southbound			- Westbound			N Twin Oaks Valley Road Northbound			N Twin Oaks Valley Road Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:00	0	137	9	0	0	0	35	222	0	15	0	39	457
16:15	0	132	11	0	0	0	29	197	0	9	0	45	423
16:30	0	195	10	0	0	0	26	189	0	18	0	49	487
16:45	0	163	4	0	0	0	21	210	0	5	0	47	450
17:00	0	225	9	0	0	0	20	203	0	12	0	41	510
17:15	0	178	6	0	0	0	21	245	0	7	0	17	474
17:30	0	166	11	0	0	0	10	279	0	5	0	47	518
17:45	0	150	6	0	0	0	27	214	0	13	0	38	448
Total	0	1346	66	0	0	0	189	1759	0	84	0	323	3767
Approach%	-	95.3	4.7	-	-	-	9.7	90.3	-	20.6	-	79.4	
Total%	-	35.7	1.8	-	-	-	5.0	46.7	-	2.2	-	8.6	

PM Intersection Peak Hour: 16:45 to 17:45

Volume	-	732	30	-	-	-	72	937	-	29	-	152	1,952
Approach%	-	96.1	3.9	-	-	-	7.1	92.9	-	16.0	-	84.0	
Total%	-	37.5	1.5	-	-	-	3.7	48.0	-	1.5	-	7.8	
PHF			0.81			#DIV/0!			0.87			0.85	0.94

Intersection Turning Movement - Bicycle & Pedestrian Count



Location: #01	File Name: ITM-25-066-01
Intersection: North Twin Oaks Valley Road & Deer Springs Road	Project: LLG Ref. 3-25-4059
Date of Count: Tuesday, December 02, 2025	Growth & Twin Oaks

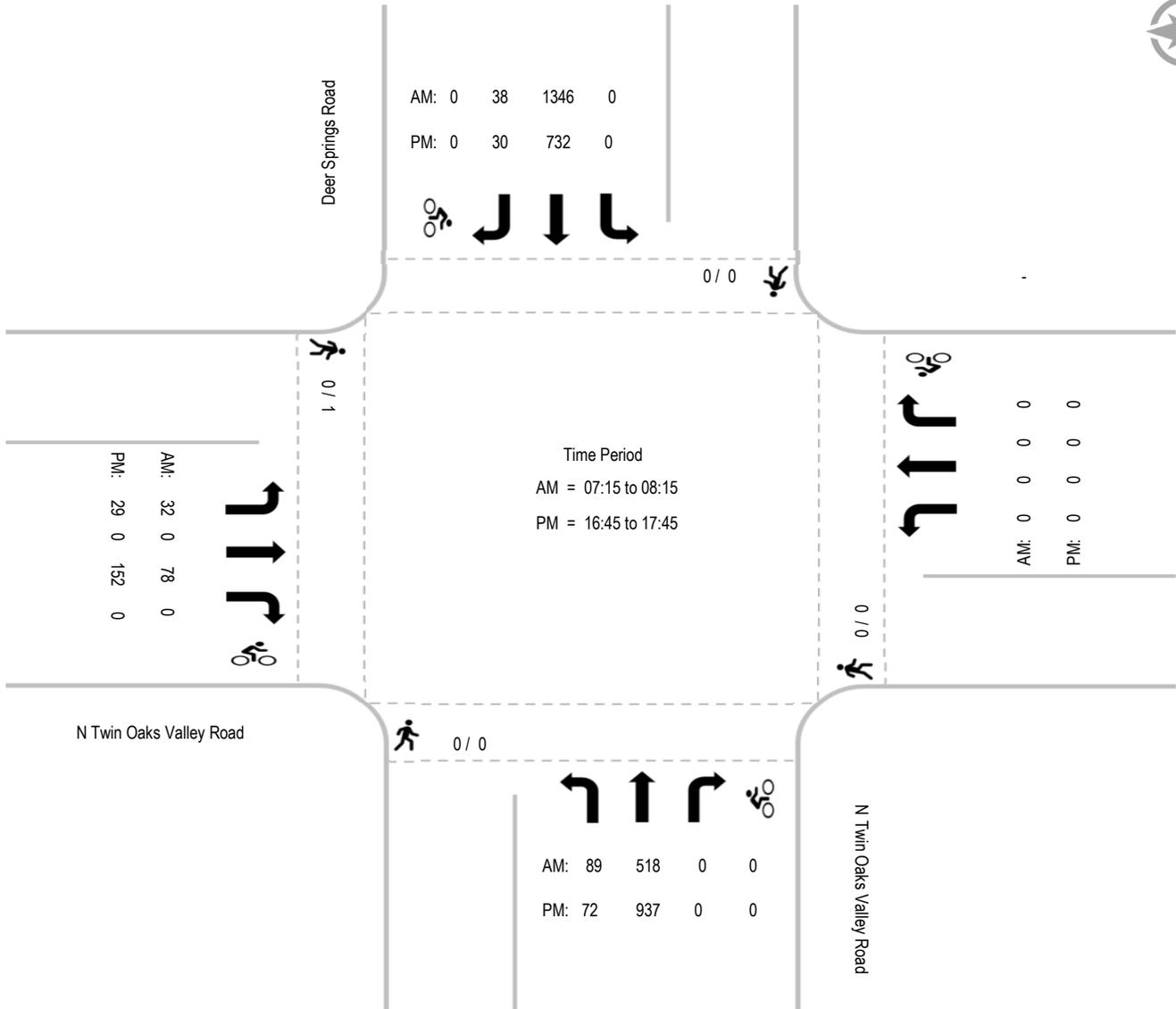
AM	Deer Springs Road Southbound				- Westbound				N Twin Oaks Valley Road Northbound				N Twin Oaks Valley Road Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Total	0				0				0				0				0	
Bike Total		0	0	0		0	0	0		0	0	0		0	0	0		0

PM	Deer Springs Road Southbound				- Westbound				N Twin Oaks Valley Road Northbound				N Twin Oaks Valley 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	1	0	0	0	1	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Total	0				0				0				1				1	
Bike Total		0	0	0		0	0	0		0	0	0		0	0	0		0

Intersection Turning Movement - Peak Hour Summary



Location: #01	File Name: ITM-25-066-01
Intersection: North Twin Oaks Valley Road & Deer Springs Road	Project: LLG Ref. 3-25-4059
Date of Count: Tuesday, December 02, 2025	Growth & Twin Oaks



Intersection Turning Movement - Peak Hour Vehicle Count



Location: #02	File Name: ITM-25-066-02
Intersection: North Twin Oaks Valley Road & Buena Creek Road	Project: LLG Ref. 3-25-4059
Date of Count: Tuesday, December 02, 2025	Growth & Twin Oaks

AM	N Twin Oaks Valley Road Southbound			Private Driveway Westbound			N Twin Oaks Valley Road Northbound			Buena Creek Road Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
7:00	0	242	69	0	0	0	18	63	0	65	0	47	504
7:15	0	248	73	0	0	0	28	72	0	74	0	57	552
7:30	0	242	75	0	1	0	23	84	1	64	0	56	546
7:45	1	232	62	0	0	0	20	93	0	65	0	54	527
8:00	0	238	58	1	0	0	26	90	0	68	0	49	530
8:15	0	225	74	1	0	0	29	72	0	68	0	43	512
8:30	0	216	116	0	0	0	36	88	1	63	0	39	559
8:45	0	162	71	0	0	0	22	80	0	56	0	38	429
Total	1	1805	598	2	1	0	202	642	2	523	0	383	4159
Approach%	0.0	75.1	24.9	66.7	33.3	-	23.9	75.9	0.2	57.7	-	42.3	
Total%	0.0	43.4	14.4	0.0	0.0	-	4.9	15.4	0.0	12.6	-	9.2	

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

Volume	1	960	268	1	1	-	97	339	1	271	-	216	2,155
Approach%	0.1	78.1	21.8	50.0	50.0	-	22.2	77.6	0.2	55.6	-	44.4	
Total%	0.0	44.5	12.4	0.0	0.0	-	4.5	15.7	0.0	12.6	-	10.0	
PHF			0.96			0.50			0.94			0.93	0.98

PM	N Twin Oaks Valley Road Southbound			Private Driveway Westbound			N Twin Oaks Valley Road Northbound			Buena Creek Road Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:00	0	141	78	1	1	0	68	143	1	93	0	48	574
16:15	0	159	74	0	0	0	45	130	0	93	0	64	565
16:30	0	191	88	1	0	0	45	127	1	87	0	42	582
16:45	0	172	83	0	0	0	42	133	0	93	0	58	581
17:00	0	180	93	0	0	0	41	128	0	95	0	43	580
17:15	0	149	83	0	0	0	52	167	0	94	0	41	586
17:30	0	199	71	1	0	0	41	154	1	81	0	45	593
17:45	0	132	75	1	0	0	37	122	0	82	0	47	496
Total	0	1323	645	4	1	0	371	1104	3	718	0	388	4557
Approach%	-	67.2	32.8	80.0	20.0	-	25.1	74.7	0.2	64.9	-	35.1	
Total%	-	29.0	14.2	0.1	0.0	-	8.1	24.2	0.1	15.8	-	8.5	

PM Intersection Peak Hour: 16:45 to 17:45

Volume	-	700	330	1	-	-	176	582	1	363	-	187	2,340
Approach%	-	68.0	32.0	100.0	-	-	23.2	76.7	0.1	66.0	-	34.0	
Total%	-	29.9	14.1	0.0	-	-	7.5	24.9	0.0	15.5	-	8.0	
PHF			0.94			0.25			0.87			0.91	0.99

Intersection Turning Movement - Bicycle & Pedestrian Count



Location: #02	File Name: ITM-25-066-02
Intersection: North Twin Oaks Valley Road & Buena Creek Road	Project: LLG Ref. 3-25-4059
Date of Count: Tuesday, December 02, 2025	Growth & Twin Oaks

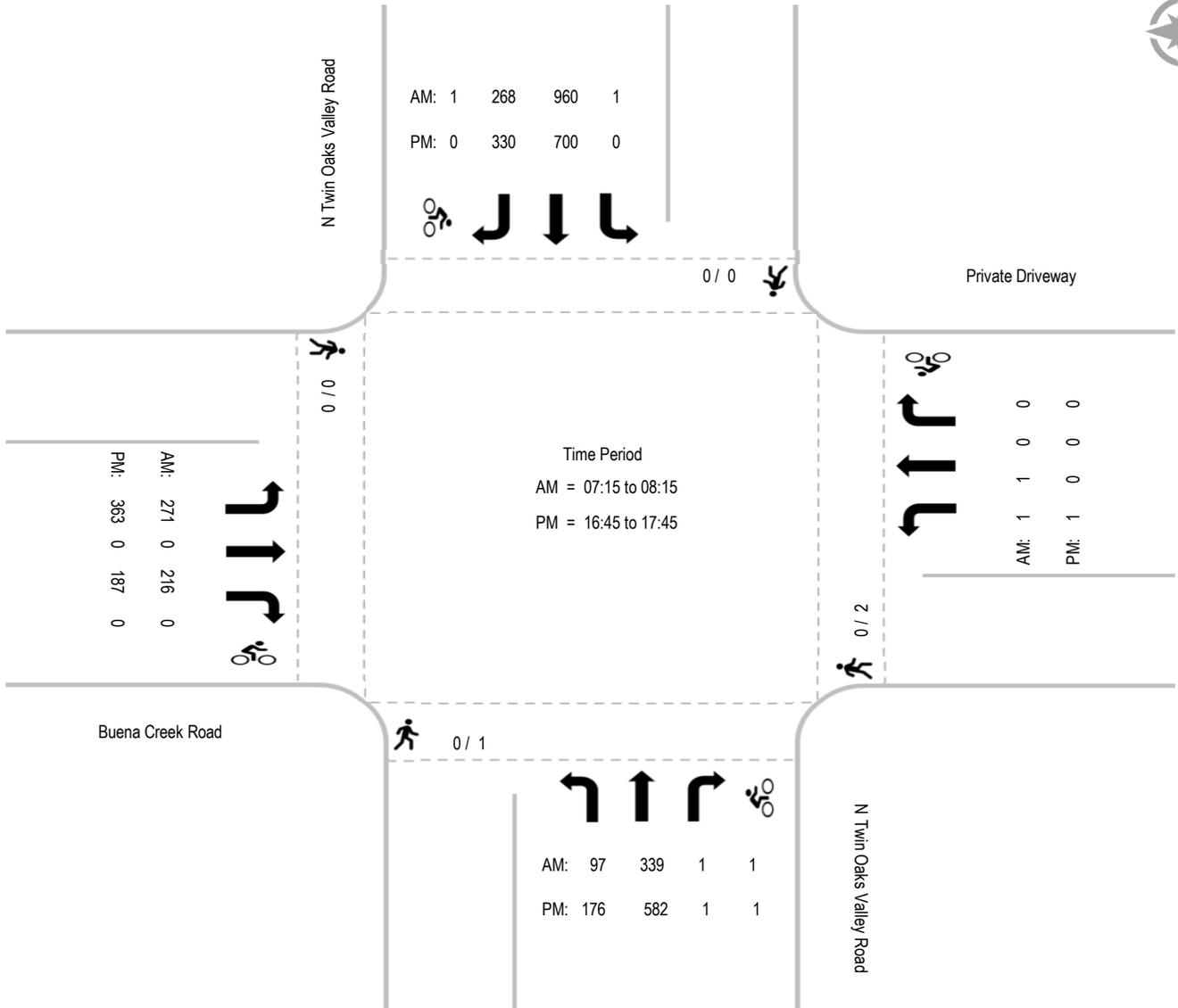
AM	N Twin Oaks Valley Road Southbound				Private Driveway Westbound				N Twin Oaks Valley Road Northbound				Buena Creek Road Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Total	0				0				0				0					0
Bike Total		0	1	0		0	0	0		0	1	0		0	0	0		2

PM	N Twin Oaks Valley Road Southbound				Private Driveway Westbound				N Twin Oaks Valley Road Northbound				Buena Creek 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	1	0	0	0	0	0	0	0	0	1	0
16:15	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
16:30	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Total	0				2				1				0					3	
Bike Total		0	0	0		0	0	0		0	1	0		0	0	0			1

Intersection Turning Movement - Peak Hour Summary



Location: #02	File Name: ITM-25-066-02
Intersection: North Twin Oaks Valley Road & Buena Creek Road	Project: LLG Ref. 3-25-4059
Date of Count: Tuesday, December 02, 2025	Growth & Twin Oaks



Intersection Turning Movement - Peak Hour Vehicle Count



Location: #03	File Name: ITM-25-066-03
Intersection: N Twin Oaks Valley Road & Olive Street	Project: LLG Ref. 3-25-4059
Date of Count: Tuesday, December 02, 2025	Growth & Twin Oaks

AM	N Twin Oaks Valley Road Southbound			Olive Street Westbound			N Twin Oaks Valley Road Northbound			(Driveway) Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
7:00	21	219	0	3	0	7	0	89	0	0	0	1	340
7:15	14	229	0	5	0	18	0	86	7	0	0	1	360
7:30	22	196	0	3	0	10	0	93	2	0	0	0	326
7:45	17	260	0	6	0	20	0	90	4	0	0	1	398
8:00	12	289	0	11	0	14	1	120	3	0	0	0	450
8:15	15	228	0	6	0	25	0	109	2	0	1	1	387
8:30	19	223	0	17	0	33	0	117	1	0	1	1	412
8:45	14	238	0	4	0	16	0	96	6	0	1	1	376
Total	134	1882	0	55	0	143	1	800	25	0	3	6	3049
Approach%	6.6	93.4	-	27.8	-	72.2	0.1	96.9	3.0	-	33.3	66.7	
Total%	4.4	61.7	-	1.8	-	4.7	0.0	26.2	0.8	-	0.1	0.2	

AM Intersection Peak Hour: 07:45 to 08:45

Volume	63	1,000	-	40	-	92	1	436	10	-	2	3	1,647
Approach%	5.9	94.1	-	30.3	-	69.7	0.2	97.5	2.2	-	40.0	60.0	
Total%	3.8	60.7	-	2.4	-	5.6	0.1	26.5	0.6	-	0.1	0.2	
PHF			0.88			0.66			0.90			0.63	0.92

PM	N Twin Oaks Valley Road Southbound			Olive Street Westbound			N Twin Oaks Valley Road Northbound			(Driveway) Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:00	29	110	0	8	1	51	1	212	3	0	1	1	417
16:15	39	129	0	4	0	22	0	188	3	1	1	0	387
16:30	20	160	0	0	0	20	0	197	1	1	1	1	401
16:45	36	146	0	3	0	25	0	211	2	0	0	0	423
17:00	27	140	0	2	0	20	0	201	2	0	0	1	393
17:15	16	126	0	2	0	19	0	213	4	0	2	2	384
17:30	33	138	0	10	0	10	0	231	11	0	0	0	433
17:45	28	125	0	1	0	16	0	174	6	0	0	0	350
Total	228	1074	0	30	1	183	1	1627	32	2	5	5	3188
Approach%	17.5	82.5	-	14.0	0.5	85.5	0.1	98.0	1.9	16.7	41.7	41.7	
Total%	7.2	33.7	-	0.9	0.0	5.7	0.0	51.0	1.0	0.1	0.2	0.2	

PM Intersection Peak Hour: 16:45 to 17:45

Volume	112	550	-	17	-	74	-	856	19	-	2	3	1,633
Approach%	16.9	83.1	-	18.7	-	81.3	-	97.8	2.2	-	40.0	60.0	
Total%	6.9	33.7	-	1.0	-	4.5	-	52.4	1.2	-	0.1	0.2	
PHF			0.91			0.81			0.90			0.31	0.94

Intersection Turning Movement - Bicycle & Pedestrian Count



Location: #03	File Name: ITM-25-066-03
Intersection: N Twin Oaks Valley Road & Olive Street	Project: LLG Ref. 3-25-4059
Date of Count: Tuesday, December 02, 2025	Growth & Twin Oaks

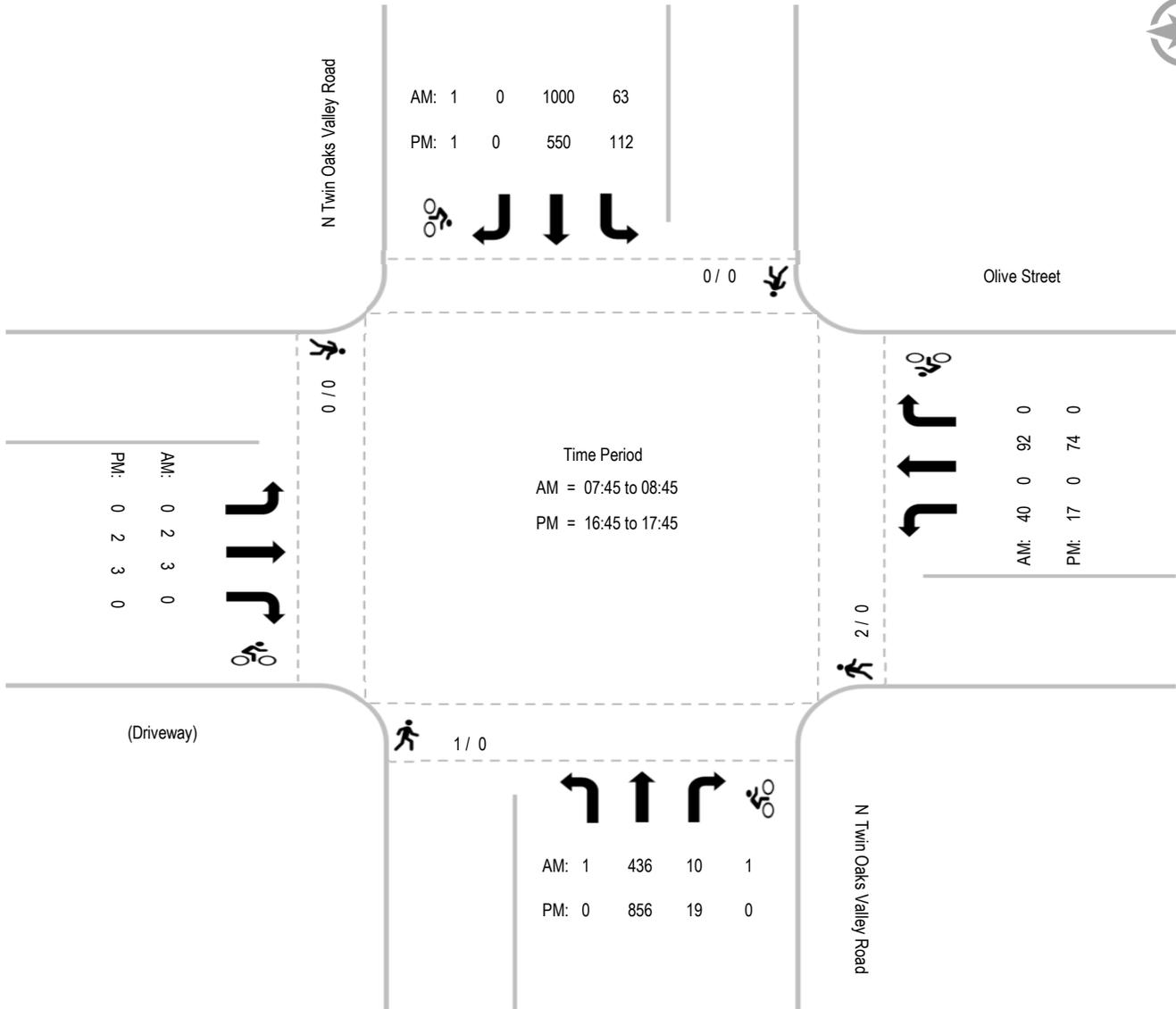
AM	N Twin Oaks Valley Road Southbound				Olive Street Westbound				N Twin Oaks Valley Road Northbound				(Driveway) Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
7:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
7:15	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
7:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Total	0				2				1				0				3	
Bike Total		1	0	0		0	0	0		0	1	0		0	0	0		2

PM	N Twin Oaks Valley Road Southbound				Olive Street Westbound				N Twin Oaks Valley Road Northbound				(Driveway) 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	0	0	0	0	0	0	0	0	0	0	0	0
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	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Total	0				0				0				0				0	
Bike Total		0	1	0		0	0	0		0	0	0		0	0	0		1

Intersection Turning Movement - Peak Hour Summary



Location: #03	File Name: ITM-25-066-03
Intersection: N Twin Oaks Valley Road & Olive Street	Project: LLG Ref. 3-25-4059
Date of Count: Tuesday, December 02, 2025	Growth & Twin Oaks



Intersection Turning Movement - Peak Hour Vehicle Count



Location: #04	File Name: ITM-25-066-04
Intersection: N. Twin Oaks Valley Road & E. La Cienega Road	Project: LLG Ref. 3-25-4059
Date of Count: Tuesday, December 02 2025	Growth & Twin Oaks

AM	N.Twin Oaks Valley Road Southbound			E. La Cienega Road Westbound			N.Twin Oaks Valley Road Northbound			- Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
7:00	7	199	0	24	0	8	0	79	16	0	0	0	333
7:15	12	194	0	35	0	11	0	71	8	0	0	0	331
7:30	13	202	0	25	0	15	0	87	11	0	0	0	353
7:45	18	194	0	33	0	31	0	95	7	0	0	0	378
8:00	17	190	0	31	0	41	0	135	3	0	0	0	417
8:15	16	196	0	37	0	55	0	130	19	0	0	0	453
8:30	17	204	0	35	0	80	0	146	4	0	0	0	486
8:45	12	169	0	34	0	27	0	101	21	0	0	0	364
Total	112	1548	0	254	0	268	0	844	89	0	0	0	3115
Approach%	6.7	93.3	-	48.7	-	51.3	-	90.5	9.5	-	-	-	
Total%	3.6	49.7	-	8.2	-	8.6	-	27.1	2.9	-	-	-	

AM Intersection Peak Hour: 07:45 to 08:45

Volume	68	784	-	136	-	207	-	506	33	-	-	-	1,734
Approach%	8.0	92.0	-	39.7	-	60.3	-	93.9	6.1	-	-	-	
Total%	3.9	45.2	-	7.8	-	11.9	-	29.2	1.9	-	-	-	
PHF			0.96			0.75			0.90			#DIV/0!	0.89

PM	N.Twin Oaks Valley Road Southbound			E. La Cienega Road Westbound			N.Twin Oaks Valley Road Northbound			- Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:00	37	109	0	27	0	11	0	159	24	0	0	0	367
16:15	22	131	0	19	0	12	0	147	28	0	0	0	359
16:30	30	150	0	22	0	17	0	168	21	0	0	0	408
16:45	23	139	0	8	0	11	0	161	11	0	0	0	353
17:00	37	137	0	11	0	7	0	177	20	0	0	0	389
17:15	32	121	0	18	0	11	0	196	26	0	0	0	404
17:30	34	121	0	16	0	14	0	171	25	0	0	0	381
17:45	36	109	0	10	0	6	0	126	15	0	0	0	302
Total	251	1017	0	131	0	89	0	1305	170	0	0	0	2963
Approach%	19.8	80.2	-	59.5	-	40.5	-	88.5	11.5	-	-	-	
Total%	8.5	34.3	-	4.4	-	3.0	-	44.0	5.7	-	-	-	

PM Intersection Peak Hour: 16:30 to 17:30

Volume	122	547	-	59	-	46	-	702	78	-	-	-	1,554
Approach%	18.2	81.8	-	56.2	-	43.8	-	90.0	10.0	-	-	-	
Total%	7.9	35.2	-	3.8	-	3.0	-	45.2	5.0	-	-	-	
PHF			0.93			0.67			0.88			#DIV/0!	0.95

Intersection Turning Movement - Bicycle & Pedestrian Count



Location: #04	File Name: ITM-25-066-04
Intersection: N. Twin Oaks Valley Road & E. La Cienega Road	Project: LLG Ref. 3-25-4059
Date of Count: Tuesday, December 02 2025	Growth & Twin Oaks

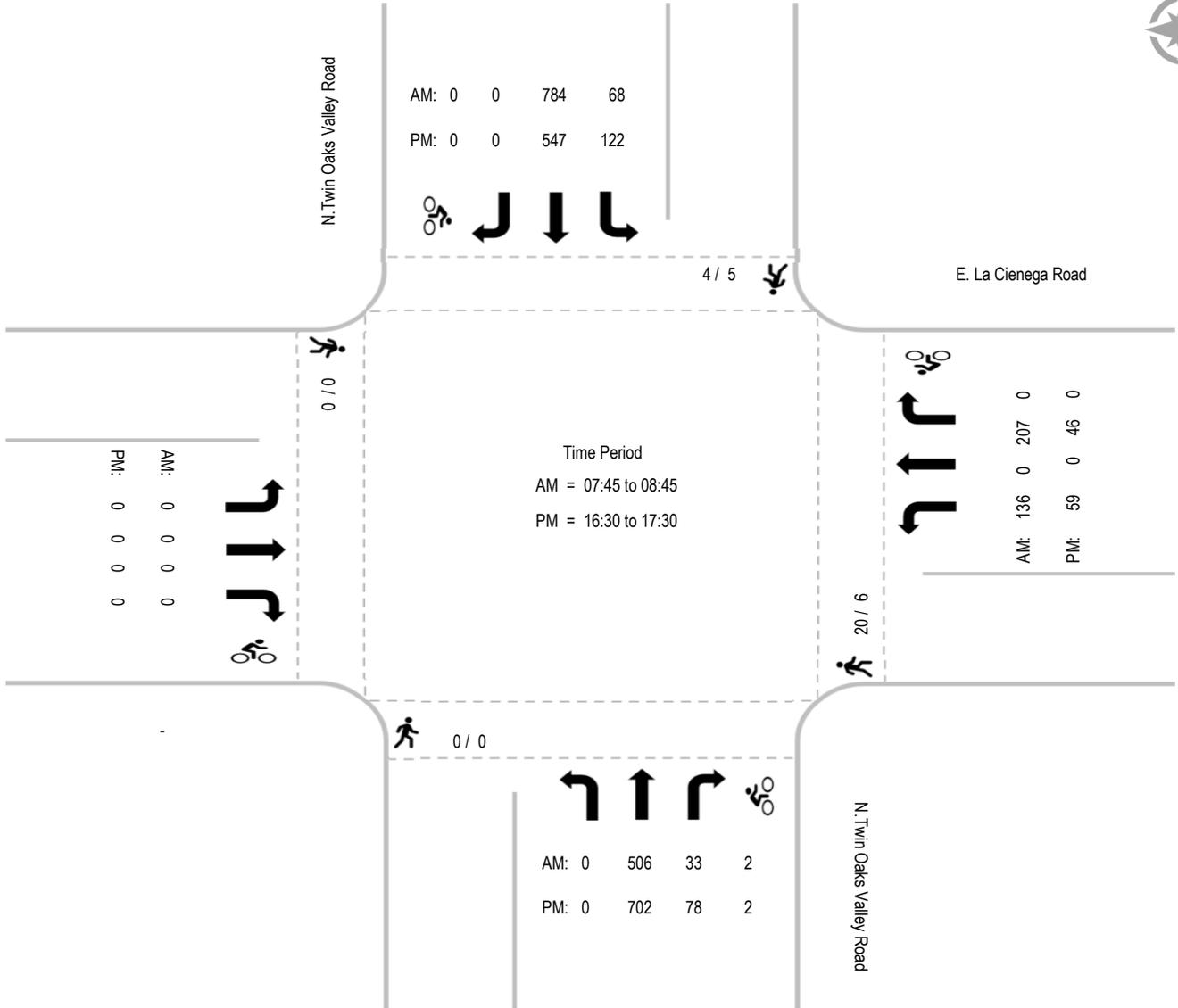
AM	N.Twin Oaks Valley Road Southbound				E. La Cienega Road Westbound				N.Twin Oaks Valley Road Northbound				- Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
7:00	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	4	0
7:15	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3	0
7:30	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	2	2
7:45	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	7	0
8:00	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0
8:15	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
8:30	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
8:45	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	4	0
Ped Total	4				20				0				0				24	
Bike Total		0	0	0		0	0	0		0	2	0		0	0	0		2

PM	N.Twin Oaks Valley Road Southbound				E. La Cienega Road Westbound				N.Twin Oaks Valley Road Northbound				- 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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
16:15	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
16:30	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	0
16:45	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	4	0
17:00	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	1
17:15	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
Ped Total	5				6				0				0				11	
Bike Total		0	0	0		0	0	0		0	2	0		0	0	0		2

Intersection Turning Movement - Peak Hour Summary



Location: #04	File Name: ITM-25-066-04
Intersection: N. Twin Oaks Valley Road & E. La Cienega Road	Project: LLG Ref. 3-25-4059
Date of Count: Tuesday, December 02 2025	Growth & Twin Oaks



Intersection Turning Movement - Peak Hour Vehicle Count



Location: #05	File Name: ITM-25-066-05
Intersection: North Twin Oaks Valley Road & Del Roy Drive	Project: LLG Ref. 3-25-4059
Date of Count: Tuesday, December 02, 2025	Growth & Twin Oaks

AM	N Twin Oaks Valley Road Southbound			(Driveway) Westbound			N Twin Oaks Valley Road Northbound			Del Roy Drive Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
7:00	1	232	1	0	0	0	6	97	3	1	0	9	350
7:15	0	240	2	0	0	0	4	81	2	0	0	10	339
7:30	1	226	0	1	0	0	3	100	5	2	0	15	353
7:45	2	231	4	0	0	0	3	106	2	2	0	12	362
8:00	1	218	1	0	0	1	4	137	3	4	0	5	374
8:15	2	232	2	1	0	0	5	153	5	4	0	10	414
8:30	4	225	2	1	0	1	7	127	7	3	0	12	389
8:45	4	191	3	1	0	0	3	118	7	1	0	10	338
Total	15	1795	15	4	0	2	35	919	34	17	0	83	2919
Approach%	0.8	98.4	0.8	66.7	-	33.3	3.5	93.0	3.4	17.0	-	83.0	
Total%	0.5	61.5	0.5	0.1	-	0.1	1.2	31.5	1.2	0.6	-	2.8	

AM Intersection Peak Hour: 07:45 to 08:45

Volume	9	906	9	2	-	2	19	523	17	13	-	39	1,539
Approach%	1.0	98.1	1.0	50.0	-	50.0	3.4	93.6	3.0	25.0	-	75.0	
Total%	0.6	58.9	0.6	0.1	-	0.1	1.2	34.0	1.1	0.8	-	2.5	
PHF			0.97			0.50			0.86			0.87	0.93

PM	N Twin Oaks Valley Road Southbound			(Driveway) Westbound			N Twin Oaks Valley Road Northbound			Del Roy Drive Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:00	0	136	0	9	0	2	11	180	0	1	0	3	342
16:15	1	153	0	7	1	3	14	174	1	1	1	9	365
16:30	3	163	4	8	0	1	11	196	0	3	0	6	395
16:45	0	148	2	9	0	2	8	191	0	0	0	4	364
17:00	0	133	2	1	0	4	12	190	2	1	0	8	353
17:15	0	136	5	5	0	5	6	215	1	1	0	4	378
17:30	0	132	0	7	0	3	7	195	3	2	0	5	354
17:45	1	117	1	1	0	0	12	142	3	0	0	0	277
Total	5	1118	14	47	1	20	81	1483	10	9	1	39	2828
Approach%	0.4	98.3	1.2	69.1	1.5	29.4	5.1	94.2	0.6	18.4	2.0	79.6	
Total%	0.2	39.5	0.5	1.7	0.0	0.7	2.9	52.4	0.4	0.3	0.0	1.4	

PM Intersection Peak Hour: 16:30 to 17:30

Volume	3	580	13	23	-	12	37	792	3	5	-	22	1,490
Approach%	0.5	97.3	2.2	65.7	-	34.3	4.4	95.2	0.4	18.5	-	81.5	
Total%	0.2	38.9	0.9	1.5	-	0.8	2.5	53.2	0.2	0.3	-	1.5	
PHF			0.88			0.80			0.94			0.75	0.94

Intersection Turning Movement - Bicycle & Pedestrian Count



Location: #05	File Name: ITM-25-066-05
Intersection: North Twin Oaks Valley Road & Del Roy Drive	Project: LLG Ref. 3-25-4059
Date of Count: Tuesday, December 02, 2025	Growth & Twin Oaks

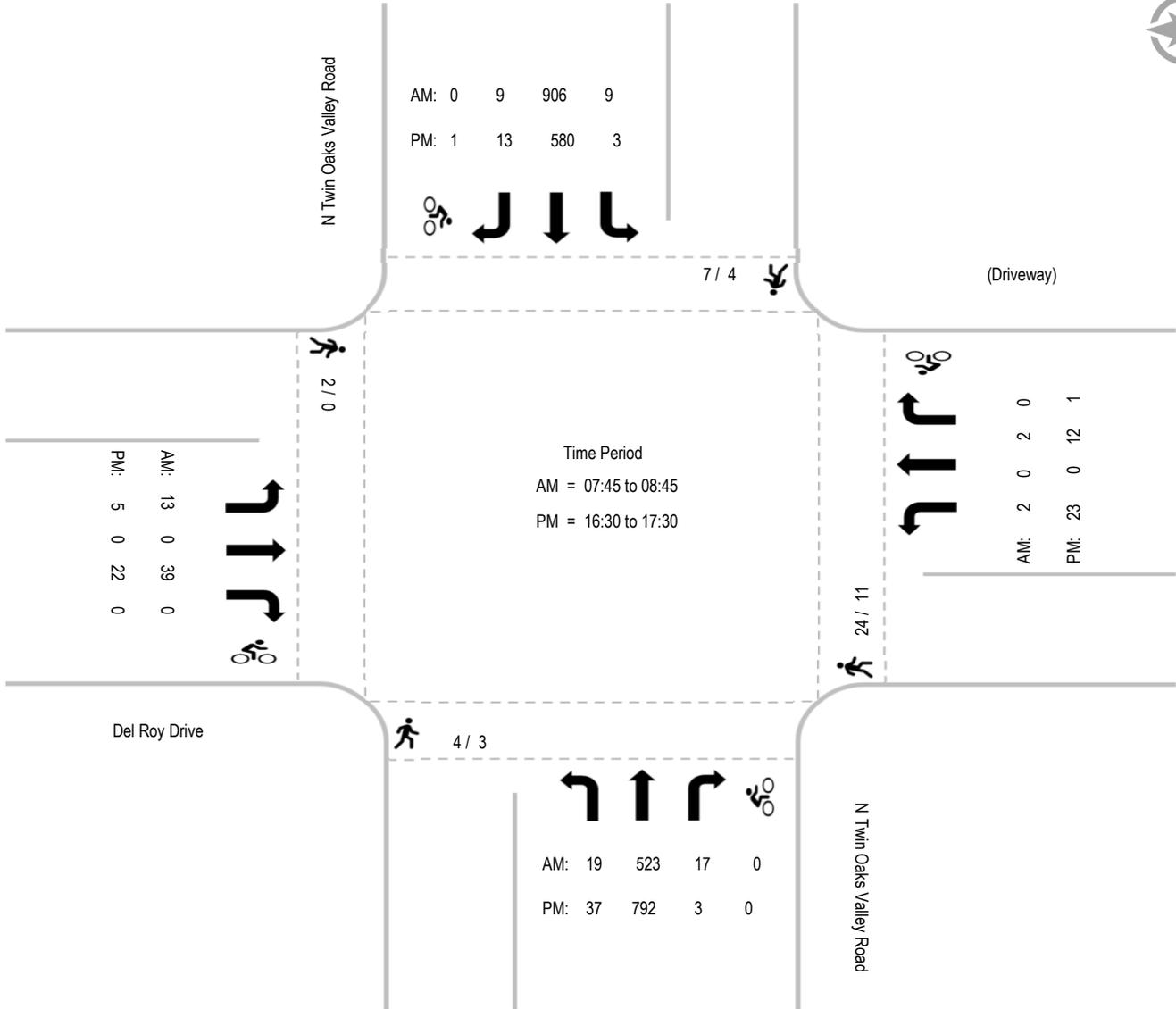
AM	N Twin Oaks Valley Road Southbound				(Driveway) Westbound				N Twin Oaks Valley Road Northbound				Del Roy Drive Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
7:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
7:15	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
7:30	5	0	0	0	5	0	0	0	2	0	0	0	0	0	0	0	12	0
7:45	1	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	4	0
8:00	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0
8:15	0	0	0	0	8	0	0	0	1	0	0	0	0	1	0	0	10	0
8:30	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	5	0
8:45	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0
Ped Total	7				24				4					2			37	
Bike Total		0	0	0		0	0	0		0	0	0			0	0		0

PM	N Twin Oaks Valley Road Southbound				(Driveway) Westbound				N Twin Oaks Valley Road Northbound				Del Roy Drive 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	3	0	0	0	0	0	0	0	8	0
16:30	1	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0	4	1
16:45	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1
17:00	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0
17:15	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
Ped Total	4				11				3					0			18	
Bike Total		0	1	0		0	1	0		0	0	0			0	0		2

Intersection Turning Movement - Peak Hour Summary



Location: #05	File Name: ITM-25-066-05
Intersection: North Twin Oaks Valley Road & Del Roy Drive	Project: LLG Ref. 3-25-4059
Date of Count: Tuesday, December 02, 2025	Growth & Twin Oaks



Intersection Turning Movement - Peak Hour Vehicle Count



Location: #06	File Name: ITM-25-066-06
Intersection: North Twin Oaks Valley Road & Windy Way	Project: LLG Ref. 3-25-4059
Date of Count: Tuesday, December 02, 2025	Growth & Twin Oaks

AM	N Twin Oaks Valley Road Southbound			(Driveway) Westbound			N Twin Oaks Valley Road Northbound			Windy Way Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
7:00	0	224	11	0	0	0	7	99	0	1	0	6	348
7:15	0	253	9	0	0	0	9	86	1	1	0	6	365
7:30	0	239	6	0	0	0	10	105	0	0	0	10	370
7:45	1	246	6	0	0	0	7	107	0	4	0	9	380
8:00	0	215	12	0	0	0	4	149	1	3	0	6	390
8:15	2	224	8	0	0	0	0	156	1	6	0	5	402
8:30	0	238	6	0	0	0	8	150	0	5	0	7	414
8:45	0	217	5	2	0	0	13	117	0	3	0	8	365
Total	3	1856	63	2	0	0	58	969	3	23	0	57	3034
Approach%	0.2	96.6	3.3	100.0	-	-	5.6	94.1	0.3	28.8	-	71.3	
Total%	0.1	61.2	2.1	0.1	-	-	1.9	31.9	0.1	0.8	-	1.9	

AM Intersection Peak Hour: 07:45 to 08:45

Volume	3	923	32	-	-	-	19	562	2	18	-	27	1,586
Approach%	0.3	96.3	3.3	-	-	-	3.3	96.4	0.3	40.0	-	60.0	
Total%	0.2	58.2	2.0	-	-	-	1.2	35.4	0.1	1.1	-	1.7	
PHF			0.95			#DIV/0!			0.92			0.87	0.96

PM	N Twin Oaks Valley Road Southbound			(Driveway) Westbound			N Twin Oaks Valley Road Northbound			Windy Way Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:00	0	159	2	0	0	0	7	217	0	10	0	13	408
16:15	0	164	2	0	0	0	11	182	0	4	0	6	369
16:30	1	187	2	0	0	0	11	195	0	10	0	5	411
16:45	1	169	2	0	0	0	17	186	0	8	0	9	392
17:00	1	144	1	0	0	0	9	200	1	7	0	9	372
17:15	0	137	4	0	0	0	6	239	0	3	0	11	400
17:30	0	141	4	0	0	0	8	191	0	1	0	8	353
17:45	0	124	3	0	0	0	5	162	0	0	0	4	298
Total	3	1225	20	0	0	0	74	1572	1	43	0	65	3003
Approach%	0.2	98.2	1.6	-	-	-	4.5	95.4	0.1	39.8	-	60.2	
Total%	0.1	40.8	0.7	-	-	-	2.5	52.3	0.0	1.4	-	2.2	

PM Intersection Peak Hour: 16:00 to 17:00

Volume	2	679	8	-	-	-	46	780	-	32	-	33	1,580
Approach%	0.3	98.5	1.2	-	-	-	5.6	94.4	-	49.2	-	50.8	
Total%	0.1	43.0	0.5	-	-	-	2.9	49.4	-	2.0	-	2.1	
PHF			0.91			#DIV/0!			0.92			0.71	0.96

Intersection Turning Movement - Bicycle & Pedestrian Count



Location: #06	File Name: ITM-25-066-06
Intersection: North Twin Oaks Valley Road & Windy Way	Project: LLG Ref. 3-25-4059
Date of Count: Tuesday, December 02, 2025	Growth & Twin Oaks

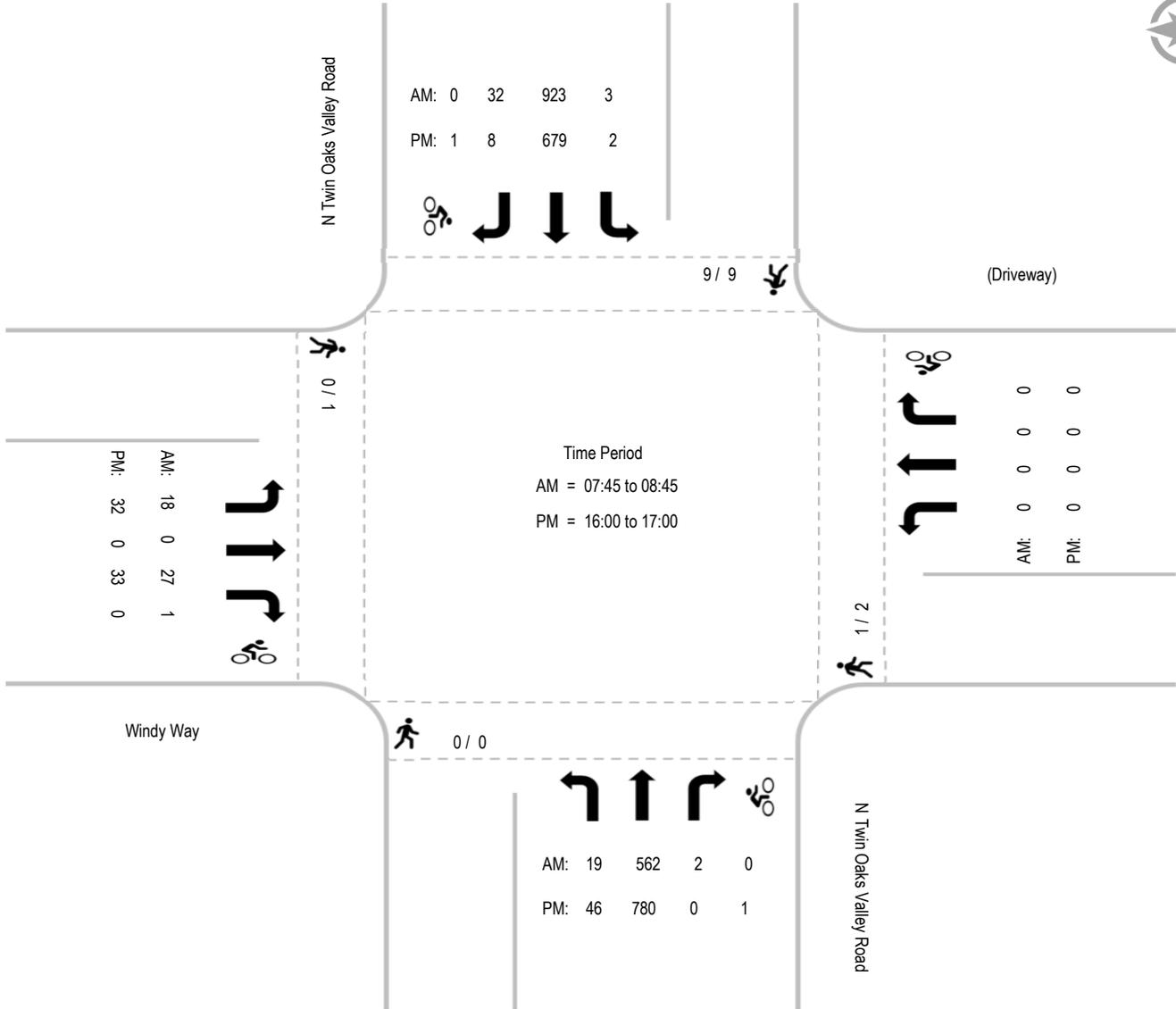
AM	N Twin Oaks Valley Road Southbound				(Driveway) Westbound				N Twin Oaks Valley Road Northbound				Windy Way Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
7:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15	5	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	6	0
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Ped Total	9				1				0				0				10	
Bike Total		0	0	0		0	0	0		0	0	0		1	0	0		1

PM	N Twin Oaks Valley Road Southbound				(Driveway) Westbound				N Twin Oaks Valley Road Northbound				Windy Way 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	1	0	1	0	0	0	1	1
16:15	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
16:30	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2	1
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
17:45	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
Ped Total	9				2				0				1				12	
Bike Total		0	1	0		0	0	0		0	1	0		0	0	0		2

Intersection Turning Movement - Peak Hour Summary



Location: #06	File Name: ITM-25-066-06
Intersection: North Twin Oaks Valley Road & Windy Way	Project: LLG Ref. 3-25-4059
Date of Count: Tuesday, December 02, 2025	Growth & Twin Oaks



City of San Marcos
 N/S: N Twin Oaks Valley Road
 E/W: Borden Road
 Weather: Clear

File Name : 07_SNM_TOV_Bord AM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 1

Groups Printed- Total Volume

Start Time	N Twin Oaks Valley Road Southbound				Borden Road Westbound				N Twin Oaks Valley Road Northbound				Borden Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	8	167	25	200	75	55	14	144	17	84	16	117	10	48	51	109	570
07:15 AM	7	182	44	233	65	108	14	187	33	75	13	121	13	34	66	113	654
07:30 AM	4	213	41	258	56	116	16	188	25	100	23	148	9	41	49	99	693
07:45 AM	8	201	48	257	69	123	12	204	31	86	20	137	9	38	49	96	694
Total	27	763	158	948	265	402	56	723	106	345	72	523	41	161	215	417	2611
08:00 AM	4	185	37	226	63	118	23	204	19	116	25	160	17	48	61	126	716
08:15 AM	14	184	47	245	53	67	16	136	21	122	30	173	26	62	55	143	697
08:30 AM	16	196	37	249	54	58	25	137	30	105	19	154	15	108	34	157	697
08:45 AM	20	180	33	233	49	79	12	140	24	111	40	175	13	73	51	137	685
Total	54	745	154	953	219	322	76	617	94	454	114	662	71	291	201	563	2795
Grand Total	81	1508	312	1901	484	724	132	1340	200	799	186	1185	112	452	416	980	5406
Apprch %	4.3	79.3	16.4		36.1	54	9.9		16.9	67.4	15.7		11.4	46.1	42.4		
Total %	1.5	27.9	5.8	35.2	9	13.4	2.4	24.8	3.7	14.8	3.4	21.9	2.1	8.4	7.7	18.1	

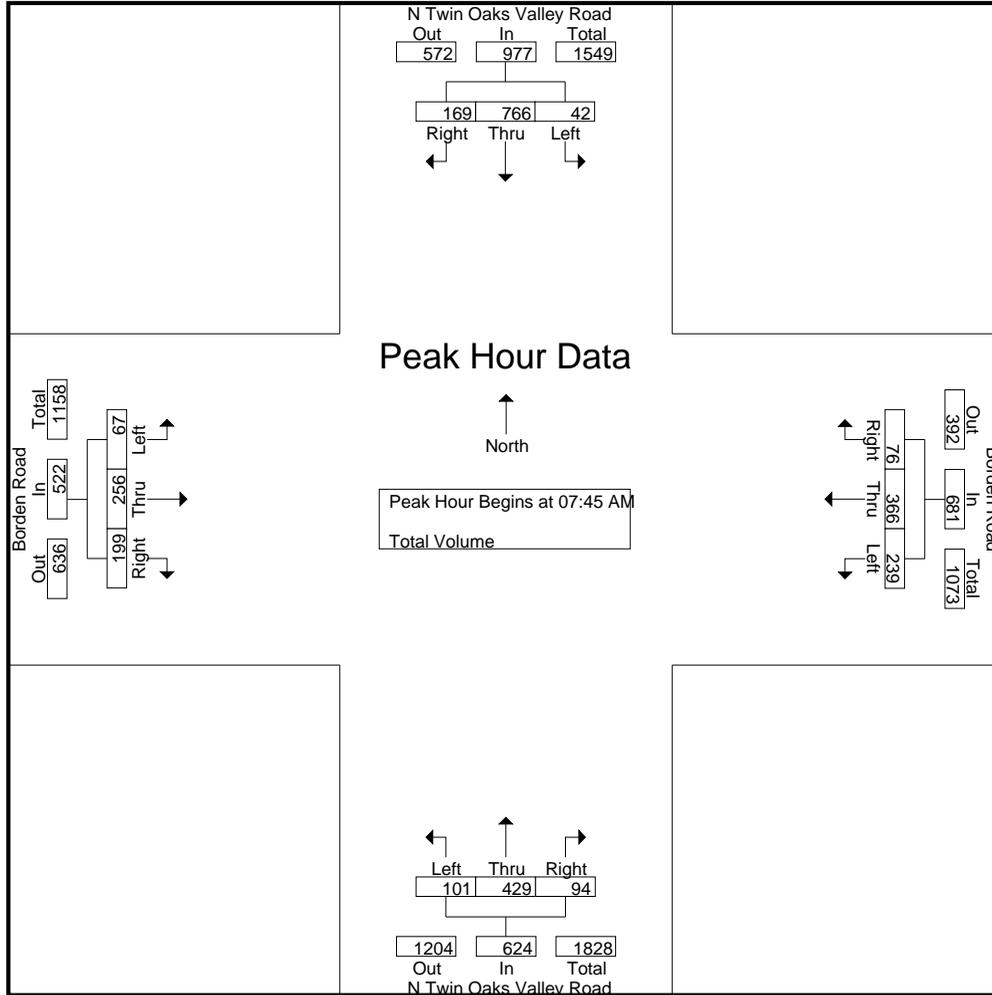
Start Time	N Twin Oaks Valley Road Southbound				Borden Road Westbound				N Twin Oaks Valley Road Northbound				Borden Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:45 AM	8	201	48	257	69	123	12	204	31	86	20	137	9	38	49	96	694
08:00 AM	4	185	37	226	63	118	23	204	19	116	25	160	17	48	61	126	716
08:15 AM	14	184	47	245	53	67	16	136	21	122	30	173	26	62	55	143	697
08:30 AM	16	196	37	249	54	58	25	137	30	105	19	154	15	108	34	157	697
Total Volume	42	766	169	977	239	366	76	681	101	429	94	624	67	256	199	522	2804
% App. Total	4.3	78.4	17.3		35.1	53.7	11.2		16.2	68.8	15.1		12.8	49	38.1		
PHF	.656	.953	.880	.950	.866	.744	.760	.835	.815	.879	.783	.902	.644	.593	.816	.831	.979

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:45 AM

City of San Marcos
 N/S: N Twin Oaks Valley Road
 E/W: Borden Road
 Weather: Clear

File Name : 07_SNM_TOV_Bord AM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
 Peak Hour for Each Approach Begins at:

	07:30 AM				07:15 AM				08:00 AM				08:00 AM			
+0 mins.	4	213	41	258	65	108	14	187	19	116	25	160	17	48	61	126
+15 mins.	8	201	48	257	56	116	16	188	21	122	30	173	26	62	55	143
+30 mins.	4	185	37	226	69	123	12	204	30	105	19	154	15	108	34	157
+45 mins.	14	184	47	245	63	118	23	204	24	111	40	175	13	73	51	137
Total Volume	30	783	173	986	253	465	65	783	94	454	114	662	71	291	201	563
% App. Total	3	79.4	17.5		32.3	59.4	8.3		14.2	68.6	17.2		12.6	51.7	35.7	
PHF	.536	.919	.901	.955	.917	.945	.707	.960	.783	.930	.713	.946	.683	.674	.824	.896

Counts Unlimited, Inc.
 PO Box 1178
 Corona, CA 92878
 (951) 268-6268

City of San Marcos
 N/S: N Twin Oaks Valley Road
 E/W: Borden Road
 Weather: Clear

File Name : 07_SNM_TOV_Bord PM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 1

Groups Printed- Total Volume

Start Time	N Twin Oaks Valley Road Southbound				Borden Road Westbound				N Twin Oaks Valley Road Northbound				Borden Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	16	156	23	195	29	46	12	87	40	150	80	270	56	135	60	251	803
04:15 PM	21	141	19	181	49	43	13	105	37	154	44	235	31	100	64	195	716
04:30 PM	19	162	16	197	34	62	18	114	50	140	53	243	44	102	53	199	753
04:45 PM	12	148	31	191	49	52	14	115	49	147	64	260	45	111	58	214	780
Total	68	607	89	764	161	203	57	421	176	591	241	1008	176	448	235	859	3052
05:00 PM	10	121	28	159	46	47	14	107	61	150	55	266	48	134	63	245	777
05:15 PM	17	110	32	159	24	49	14	87	42	168	76	286	59	111	56	226	758
05:30 PM	7	106	21	134	35	60	9	104	60	154	58	272	40	85	50	175	685
05:45 PM	11	102	22	135	30	52	9	91	61	131	59	251	28	79	53	160	637
Total	45	439	103	587	135	208	46	389	224	603	248	1075	175	409	222	806	2857
Grand Total	113	1046	192	1351	296	411	103	810	400	1194	489	2083	351	857	457	1665	5909
Apprch %	8.4	77.4	14.2		36.5	50.7	12.7		19.2	57.3	23.5		21.1	51.5	27.4		
Total %	1.9	17.7	3.2	22.9	5	7	1.7	13.7	6.8	20.2	8.3	35.3	5.9	14.5	7.7	28.2	

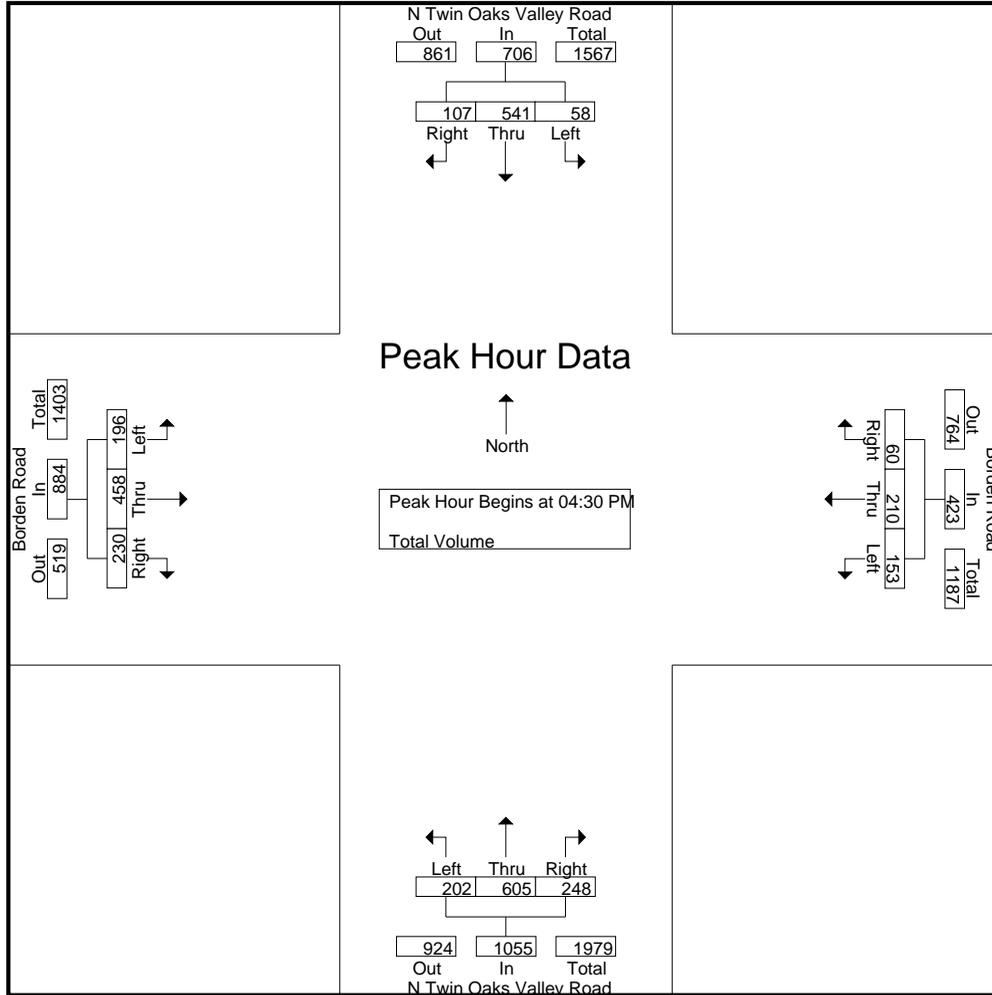
Start Time	N Twin Oaks Valley Road Southbound				Borden Road Westbound				N Twin Oaks Valley Road Northbound				Borden Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:30 PM	19	162	16	197	34	62	18	114	50	140	53	243	44	102	53	199	753
04:45 PM	12	148	31	191	49	52	14	115	49	147	64	260	45	111	58	214	780
05:00 PM	10	121	28	159	46	47	14	107	61	150	55	266	48	134	63	245	777
05:15 PM	17	110	32	159	24	49	14	87	42	168	76	286	59	111	56	226	758
Total Volume	58	541	107	706	153	210	60	423	202	605	248	1055	196	458	230	884	3068
% App. Total	8.2	76.6	15.2		36.2	49.6	14.2		19.1	57.3	23.5		22.2	51.8	26		
PHF	.763	.835	.836	.896	.781	.847	.833	.920	.828	.900	.816	.922	.831	.854	.913	.902	.983

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:30 PM

City of San Marcos
 N/S: N Twin Oaks Valley Road
 E/W: Borden Road
 Weather: Clear

File Name : 07_SNM_TOV_Bord PM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
 Peak Hour for Each Approach Begins at:

	04:00 PM				04:15 PM				04:45 PM				04:30 PM			
+0 mins.	16	156	23	195	49	43	13	105	49	147	64	260	44	102	53	199
+15 mins.	21	141	19	181	34	62	18	114	61	150	55	266	45	111	58	214
+30 mins.	19	162	16	197	49	52	14	115	42	168	76	286	48	134	63	245
+45 mins.	12	148	31	191	46	47	14	107	60	154	58	272	59	111	56	226
Total Volume	68	607	89	764	178	204	59	441	212	619	253	1084	196	458	230	884
% App. Total	8.9	79.5	11.6		40.4	46.3	13.4		19.6	57.1	23.3		22.2	51.8	26	
PHF	.810	.937	.718	.970	.908	.823	.819	.959	.869	.921	.832	.948	.831	.854	.913	.902

City of San Marcos
 N/S: Woodward Street
 E/W: Borden Road
 Weather: Clear

File Name : 08_SNM_Ww_Bord AM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 1

Groups Printed- Total Volume

Start Time	Woodward Street Southbound				Borden Road Westbound				Woodward Street Northbound				Borden Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	12	23	38	73	1	104	2	107	3	8	7	18	15	49	7	71	269
07:15 AM	11	35	43	89	1	118	1	120	9	8	3	20	3	44	7	54	283
07:30 AM	16	40	38	94	2	141	0	143	6	6	4	16	15	48	5	68	321
07:45 AM	9	34	25	68	4	161	9	174	9	12	4	25	9	47	10	66	333
Total	48	132	144	324	8	524	12	544	27	34	18	79	42	188	29	259	1206
08:00 AM	8	23	28	59	3	163	5	171	19	2	3	24	15	62	3	80	334
08:15 AM	5	35	39	79	3	83	2	88	12	8	2	22	13	65	15	93	282
08:30 AM	14	40	30	84	6	93	4	103	16	10	4	30	14	121	14	149	366
08:45 AM	11	23	22	56	2	110	3	115	3	14	3	20	22	105	15	142	333
Total	38	121	119	278	14	449	14	477	50	34	12	96	64	353	47	464	1315
Grand Total	86	253	263	602	22	973	26	1021	77	68	30	175	106	541	76	723	2521
Apprch %	14.3	42	43.7		2.2	95.3	2.5		44	38.9	17.1		14.7	74.8	10.5		
Total %	3.4	10	10.4	23.9	0.9	38.6	1	40.5	3.1	2.7	1.2	6.9	4.2	21.5	3	28.7	

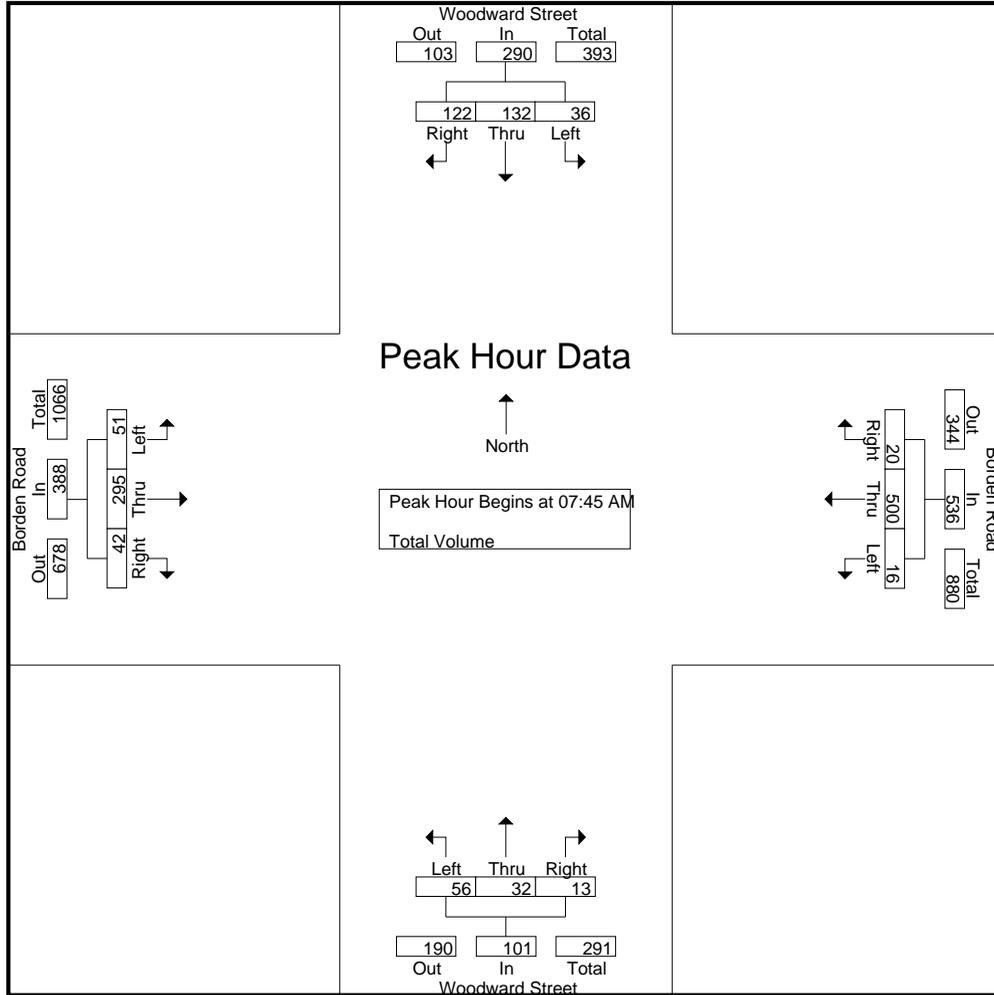
Start Time	Woodward Street Southbound				Borden Road Westbound				Woodward Street Northbound				Borden Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:45 AM	9	34	25	68	4	161	9	174	9	12	4	25	9	47	10	66	333
08:00 AM	8	23	28	59	3	163	5	171	19	2	3	24	15	62	3	80	334
08:15 AM	5	35	39	79	3	83	2	88	12	8	2	22	13	65	15	93	282
08:30 AM	14	40	30	84	6	93	4	103	16	10	4	30	14	121	14	149	366
Total Volume	36	132	122	290	16	500	20	536	56	32	13	101	51	295	42	388	1315
% App. Total	12.4	45.5	42.1		3	93.3	3.7		55.4	31.7	12.9		13.1	76	10.8		
PHF	.643	.825	.782	.863	.667	.767	.556	.770	.737	.667	.813	.842	.850	.610	.700	.651	.898

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:45 AM

City of San Marcos
 N/S: Woodward Street
 E/W: Borden Road
 Weather: Clear

File Name : 08_SNM_Ww_Bord AM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
 Peak Hour for Each Approach Begins at:

	07:00 AM				07:15 AM				07:45 AM				08:00 AM			
+0 mins.	12	23	38	73	1	118	1	120	9	12	4	25	15	62	3	80
+15 mins.	11	35	43	89	2	141	0	143	19	2	3	24	13	65	15	93
+30 mins.	16	40	38	94	4	161	9	174	12	8	2	22	14	121	14	149
+45 mins.	9	34	25	68	3	163	5	171	16	10	4	30	22	105	15	142
Total Volume	48	132	144	324	10	583	15	608	56	32	13	101	64	353	47	464
% App. Total	14.8	40.7	44.4		1.6	95.9	2.5		55.4	31.7	12.9		13.8	76.1	10.1	
PHF	.750	.825	.837	.862	.625	.894	.417	.874	.737	.667	.813	.842	.727	.729	.783	.779

City of San Marcos
 N/S: Woodward Street
 E/W: Borden Road
 Weather: Clear

File Name : 08_SNM_Ww_Bord PM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 1

Groups Printed- Total Volume

Start Time	Woodward Street Southbound				Borden Road Westbound				Woodward Street Northbound				Borden Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	1	17	12	30	3	69	8	80	19	19	1	39	57	167	7	231	380
04:15 PM	5	20	20	45	6	72	7	85	9	22	3	34	23	139	13	175	339
04:30 PM	6	19	17	42	10	77	3	90	18	25	3	46	31	141	5	177	355
04:45 PM	6	16	27	49	3	68	9	80	16	19	5	40	33	136	11	180	349
Total	18	72	76	166	22	286	27	335	62	85	12	159	144	583	36	763	1423
05:00 PM	5	20	22	47	3	64	10	77	17	19	5	41	35	167	6	208	373
05:15 PM	8	18	14	40	3	64	9	76	16	30	10	56	48	141	13	202	374
05:30 PM	8	13	22	43	1	73	8	82	6	17	3	26	37	109	6	152	303
05:45 PM	6	11	15	32	1	65	12	78	13	31	1	45	36	101	8	145	300
Total	27	62	73	162	8	266	39	313	52	97	19	168	156	518	33	707	1350
Grand Total	45	134	149	328	30	552	66	648	114	182	31	327	300	1101	69	1470	2773
Apprch %	13.7	40.9	45.4		4.6	85.2	10.2		34.9	55.7	9.5		20.4	74.9	4.7		
Total %	1.6	4.8	5.4	11.8	1.1	19.9	2.4	23.4	4.1	6.6	1.1	11.8	10.8	39.7	2.5	53	

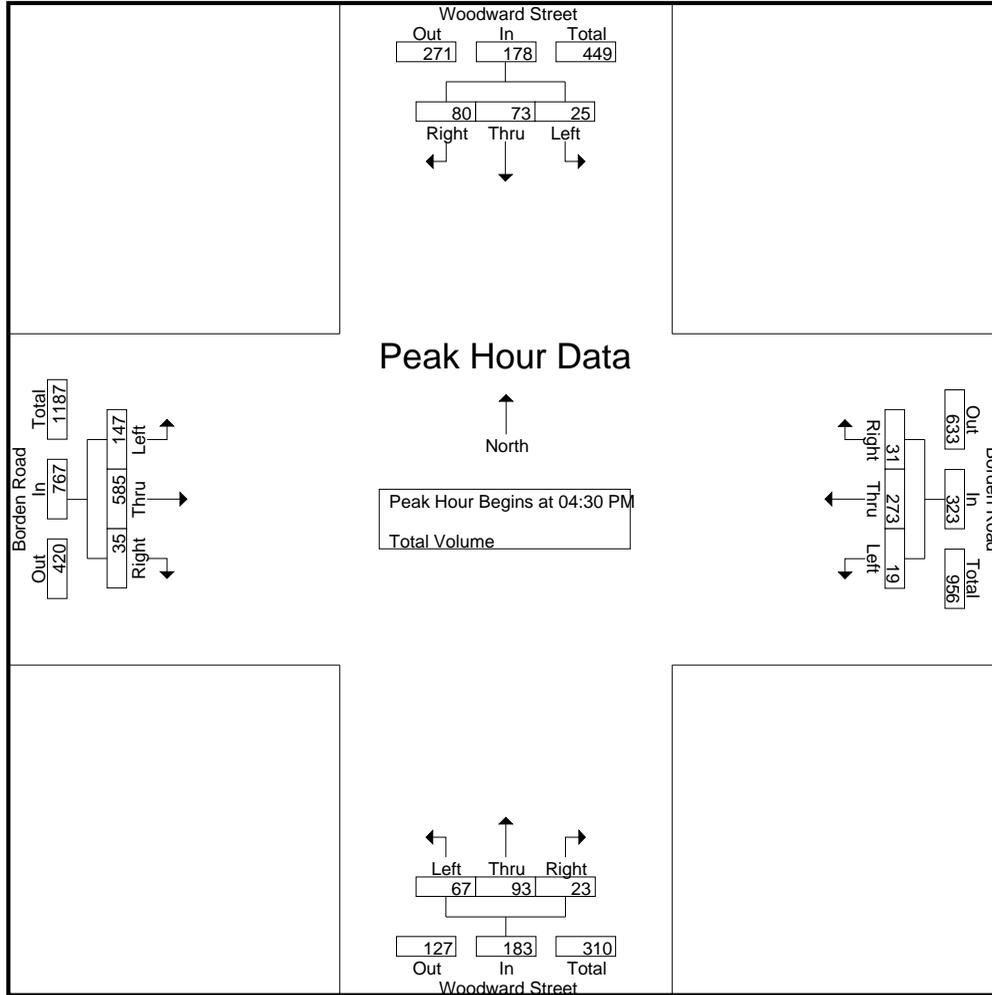
Start Time	Woodward Street Southbound				Borden Road Westbound				Woodward Street Northbound				Borden Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:30 PM	6	19	17	42	10	77	3	90	18	25	3	46	31	141	5	177	355
04:45 PM	6	16	27	49	3	68	9	80	16	19	5	40	33	136	11	180	349
05:00 PM	5	20	22	47	3	64	10	77	17	19	5	41	35	167	6	208	373
05:15 PM	8	18	14	40	3	64	9	76	16	30	10	56	48	141	13	202	374
Total Volume	25	73	80	178	19	273	31	323	67	93	23	183	147	585	35	767	1451
% App. Total	14	41	44.9		5.9	84.5	9.6		36.6	50.8	12.6		19.2	76.3	4.6		
PHF	.781	.913	.741	.908	.475	.886	.775	.897	.931	.775	.575	.817	.766	.876	.673	.922	.970

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:30 PM

City of San Marcos
 N/S: Woodward Street
 E/W: Borden Road
 Weather: Clear

File Name : 08_SNM_Ww_Bord PM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
 Peak Hour for Each Approach Begins at:

	04:15 PM				04:00 PM				04:30 PM				04:30 PM			
+0 mins.	5	20	20	45	3	69	8	80	18	25	3	46	31	141	5	177
+15 mins.	6	19	17	42	6	72	7	85	16	19	5	40	33	136	11	180
+30 mins.	6	16	27	49	10	77	3	90	17	19	5	41	35	167	6	208
+45 mins.	5	20	22	47	3	68	9	80	16	30	10	56	48	141	13	202
Total Volume	22	75	86	183	22	286	27	335	67	93	23	183	147	585	35	767
% App. Total	12	41	47		6.6	85.4	8.1		36.6	50.8	12.6		19.2	76.3	4.6	
PHF	.917	.938	.796	.934	.550	.929	.750	.931	.931	.775	.575	.817	.766	.876	.673	.922

City of San Marcos
 N/S: N Twin Oaks Valley Road
 E/W: Richmar Avenue
 Weather: Clear

File Name : 09_SNM_TOV_Rich AM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 1

Groups Printed- Total Volume

Start Time	N Twin Oaks Valley Road Southbound				Richmar Avenue Westbound				N Twin Oaks Valley Road Northbound				Richmar Avenue Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	2	285	29	316	2	3	0	5	9	101	4	114	17	1	37	55	490
07:15 AM	1	301	48	350	2	0	1	3	8	103	1	112	25	1	24	50	515
07:30 AM	3	284	46	333	3	0	1	4	13	124	2	139	20	0	28	48	524
07:45 AM	2	281	43	326	3	0	0	3	15	132	4	151	24	0	25	49	529
Total	8	1151	166	1325	10	3	2	15	45	460	11	516	86	2	114	202	2058
08:00 AM	5	252	41	298	3	1	0	4	12	138	1	151	39	4	27	70	523
08:15 AM	4	257	40	301	4	0	0	4	16	132	4	152	39	3	28	70	527
08:30 AM	4	230	52	286	3	0	0	3	15	134	1	150	28	2	24	54	493
08:45 AM	3	241	39	283	1	0	0	1	12	149	2	163	28	3	22	53	500
Total	16	980	172	1168	11	1	0	12	55	553	8	616	134	12	101	247	2043
Grand Total	24	2131	338	2493	21	4	2	27	100	1013	19	1132	220	14	215	449	4101
Apprch %	1	85.5	13.6		77.8	14.8	7.4		8.8	89.5	1.7		49	3.1	47.9		
Total %	0.6	52	8.2	60.8	0.5	0.1	0	0.7	2.4	24.7	0.5	27.6	5.4	0.3	5.2	10.9	

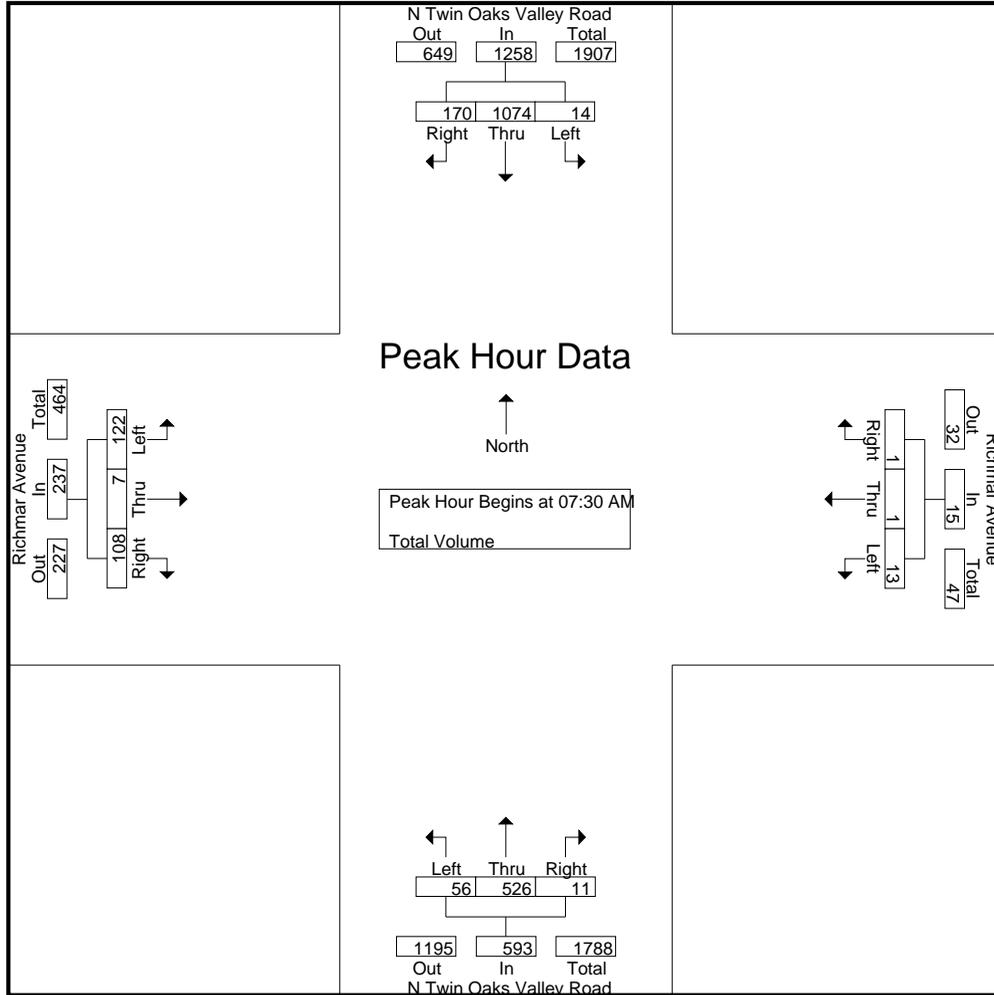
Start Time	N Twin Oaks Valley Road Southbound				Richmar Avenue Westbound				N Twin Oaks Valley Road Northbound				Richmar Avenue Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:30 AM	3	284	46	333	3	0	1	4	13	124	2	139	20	0	28	48	524
07:45 AM	2	281	43	326	3	0	0	3	15	132	4	151	24	0	25	49	529
08:00 AM	5	252	41	298	3	1	0	4	12	138	1	151	39	4	27	70	523
08:15 AM	4	257	40	301	4	0	0	4	16	132	4	152	39	3	28	70	527
Total Volume	14	1074	170	1258	13	1	1	15	56	526	11	593	122	7	108	237	2103
% App. Total	1.1	85.4	13.5		86.7	6.7	6.7		9.4	88.7	1.9		51.5	3	45.6		
PHF	.700	.945	.924	.944	.813	.250	.250	.938	.875	.953	.688	.975	.782	.438	.964	.846	.994

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM

City of San Marcos
 N/S: N Twin Oaks Valley Road
 E/W: Richmar Avenue
 Weather: Clear

File Name : 09_SNM_TOV_Rich AM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
 Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				08:00 AM				08:00 AM			
+0 mins.	2	285	29	316	2	3	0	5	12	138	1	151	39	4	27	70
+15 mins.	1	301	48	350	2	0	1	3	16	132	4	152	39	3	28	70
+30 mins.	3	284	46	333	3	0	1	4	15	134	1	150	28	2	24	54
+45 mins.	2	281	43	326	3	0	0	3	12	149	2	163	28	3	22	53
Total Volume	8	1151	166	1325	10	3	2	15	55	553	8	616	134	12	101	247
% App. Total	0.6	86.9	12.5		66.7	20	13.3		8.9	89.8	1.3		54.3	4.9	40.9	
PHF	.667	.956	.865	.946	.833	.250	.500	.750	.859	.928	.500	.945	.859	.750	.902	.882

City of San Marcos
 N/S: N Twin Oaks Valley Road
 E/W: Richmar Avenue
 Weather: Clear

File Name : 09_SNM_TOV_Rich PM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 1

Groups Printed- Total Volume

Start Time	N Twin Oaks Valley Road Southbound				Richmar Avenue Westbound				N Twin Oaks Valley Road Northbound				Richmar Avenue Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	9	221	47	277	0	0	1	1	34	240	4	278	54	0	21	75	631
04:15 PM	14	209	46	269	1	3	1	5	23	216	2	241	44	0	17	61	576
04:30 PM	8	212	45	265	1	4	1	6	34	220	5	259	48	0	14	62	592
04:45 PM	11	212	39	262	4	1	1	6	32	221	3	256	58	4	20	82	606
Total	42	854	177	1073	6	8	4	18	123	897	14	1034	204	4	72	280	2405
05:00 PM	13	214	47	274	10	0	0	10	21	253	7	281	35	3	27	65	630
05:15 PM	3	195	36	234	4	1	1	6	28	236	3	267	57	2	12	71	578
05:30 PM	8	204	23	235	3	1	1	5	32	231	4	267	46	2	16	64	571
05:45 PM	2	182	28	212	1	2	0	3	20	227	0	247	41	1	7	49	511
Total	26	795	134	955	18	4	2	24	101	947	14	1062	179	8	62	249	2290
Grand Total	68	1649	311	2028	24	12	6	42	224	1844	28	2096	383	12	134	529	4695
Apprch %	3.4	81.3	15.3		57.1	28.6	14.3		10.7	88	1.3		72.4	2.3	25.3		
Total %	1.4	35.1	6.6	43.2	0.5	0.3	0.1	0.9	4.8	39.3	0.6	44.6	8.2	0.3	2.9	11.3	

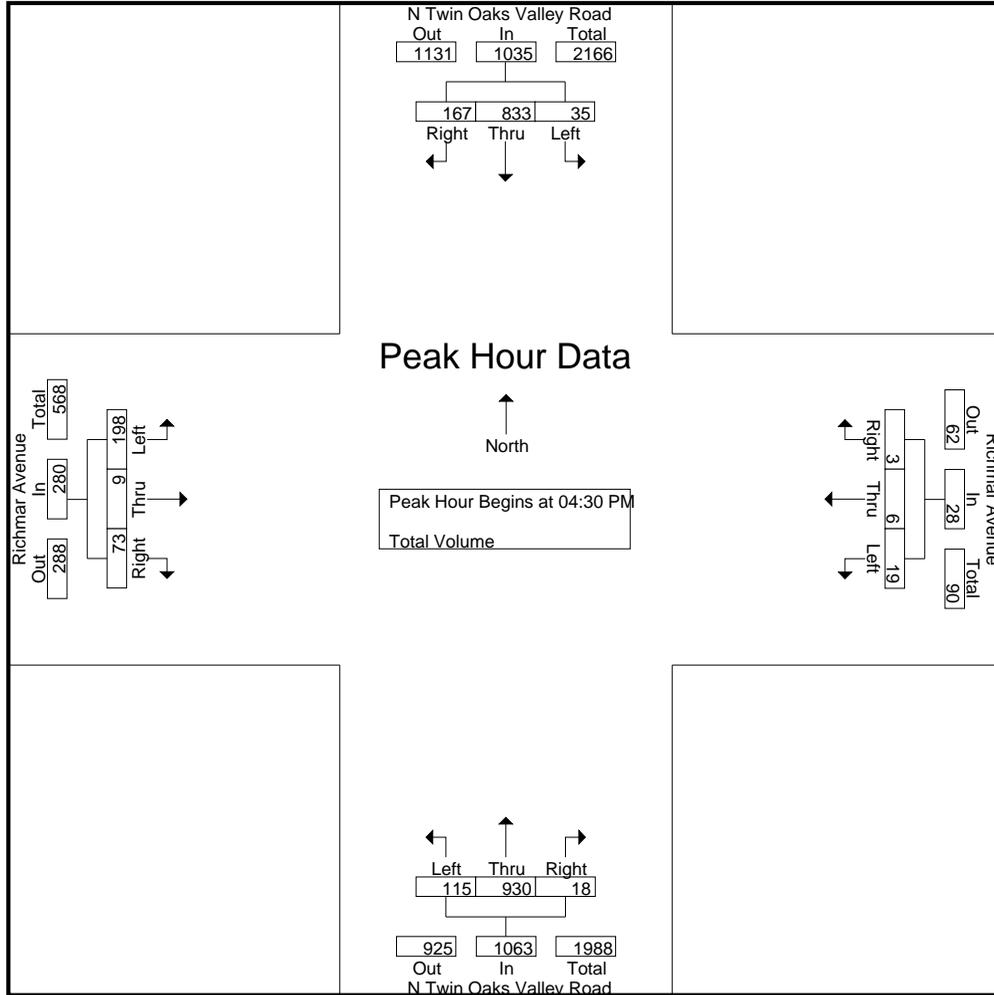
Start Time	N Twin Oaks Valley Road Southbound				Richmar Avenue Westbound				N Twin Oaks Valley Road Northbound				Richmar Avenue Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:30 PM	8	212	45	265	1	4	1	6	34	220	5	259	48	0	14	62	592
04:45 PM	11	212	39	262	4	1	1	6	32	221	3	256	58	4	20	82	606
05:00 PM	13	214	47	274	10	0	0	10	21	253	7	281	35	3	27	65	630
05:15 PM	3	195	36	234	4	1	1	6	28	236	3	267	57	2	12	71	578
Total Volume	35	833	167	1035	19	6	3	28	115	930	18	1063	198	9	73	280	2406
% App. Total	3.4	80.5	16.1		67.9	21.4	10.7		10.8	87.5	1.7		70.7	3.2	26.1		
PHF	.673	.973	.888	.944	.475	.375	.750	.700	.846	.919	.643	.946	.853	.563	.676	.854	.955

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:30 PM

City of San Marcos
 N/S: N Twin Oaks Valley Road
 E/W: Richmar Avenue
 Weather: Clear

File Name : 09_SNM_TOV_Rich PM
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Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
 Peak Hour for Each Approach Begins at:

	04:00 PM				04:30 PM				04:45 PM				04:45 PM			
+0 mins.	9	221	47	277	1	4	1	6	32	221	3	256	58	4	20	82
+15 mins.	14	209	46	269	4	1	1	6	21	253	7	281	35	3	27	65
+30 mins.	8	212	45	265	10	0	0	10	28	236	3	267	57	2	12	71
+45 mins.	11	212	39	262	4	1	1	6	32	231	4	267	46	2	16	64
Total Volume	42	854	177	1073	19	6	3	28	113	941	17	1071	196	11	75	282
% App. Total	3.9	79.6	16.5		67.9	21.4	10.7		10.6	87.9	1.6		69.5	3.9	26.6	
PHF	.750	.966	.941	.968	.475	.375	.750	.700	.883	.930	.607	.953	.845	.688	.694	.860

City of San Marcos
 N/S: N Twin Oaks Valley Road
 E/W: San Marcos Boulevard
 Weather: Clear

File Name : 10_SNM_TOV_SMB AM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 1

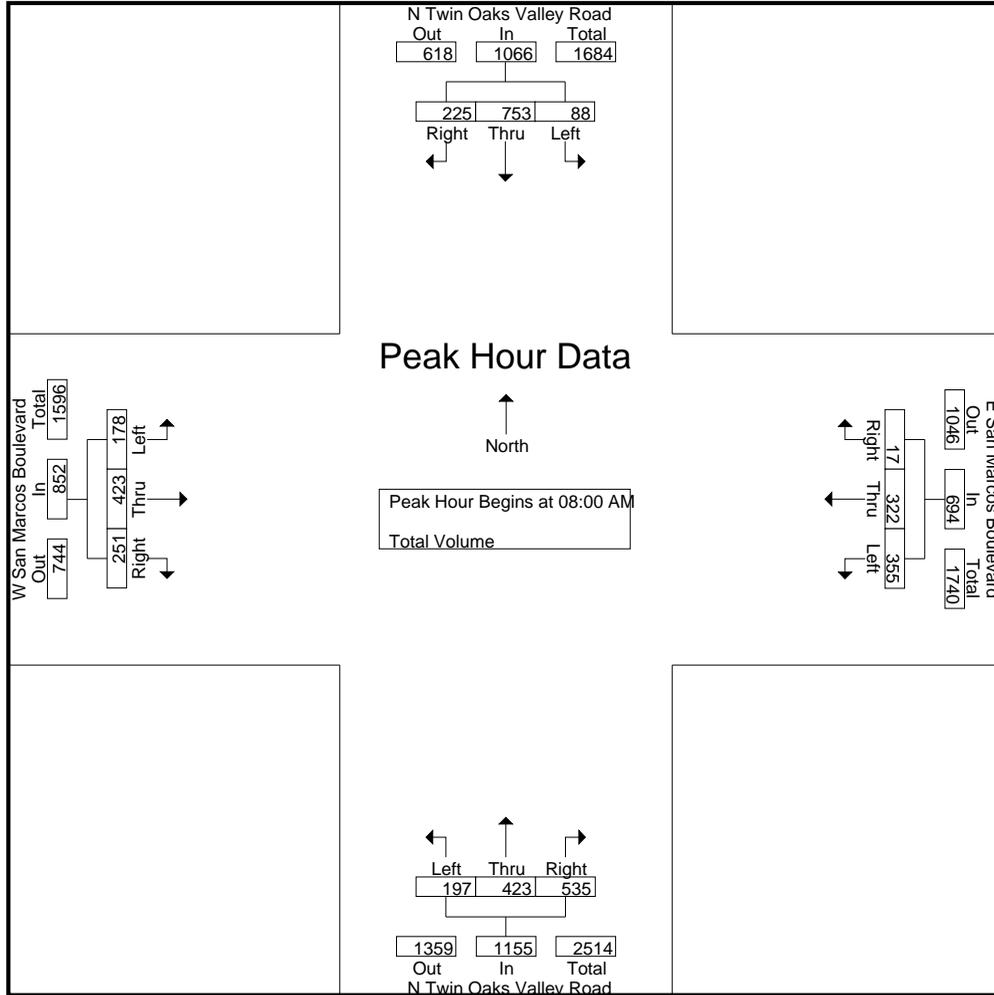
Groups Printed- Total Volume

Start Time	N Twin Oaks Valley Road Southbound				E San Marcos Boulevard Westbound				N Twin Oaks Valley Road Northbound				W San Marcos Boulevard Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	17	198	75	290	68	62	4	134	27	79	61	167	31	33	61	125	716
07:15 AM	16	229	86	331	78	93	4	175	33	86	98	217	21	67	70	158	881
07:30 AM	16	225	74	315	108	110	7	225	29	100	78	207	33	77	72	182	929
07:45 AM	31	216	72	319	101	85	6	192	37	104	118	259	44	95	70	209	979
Total	80	868	307	1255	355	350	21	726	126	369	355	850	129	272	273	674	3505
08:00 AM	18	203	62	283	60	75	4	139	55	104	117	276	44	95	61	200	898
08:15 AM	27	179	59	265	97	77	4	178	51	111	124	286	43	101	69	213	942
08:30 AM	14	185	53	252	102	84	3	189	42	107	125	274	41	100	64	205	920
08:45 AM	29	186	51	266	96	86	6	188	49	101	169	319	50	127	57	234	1007
Total	88	753	225	1066	355	322	17	694	197	423	535	1155	178	423	251	852	3767
Grand Total	168	1621	532	2321	710	672	38	1420	323	792	890	2005	307	695	524	1526	7272
Apprch %	7.2	69.8	22.9		50	47.3	2.7		16.1	39.5	44.4		20.1	45.5	34.3		
Total %	2.3	22.3	7.3	31.9	9.8	9.2	0.5	19.5	4.4	10.9	12.2	27.6	4.2	9.6	7.2	21	

Start Time	N Twin Oaks Valley Road Southbound				E San Marcos Boulevard Westbound				N Twin Oaks Valley Road Northbound				W San Marcos Boulevard Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	18	203	62	283	60	75	4	139	55	104	117	276	44	95	61	200	898
08:15 AM	27	179	59	265	97	77	4	178	51	111	124	286	43	101	69	213	942
08:30 AM	14	185	53	252	102	84	3	189	42	107	125	274	41	100	64	205	920
08:45 AM	29	186	51	266	96	86	6	188	49	101	169	319	50	127	57	234	1007
Total Volume	88	753	225	1066	355	322	17	694	197	423	535	1155	178	423	251	852	3767
% App. Total	8.3	70.6	21.1		51.2	46.4	2.4		17.1	36.6	46.3		20.9	49.6	29.5		
PHF	.759	.927	.907	.942	.870	.936	.708	.918	.895	.953	.791	.905	.890	.833	.909	.910	.935

City of San Marcos
 N/S: N Twin Oaks Valley Road
 E/W: San Marcos Boulevard
 Weather: Clear

File Name : 10_SNM_TOV_SMB AM
 Site Code : 251157
 Start Date : 12/2/2025
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Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
 Peak Hour for Each Approach Begins at:

	07:00 AM				07:30 AM				08:00 AM				08:00 AM			
+0 mins.	17	198	75	290	108	110	7	225	55	104	117	276	44	95	61	200
+15 mins.	16	229	86	331	101	85	6	192	51	111	124	286	43	101	69	213
+30 mins.	16	225	74	315	60	75	4	139	42	107	125	274	41	100	64	205
+45 mins.	31	216	72	319	97	77	4	178	49	101	169	319	50	127	57	234
Total Volume	80	868	307	1255	366	347	21	734	197	423	535	1155	178	423	251	852
% App. Total	6.4	69.2	24.5		49.9	47.3	2.9		17.1	36.6	46.3		20.9	49.6	29.5	
PHF	.645	.948	.892	.948	.847	.789	.750	.816	.895	.953	.791	.905	.890	.833	.909	.910

City of San Marcos
 N/S: N Twin Oaks Valley Road
 E/W: San Marcos Boulevard
 Weather: Clear

File Name : 10_SNM_TOV_SMB PM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 1

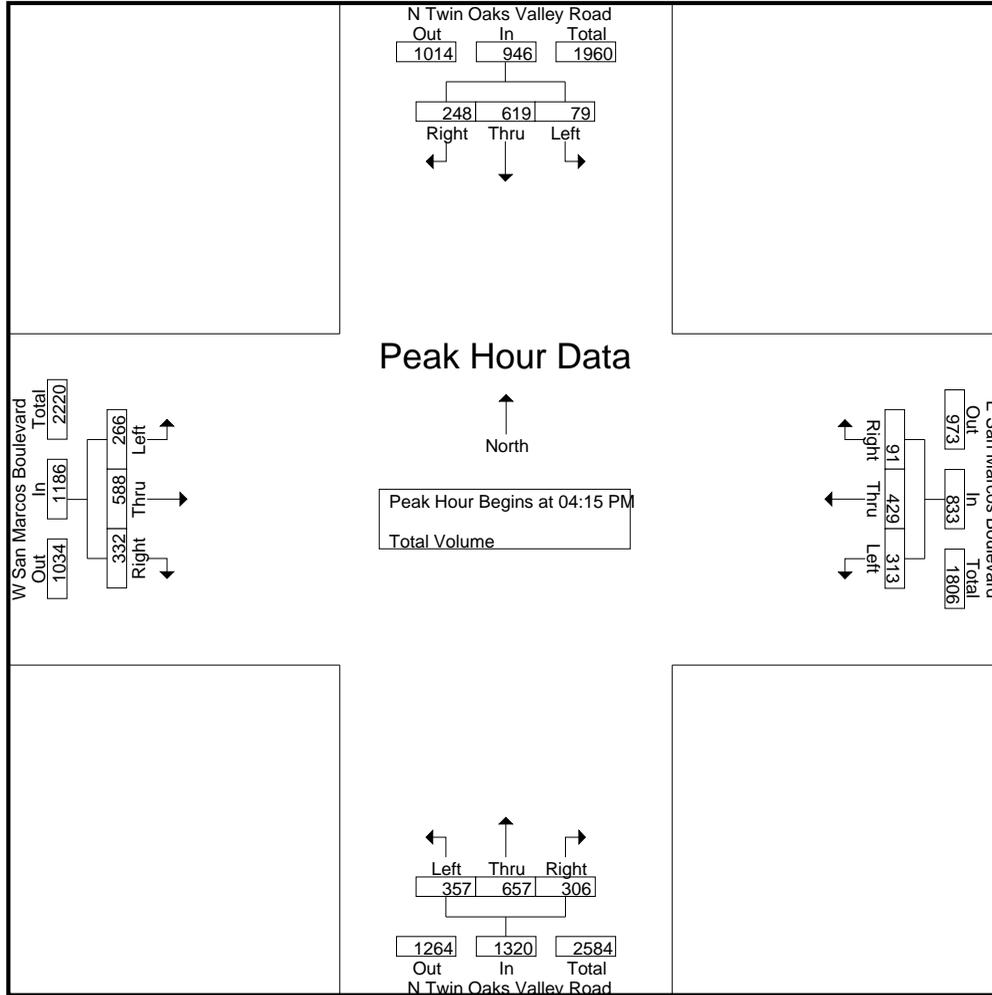
Groups Printed- Total Volume

Start Time	N Twin Oaks Valley Road Southbound				E San Marcos Boulevard Westbound				N Twin Oaks Valley Road Northbound				W San Marcos Boulevard Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	38	177	51	266	68	104	17	189	70	182	75	327	77	149	79	305	1087
04:15 PM	22	145	73	240	80	103	19	202	95	160	91	346	58	148	81	287	1075
04:30 PM	15	148	64	227	74	111	33	218	93	159	55	307	65	152	92	309	1061
04:45 PM	23	147	60	230	68	107	15	190	80	160	85	325	71	142	68	281	1026
Total	98	617	248	963	290	425	84	799	338	661	306	1305	271	591	320	1182	4249
05:00 PM	19	179	51	249	91	108	24	223	89	178	75	342	72	146	91	309	1123
05:15 PM	26	149	58	233	68	95	13	176	84	163	82	329	65	178	91	334	1072
05:30 PM	27	132	69	228	52	74	12	138	91	174	85	350	60	171	82	313	1029
05:45 PM	18	112	63	193	51	66	9	126	97	175	85	357	63	183	54	300	976
Total	90	572	241	903	262	343	58	663	361	690	327	1378	260	678	318	1256	4200
Grand Total	188	1189	489	1866	552	768	142	1462	699	1351	633	2683	531	1269	638	2438	8449
Apprch %	10.1	63.7	26.2		37.8	52.5	9.7		26.1	50.4	23.6		21.8	52.1	26.2		
Total %	2.2	14.1	5.8	22.1	6.5	9.1	1.7	17.3	8.3	16	7.5	31.8	6.3	15	7.6	28.9	

Start Time	N Twin Oaks Valley Road Southbound				E San Marcos Boulevard Westbound				N Twin Oaks Valley Road Northbound				W San Marcos Boulevard Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	22	145	73	240	80	103	19	202	95	160	91	346	58	148	81	287	1075
04:30 PM	15	148	64	227	74	111	33	218	93	159	55	307	65	152	92	309	1061
04:45 PM	23	147	60	230	68	107	15	190	80	160	85	325	71	142	68	281	1026
05:00 PM	19	179	51	249	91	108	24	223	89	178	75	342	72	146	91	309	1123
Total Volume	79	619	248	946	313	429	91	833	357	657	306	1320	266	588	332	1186	4285
% App. Total	8.4	65.4	26.2		37.6	51.5	10.9		27	49.8	23.2		22.4	49.6	28		
PHF	.859	.865	.849	.950	.860	.966	.689	.934	.939	.923	.841	.954	.924	.967	.902	.960	.954

City of San Marcos
 N/S: N Twin Oaks Valley Road
 E/W: San Marcos Boulevard
 Weather: Clear

File Name : 10_SNM_TOV_SMB PM
 Site Code : 251157
 Start Date : 12/2/2025
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Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
 Peak Hour for Each Approach Begins at:

	04:00 PM				04:15 PM				05:00 PM				05:00 PM			
+0 mins.	38	177	51	266	80	103	19	202	89	178	75	342	72	146	91	309
+15 mins.	22	145	73	240	74	111	33	218	84	163	82	329	65	178	91	334
+30 mins.	15	148	64	227	68	107	15	190	91	174	85	350	60	171	82	313
+45 mins.	23	147	60	230	91	108	24	223	97	175	85	357	63	183	54	300
Total Volume	98	617	248	963	313	429	91	833	361	690	327	1378	260	678	318	1256
% App. Total	10.2	64.1	25.8		37.6	51.5	10.9		26.2	50.1	23.7		20.7	54	25.3	
PHF	.645	.871	.849	.905	.860	.966	.689	.934	.930	.969	.962	.965	.903	.926	.874	.940

City of San Marcos
 N/S: N Twin Oaks Valley Road
 E/W: SR-78 Westbound Ramps
 Weather: Clear

File Name : 11_SNM_TOV_78W AM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 1

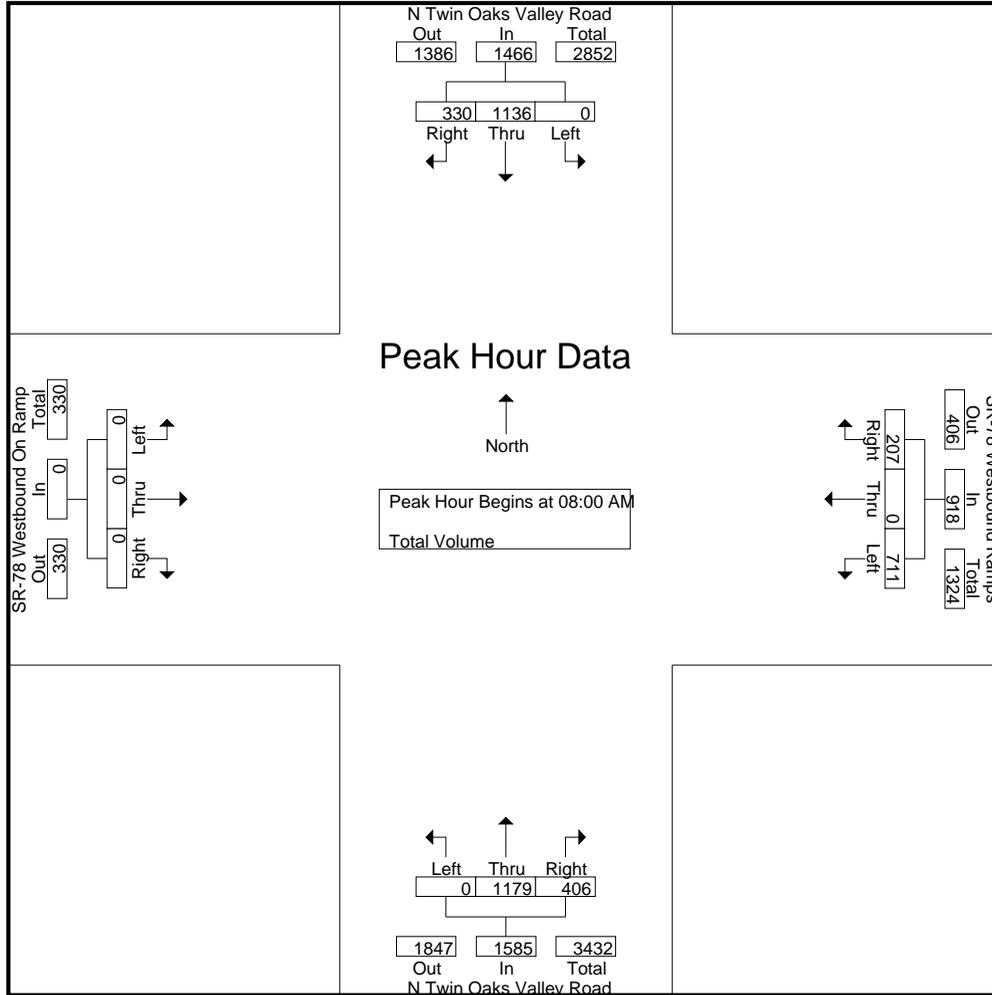
Groups Printed- Total Volume

Start Time	N Twin Oaks Valley Road Southbound				SR-78 Westbound Ramps Westbound				N Twin Oaks Valley Road Northbound				SR-78 Westbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	0	265	89	354	121	0	40	161	0	133	69	202	0	0	0	0	717
07:15 AM	0	309	92	401	148	0	48	196	0	189	94	283	0	0	0	0	880
07:30 AM	0	306	131	437	144	0	30	174	0	192	132	324	0	0	0	0	935
07:45 AM	0	326	107	433	107	0	33	140	0	276	149	425	0	0	0	0	998
Total	0	1206	419	1625	520	0	151	671	0	790	444	1234	0	0	0	0	3530
08:00 AM	0	250	94	344	155	0	47	202	0	291	106	397	0	0	0	0	943
08:15 AM	0	285	78	363	177	0	53	230	0	289	108	397	0	0	0	0	990
08:30 AM	0	316	76	392	172	0	49	221	0	280	85	365	0	0	0	0	978
08:45 AM	0	285	82	367	207	0	58	265	0	319	107	426	0	0	0	0	1058
Total	0	1136	330	1466	711	0	207	918	0	1179	406	1585	0	0	0	0	3969
Grand Total	0	2342	749	3091	1231	0	358	1589	0	1969	850	2819	0	0	0	0	7499
Apprch %	0	75.8	24.2		77.5	0	22.5		0	69.8	30.2		0	0	0		
Total %	0	31.2	10	41.2	16.4	0	4.8	21.2	0	26.3	11.3	37.6	0	0	0	0	

Start Time	N Twin Oaks Valley Road Southbound				SR-78 Westbound Ramps Westbound				N Twin Oaks Valley Road Northbound				SR-78 Westbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	250	94	344	155	0	47	202	0	291	106	397	0	0	0	0	943
08:15 AM	0	285	78	363	177	0	53	230	0	289	108	397	0	0	0	0	990
08:30 AM	0	316	76	392	172	0	49	221	0	280	85	365	0	0	0	0	978
08:45 AM	0	285	82	367	207	0	58	265	0	319	107	426	0	0	0	0	1058
Total Volume	0	1136	330	1466	711	0	207	918	0	1179	406	1585	0	0	0	0	3969
% App. Total	0	77.5	22.5		77.5	0	22.5		0	74.4	25.6		0	0	0		
PHF	.000	.899	.878	.935	.859	.000	.892	.866	.000	.924	.940	.930	.000	.000	.000	.000	.938

City of San Marcos
 N/S: N Twin Oaks Valley Road
 E/W: SR-78 Westbound Ramps
 Weather: Clear

File Name : 11_SNM_TOV_78W AM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
 Peak Hour for Each Approach Begins at:

	07:00 AM				08:00 AM				08:00 AM				07:00 AM			
+0 mins.	0	265	89	354	155	0	47	202	0	291	106	397	0	0	0	0
+15 mins.	0	309	92	401	177	0	53	230	0	289	108	397	0	0	0	0
+30 mins.	0	306	131	437	172	0	49	221	0	280	85	365	0	0	0	0
+45 mins.	0	326	107	433	207	0	58	265	0	319	107	426	0	0	0	0
Total Volume	0	1206	419	1625	711	0	207	918	0	1179	406	1585	0	0	0	0
% App. Total	0	74.2	25.8		77.5	0	22.5		0	74.4	25.6		0	0	0	0
PHF	.000	.925	.800	.930	.859	.000	.892	.866	.000	.924	.940	.930	.000	.000	.000	.000

City of San Marcos
 N/S: N Twin Oaks Valley Road
 E/W: SR-78 Westbound Ramps
 Weather: Clear

File Name : 11_SNM_TOV_78W PM
 Site Code : 251157
 Start Date : 12/2/2025
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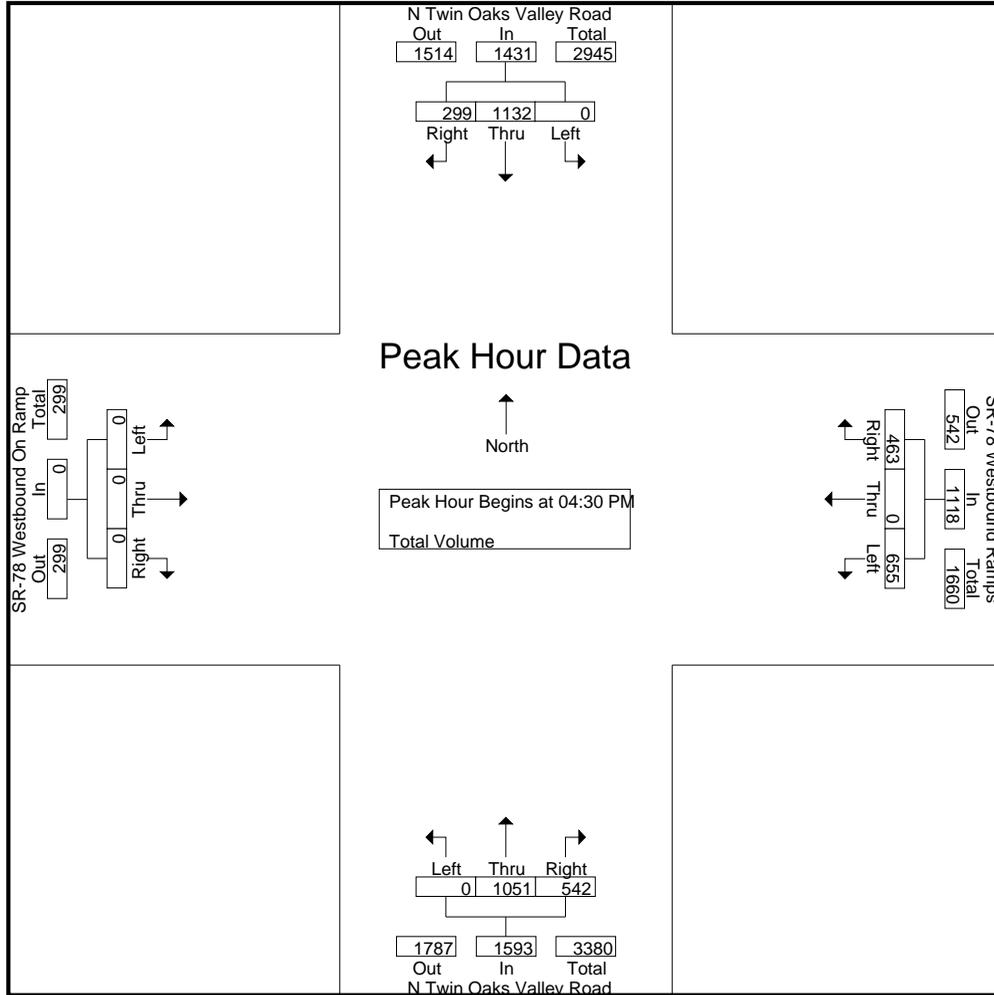
Groups Printed- Total Volume

Start Time	N Twin Oaks Valley Road Southbound				SR-78 Westbound Ramps Westbound				N Twin Oaks Valley Road Northbound				SR-78 Westbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	0	302	86	388	143	0	84	227	0	289	192	481	0	0	0	0	1096
04:15 PM	0	265	64	329	148	0	106	254	0	298	137	435	0	0	0	0	1018
04:30 PM	0	296	74	370	174	0	133	307	0	212	118	330	0	0	0	0	1007
04:45 PM	0	263	66	329	159	0	116	275	0	262	123	385	0	0	0	0	989
Total	0	1126	290	1416	624	0	439	1063	0	1061	570	1631	0	0	0	0	4110
05:00 PM	0	302	76	378	168	0	106	274	0	263	139	402	0	0	0	0	1054
05:15 PM	0	271	83	354	154	0	108	262	0	314	162	476	0	0	0	0	1092
05:30 PM	0	235	65	300	145	0	100	245	0	291	138	429	0	0	0	0	974
05:45 PM	0	173	57	230	146	0	130	276	0	254	125	379	0	0	0	0	885
Total	0	981	281	1262	613	0	444	1057	0	1122	564	1686	0	0	0	0	4005
Grand Total	0	2107	571	2678	1237	0	883	2120	0	2183	1134	3317	0	0	0	0	8115
Apprch %	0	78.7	21.3		58.3	0	41.7		0	65.8	34.2		0	0	0		
Total %	0	26	7	33	15.2	0	10.9	26.1	0	26.9	14	40.9	0	0	0	0	

Start Time	N Twin Oaks Valley Road Southbound				SR-78 Westbound Ramps Westbound				N Twin Oaks Valley Road Northbound				SR-78 Westbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	296	74	370	174	0	133	307	0	212	118	330	0	0	0	0	1007
04:45 PM	0	263	66	329	159	0	116	275	0	262	123	385	0	0	0	0	989
05:00 PM	0	302	76	378	168	0	106	274	0	263	139	402	0	0	0	0	1054
05:15 PM	0	271	83	354	154	0	108	262	0	314	162	476	0	0	0	0	1092
Total Volume	0	1132	299	1431	655	0	463	1118	0	1051	542	1593	0	0	0	0	4142
% App. Total	0	79.1	20.9		58.6	0	41.4		0	66	34		0	0	0		
PHF	.000	.937	.901	.946	.941	.000	.870	.910	.000	.837	.836	.837	.000	.000	.000	.000	.948

City of San Marcos
 N/S: N Twin Oaks Valley Road
 E/W: SR-78 Westbound Ramps
 Weather: Clear

File Name : 11_SNM_TOV_78W PM
 Site Code : 251157
 Start Date : 12/2/2025
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Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
 Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:45 PM				04:00 PM			
+0 mins.	0	296	74	370	174	0	133	307	0	262	123	385	0	0	0	0
+15 mins.	0	263	66	329	159	0	116	275	0	263	139	402	0	0	0	0
+30 mins.	0	302	76	378	168	0	106	274	0	314	162	476	0	0	0	0
+45 mins.	0	271	83	354	154	0	108	262	0	291	138	429	0	0	0	0
Total Volume	0	1132	299	1431	655	0	463	1118	0	1130	562	1692	0	0	0	0
% App. Total	0	79.1	20.9		58.6	0	41.4		0	66.8	33.2		0	0	0	
PHF	.000	.937	.901	.946	.941	.000	.870	.910	.000	.900	.867	.889	.000	.000	.000	.000

City of San Marcos
 N/S: N Twin Oaks Valley Road
 E/W: SR-78 Eastbound Ramps
 Weather: Clear

File Name : 12_SNM_TOV_78E AM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 1

Groups Printed- Total Volume

Start Time	N Twin Oaks Valley Road Southbound				SR-78 Eastbound On Ramp Westbound				N Twin Oaks Valley Road Northbound				SR-78 Eastbound Off Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	93	281	0	374	0	0	0	0	0	150	116	266	74	1	136	211	851
07:15 AM	98	368	0	466	0	0	0	0	0	200	136	336	78	10	133	221	1023
07:30 AM	99	362	0	461	0	0	0	0	0	248	166	414	89	4	137	230	1105
07:45 AM	87	328	0	415	0	0	0	0	0	285	121	406	119	0	186	305	1126
Total	377	1339	0	1716	0	0	0	0	0	883	539	1422	360	15	592	967	4105
08:00 AM	84	331	0	415	0	0	0	0	0	253	119	372	144	1	177	322	1109
08:15 AM	84	349	0	433	0	0	0	0	0	260	112	372	130	1	204	335	1140
08:30 AM	67	413	0	480	0	0	0	0	0	273	101	374	106	3	206	315	1169
08:45 AM	81	422	0	503	0	0	0	0	0	300	122	422	125	1	227	353	1278
Total	316	1515	0	1831	0	0	0	0	0	1086	454	1540	505	6	814	1325	4696
Grand Total	693	2854	0	3547	0	0	0	0	0	1969	993	2962	865	21	1406	2292	8801
Apprch %	19.5	80.5	0		0	0	0		0	66.5	33.5		37.7	0.9	61.3		
Total %	7.9	32.4	0	40.3	0	0	0	0	0	22.4	11.3	33.7	9.8	0.2	16	26	

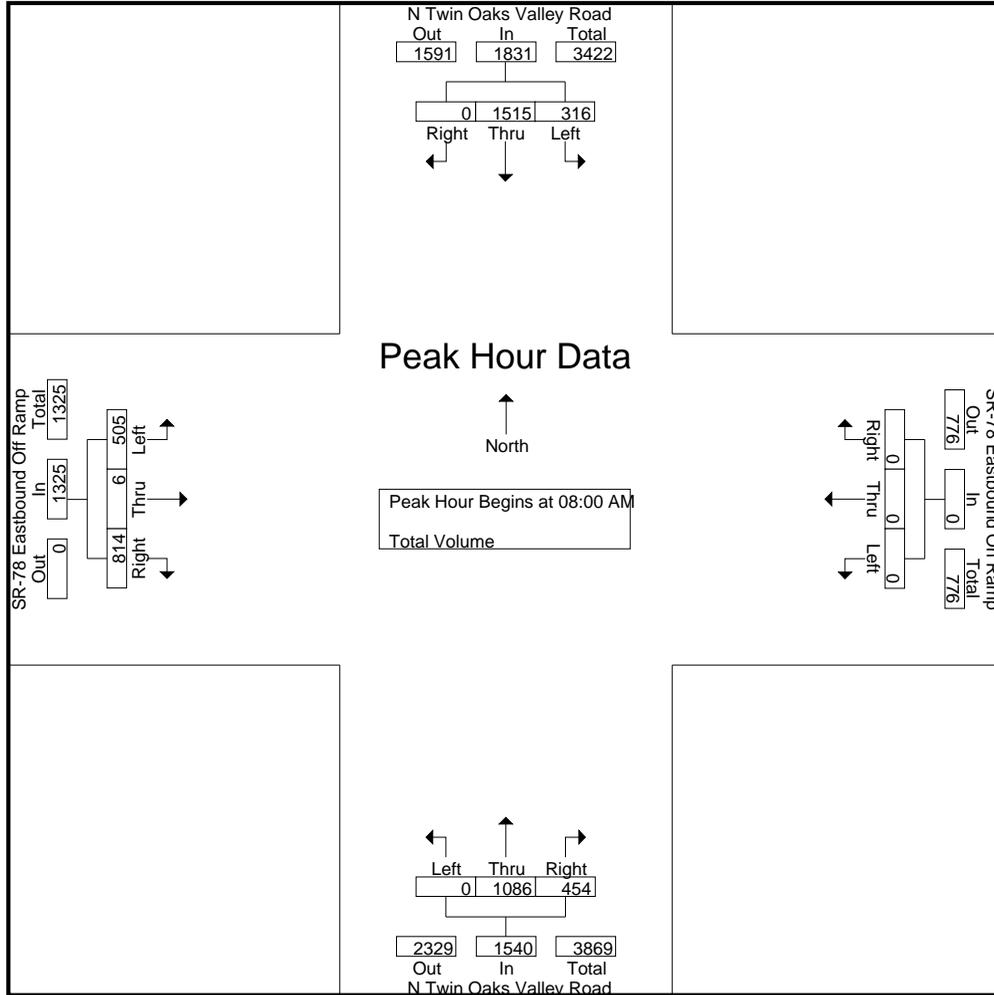
Start Time	N Twin Oaks Valley Road Southbound				SR-78 Eastbound On Ramp Westbound				N Twin Oaks Valley Road Northbound				SR-78 Eastbound Off Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
08:00 AM	84	331	0	415	0	0	0	0	0	253	119	372	144	1	177	322	1109
08:15 AM	84	349	0	433	0	0	0	0	0	260	112	372	130	1	204	335	1140
08:30 AM	67	413	0	480	0	0	0	0	0	273	101	374	106	3	206	315	1169
08:45 AM	81	422	0	503	0	0	0	0	0	300	122	422	125	1	227	353	1278
Total Volume	316	1515	0	1831	0	0	0	0	0	1086	454	1540	505	6	814	1325	4696
% App. Total	17.3	82.7	0		0	0	0		0	70.5	29.5		38.1	0.5	61.4		
PHF	.940	.898	.000	.910	.000	.000	.000	.000	.000	.905	.930	.912	.877	.500	.896	.938	.919

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 08:00 AM

City of San Marcos
 N/S: N Twin Oaks Valley Road
 E/W: SR-78 Eastbound Ramps
 Weather: Clear

File Name : 12_SNM_TOV_78E AM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
 Peak Hour for Each Approach Begins at:

	08:00 AM				07:00 AM				07:30 AM				08:00 AM			
+0 mins.	84	331	0	415	0	0	0	0	0	248	166	414	144	1	177	322
+15 mins.	84	349	0	433	0	0	0	0	0	285	121	406	130	1	204	335
+30 mins.	67	413	0	480	0	0	0	0	0	253	119	372	106	3	206	315
+45 mins.	81	422	0	503	0	0	0	0	0	260	112	372	125	1	227	353
Total Volume	316	1515	0	1831	0	0	0	0	0	1046	518	1564	505	6	814	1325
% App. Total	17.3	82.7	0		0	0	0	0	0	66.9	33.1		38.1	0.5	61.4	
PHF	.940	.898	.000	.910	.000	.000	.000	.000	.000	.918	.780	.944	.877	.500	.896	.938

City of San Marcos
 N/S: N Twin Oaks Valley Road
 E/W: SR-78 Eastbound Ramps
 Weather: Clear

File Name : 12_SNM_TOV_78E PM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 1

Groups Printed- Total Volume

Start Time	N Twin Oaks Valley Road Southbound				SR-78 Eastbound On Ramp Westbound				N Twin Oaks Valley Road Northbound				SR-78 Eastbound Off Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	93	338	0	431	0	0	0	0	0	458	250	708	26	4	66	96	1235
04:15 PM	95	328	0	423	0	0	0	0	0	390	248	638	24	8	50	82	1143
04:30 PM	86	373	0	459	0	0	0	0	0	307	243	550	24	9	38	71	1080
04:45 PM	72	368	0	440	0	0	0	0	0	352	128	480	28	18	58	104	1024
Total	346	1407	0	1753	0	0	0	0	0	1507	869	2376	102	39	212	353	4482
05:00 PM	99	370	0	469	0	0	0	0	0	369	233	602	29	16	36	81	1152
05:15 PM	78	352	0	430	0	0	0	0	0	429	245	674	29	10	58	97	1201
05:30 PM	102	296	0	398	0	0	0	0	0	386	222	608	29	8	38	75	1081
05:45 PM	55	267	0	322	0	0	0	0	0	349	240	589	33	17	54	104	1015
Total	334	1285	0	1619	0	0	0	0	0	1533	940	2473	120	51	186	357	4449
Grand Total	680	2692	0	3372	0	0	0	0	0	3040	1809	4849	222	90	398	710	8931
Apprch %	20.2	79.8	0		0	0	0		0	62.7	37.3		31.3	12.7	56.1		
Total %	7.6	30.1	0	37.8	0	0	0	0	0	34	20.3	54.3	2.5	1	4.5	7.9	

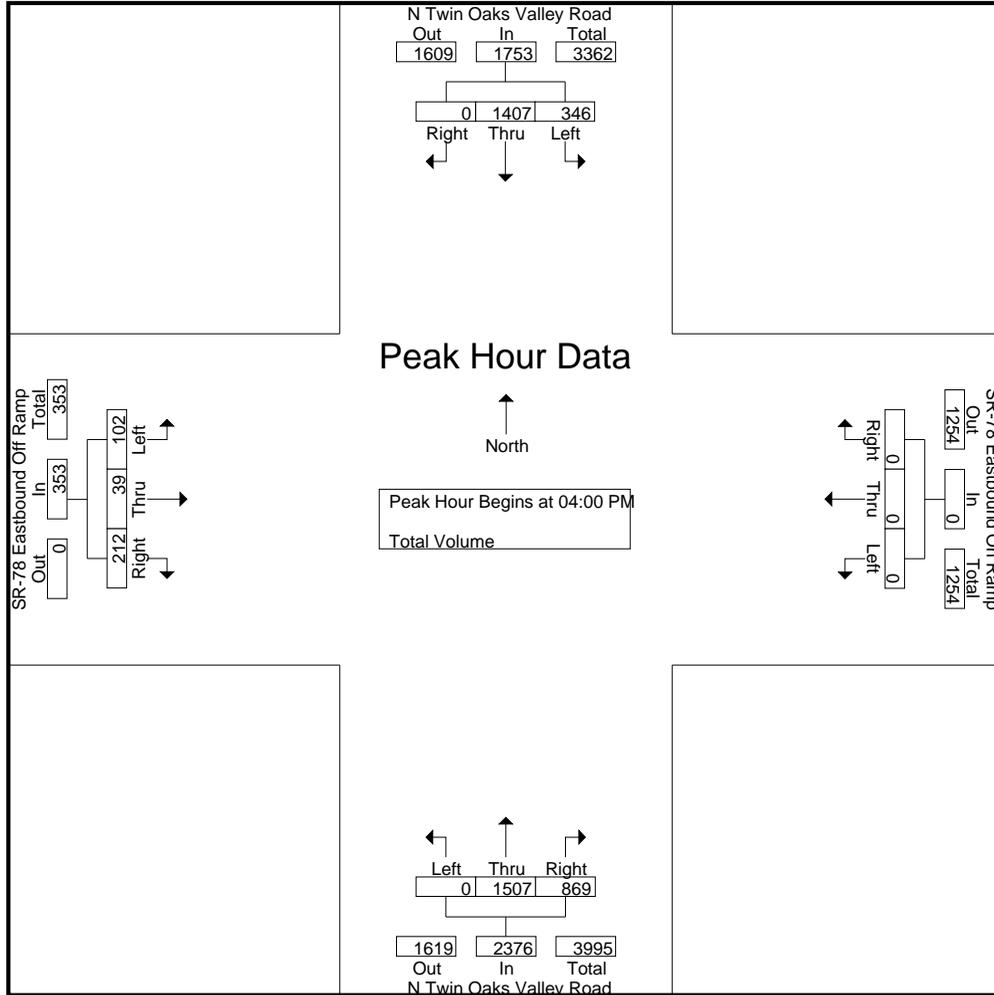
Start Time	N Twin Oaks Valley Road Southbound				SR-78 Eastbound On Ramp Westbound				N Twin Oaks Valley Road Northbound				SR-78 Eastbound Off Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	93	338	0	431	0	0	0	0	0	458	250	708	26	4	66	96	1235
04:15 PM	95	328	0	423	0	0	0	0	0	390	248	638	24	8	50	82	1143
04:30 PM	86	373	0	459	0	0	0	0	0	307	243	550	24	9	38	71	1080
04:45 PM	72	368	0	440	0	0	0	0	0	352	128	480	28	18	58	104	1024
Total Volume	346	1407	0	1753	0	0	0	0	0	1507	869	2376	102	39	212	353	4482
% App. Total	19.7	80.3	0		0	0	0		0	63.4	36.6		28.9	11	60.1		
PHF	.911	.943	.000	.955	.000	.000	.000	.000	.000	.823	.869	.839	.911	.542	.803	.849	.907

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:00 PM

City of San Marcos
 N/S: N Twin Oaks Valley Road
 E/W: SR-78 Eastbound Ramps
 Weather: Clear

File Name : 12_SNM_TOV_78E PM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
 Peak Hour for Each Approach Begins at:

	04:30 PM				04:00 PM				05:00 PM				04:45 PM			
+0 mins.	86	373	0	459	0	0	0	0	0	369	233	602	28	18	58	104
+15 mins.	72	368	0	440	0	0	0	0	0	429	245	674	29	16	36	81
+30 mins.	99	370	0	469	0	0	0	0	0	386	222	608	29	10	58	97
+45 mins.	78	352	0	430	0	0	0	0	0	349	240	589	29	8	38	75
Total Volume	335	1463	0	1798	0	0	0	0	0	1533	940	2473	115	52	190	357
% App. Total	18.6	81.4	0		0	0	0		0	62	38		32.2	14.6	53.2	
PHF	.846	.981	.000	.958	.000	.000	.000	.000	.000	.893	.959	.917	.991	.722	.819	.858

City of San Marcos
 N/S: Woodward Street/E San Marcos Blvd
 E/W: E Mission Road
 Weather: Clear

File Name : 13_SNM_Ww_Miss AM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 1

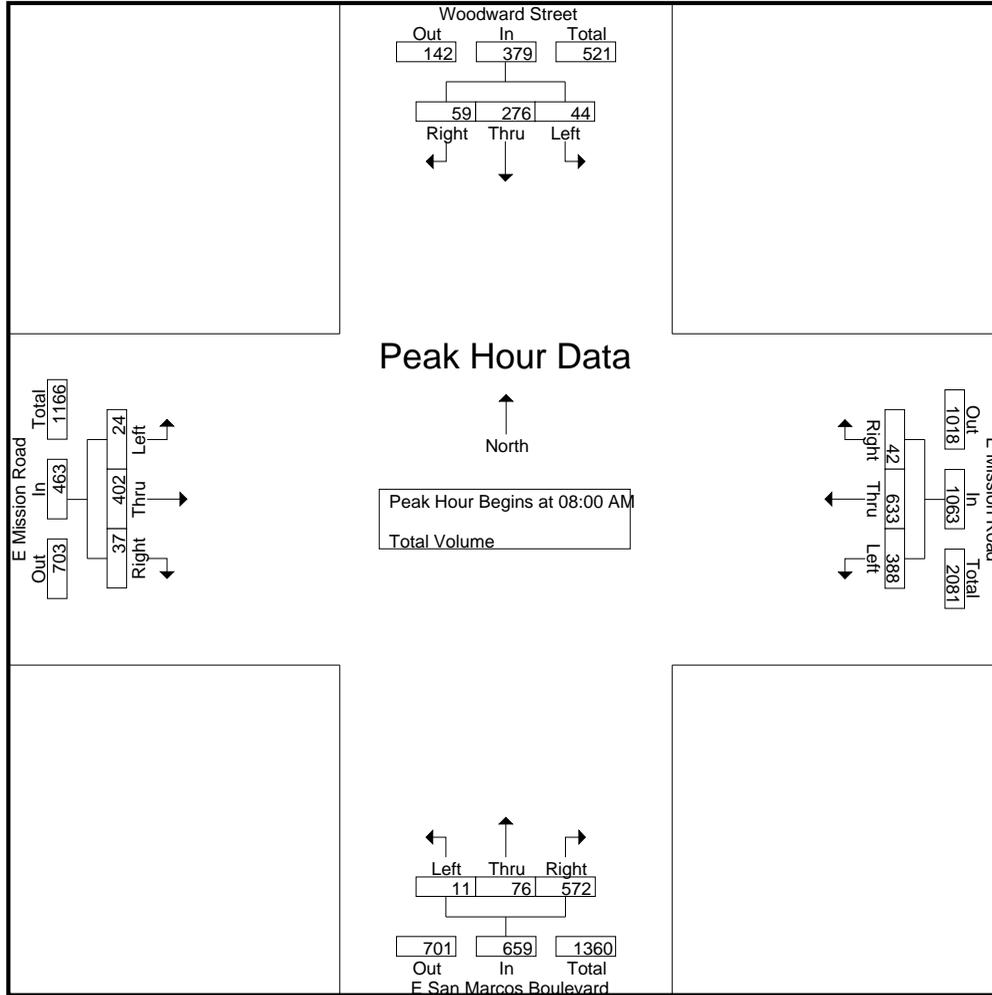
Groups Printed- Total Volume

Start Time	Woodward Street Southbound				E Mission Road Westbound				E San Marcos Boulevard Northbound				E Mission Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	5	58	12	75	60	67	5	132	3	15	47	65	2	39	7	48	320
07:15 AM	6	76	10	92	91	144	6	241	6	18	87	111	5	84	7	96	540
07:30 AM	10	85	17	112	126	162	11	299	6	7	79	92	10	79	7	96	599
07:45 AM	5	89	24	118	107	209	11	327	3	19	109	131	6	102	23	131	707
Total	26	308	63	397	384	582	33	999	18	59	322	399	23	304	44	371	2166
08:00 AM	6	67	16	89	88	159	13	260	1	15	99	115	0	84	10	94	558
08:15 AM	8	76	11	95	82	163	9	254	5	24	140	169	4	85	9	98	616
08:30 AM	16	68	18	102	90	143	8	241	1	15	122	138	7	112	8	127	608
08:45 AM	14	65	14	93	128	168	12	308	4	22	211	237	13	121	10	144	782
Total	44	276	59	379	388	633	42	1063	11	76	572	659	24	402	37	463	2564
Grand Total	70	584	122	776	772	1215	75	2062	29	135	894	1058	47	706	81	834	4730
Apprch %	9	75.3	15.7		37.4	58.9	3.6		2.7	12.8	84.5		5.6	84.7	9.7		
Total %	1.5	12.3	2.6	16.4	16.3	25.7	1.6	43.6	0.6	2.9	18.9	22.4	1	14.9	1.7	17.6	

Start Time	Woodward Street Southbound				E Mission Road Westbound				E San Marcos Boulevard Northbound				E Mission Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	6	67	16	89	88	159	13	260	1	15	99	115	0	84	10	94	558
08:15 AM	8	76	11	95	82	163	9	254	5	24	140	169	4	85	9	98	616
08:30 AM	16	68	18	102	90	143	8	241	1	15	122	138	7	112	8	127	608
08:45 AM	14	65	14	93	128	168	12	308	4	22	211	237	13	121	10	144	782
Total Volume	44	276	59	379	388	633	42	1063	11	76	572	659	24	402	37	463	2564
% App. Total	11.6	72.8	15.6		36.5	59.5	4		1.7	11.5	86.8		5.2	86.8	8		
PHF	.688	.908	.819	.929	.758	.942	.808	.863	.550	.792	.678	.695	.462	.831	.925	.804	.820

City of San Marcos
 N/S: Woodward Street/E San Marcos Blvd
 E/W: E Mission Road
 Weather: Clear

File Name : 13_SNM_Ww_Miss AM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
 Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				08:00 AM				08:00 AM			
+0 mins.	10	85	17	112	126	162	11	299	1	15	99	115	0	84	10	94
+15 mins.	5	89	24	118	107	209	11	327	5	24	140	169	4	85	9	98
+30 mins.	6	67	16	89	88	159	13	260	1	15	122	138	7	112	8	127
+45 mins.	8	76	11	95	82	163	9	254	4	22	211	237	13	121	10	144
Total Volume	29	317	68	414	403	693	44	1140	11	76	572	659	24	402	37	463
% App. Total	7	76.6	16.4		35.4	60.8	3.9		1.7	11.5	86.8		5.2	86.8	8	
PHF	.725	.890	.708	.877	.800	.829	.846	.872	.550	.792	.678	.695	.462	.831	.925	.804

City of San Marcos
 N/S: Woodward Street/E San Marcos Blvd
 E/W: E Mission Road
 Weather: Clear

File Name : 13_SNM_Ww_Miss PM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 1

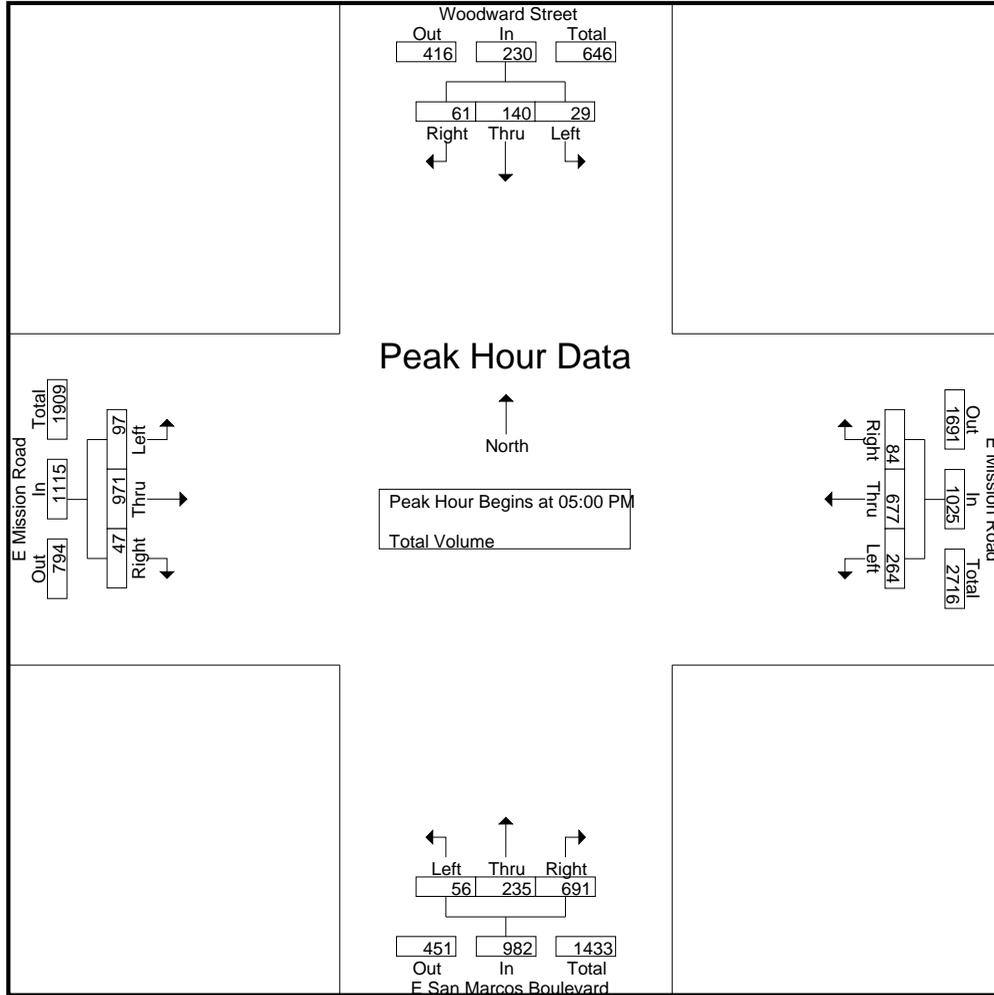
Groups Printed- Total Volume

Start Time	Woodward Street Southbound				E Mission Road Westbound				E San Marcos Boulevard Northbound				E Mission Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	4	29	15	48	82	131	25	238	13	59	141	213	17	240	22	279	778
04:15 PM	7	50	16	73	82	152	23	257	5	55	171	231	26	233	25	284	845
04:30 PM	5	36	12	53	75	132	32	239	14	59	142	215	23	217	8	248	755
04:45 PM	9	31	2	42	86	138	16	240	19	62	158	239	21	206	22	249	770
Total	25	146	45	216	325	553	96	974	51	235	612	898	87	896	77	1060	3148
05:00 PM	8	35	9	52	84	158	15	257	19	63	143	225	24	254	12	290	824
05:15 PM	6	46	18	70	70	189	29	288	24	66	185	275	22	239	6	267	900
05:30 PM	6	34	12	52	49	191	27	267	5	33	186	224	23	260	10	293	836
05:45 PM	9	25	22	56	61	139	13	213	8	73	177	258	28	218	19	265	792
Total	29	140	61	230	264	677	84	1025	56	235	691	982	97	971	47	1115	3352
Grand Total	54	286	106	446	589	1230	180	1999	107	470	1303	1880	184	1867	124	2175	6500
Apprch %	12.1	64.1	23.8		29.5	61.5	9		5.7	25	69.3		8.5	85.8	5.7		
Total %	0.8	4.4	1.6	6.9	9.1	18.9	2.8	30.8	1.6	7.2	20	28.9	2.8	28.7	1.9	33.5	

Start Time	Woodward Street Southbound				E Mission Road Westbound				E San Marcos Boulevard Northbound				E Mission Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	8	35	9	52	84	158	15	257	19	63	143	225	24	254	12	290	824
05:15 PM	6	46	18	70	70	189	29	288	24	66	185	275	22	239	6	267	900
05:30 PM	6	34	12	52	49	191	27	267	5	33	186	224	23	260	10	293	836
05:45 PM	9	25	22	56	61	139	13	213	8	73	177	258	28	218	19	265	792
Total Volume	29	140	61	230	264	677	84	1025	56	235	691	982	97	971	47	1115	3352
% App. Total	12.6	60.9	26.5		25.8	66	8.2		5.7	23.9	70.4		8.7	87.1	4.2		
PHF	.806	.761	.693	.821	.786	.886	.724	.890	.583	.805	.929	.893	.866	.934	.618	.951	.931

City of San Marcos
 N/S: Woodward Street/E San Marcos Blvd
 E/W: E Mission Road
 Weather: Clear

File Name : 13_SNM_Ww_Miss PM
 Site Code : 251157
 Start Date : 12/2/2025
 Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
 Peak Hour for Each Approach Begins at:

	05:00 PM				04:45 PM				05:00 PM				05:00 PM			
+0 mins.	8	35	9	52	86	138	16	240	19	63	143	225	24	254	12	290
+15 mins.	6	46	18	70	84	158	15	257	24	66	185	275	22	239	6	267
+30 mins.	6	34	12	52	70	189	29	288	5	33	186	224	23	260	10	293
+45 mins.	9	25	22	56	49	191	27	267	8	73	177	258	28	218	19	265
Total Volume	29	140	61	230	289	676	87	1052	56	235	691	982	97	971	47	1115
% App. Total	12.6	60.9	26.5		27.5	64.3	8.3		5.7	23.9	70.4		8.7	87.1	4.2	
PHF	.806	.761	.693	.821	.840	.885	.750	.913	.583	.805	.929	.893	.866	.934	.618	.951

Linscott, Law & Greenspan, Engineers

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

Average Daily Traffic

Location: **BC 25-066 #01 Deer Springs Road between Sycamore Drive & Twin Oaks Valley Road**

Date: Tuesday, December 02, 2025				Total Daily Volume: 19411																		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		
63	59	61	83	224	577	1161	1905	1822	1232	881	833	881	949	1308	1558	1540	1747	967	462	378	348	241	131		
25	16	16	15	34	113	188	438	485	427	253	229	193	203	330	377	386	453	302	161	106	95	63	45		
13	15	6	18	63	116	280	488	470	265	182	198	205	231	307	388	352	441	251	105	93	92	64	32		
17	17	23	25	53	153	297	498	463	286	227	208	253	230	351	402	416	466	214	101	91	89	68	27		
8	11	16	25	74	195	396	481	404	254	219	198	230	285	320	391	386	387	200	95	88	72	46	27		

Date: Tuesday, December 02, 2025				Total Daily Volume: 9001																		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		
36	30	24	24	43	124	324	516	545	405	335	397	442	524	799	908	873	988	615	299	257	240	167	86		
15	11	5	7	7	14	55	105	143	117	95	102	104	102	196	218	239	217	161	102	67	61	45	33		
7	7	3	8	18	26	90	131	131	104	71	93	88	132	190	227	208	255	154	69	62	62	47	19		
12	8	12	5	7	38	84	143	144	93	95	105	135	123	201	237	209	287	149	68	66	69	45	17		
2	4	4	4	11	46	95	137	127	91	74	97	115	167	212	226	217	229	151	60	62	48	30	17		

Date: Tuesday, December 02, 2025				Total Daily Volume: 10410																		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		
27	29	37	59	181	453	837	1389	1277	827	546	436	439	425	509	650	667	759	352	163	121	108	74	45		
10	5	11	8	27	99	133	333	342	310	158	127	89	101	134	159	147	236	141	59	39	34	18	12		
6	8	3	10	45	90	190	357	339	161	111	105	117	99	117	161	144	186	97	36	31	30	17	13		
5	9	11	20	46	115	213	355	319	193	132	103	118	107	150	165	207	179	65	33	25	20	23	10		
6	7	12	21	63	149	301	344	277	163	145	101	115	118	108	165	169	158	49	35	26	24	16	10		

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

Average Daily Traffic

Location: **BC 25-066 #2 N. Twin Oaks Valley Road between Deer Springs Road & Buena Creek Road**

Date: Tuesday, December 02, 2025		Total Daily Volume: 22009																				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
70	60	55	86	249	733	1459	1841	1762	1357	1051	980	1054	1133	1549	1877	1903	1925	1134	538	413	379	261	140
26	16	14	20	38	120	264	443	459	424	288	256	244	250	374	439	459	501	366	186	111	106	77	48
17	14	6	11	62	141	378	471	443	323	234	239	239	277	379	487	460	498	294	118	100	108	70	37
19	19	18	25	59	203	388	469	488	306	269	245	279	271	407	481	498	510	251	119	106	93	68	27
8	11	17	30	90	269	429	458	372	304	260	240	292	335	389	470	486	416	223	115	96	72	46	28

Date: Tuesday, December 02, 2025		Total Daily Volume: 9683																				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
41	33	16	23	55	216	485	585	591	438	365	419	468	551	818	957	907	932	654	330	274	256	181	88
15	11	3	10	8	19	106	129	160	122	106	95	109	103	200	207	238	225	179	109	66	68	55	33
10	9	3	5	16	30	134	147	141	120	75	101	89	141	205	260	225	264	162	78	68	66	52	20
13	9	6	4	13	65	118	149	153	93	94	112	137	132	196	242	216	237	153	76	72	71	44	16
3	4	4	4	18	102	127	160	137	103	90	111	133	175	217	248	228	206	160	67	68	51	30	19

Date: Tuesday, December 02, 2025		Total Daily Volume: 12326																				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
29	27	39	63	194	517	974	1256	1171	919	686	561	586	582	731	920	996	993	480	208	139	123	80	52
11	5	11	10	30	101	158	314	299	302	182	161	135	147	174	232	221	276	187	77	45	38	22	15
7	5	3	6	46	111	244	324	302	203	159	138	150	136	174	227	235	234	132	40	32	42	18	17
6	10	12	21	46	138	270	320	335	213	175	133	142	139	211	239	282	273	98	43	34	22	24	11
5	7	13	26	72	167	302	298	235	201	170	129	159	160	172	222	258	210	63	48	28	21	16	9

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

Average Daily Traffic

Location: **BC 25-066 ADT #3 N. Twin Oaks Valley Road between Buena Creek Road & Olive Street**

Date: Tuesday, December 02, 2025		Total Daily Volume: 16687										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
56	48	38	67	178	462	922	1307	1246	981	842	818	871	886	1260	1439	1483	1453	860	490	356	311	192	121
21	10	8	15	28	89	148	299	347	290	212	216	202	212	310	319	381	367	247	159	84	94	49	37
12	12	8	7	43	92	243	318	305	253	197	207	191	192	332	371	343	375	255	110	97	83	50	36
17	18	13	23	39	124	242	341	322	212	193	199	232	225	330	389	364	382	185	113	91	83	55	24
6	8	9	22	68	157	289	349	272	226	240	196	246	257	288	360	395	329	173	108	84	51	38	24

Date: Tuesday, December 02, 2025		Total Daily Volume: 8190										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
33	27	13	16	40	106	300	420	490	340	330	401	447	463	742	868	816	814	514	319	256	219	134	82
13	8	1	8	7	13	54	87	117	100	92	101	108	98	169	185	232	198	128	97	53	68	39	27
5	8	4	4	12	16	86	100	109	97	74	95	88	119	214	233	185	237	144	78	74	53	34	20
13	8	5	3	7	28	72	116	147	68	81	96	124	117	189	228	183	206	115	75	69	65	38	18
2	3	3	1	14	49	88	117	117	75	83	109	127	129	170	222	216	173	127	69	60	33	23	17

Date: Tuesday, December 02, 2025		Total Daily Volume: 8497										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
23	21	25	51	138	356	622	887	756	641	512	417	424	423	518	571	667	639	346	171	100	92	58	39
8	2	7	7	21	76	94	212	230	190	120	115	94	114	141	134	149	169	119	62	31	26	10	10
7	4	4	3	31	76	157	218	196	156	123	112	103	73	118	138	158	138	111	32	23	30	16	16
4	10	8	20	32	96	170	225	175	144	112	103	108	108	141	161	181	176	70	38	22	18	17	6
4	5	6	21	54	108	201	232	155	151	157	87	119	128	118	138	179	156	46	39	24	18	15	7

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

Average Daily Traffic

Location: **BC 25-066 #4 N. Twin Oaks Valley Road between Olive Street & E. La Cienega Road**

Date: Tuesday, December 02, 2025		Total Daily Volume: 16326										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
57	57	40	65	168	408	847	1308	1486	1002	821	778	817	860	1197	1407	1393	1401	802	465	338	299	189	121
19	12	11	17	24	88	136	315	427	336	210	194	185	211	308	289	338	349	236	152	80	87	48	36
15	12	9	5	40	85	215	331	349	234	198	203	181	189	307	393	327	350	242	98	93	77	49	36
17	21	10	23	40	107	234	297	362	211	179	189	236	209	315	374	363	393	166	107	87	83	51	25
6	12	10	20	64	128	262	365	348	221	234	192	215	251	267	351	365	309	158	108	78	52	41	24

Date: Tuesday, December 02, 2025		Total Daily Volume: 7899										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
36	33	18	14	36	101	278	375	459	315	305	385	417	458	696	830	826	850	499	304	245	206	131	82
12	10	6	8	3	14	48	90	125	92	85	91	95	104	159	148	218	205	130	92	52	59	38	26
8	8	5	3	12	18	86	94	112	83	77	91	83	116	196	219	193	219	139	72	70	49	33	20
13	8	3	3	7	26	75	96	119	65	70	98	136	104	186	230	200	244	108	70	65	65	36	19
3	7	4	0	14	43	69	95	103	75	73	105	103	134	155	233	215	182	122	70	58	33	24	17

Date: Tuesday, December 02, 2025		Total Daily Volume: 8427										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
21	24	22	51	132	307	569	933	1027	687	516	393	400	402	501	577	567	551	303	161	93	93	58	39
7	2	5	9	21	74	88	225	302	244	125	103	90	107	149	141	120	144	106	60	28	28	10	10
7	4	4	2	28	67	129	237	237	151	121	112	98	73	111	174	134	131	103	26	23	28	16	16
4	13	7	20	33	81	159	201	243	146	109	91	100	105	129	144	163	149	58	37	22	18	15	6
3	5	6	20	50	85	193	270	245	146	161	87	112	117	112	118	150	127	36	38	20	19	17	7

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

Average Daily Traffic

Location: **BC 25-066 #5 N. Twin Oaks Valley Road, between E. La Cienega Road & Del Roy Drive**

Date: Tuesday, December 02, 2025		Total Daily Volume: 16715										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
51	39	43	65	175	434	848	1292	1468	1059	858	858	915	921	1270	1424	1338	1310	834	490	380	324	196	123
17	12	12	18	25	92	156	320	362	320	227	213	219	207	341	368	322	348	251	160	97	91	52	38
10	13	10	7	39	86	205	311	385	243	204	225	217	208	328	365	329	364	225	109	101	93	54	34
10	5	10	22	43	115	210	329	393	236	192	202	247	238	308	364	365	336	191	121	94	80	50	25
14	9	11	18	68	141	277	332	328	260	235	218	232	268	293	327	322	262	167	100	88	60	40	26

Date: Tuesday, December 02, 2025		Total Daily Volume: 8030										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
36	21	14	13	39	119	273	378	564	356	300	415	459	506	712	763	727	763	521	321	280	227	137	86
12	8	2	7	3	15	55	96	139	93	74	104	106	102	170	218	185	199	142	105	64	61	42	28
6	7	5	4	10	20	77	80	150	91	77	107	103	119	189	174	177	224	133	72	75	65	35	20
8	2	3	2	11	32	64	99	152	84	76	94	137	141	178	184	191	198	119	79	74	60	36	19
10	4	4	0	15	52	77	103	123	88	73	110	113	144	175	187	174	142	127	65	67	41	24	19

Date: Tuesday, December 02, 2025		Total Daily Volume: 8685										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
15	18	29	52	136	315	575	914	904	703	558	443	456	415	558	661	611	547	313	169	100	97	59	37
5	4	10	11	22	77	101	224	223	227	153	109	113	105	171	150	137	149	109	55	33	30	10	10
4	6	5	3	29	66	128	231	235	152	127	118	114	89	139	191	152	140	92	37	26	28	19	14
2	3	7	20	32	83	146	230	241	152	116	108	110	97	130	180	174	138	72	42	20	20	14	6
4	5	7	18	53	89	200	229	205	172	162	108	119	124	118	140	148	120	40	35	21	19	16	7

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

Average Daily Traffic

Location: **BC 25-061 #6 N. Twin Oaks Valley Road, between Del Roy Drive & Windy Way**

Date: Tuesday, December 02, 2025		Total Daily Volume: 17957										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
52	40	43	67	187	449	893	1401	1495	1167	931	960	1011	1018	1363	1502	1463	1356	922	527	417	357	209	127
16	12	12	17	24	90	179	350	370	320	237	224	245	245	341	373	349	349	294	170	107	99	50	38
12	13	10	7	41	98	215	341	410	277	228	254	239	225	357	384	362	370	236	124	107	101	59	36
9	6	10	22	48	122	223	353	382	280	206	223	273	276	356	390	388	352	207	123	109	88	55	29
15	9	11	21	74	139	276	357	333	290	260	259	254	272	309	355	364	285	185	110	94	69	45	24

Date: Tuesday, December 02, 2025		Total Daily Volume: 8668										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
37	22	14	14	39	121	293	416	581	407	337	468	501	565	768	798	794	796	563	344	308	249	145	88
11	8	2	7	3	17	63	107	145	92	84	114	119	124	175	216	193	206	157	111	73	67	40	27
8	7	5	4	10	23	85	88	165	108	80	126	114	133	196	187	191	224	138	82	78	71	39	22
7	3	3	2	11	30	64	109	142	99	82	103	142	153	207	191	209	207	134	81	83	65	38	22
11	4	4	1	15	51	81	112	129	108	91	125	126	155	190	204	201	159	134	70	74	46	28	17

Date: Tuesday, December 02, 2025		Total Daily Volume: 9289										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
15	18	29	53	148	328	600	985	914	760	594	492	510	453	595	704	669	560	359	183	109	108	64	39
5	4	10	10	21	73	116	243	225	228	153	110	126	121	166	157	156	143	137	59	34	32	10	11
4	6	5	3	31	75	130	253	245	169	148	128	125	92	161	197	171	146	98	42	29	30	20	14
2	3	7	20	37	92	159	244	240	181	124	120	131	123	149	199	179	145	73	42	26	23	17	7
4	5	7	20	59	88	195	245	204	182	169	134	128	117	119	151	163	126	51	40	20	23	17	7

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

Average Daily Traffic

Location: **BC 25-066 #7 N Twin Oaks Valley Road, between Windy Way & Borden Road**

Date: Tuesday, December 02, 2025		Total Daily Volume: 18981										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
62	41	42	73	194	484	925	1439	1536	1244	983	1045	1105	1104	1414	1590	1554	1412	1010	553	439	377	217	138
16	13	12	18	22	97	181	339	379	334	255	245	255	270	326	393	400	367	320	168	109	118	57	41
19	14	10	8	42	100	224	359	390	311	231	283	272	251	411	441	367	396	263	141	115	103	58	34
11	5	11	23	51	127	229	368	407	299	244	246	289	286	356	401	402	351	216	125	108	92	55	35
16	9	9	24	79	160	291	373	360	300	253	271	289	297	321	355	385	298	211	119	107	64	47	28

Date: Tuesday, December 02, 2025		Total Daily Volume: 9196										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
43	23	14	18	51	144	307	435	606	462	356	511	548	603	788	842	834	829	611	353	321	251	153	93
11	10	2	8	2	27	62	107	156	106	86	123	122	137	160	243	226	212	172	103	70	76	47	29
13	7	5	4	12	25	94	97	159	128	82	155	130	133	232	211	195	247	153	94	82	67	37	21
9	2	3	3	16	31	65	116	160	111	107	109	150	155	200	194	208	201	136	81	85	67	40	24
10	4	4	3	21	61	86	115	131	117	81	124	146	178	196	194	205	169	150	75	84	41	29	19

Date: Tuesday, December 02, 2025		Total Daily Volume: 9785										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
19	18	28	55	143	340	618	1004	930	782	627	534	557	501	626	748	720	583	399	200	118	126	64	45
5	3	10	10	20	70	119	232	223	228	169	122	133	133	166	150	174	155	148	65	39	42	10	12
6	7	5	4	30	75	130	262	231	183	149	128	142	118	179	230	172	149	110	47	33	36	21	13
2	3	8	20	35	96	164	252	247	188	137	137	139	131	156	207	194	150	80	44	23	25	15	11
6	5	5	21	58	99	205	258	229	183	172	147	143	119	125	161	180	129	61	44	23	23	18	9

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Counts Unlimited, Inc.

City of San Marcos
 Twin Oaks Valley Road
 B/ Borden Road - Richmar Avenue
 24 Hour Directional Volume Count

PO Box 1178
 Corona, CA 92878
 Phone: 951-268-6268
 email: counts@countsunlimited.com

SNM008V
 Site Code: 057-251157

Start Time	12/2/2025 Tue	Northbound		Hour Totals		Southbound		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		18	184			6	216				
12:15		16	183			13	193				
12:30		17	180			7	216				
12:45		13	184	64	731	11	214	37	839	101	1570
01:00		11	174			7	181				
01:15		9	174			10	185				
01:30		6	191			5	177				
01:45		3	220	29	759	9	196	31	739	60	1498
02:00		6	208			14	229				
02:15		6	224			7	243				
02:30		6	229			7	197				
02:45		5	250	23	911	9	213	37	882	60	1793
03:00		10	269			8	221				
03:15		4	242			10	292				
03:30		7	234			27	277				
03:45		11	262	32	1007	30	232	75	1022	107	2029
04:00		11	272			26	245				
04:15		12	232			38	254				
04:30		18	246			51	249				
04:45		20	263	61	1013	76	255	191	1003	252	2016
05:00		21	282			92	230				
05:15		26	281			103	190				
05:30		51	270			138	191				
05:45		78	243	176	1076	147	185	480	796	656	1872
06:00		61	247			166	185				
06:15		90	208			187	193				
06:30		86	237			215	142				
06:45		103	230	340	922	264	127	832	647	1172	1569
07:00		131	169			293	103				
07:15		129	175			313	97				
07:30		156	121			318	118				
07:45		163	121	579	586	319	124	1243	442	1822	1028
08:00		167	109			309	77				
08:15		164	139			292	75				
08:30		164	119			284	78				
08:45		169	125	664	492	280	59	1165	289	1829	781
09:00		124	89			259	70				
09:15		159	99			207	85				
09:30		179	87			230	43				
09:45		174	56	636	331	203	34	899	232	1535	563
10:00		139	62			216	32				
10:15		128	61			201	33				
10:30		152	61			181	23				
10:45		136	44	555	228	209	25	807	113	1362	341
11:00		145	49			176	26				
11:15		170	44			155	21				
11:30		160	26			187	18				
11:45		171	23	646	142	222	11	740	76	1386	218
Total		3805	8198	3805	8198	6537	7080	6537	7080	10342	15278
Combined Total		12003		12003		13617		13617		25620	
AM Peak	-	08:00	-	-	-	07:15	-	-	-	-	-
Vol.	-	664	-	-	-	1259	-	-	-	-	-
P.H.F.		0.982				0.987					
PM Peak	-	-	04:45	-	-	-	03:15	-	-	-	-
Vol.	-	-	1096	-	-	-	1046	-	-	-	-
P.H.F.			0.972				0.896				
Percentage		31.7%	68.3%			48.0%	52.0%				
ADT/AADT		ADT 25,620		AADT 25,620							

Counts Unlimited, Inc.

City of San Marcos
 Twin Oaks Valley Road
 B/ Richmar Avenue - San Marcos Boulevard
 24 Hour Directional Volume Count

PO Box 1178
 Corona, CA 92878
 Phone: 951-268-6268
 email: counts@countsunlimited.com

SNM009V
 Site Code: 057-251157

Start Time	12/2/2025 Tue	Northbound		Hour Totals		Southbound		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		28	210			17	254				
12:15		19	183			14	247				
12:30		18	177			7	238				
12:45		11	167	76	737	11	250	49	989	125	1726
01:00		11	179			9	214				
01:15		8	169			8	214				
01:30		10	188			8	191				
01:45		5	199	34	735	4	215	29	834	63	1569
02:00		9	211			15	214				
02:15		7	215			15	260				
02:30		8	220			8	227				
02:45		5	219	29	865	9	240	47	941	76	1806
03:00		8	249			7	216				
03:15		5	231			11	253				
03:30		9	188			10	252				
03:45		9	210	31	878	31	234	59	955	90	1833
04:00		14	276			29	266				
04:15		9	237			43	240				
04:30		23	257			52	227				
04:45		18	246	64	1016	92	230	216	963	280	1979
05:00		24	274			96	249				
05:15		23	241			102	233				
05:30		45	246			165	228				
05:45		67	247	159	1008	143	193	506	903	665	1911
06:00		66	264			160	172				
06:15		88	234			169	205				
06:30		80	221			245	193				
06:45		107	232	341	951	277	144	851	714	1192	1665
07:00		114	157			290	145				
07:15		111	161			331	122				
07:30		140	120			315	123				
07:45		154	125	519	563	319	113	1255	503	1774	1066
08:00		152	102			283	85				
08:15		158	145			265	81				
08:30		151	117			252	84				
08:45		157	137	618	501	266	103	1066	353	1684	854
09:00		125	95			274	87				
09:15		163	97			242	88				
09:30		166	91			221	66				
09:45		168	65	622	348	246	44	983	285	1605	633
10:00		128	63			225	40				
10:15		135	53			244	41				
10:30		152	51			212	35				
10:45		145	47	560	214	220	33	901	149	1461	363
11:00		163	55			201	24				
11:15		165	41			189	22				
11:30		166	44			193	21				
11:45		183	29	677	169	171	12	754	79	1431	248
Total		3730	7985	3730	7985	6716	7668	6716	7668	10446	15653
Combined Total		11715		11715		14384		14384		26099	
AM Peak	-	11:00	-	-	-	07:00	-	-	-	-	-
Vol.	-	677	-	-	-	1255	-	-	-	-	-
P.H.F.	-	0.925	-	-	-	0.948	-	-	-	-	-
PM Peak	-	-	04:30	-	-	-	03:15	-	-	-	-
Vol.	-	-	1018	-	-	-	1005	-	-	-	-
P.H.F.	-	-	0.929	-	-	-	0.945	-	-	-	-
Percentage		31.8%	68.2%			46.7%	53.3%				
ADT/AADT		ADT 26,099		AADT 26,099							

Counts Unlimited, Inc.

City of San Marcos
 Twin Oaks Valley Road
 B/ San Marcos Boulevard - State Route 78
 24 Hour Directional Volume Count

PO Box 1178
 Corona, CA 92878
 Phone: 951-268-6268
 email: counts@countsunlimited.com

SNM010V
 Site Code: 057-251157

Start Time	12/2/2025 Tue	Northbound		Hour Totals		Southbound		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		38	280			29	290				
12:15		38	266			17	293				
12:30		33	262			15	269				
12:45		24	242	133	1050	16	277	77	1129	210	2179
01:00		12	250			7	265				
01:15		11	246			10	232				
01:30		16	261			10	231				
01:45		6	277	45	1034	5	257	32	985	77	2019
02:00		11	261			10	264				
02:15		12	255			11	282				
02:30		11	285			8	303				
02:45		7	268	41	1069	7	301	36	1150	77	2219
03:00		7	303			2	286				
03:15		8	289			8	312				
03:30		13	280			12	352				
03:45		15	274	43	1146	23	349	45	1299	88	2445
04:00		17	327			26	324				
04:15		12	346			39	306				
04:30		28	307			54	314				
04:45		29	325	86	1305	70	283	189	1227	275	2532
05:00		45	342			80	361				
05:15		43	329			96	308				
05:30		67	350			165	266				
05:45		124	357	279	1378	157	217	498	1152	777	2530
06:00		114	304			188	235				
06:15		124	274			212	265				
06:30		107	279			302	245				
06:45		147	309	492	1166	291	205	993	950	1485	2116
07:00		167	213			327	208				
07:15		217	212			377	156				
07:30		207	196			405	155				
07:45		259	188	850	809	387	146	1496	665	2346	1474
08:00		276	174			324	137				
08:15		286	236			345	105				
08:30		274	177			351	117				
08:45		319	221	1155	808	339	122	1359	481	2514	1289
09:00		255	154			323	118				
09:15		230	147			294	100				
09:30		217	138			280	82				
09:45		266	112	968	551	307	58	1204	358	2172	909
10:00		190	93			264	62				
10:15		224	100			266	52				
10:30		248	82			241	49				
10:45		217	72	879	347	227	38	998	201	1877	548
11:00		235	72			226	39				
11:15		209	60			226	33				
11:30		233	77			251	22				
11:45		239	38	916	247	233	18	936	112	1852	359
Total		5887	10910	5887	10910	7863	9709	7863	9709	13750	20619
Combined Total		16797		16797		17572		17572		34369	
AM Peak	-	08:00	-	-	-	07:00	-	-	-	-	-
Vol.	-	1155	-	-	-	1496	-	-	-	-	-
P.H.F.	-	0.905	-	-	-	0.923	-	-	-	-	-
PM Peak	-	-	05:00	-	-	-	03:15	-	-	-	-
Vol.	-	-	1378	-	-	-	1337	-	-	-	-
P.H.F.	-	-	0.965	-	-	-	0.950	-	-	-	-
Percentage		35.0%	65.0%			44.7%	55.3%				
ADT/AADT		ADT 34,369		AADT 34,369							

Counts Unlimited, Inc.

City of San Marcos
 Borden Road
 B/ Windy Point Road - Twin Oaks Valley Road
 24 Hour Directional Volume Count

PO Box 1178
 Corona, CA 92878
 Phone: 951-268-6268
 email: counts@countsunlimited.com

SNM013V
 Site Code: 057-251157

Start Time	12/2/2025 Tue	Eastbound		Hour Totals		Westbound		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		1	142			4	78				
12:15		5	87			6	74				
12:30		4	152			4	89				
12:45		6	147	16	528	5	79	19	320	35	848
01:00		3	103			3	79				
01:15		4	101			3	56				
01:30		0	92			2	69				
01:45		3	100	10	396	0	61	8	265	18	661
02:00		1	134			2	85				
02:15		3	156			1	90				
02:30		1	138			3	81				
02:45		0	117	5	545	2	77	8	333	13	878
03:00		1	139			1	94				
03:15		3	214			1	107				
03:30		4	160			1	131				
03:45		3	183	11	696	2	119	5	451	16	1147
04:00		5	251			2	109				
04:15		10	195			4	99				
04:30		9	199			3	128				
04:45		21	214	45	859	11	132	20	468	65	1327
05:00		15	245			6	136				
05:15		24	226			7	123				
05:30		23	175			16	141				
05:45		30	160	92	806	21	135	50	535	142	1341
06:00		36	156			17	108				
06:15		46	142			28	100				
06:30		49	77			35	70				
06:45		60	103	191	478	51	75	131	353	322	831
07:00		109	71			97	87				
07:15		113	77			185	78				
07:30		99	98			182	49				
07:45		96	103	417	349	202	54	666	268	1083	617
08:00		126	72			174	52				
08:15		143	75			135	52				
08:30		157	84			125	35				
08:45		137	56	563	287	136	28	570	167	1133	454
09:00		91	55			150	21				
09:15		81	64			155	25				
09:30		91	37			145	17				
09:45		69	23	332	179	132	22	582	85	914	264
10:00		65	28			91	18				
10:15		60	13			72	21				
10:30		61	7			76	10				
10:45		91	9	277	57	112	17	351	66	628	123
11:00		101	15			79	14				
11:15		99	4			74	8				
11:30		69	4			61	7				
11:45		114	3	383	26	74	10	288	39	671	65
Total		2342	5206	2342	5206	2698	3350	2698	3350	5040	8556
Combined Total		7548		7548		6048		6048		13596	
AM Peak	-	08:00	-	-	-	07:15	-	-	-	-	-
Vol.	-	563	-	-	-	743	-	-	-	-	-
P.H.F.	-	0.896	-	-	-	0.920	-	-	-	-	-
PM Peak	-	-	04:30	-	-	-	05:00	-	-	-	-
Vol.	-	-	884	-	-	-	535	-	-	-	-
P.H.F.	-	-	0.902	-	-	-	0.949	-	-	-	-
Percentage		31.0%	69.0%			44.6%	55.4%				
ADT/AADT		ADT 13,596		AADT 13,596							

Counts Unlimited, Inc.

City of San Marcos
 Buena Creek Road
 W/ Twin Oaks Valley Road
 24 Hour Directional Volume Count

PO Box 1178
 Corona, CA 92878
 (951) 268-6268
 email: counts@countsunlimited.com

SNM012
 Site Code: 057-251157
 Date Start: 12/2/25

Start Time	12/2/25 Tue	Eastbound		Hour Totals		Westbound		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		4	48			7	76				
12:15		4	48			3	50				
12:30		5	76			2	81				
12:45		9	62	22	234	1	67	13	274	35	508
01:00		1	79			3	57				
01:15		4	54			5	69				
01:30		3	58			1	70				
01:45		1	107	9	298	3	65	12	261	21	559
02:00		3	111			1	60				
02:15		1	85			3	92				
02:30		0	106			2	105				
02:45		5	126	9	428	4	91	10	348	19	776
03:00		1	120			1	126				
03:15		3	130			2	148				
03:30		3	143			4	148				
03:45		4	121	11	514	6	166	13	588	24	1102
04:00		6	152			4	172				
04:15		5	130			12	160				
04:30		7	143			16	153				
04:45		15	131	33	556	17	188	49	673	82	1229
05:00		14	121			27	155				
05:15		29	121			29	154				
05:30		55	107			47	156				
05:45		96	129	194	478	54	137	157	602	351	1080
06:00		97	131			62	104				
06:15		98	113			83	83				
06:30		101	95			88	69				
06:45		106	85	402	424	97	61	330	317	732	741
07:00		91	58			99	42				
07:15		138	34			109	42				
07:30		147	30			109	31				
07:45		140	31	516	153	88	36	405	151	921	304
08:00		131	35			93	32				
08:15		109	25			120	30				
08:30		115	25			143	36				
08:45		96	22	451	107	114	15	470	113	921	220
09:00		88	22			128	27				
09:15		78	26			75	19				
09:30		65	25			64	26				
09:45		70	30	301	103	64	13	331	85	632	188
10:00		60	17			62	9				
10:15		53	19			68	7				
10:30		54	13			55	5				
10:45		56	15	223	64	59	9	244	30	467	94
11:00		53	6			66	8				
11:15		48	1			66	6				
11:30		60	7			48	7				
11:45		54	3	215	17	62	4	242	25	457	42
Total		2386	3376	2386	3376	2276	3467	2276	3467	4662	6843
Combined Total		5762		5762		5743		5743		11505	
AM Peak	-	07:15	-	-	-	08:15	-	-	-	-	-
Vol.	-	556	-	-	-	505	-	-	-	-	-
P.H.F.	-	0.946	-	-	-	0.883	-	-	-	-	-
PM Peak	-	-	04:00	-	-	-	04:00	-	-	-	-
Vol.	-	-	556	-	-	-	673	-	-	-	-
P.H.F.	-	-	0.914	-	-	-	0.895	-	-	-	-
Percentage		41.4%	58.6%			39.6%	60.4%				
ADT/AADT		ADT 11,505		AADT 11,505							

Counts Unlimited, Inc.

City of San Marcos
 Woodward Street
 B/ Borden Road - Mission Road
 24 Hour Directional Volume Count

PO Box 1178
 Corona, CA 92878
 (951) 268-6268
 email: counts@countsunlimited.com

SNM015
 Site Code: 057-251157
 Date Start: 12/2/25

Start Time	12/2/25 Tue	Northbound		Hour Totals		Southbound		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		4	22			2	20				
12:15		5	25			0	23				
12:30		3	20			1	37				
12:45		4	22	16	89	2	24	5	104	21	193
01:00		4	21			0	33				
01:15		2	24			0	21				
01:30		2	24			0	27				
01:45		1	28	9	97	1	22	1	103	10	200
02:00		0	20			0	21				
02:15		1	28			0	17				
02:30		1	23			1	21				
02:45		1	38	3	109	1	18	2	77	5	186
03:00		0	32			1	26				
03:15		3	39			1	43				
03:30		0	62			3	36				
03:45		0	39	3	172	0	27	5	132	8	304
04:00		2	45			0	26				
04:15		2	36			1	41				
04:30		0	52			1	24				
04:45		2	44	6	177	7	32	9	123	15	300
05:00		1	39			6	29				
05:15		2	53			4	33				
05:30		4	32			6	22				
05:45		6	50	13	174	6	21	22	105	35	279
06:00		6	38			9	26				
06:15		5	33			13	24				
06:30		8	36			17	10				
06:45		18	32	37	139	12	18	51	78	88	217
07:00		17	28			32	11				
07:15		20	23			41	9				
07:30		14	21			48	12				
07:45		27	19	78	91	47	11	168	43	246	134
08:00		15	14			29	10				
08:15		16	13			52	9				
08:30		25	10			72	8				
08:45		21	15	77	52	44	5	197	32	274	84
09:00		29	16			28	2				
09:15		20	7			22	6				
09:30		17	5			29	2				
09:45		30	6	96	34	31	4	110	14	206	48
10:00		12	14			26	4				
10:15		9	9			8	3				
10:30		12	11			25	1				
10:45		28	7	61	41	24	3	83	11	144	52
11:00		19	5			20	3				
11:15		15	6			21	3				
11:30		24	3			16	1				
11:45		26	3	84	17	19	1	76	8	160	25
Total		483	1192	483	1192	729	830	729	830	1212	2022
Combined Total		1675		1675		1559		1559		3234	
AM Peak	-	09:00	-	-	-	07:45	-	-	-	-	-
Vol.	-	96	-	-	-	200	-	-	-	-	-
P.H.F.	-	0.800	-	-	-	0.694	-	-	-	-	-
PM Peak	-	-	04:30	-	-	-	03:00	-	-	-	-
Vol.	-	-	188	-	-	-	132	-	-	-	-
P.H.F.	-	-	0.758	-	-	-	0.767	-	-	-	-
Percentage		28.8%	71.2%			46.8%	53.2%				
ADT/AADT		ADT 3,234		AADT 3,234							



APPENDIX B
SCOPING MEMO AND CITY REVIEW



This form is required with the initial submittal package of any traffic-generating entitlement project. Please contact engineeringdivision@san-marcos.net and/or the assigned staff with questions.

PROJECT INFORMATION

Project Name:				
Project Applicant				
Name:				
Address:				
Phone Number:		Email:		
Project Location and Context				
Project Address:				
APN(s):				
Nearest Cross Streets:				
Community Plan Area:		Land Use Designation:		Zoning Designation:
Project Description (with Proposed Land Uses and Intensities):				
Number of Parking Spaces:	Vehicles	Accessible	Bicycles	Motorcycles
Attachments				
Attachment A – Project Vicinity Map				
Attachment B – Project Site Plan that clearly identifies the following:				
<ul style="list-style-type: none"> • Land use types and quantities • Number of parking spaces provided (vehicle, ADA, bicycle, motorcycle). • Driveway locations and type (full access, partial access, right in/out only). • Pedestrian and bicycle access; on-site pedestrian circulation • Location/distance of closest existing transit stop, and proposed transit stops identified in RTIP (measured as walking distance to project entrance/or middle of parcel). 				
Attachment C – Transportation Demand Management (TDM) – Identify any TDM project features/measures (see Section 2.1.4 of TIA Guidelines) (i.e. transit pass subsidies, unbundled parking, shuttle services, car share, bicycle supportive features such as repair stations, lockers, etcetera). Identify all transportation amenities. Attachment C may not be required with the initial entitlement submittal at the discretion of assigned staff.				

***A project specific TDM plan will be prepared and submitted at a later design phase.**



PRELIMINARY SCREENING INFORMATION

CEQA Transportation Analysis Screening		
<p>Refer to Section 2.1.2 of the City Traffic Impact Analysis Guidelines. Review the exemption criteria below for each land use that applies to the project. The portion of a project that meets all of the exemption criteria in any of the applicable five categories below would be considered to have a less-than-significant VMT impact and may be screened out from requiring a CEQA transportation analysis.</p>		Screened Out?
1 SMALL PROJECT:		Yes No
	a. Is the Project consistent with the General Plan?	
	b. Does the Project generate fewer than 110 daily vehicle trips?	
2 AFFORDABLE HOUSING:		Yes No
	a. Is the Project located in a Smart Growth Opportunity Area ?	
	b. Does the Project include deed-restricted affordable housing? The affordable component does not require a detailed VMT analysis.	
3 LOCAL-SERVING RETAIL AND PUBLIC FACILITIES		Yes No
	a. Is the Project a local-serving retail project of 50,000 square feet gross floor area or less OR a local-serving public facility?	
4 ADJACENCY TO HIGH-QUALITY TRANSIT		Yes No
	a. Does the Project meet all of the following? <ul style="list-style-type: none"> • Floor Area Ratio > 0.75 • No parking beyond minimum required by Municipal Code • Consistent with current General Plan • Does not reduce existing affordable housing 	
	b. Is the Project in a high-quality transit area per TIAG Attachment B ?	
5 MAP-BASED SCREENING		Yes No
	c. Is the Project a non-retail project? Retail projects, retail portions of a mixed-use project, and projects that are not analyzed using VMT per capita or per employee metrics are ineligible.	
	d. Does the Project incorporate similar land use characteristics (uses, density, and mix) to development in the area or census tract?	
	e. Is the Project located in a low VMT area using the SANDAG residential and/or employment project maps , as applicable?	
Local Mobility Analysis		
Is the Project's land use consistent with the Community Plan zoning?	<input type="checkbox"/> Consistent <input type="checkbox"/> Generates less than 1,000 daily trips (unadjusted driveway trips) <input type="checkbox"/> Generates less than 100 peak hour vehicle trips?	<input type="checkbox"/> Inconsistent <input type="checkbox"/> Generates less than 500 daily trips (unadjusted driveway trips) <input type="checkbox"/> Generates less than 50 peak hour vehicle trips?
<p>If a Local Transportation Analysis is required for the Project, provide an exhibit showing the project's trip distribution percentages, project trip assignment, and study area using the process described in Section 3.5 of the TIA Guidelines. Include all intersections and roadways where the Project adds 50 or more peak hour trips. This component may not be required with the initial entitlement submittal at the discretion of assigned staff.</p>		
Study Scenarios (Check all Applicable)	<input type="checkbox"/> Existing <input type="checkbox"/> Existing w/ Project	<input type="checkbox"/> Opening Year <input type="checkbox"/> Opening Year w/ Project <input type="checkbox"/> Horizon Year <input type="checkbox"/> Horizon Year w/ Project

Oak Crest Specific Plan
Trip Generation Summary

Land Use	Size	Daily Trip Ends (ADTs)		AM Peak Hour					PM Peak Hour				
		Rate ^a	Volume	% of ADT	In:Out Split ^a	Volume			% of ADT	In:Out Split	Volume		
						In	Out	Total			In	Out	Total
Condominium	112 DU	8 DU	896	8%	20% : 80%	14	58	72	10%	70% : 30%	63	27	90
Single Family Residential	145 DU	10 DU	1,450	8%	30% : 70%	35	81	116	10%	70% : 30%	102	43	145
Neighborhood Park	6.22 Acres	5 Acre	31	13%	50% : 50%	2	2	4	9%	50% : 50%	1	2	3
Total			2,377			51	141	192			166	71	237

Footnotes:

a. Trip generation rates from SANDAG's (Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region (April 2002).

Proposed Study Area

Intersections

1. N Twin Oaks Valley Road & Deer Springs Road (signalized)
2. N Twin Oaks Valley Road & Buena Creek Road (signalized)
3. N Twin Oaks Valley Road & Del Roy Drive (signalized)
4. N Twin Oaks Valley Road & Project Driveway (signalized; future conditions only)
5. N Twin Oaks Valley Road & Windy Way (signalized)
6. N Twin Oaks Valley Road & Borden Road (signalized)
7. N Twin Oaks Valley Road & Richmar Avenue (signalized)
8. N Twin Oaks Valley Road & San Marcos Boulevard (signalized)
9. N Twin Oaks Valley Road & SR-78 WB Ramps (signalized)
10. N Twin Oaks Valley Road & SR-78 EB Ramps (signalized)
11. Mission Road & San Marcos Boulevard/Woodward Street (signalized)

Borden Rd & Woodward St.

Segments

- A. **Deer Springs Road:** Sycamore Drive to Twin Oaks Valley Road
- B. **N Twin Oaks Valley Road:** Deer Springs Road to Buena Creek Road
- C. **N Twin Oaks Valley Road:** Buena Creek Road to Del Roy Drive
- D. **N Twin Oaks Valley Road:** Del Roy Drive to Windy Way
- E. **N Twin Oaks Valley Road:** Windy Way to Borden Road
- F. **N Twin Oaks Valley Road:** Borden Road to Richmar Avenue
- G. **N Twin Oaks Valley Road:** Richmar Avenue to San Marcos Boulevard
- H. **N Twin Oaks Valley Road:** San Marcos Boulevard to SR-78 Ramps
- I. **N Twin Oaks Valley Road:** SR-78 Ramps to N City Drive
- J. **Buena Creek Road:** West of N Twin Oaks Valley Road
- K. **Borden Road:** Windy Point Road to N Twin Oaks Valley Road
- L. **Borden Road:** N Twin Oaks Valley Road to Woodward Street

Woodward St between Mission Rd & Borden

Borden Rd between Twin Oaks and Woodward St



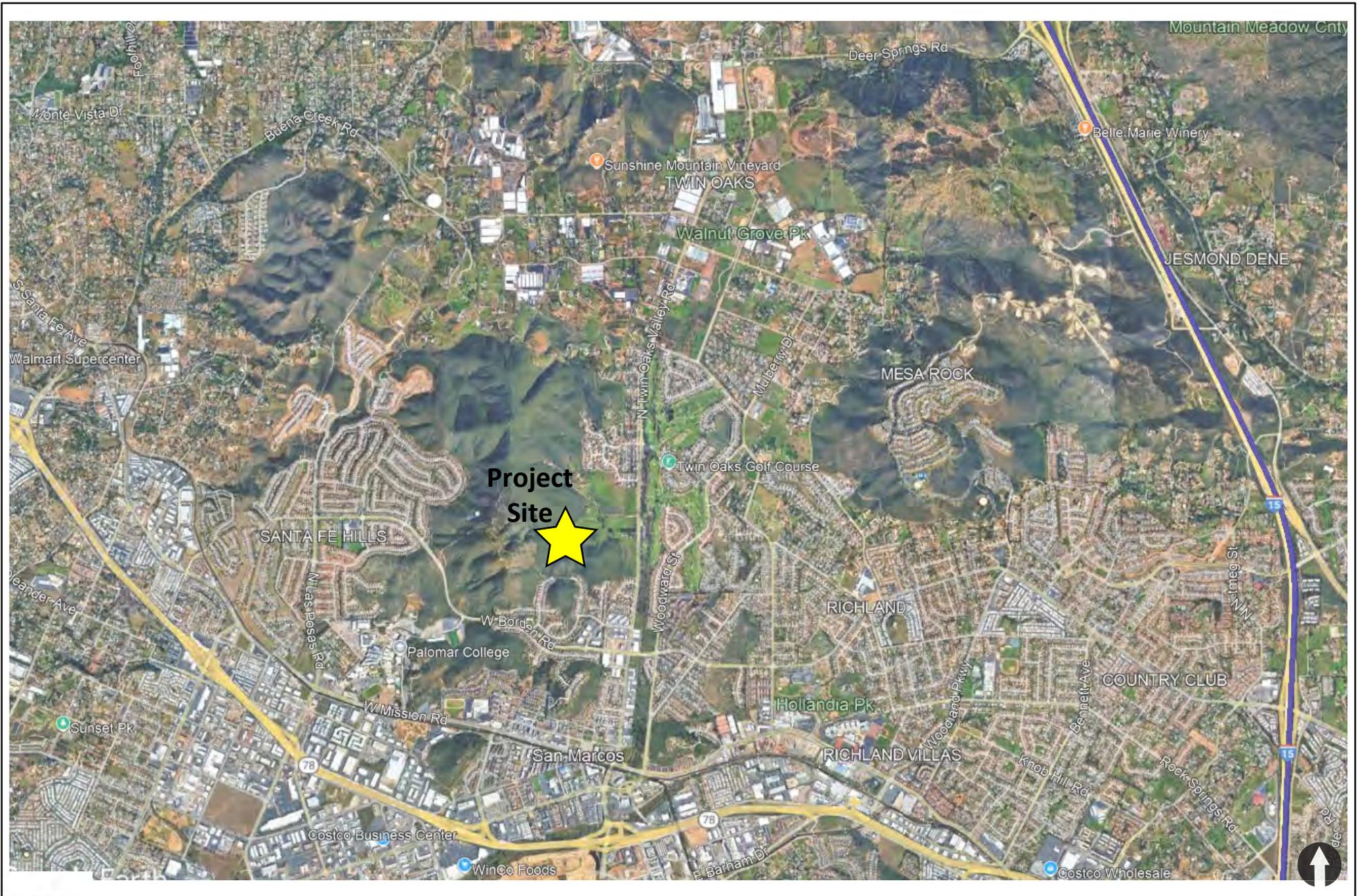
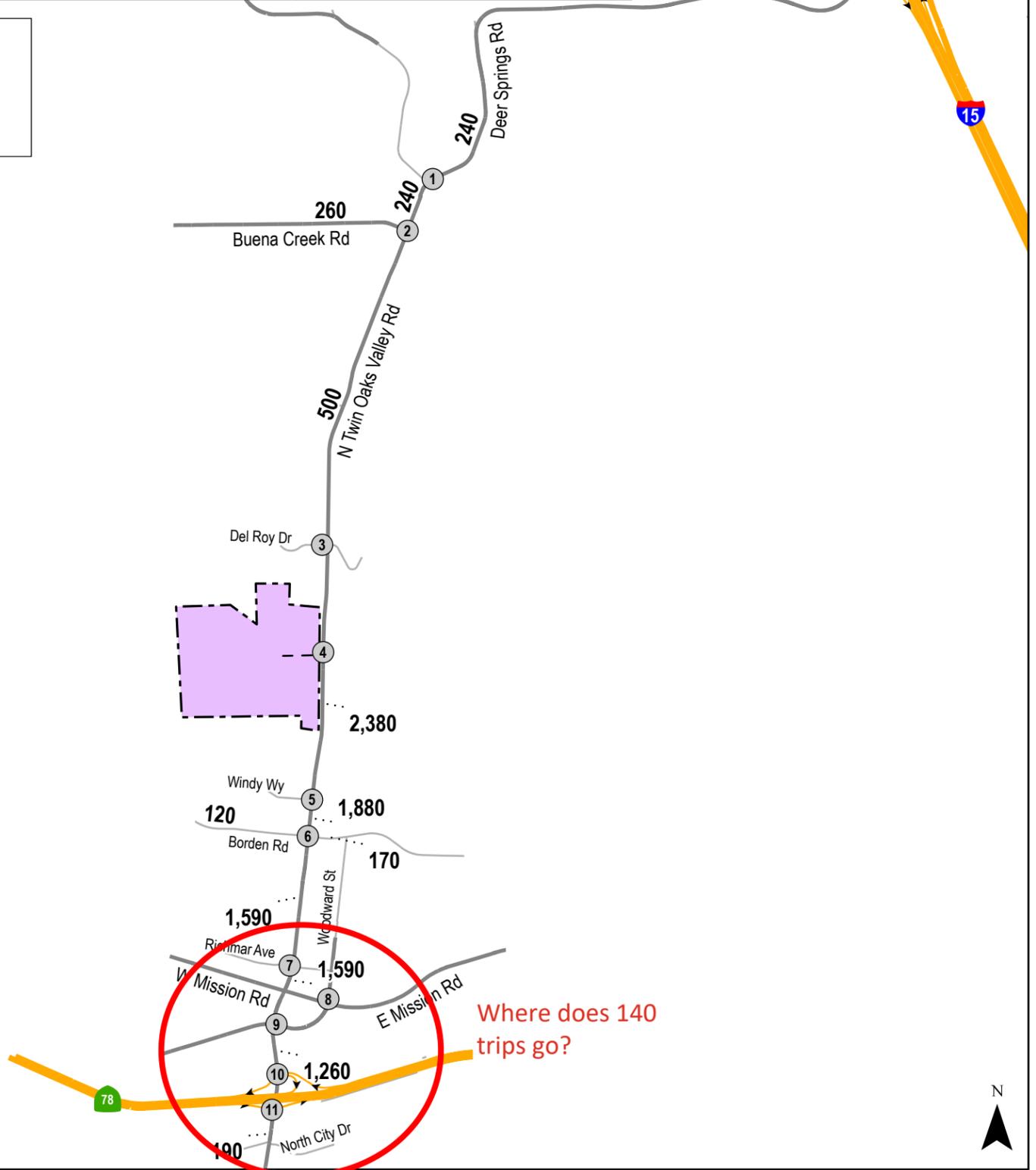
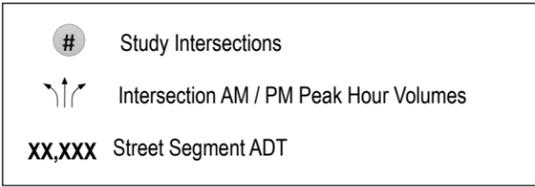
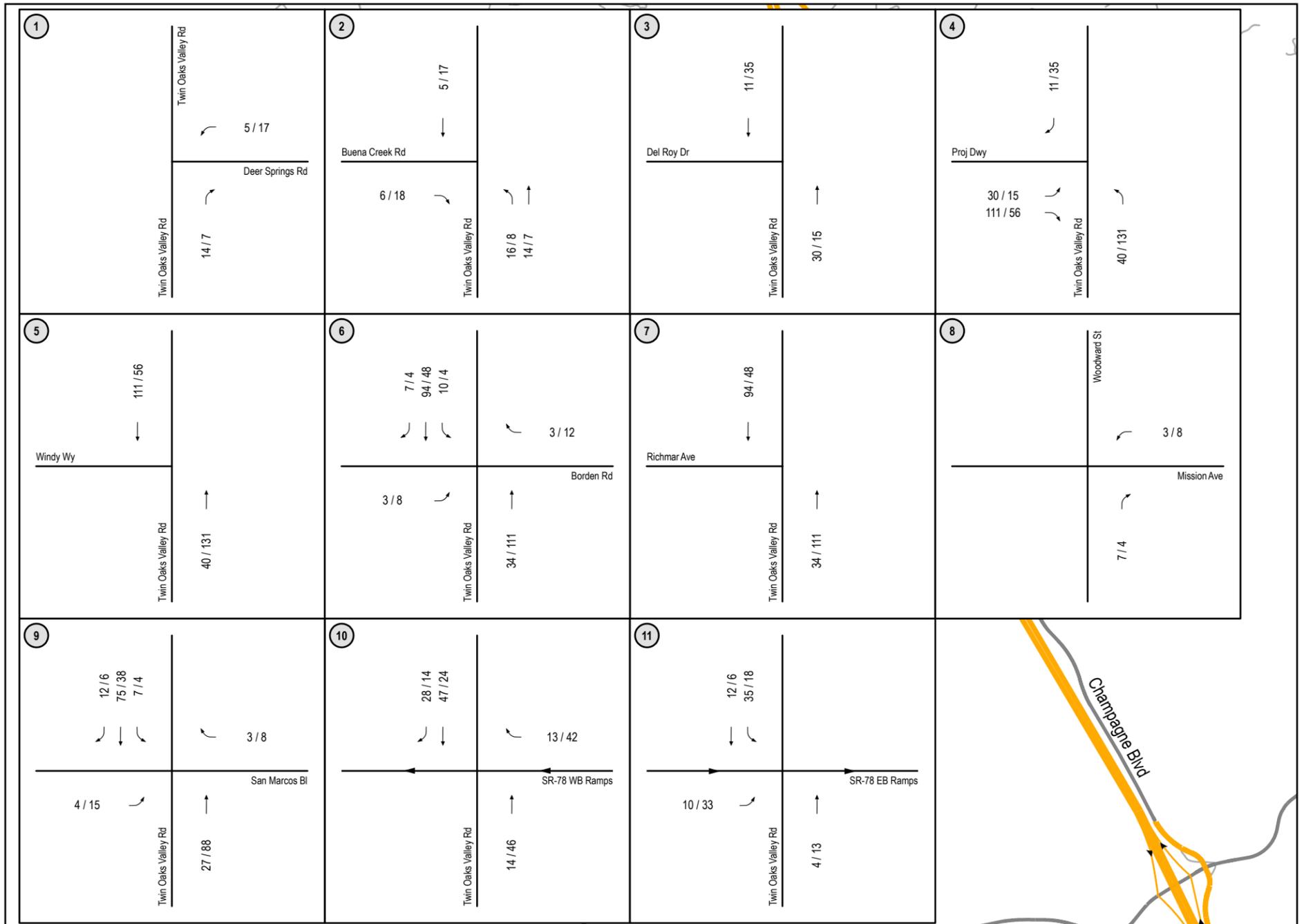


Figure A
Project Area Map







APPENDIX C

CITY OF SAN MARCOS ROADWAY CLASSIFICATION TABLE & COUNTY OF SAN DIEGO ROADWAY CLASSIFICATION TABLE

Table 3: Roadway Classifications, Capacity, and LOS

Street Classification	Lanes	LOS A	LOS B	LOS C	LOS D	LOS E (Capacity)
Expressway	6	30,000	42,000	60,000	70,000	80,000
Prime Arterial	6	25,000	35,000	50,000	55,000	60,000
Major Arterial	6	20,000	28,000	40,000	45,000	50,000
Major Arterial	4	15,000	21,000	30,000	35,000	40,000
Major Arterial (One-Way)	3	12,500	16,500	22,500	25,000	27,500
Major Arterial (One-Way)	2	10,000	13,000	17,500	20,000	22,500
Secondary Arterial/Collector	4	10,000	14,000	20,000	25,000	30,000
Collector (no center lane)	4	5,000	7,000	10,000	13,000	15,000
Collector (continuous left-turn lane)	2	5,000	7,000	10,000	13,000	15,000
Collector (no fronting property)	2	4,000	5,500	7,500	9,000	10,000
Collector (commercial-industrial fronting)	2	2,500	3,500	5,000	6,500	8,000
Collector (multi-family)	2	2,500	3,500	5,000	6,500	8,000
Collector (one-way)	3	11,000	14,000	19,000	22,500	26,000
Collector (one-way)	2	7,500	9,500	12,500	15,000	17,500
Collector (one-way)	1	2,500	3,500	5,000	6,500	7,500
Sub-Collector (single-family)	2	--	--	2,200	--	--

Source: *Guidelines for Transportation Impact Studies in the San Diego Region* (May 2019)

Notes: 1. The volumes and the average daily level of service listed above are only intended as a general planning outline.

2. Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.

3.7. LEVEL OF SERVICE STANDARDS

The City of San Marcos strives to maintain intersection and roadway segment operations based on LOS standards outlined in the General Plan Mobility Element. The local transportation analysis should note intersections and roadway segments that perform unacceptably (based on standards in the current General Plan Mobility Element) under no project and/or plus project conditions, and improvements that can be applied to increase performance to acceptable levels.

For study intersections, the study should identify if the addition of the traffic generated from the proposed project results in any one of the following, and improvements should be identified to increase performance to acceptable or pre-project conditions under each scenario:

- ▶ Triggers an intersection operating at acceptable LOS to operate at unacceptable LOS and increases the average delay per vehicle by more than 2.0 seconds.
- ▶ Increases the average delay per vehicle for a study intersection that is already operating at unacceptable LOS by more than 2.0 seconds.

**TABLE 1
AVERAGE DAILY VEHICLE TRIPS***

MOBILITY ELEMENT ROADS		LEVELS OF SERVICE					
Road Classification	# of Travel Lanes	A	B	C	D	E	
Expressway (6.1)	6	<36,000	<54,000	<70,000	<86,000	<108,000	
Prime Arterial (6.2)	6	<22,200	<37,000	<44,600	<50,000	<57,000	
Major Road	w/ Raised Median (4.1A)	4	<14,800	<24,700	<29,600	<33,400	<37,000
	w/ Intermittent Turn Lanes (4.1B)	4	<13,700	<22,800	<27,400	<30,800	<34,200
Boulevard	w/ Raised Median (4.2A)	4	<18,000	<21,000	<24,000	<27,000	<30,000
	w/ Intermittent Turn Lanes (4.2B)	4	<16,800	<19,600	<22,500	<25,000	<28,000
Community Collector	w/ Raised Median (2.1A)	2	<10,000	<11,700	<13,400	<15,000	<19,000
	w/ Continuous Left Turn Lane (2.1B)	2	<3,000	<6,000	<9,500	<13,500	<19,000
	w/ Intermittent Turn Lane (2.1C)	2	<3,000	<6,000	<9,500	<13,500	<19,000
	w/ Passing Lane (2.1D)	2	<3,000	<6,000	<9,500	<13,500	<19,000
	No Median (2.1E)	2	<1,900	<4,100	<7,100	<10,900	<16,200
Light Collector	w/ Raised Median (2.2A)	2	<3,000	<6,000	<9,500	<13,500	<19,000
	w/ Continuous Left Turn Lane (2.2B)	2	<3,000	<6,000	<9,500	<13,500	<19,000
	w/ Intermittent Turn Lane (2.2C)	2	<3,000	<6,000	<9,500	<13,500	<19,000
	w/ Passing Lane (2.2D)	2	<3,000	<6,000	<9,500	<13,500	<19,000
	No Median (2.2E)	2	<1,900	<4,100	<7,100	<10,900	<16,200
	w/ Reduced Shoulder (2.2F)	2	<5,800	<6,800	<7,800	<8,700	<9,700
Minor Collector	w/ Raised Median (2.3A)	2	<3,000	<6,000	<7,000	<8,000	<9,000
	w/ Intermittent Turn Lane (2.3B)	2	<3,000	<6,000	<7,000	<8,000	<9,000
	No Median (2.3C)	2	<1,900	<4,100	<6,000	<7,000	<8,000
NON-MOBILITY ELEMENT ROADS**		LEVELS OF SERVICE					
Residential Collector	2	-	-	<4,500	-	-	
Rural Residential Collector***	2	-	-	<4,500	-	-	
Residential Road	2	-	-	<1,500	-	-	
Rural Residential Road***	2	-	-	<1,500	-	-	
Residential Cul-de-Sac or Loop Road	2	-	-	<200	-	-	

* The values shown are subject to adjustment based on the geometry of the roadway, side frictions, and other relevant factors as determined by the Director, Department of Public Works.

** Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.

*** Rural Residential Collectors and Rural Residential Roads are intended to serve areas with lot sizes of 2 acres or more which do not have a demand for on-street parking. On-street parking is not assured for these cross sections. Additional right-of-way is needed if on-street parking is in paved area.

**** See Tables 2A and 2B for roadway surfacing and right-of-way widths.

TABLE 2A: COUNTY OF SAN DIEGO - PUBLIC ROAD STANDARDS

CLASSIC CIRCULATION ELEMENT ROAD CLASSIFICATIONS

ROAD CLASSIFICATION	# LANES / LANE WIDTH	MEDIAN WIDTH	ROAD SURFACING WIDTH	R.O.W. WIDTH	PAVED SHOULDER (# / WIDTH)	PARKWAY WIDTH	MIN. CURVE RADIUS	MAX. DESIRABLE GRADE	MIN. DESIGN SPEED (MPH)
Expressway (6.1)	6 / 12'	34'	126'	146'	2 / 10'	10'	1,700'	6%	65
Prime Arterial (6.2)	6 / 12'	14'	102'	122'	2 / 8'	10'	1,700'	6%	65
Major Road (4.1A)	4 / 12'	14'	78'	98'	2 / 8'	10'	1,200'	7%	55
Collector	4 / 12'	-	64'	84'	2 / 8'	10'	1,200'	7%	55
Town Collector	2 / 12'	12'	54'	74'	2 / 8'	10'	500'	9%	40
Light Collector	2 / 12'	-	40'	60'	2 / 8'	10'	700'	9%	45
Rural Collector	2 / 12'	-	40'	84'	2 / 8'	22'	500'	12%	40
Rural Light Collector	2 / 12'	-	40'	60'	2 / 8'	10'	500'	12%	40
Rural Mountain	2 / 12'	-	40'	100'	2 / 8'	30'	500'	12%	40
Recreational Parkway	2 / 12'	-	40'	100'	2 / 8'	30'	400'	12%	25

MODERN CIRCULATION ELEMENT ROAD CLASSIFICATIONS

Major Road										
*	With Intermittent Turn Lanes (4.1B)	4 / 12'	-	64' - 78'	84' - 98'	2 / 8'	10'	1,200'	7%	55
Boulevard										
***	With Raised Median (4.2A)	4 / 12'	14'	78'	106'	2 / 8'	14'	500'	9%	40
***	With Intermittent Turn Lanes (4.2B)	4 / 12'	-	64' - 78'	92' - 106'	2 / 8'	14'	500'	9%	40
Community Collector										
**	With Raised Median (2.1A)	2 / 12'	14'	54'	74'	2 / 8'	10'	700'	9%	45
**	With Continuous Left Turn Lane (2.1B)	2 / 12'	14'	54'	74'	2 / 8'	10'	700'	9%	45
***	With Intermittent Turn Lanes (2.1C)	2 / 12'	-	40' - 54'	60' - 74'	2 / 8'	10'	700'	9%	45
***	With Passing Lane (2.1D)	2 / 12'	-	40'	84'	2 / 8'	10'	700'	9%	45
+	No Median (2.1E)	2 / 12'	-	40'	60'	2 / 8'	10'	700'	9%	45
Light Collector										
**	With Raised Median (2.2A)	2 / 12'	14'	54'	78'	2 / 8'	10'	500'	9%	40
**	With Continuous Left Turn Lane (2.2B)	2 / 12'	14'	54'	78'	2 / 8'	10'	500'	9%	40
***	With Intermittent Turn Lanes (2.2C)	2 / 12'	-	40' - 54'	64' - 78'	2 / 8'	10'	500'	9%	40
***	With Passing Lane (2.2D)	2 / 12'	-	40'	88'	2 / 8'	10'	500'	9%	40
**	No Median (2.2E)	2 / 12'	-	40'	64'	2 / 8'	10'	500'	9%	40
***	With Reduced Shoulder (2.2F)	2 / 12'	-	40'	52'	2 / 2'	10'	500'	9%	40
Minor Collector										
***	With Raised Median (2.3A)	2 / 12'	14'	54'	82'	2 / 8'	10'	350'	12%	35
***	With Intermittent Turn Lanes (2.3B)	2 / 12'	-	40' - 54'	68' - 82'	2 / 8'	10'	350'	12%	35
***	No Median (2.3C)	2 / 12'	-	40'	68'	2 / 8'	10'	350'	12%	35

- NOTES:
- 1 Minimum longitudinal gradient shall be 1.0 percent for all road classificationis shown above.
 - 2 The maximum grade for a permanent cul-de-sac street turning area shall be 6 percent.
 - 3 The maximum grade for a temporary cul-de-sac street turning area shall be that of the classification of the road being constructed.
 - 4 For standards, see County Design Standard Drawing DS-2, DS-3, DS-4, and Section 4.5N of these Standards.
 - 5 Additional pavement and ROW may be required for CE Collectors (4 feet) and Light Collectors (12 feet) in Industrial/Commercial Zones.
 - 6 CE roads needing additional turn lanes will require an additional 12 to 14 feet of pavement and ROW for each lane.
 - 7 The maximum superelevation allowed on CE roads is 6%. Superelevation is not normally required on Non-CE roads.
 - 8 CE roads designated with Bike Lanes will require an additional 10 feet of pavement and ROW. This may be increased to 12' for Collector Roads and above based upon the provisions in Section 7.3 of these standards.
 - 9 The minimum curve radii, shown in the table above, are based on the design speed with 6% superelevation.
 - 10 Interim roads are to be a minimum of 28 feet A.C. within a 40 feet graded roadbed. They may be larger if traffic volumes require more travel lanes.

- LEGEND:
- * Similar to existing Collector Road
 - ** Similar to existing Town Collector
 - *** Similar to existing Rural Collector
 - + Same as existing Light Collector
 - ++ Similar to existing Rural Light Collector
 - +++ New Classification Standard

TABLE 2B: COUNTY OF SAN DIEGO - PUBLIC ROAD STANDARDS

NON-CIRCULATION ELEMENT ROAD CLASSIFICATIONS

ROAD CLASSIFICATION	# LANES / LANE WIDTH	MEDIAN WIDTH	R.O.W. WIDTH	ROAD SURFACING WIDTH	PAVED SHOULDER (# / WIDTH)	PARKWAY WIDTH	MINIMUM CURVE RADIUS	MAXIMUM DESIRABLE GRADE	MINIMUM DESIGN SPEED (MPH)
Residential Collector	2 / 12'	-	60'	40'	2 / 8'	10'	300'	12%	30
Residential	2 / 12'	-	56'	36'	2 / 6'	10'	200'	15%	30
Residential Cul-de-sac	2 / 12'	-	52'	32'	2 / 4'	10'	200'	15%	30
Residential Loop	2 / 12'	-	52'	32'	2 / 4'	10'	200'	15%	30
Industrial/Commerical Collector	4 / 12'	-	88'	68'	2 / 10'	10'	300'	8%	30
Industrial/Commerical	2 / 16'	-	72'	52'	2 / 10'	10'	200'	8%	30
Industrial/Commercial Cul-de-sac	2 / 16'	-	72'	52'	2 / 10'	10'	200'	8%	30
Frontage	2 / 12'	-	52' min	32' min	1 / 8'	10'	See above	See above	-
Alley	2 / 10'	-	20-30'	20-30'	None	None	50'	12%	n/a
Hillside Residential	See NOTE 4	-	-	-	-	-	-	-	-
Rural Collector *	2 / 12'	-	48'	28'	2 / 2'	10'	300'	12%	30
Rural Residential	2 / 12'	-	48'	28'	2 / 2'	10'	200'	15%	30

- NOTES: 1 Minimum longitudinal gradient shall be 1.0 percent for all road classificationis shown above.
 2 The maximum grade for a permanent cul-de-sac street turning area shall be 6 percent.
 3 The maximum grade for a temporary cul-de-sac street turning area shall be that of the classification of the road being constructed.
 4 For standards, see County Design Standard Drawing DS-2, DS-3, DS-4, and Section 4.5N of these Standards.
 5 The minimum curve radii, shown in the table above, are based on the design speed with 6% superelevation.
 6 Interim roads are to be a minimum of 28 feet A.C. within a 40 feet graded roadbed. They may be larger if traffic volumes require more travel lanes.

LEGEND: * Serves lots > 2 acres in size w/
no demand for on-street parking



APPENDIX D
EXISTING ANALYSIS WORKSHEETS

HCM 7th Signalized Intersection Summary
 1: Twin Oaks Valley Rd & Deer Springs Rd

Existing AM
 12/09/2025



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	32	78	89	518	1346	38
Future Volume (veh/h)	32	78	89	518	1346	38
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	39	94	93	540	1373	39
Peak Hour Factor	0.83	0.83	0.96	0.96	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	133	118	106	1581	1401	1150
Arrive On Green	0.07	0.07	0.06	0.85	0.75	0.75
Sat Flow, veh/h	1781	1585	1781	1870	1870	1535
Grp Volume(v), veh/h	39	94	93	540	1373	39
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1535
Q Serve(g_s), s	2.8	7.9	7.0	8.5	93.5	0.9
Cycle Q Clear(g_c), s	2.8	7.9	7.0	8.5	93.5	0.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	133	118	106	1581	1401	1150
V/C Ratio(X)	0.29	0.79	0.88	0.34	0.98	0.03
Avail Cap(c_a), veh/h	317	282	106	1597	1417	1163
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.1	61.4	63.0	2.3	16.0	4.4
Incr Delay (d2), s/veh	1.2	11.3	51.9	0.1	19.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.4	4.6	1.7	41.1	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	60.3	72.8	114.9	2.4	35.2	4.4
LnGrp LOS	E	E	F	A	D	A
Approach Vol, veh/h	133			633	1412	
Approach Delay, s/veh	69.1			18.9	34.3	
Approach LOS	E			B	C	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		119.9		15.1	13.0	106.9
Change Period (Y+Rc), s		5.8		5.0	5.0	5.8
Max Green Setting (Gmax), s		115.2		24.0	8.0	102.2
Max Q Clear Time (g_c+I1), s		10.5		9.9	9.0	95.5
Green Ext Time (p_c), s		3.5		0.3	0.0	5.6
Intersection Summary						
HCM 7th Control Delay, s/veh			32.0			
HCM 7th LOS			C			

HCM 7th Signalized Intersection Summary
2: Twin Oaks Valley Rd & Buena Creek Rd

Existing AM
12/09/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↔		↖	↗		↖	↕	↗
Traffic Volume (veh/h)	271	0	216	1	1	0	97	339	1	1	960	268
Future Volume (veh/h)	271	0	216	1	1	0	97	339	1	1	960	268
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	291	0	232	2	2	0	103	361	1	1	1000	279
Peak Hour Factor	0.93	0.93	0.93	0.50	0.50	0.50	0.94	0.94	0.94	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	276	0	358	44	31	0	125	1024	3	147	1055	871
Arrive On Green	0.23	0.00	0.23	0.23	0.23	0.00	0.07	0.55	0.55	0.08	0.56	0.56
Sat Flow, veh/h	939	0	1551	0	134	0	1781	1864	5	1781	1870	1543
Grp Volume(v), veh/h	291	0	232	4	0	0	103	0	362	1	1000	279
Grp Sat Flow(s),veh/h/ln	939	0	1551	134	0	0	1781	0	1869	1781	1870	1543
Q Serve(g_s), s	0.0	0.0	16.4	0.0	0.0	0.0	6.9	0.0	13.1	0.1	60.8	11.7
Cycle Q Clear(g_c), s	28.0	0.0	16.4	28.0	0.0	0.0	6.9	0.0	13.1	0.1	60.8	11.7
Prop In Lane	1.00		1.00	0.50		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	276	0	358	75	0	0	125	0	1027	147	1055	871
V/C Ratio(X)	1.05	0.00	0.65	0.05	0.00	0.00	0.83	0.00	0.35	0.01	0.95	0.32
Avail Cap(c_a), veh/h	276	0	358	75	0	0	125	0	1027	245	1128	930
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.7	0.0	42.3	38.8	0.0	0.0	55.7	0.0	15.3	51.1	24.8	14.1
Incr Delay (d2), s/veh	69.3	0.0	4.1	0.3	0.0	0.0	34.6	0.0	0.2	0.0	15.3	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.8	0.0	6.7	0.1	0.0	0.0	4.2	0.0	5.3	0.0	28.4	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	119.0	0.0	46.3	39.1	0.0	0.0	90.3	0.0	15.5	51.2	40.1	14.3
LnGrp LOS	F		D	D			F		B	D	D	B
Approach Vol, veh/h		523			4			465			1280	
Approach Delay, s/veh		86.7			39.1			32.1			34.5	
Approach LOS		F			D			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.8	72.5		33.1	14.0	74.3		33.1				
Change Period (Y+Rc), s	5.8	5.8		* 5.1	5.5	5.8		5.1				
Max Green Setting (Gmax), s	16.7	64.7		* 28	8.5	73.2		26.9				
Max Q Clear Time (g_c+I1), s	2.1	15.1		30.0	8.9	62.8		30.0				
Green Ext Time (p_c), s	0.0	2.1		0.0	0.0	5.7		0.0				

Intersection Summary

HCM 7th Control Delay, s/veh	46.0
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 3: Twin Oaks Valley Rd & Olive Street

Existing AM
 12/09/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↖	↗		↖	↗		↖	↗	
Traffic Volume (veh/h)	0	2	3	40	0	92	1	436	10	63	1000	0
Future Volume (veh/h)	0	2	3	40	0	92	1	436	10	63	1000	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.91	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		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	0	3	5	61	0	139	1	484	11	72	1136	0
Peak Hour Factor	0.63	0.63	0.63	0.66	0.66	0.66	0.90	0.90	0.90	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	21	36	210	0	170	2	1088	25	106	1226	0
Arrive On Green	0.00	0.04	0.04	0.12	0.00	0.12	0.00	0.60	0.60	0.06	0.66	0.00
Sat Flow, veh/h	0	599	998	1781	0	1440	1781	1820	41	1781	1870	0
Grp Volume(v), veh/h	0	0	8	61	0	139	1	0	495	72	1136	0
Grp Sat Flow(s),veh/h/ln	0	0	1597	1781	0	1440	1781	0	1861	1781	1870	0
Q Serve(g_s), s	0.0	0.0	0.5	3.2	0.0	9.7	0.1	0.0	15.0	4.1	54.9	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.5	3.2	0.0	9.7	0.1	0.0	15.0	4.1	54.9	0.0
Prop In Lane	0.00		0.62	1.00		1.00	1.00		0.02	1.00		0.00
Lane Grp Cap(c), veh/h	0	0	57	210	0	170	2	0	1113	106	1226	0
V/C Ratio(X)	0.00	0.00	0.14	0.29	0.00	0.82	0.41	0.00	0.44	0.68	0.93	0.00
Avail Cap(c_a), veh/h	0	0	279	320	0	258	86	0	1381	216	1524	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	48.2	41.5	0.0	44.4	51.4	0.0	11.4	47.5	15.6	0.0
Incr Delay (d2), s/veh	0.0	0.0	1.1	0.8	0.0	11.5	84.1	0.0	0.3	7.5	8.8	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.2	1.4	0.0	3.9	0.1	0.0	5.4	2.0	21.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	49.3	42.3	0.0	55.9	135.6	0.0	11.6	55.0	24.3	0.0
LnGrp LOS			D	D		E	F		B	E	C	
Approach Vol, veh/h		8			200			496			1208	
Approach Delay, s/veh		49.3			51.7			11.9			26.2	
Approach LOS		D			D			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.7	67.9		8.3	4.7	73.9		16.2				
Change Period (Y+Rc), s	4.6	6.3		4.6	4.6	6.3		4.0				
Max Green Setting (Gmax), s	12.5	76.5		18.0	5.0	84.0		18.5				
Max Q Clear Time (g_c+I1), s	6.1	17.0		2.5	2.1	56.9		11.7				
Green Ext Time (p_c), s	0.1	3.1		0.0	0.0	10.7		0.5				
Intersection Summary												
HCM 7th Control Delay, s/veh			25.2									
HCM 7th LOS			C									

HCM 7th Signalized Intersection Summary
 4: Twin Oaks Valley Rd & E. La Cienega Road

Existing AM
 12/09/2025



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	136	207	506	33	68	784
Future Volume (veh/h)	136	207	506	33	68	784
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00		0.95	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	181	276	562	37	71	817
Peak Hour Factor	0.75	0.75	0.90	0.90	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	418	372	925	61	115	1666
Arrive On Green	0.23	0.23	0.27	0.27	0.06	0.47
Sat Flow, veh/h	1781	1585	3465	221	1781	3647
Grp Volume(v), veh/h	181	276	296	303	71	817
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1816	1781	1777
Q Serve(g_s), s	4.0	7.5	6.7	6.7	1.8	7.3
Cycle Q Clear(g_c), s	4.0	7.5	6.7	6.7	1.8	7.3
Prop In Lane	1.00	1.00		0.12	1.00	
Lane Grp Cap(c), veh/h	418	372	487	498	115	1666
V/C Ratio(X)	0.43	0.74	0.61	0.61	0.62	0.49
Avail Cap(c_a), veh/h	1079	961	858	877	193	2561
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.1	16.4	14.6	14.6	21.0	8.5
Incr Delay (d2), s/veh	0.7	2.9	1.2	1.2	5.3	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.3	2.1	2.2	0.8	1.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	15.8	19.3	15.8	15.8	26.3	8.7
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	457		599			888
Approach Delay, s/veh	17.9		15.8			10.1
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.0	19.9			28.9	17.3
Change Period (Y+Rc), s	6.0	7.2			7.2	6.5
Max Green Setting (Gmax), s	5.0	22.3			33.3	28.0
Max Q Clear Time (g_c+I1), s	3.8	8.7			9.3	9.5
Green Ext Time (p_c), s	0.0	2.6			5.2	1.4
Intersection Summary						
HCM 7th Control Delay, s/veh			13.7			
HCM 7th LOS			B			

HCM 7th Signalized Intersection Summary
 5: Twin Oaks Valley Rd & Del Roy Dr

Existing AM
 12/09/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷		↶	↷		↶	↷	
Traffic Volume (veh/h)	13	0	39	2	0	2	19	523	17	9	906	9
Future Volume (veh/h)	13	0	39	2	0	2	19	523	17	9	906	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.93	1.00		0.93
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	15	0	45	4	0	4	22	608	20	9	934	9
Peak Hour Factor	0.87	0.87	0.87	0.50	0.50	0.50	0.86	0.86	0.86	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	40	0	232	12	0	252	56	1327	44	25	1303	13
Arrive On Green	0.02	0.00	0.15	0.01	0.00	0.16	0.03	0.38	0.38	0.01	0.36	0.36
Sat Flow, veh/h	1781	0	1553	1781	0	1556	1781	3501	115	1781	3603	35
Grp Volume(v), veh/h	15	0	45	4	0	4	22	308	320	9	461	482
Grp Sat Flow(s),veh/h/ln	1781	0	1553	1781	0	1556	1781	1777	1840	1781	1777	1861
Q Serve(g_s), s	0.4	0.0	1.3	0.1	0.0	0.1	0.6	6.8	6.9	0.3	11.7	11.7
Cycle Q Clear(g_c), s	0.4	0.0	1.3	0.1	0.0	0.1	0.6	6.8	6.9	0.3	11.7	11.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.06	1.00		0.02
Lane Grp Cap(c), veh/h	40	0	232	12	0	252	56	673	697	25	643	673
V/C Ratio(X)	0.38	0.00	0.19	0.35	0.00	0.02	0.39	0.46	0.46	0.36	0.72	0.72
Avail Cap(c_a), veh/h	204	0	1006	204	0	1052	204	856	886	204	856	896
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	25.3	0.0	19.6	26.0	0.0	18.5	24.9	12.3	12.3	25.7	14.4	14.4
Incr Delay (d2), s/veh	5.7	0.0	0.4	16.9	0.0	0.0	4.4	0.5	0.5	8.5	1.9	1.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.5	0.1	0.0	0.0	0.3	2.1	2.1	0.2	3.8	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	31.0	0.0	20.0	42.9	0.0	18.5	29.4	12.7	12.7	34.1	16.4	16.3
LnGrp LOS	C		B	D		B	C	B	B	C	B	B
Approach Vol, veh/h		60			8			650			952	
Approach Delay, s/veh		22.7			30.7			13.3			16.5	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.2	26.1	6.3	13.8	7.1	25.2	5.7	14.5				
Change Period (Y+Rc), s	5.5	6.2	6.0	6.0	5.5	6.2	4.5	6.0				
Max Green Setting (Gmax), s	6.0	25.3	6.0	34.0	6.0	25.3	6.0	35.5				
Max Q Clear Time (g_c+I1), s	2.3	8.9	2.1	3.3	2.6	13.7	2.4	2.1				
Green Ext Time (p_c), s	0.0	3.0	0.0	0.2	0.0	4.1	0.0	0.0				
Intersection Summary												
HCM 7th Control Delay, s/veh			15.5									
HCM 7th LOS			B									

HCM 7th Signalized Intersection Summary
 7: Twin Oaks Valley Rd & Windy Wy

Existing AM
 12/09/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗					↖	↕		↖	↗	
Traffic Volume (veh/h)	18	0	27	0	0	0	19	562	2	3	923	32
Future Volume (veh/h)	18	0	27	0	0	0	19	562	2	3	923	32
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.93				1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	21	0	31				21	611	2	3	972	34
Peak Hour Factor	0.87	0.87	0.87				0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2				2	2	2	2	2	2
Cap, veh/h	81	0	67				51	3000	10	7	2803	98
Arrive On Green	0.05	0.00	0.05				0.03	0.83	0.83	0.00	0.80	0.80
Sat Flow, veh/h	1781	0	1470				1781	3633	12	1781	3498	122
Grp Volume(v), veh/h	21	0	31				21	299	314	3	494	512
Grp Sat Flow(s),veh/h/ln	1781	0	1470				1781	1777	1868	1781	1777	1844
Q Serve(g_s), s	1.5	0.0	2.7				1.5	4.6	4.6	0.2	9.9	9.9
Cycle Q Clear(g_c), s	1.5	0.0	2.7				1.5	4.6	4.6	0.2	9.9	9.9
Prop In Lane	1.00		1.00				1.00		0.01	1.00		0.07
Lane Grp Cap(c), veh/h	81	0	67				51	1467	1542	7	1424	1477
V/C Ratio(X)	0.26	0.00	0.46				0.41	0.20	0.20	0.43	0.35	0.35
Avail Cap(c_a), veh/h	343	0	283				137	1467	1542	96	1424	1477
HCM Platoon Ratio	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				0.89	0.89	0.89	0.93	0.93	0.93
Uniform Delay (d), s/veh	59.9	0.0	60.5				62.1	2.4	2.4	64.6	3.6	3.6
Incr Delay (d2), s/veh	1.7	0.0	4.9				4.7	0.3	0.3	33.8	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
%ile BackOfQ(50%),veh/ln	0.7	0.0	1.1				0.7	1.1	1.1	0.2	2.7	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	61.6	0.0	65.4				66.7	2.6	2.6	98.4	4.2	4.2
LnGrp LOS	E		E				E	A	A	F	A	A
Approach Vol, veh/h		52						634			1009	
Approach Delay, s/veh		63.8						4.8			4.5	
Approach LOS		E						A			A	
Timer - Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	5.5	113.6		10.9	8.7	110.3						
Change Period (Y+Rc), s	5.0	6.2		5.0	5.0	6.2						
Max Green Setting (Gmax), s	7.0	81.8		25.0	10.0	78.8						
Max Q Clear Time (g_c+I1), s	2.2	6.6		4.7	3.5	11.9						
Green Ext Time (p_c), s	0.0	3.6		0.2	0.0	7.1						
Intersection Summary												
HCM 7th Control Delay, s/veh			6.4									
HCM 7th LOS			A									

HCM 7th Signalized Intersection Summary
 8: Twin Oaks Valley Rd & Borden Rd

Existing AM
 12/09/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕		↖	↕	↗	↖	↕	↗
Traffic Volume (veh/h)	67	256	199	239	366	76	101	429	94	42	766	169
Future Volume (veh/h)	67	256	199	239	366	76	101	429	94	42	766	169
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	81	308	240	285	436	90	112	477	104	44	806	178
Peak Hour Factor	0.83	0.83	0.83	0.84	0.84	0.84	0.90	0.90	0.90	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	102	591	447	311	1253	256	135	1106	756	73	1014	439
Arrive On Green	0.06	0.31	0.31	0.17	0.43	0.43	0.08	0.31	0.31	0.04	0.29	0.29
Sat Flow, veh/h	1781	1901	1438	1781	2924	598	1781	3554	1540	1781	3554	1538
Grp Volume(v), veh/h	81	287	261	285	263	263	112	477	104	44	806	178
Grp Sat Flow(s),veh/h/ln	1781	1777	1562	1781	1777	1745	1781	1777	1540	1781	1777	1538
Q Serve(g_s), s	6.4	18.8	19.5	22.2	14.1	14.3	8.8	15.1	5.3	3.4	29.6	13.2
Cycle Q Clear(g_c), s	6.4	18.8	19.5	22.2	14.1	14.3	8.8	15.1	5.3	3.4	29.6	13.2
Prop In Lane	1.00		0.92	1.00		0.34	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	102	552	485	311	761	748	135	1106	756	73	1014	439
V/C Ratio(X)	0.80	0.52	0.54	0.92	0.35	0.35	0.83	0.43	0.14	0.61	0.79	0.41
Avail Cap(c_a), veh/h	169	552	485	392	761	748	181	1106	756	117	1014	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	65.9	40.1	40.3	57.3	27.1	27.2	64.5	38.8	20.0	66.7	46.7	40.8
Incr Delay (d2), s/veh	13.2	3.5	4.2	22.5	1.2	1.3	20.6	1.2	0.4	7.9	6.4	2.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	8.8	8.1	12.0	6.3	6.3	4.7	6.7	1.9	1.7	13.7	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	79.0	43.5	44.5	79.9	28.4	28.5	85.0	40.0	20.4	74.6	53.1	43.6
LnGrp LOS	E	D	D	E	C	C	F	D	C	E	D	D
Approach Vol, veh/h		629			811			693			1028	
Approach Delay, s/veh		48.5			46.5			44.3			52.4	
Approach LOS		D			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	29.6	50.0	15.3	46.4	13.0	66.7	11.7	50.1				
Change Period (Y+Rc), s	* 4.9	* 6.1	4.6	* 6.1	* 4.9	* 6.1	5.9	* 6.1				
Max Green Setting (Gmax), s	* 31	* 43	14.4	* 40	* 13	* 61	9.3	* 44				
Max Q Clear Time (g_c+I1), s	24.2	21.5	10.8	31.6	8.4	16.3	5.4	17.1				
Green Ext Time (p_c), s	0.5	3.5	0.1	3.6	0.1	3.6	0.0	3.3				

Intersection Summary												
HCM 7th Control Delay, s/veh				48.4								
HCM 7th LOS				D								

Notes
 * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 9: Woodward St & Borden Rd

Existing AM
 12/09/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	↖
Traffic Volume (veh/h)	51	295	42	16	500	20	56	32	13	36	132	122
Future Volume (veh/h)	51	295	42	16	500	20	56	32	13	36	132	122
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.95	1.00		0.97	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	78	454	65	21	649	26	67	38	15	42	153	142
Peak Hour Factor	0.65	0.65	0.65	0.77	0.77	0.77	0.84	0.84	0.84	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	206	1136	162	60	1012	41	172	289	114	100	350	285
Arrive On Green	0.12	0.37	0.37	0.03	0.29	0.29	0.10	0.23	0.23	0.06	0.19	0.19
Sat Flow, veh/h	1781	3103	441	1781	3475	139	1781	1262	498	1781	1870	1523
Grp Volume(v), veh/h	78	259	260	21	332	343	67	0	53	42	153	142
Grp Sat Flow(s),veh/h/ln	1781	1777	1767	1781	1777	1837	1781	0	1760	1781	1870	1523
Q Serve(g_s), s	2.8	7.5	7.6	0.8	11.3	11.3	2.4	0.0	1.7	1.6	5.0	5.8
Cycle Q Clear(g_c), s	2.8	7.5	7.6	0.8	11.3	11.3	2.4	0.0	1.7	1.6	5.0	5.8
Prop In Lane	1.00		0.25	1.00		0.08	1.00		0.28	1.00		1.00
Lane Grp Cap(c), veh/h	206	650	647	60	518	535	172	0	404	100	350	285
V/C Ratio(X)	0.38	0.40	0.40	0.35	0.64	0.64	0.39	0.00	0.13	0.42	0.44	0.50
Avail Cap(c_a), veh/h	474	1204	1198	180	927	958	463	0	1032	229	843	686
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.3	16.3	16.3	32.7	21.4	21.4	29.3	0.0	21.2	31.6	24.9	25.2
Incr Delay (d2), s/veh	1.1	0.4	0.4	3.5	1.3	1.3	1.4	0.0	0.1	2.8	0.9	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	2.8	2.8	0.4	4.5	4.6	1.0	0.0	0.6	0.7	2.2	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	29.5	16.7	16.7	36.2	22.7	22.7	30.8	0.0	21.3	34.4	25.8	26.6
LnGrp LOS	C	B	B	D	C	C	C		C	C	C	C
Approach Vol, veh/h		597			696			120			337	
Approach Delay, s/veh		18.4			23.1			26.6			27.2	
Approach LOS		B			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.4	31.1	11.9	18.8	12.6	26.0	9.0	21.7				
Change Period (Y+Rc), s	5.1	* 5.8	5.2	5.8	4.6	* 5.8	5.1	* 5.8				
Max Green Setting (Gmax), s	7.0	* 47	18.0	31.2	18.4	* 36	8.9	* 41				
Max Q Clear Time (g_c+I1), s	2.8	9.6	4.4	7.8	4.8	13.3	3.6	3.7				
Green Ext Time (p_c), s	0.0	3.3	0.1	1.3	0.1	4.1	0.0	0.2				

Intersection Summary												
HCM 7th Control Delay, s/veh				22.5								
HCM 7th LOS				C								

Notes
 * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 10: Twin Oaks Valley Rd & Richmar Road

Existing AM
 12/09/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↕↔		↔	↕↔	
Traffic Volume (veh/h)	122	7	108	13	1	1	56	526	11	14	1074	170
Future Volume (veh/h)	122	7	108	13	1	1	56	526	11	14	1074	170
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.96	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	144	8	127	14	1	1	57	537	11	15	1143	181
Peak Hour Factor	0.85	0.85	0.85	0.94	0.94	0.94	0.98	0.98	0.98	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	186	9	148	128	60	60	73	2192	45	34	1817	286
Arrive On Green	0.10	0.10	0.10	0.07	0.07	0.07	0.04	0.62	0.62	0.02	0.59	0.59
Sat Flow, veh/h	1781	89	1418	1781	838	838	1781	3558	73	1781	3058	482
Grp Volume(v), veh/h	144	0	135	14	0	2	57	268	280	15	662	662
Grp Sat Flow(s),veh/h/ln	1781	0	1508	1781	0	1676	1781	1777	1854	1781	1777	1763
Q Serve(g_s), s	10.2	0.0	11.4	1.0	0.0	0.1	4.1	8.9	8.9	1.1	31.3	31.7
Cycle Q Clear(g_c), s	10.2	0.0	11.4	1.0	0.0	0.1	4.1	8.9	8.9	1.1	31.3	31.7
Prop In Lane	1.00		0.94	1.00		0.50	1.00		0.04	1.00		0.27
Lane Grp Cap(c), veh/h	186	0	158	128	0	120	73	1094	1142	34	1056	1048
V/C Ratio(X)	0.77	0.00	0.86	0.11	0.00	0.02	0.78	0.24	0.25	0.44	0.63	0.63
Avail Cap(c_a), veh/h	201	0	170	521	0	490	93	1094	1142	82	1056	1048
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	0.89	0.89	0.89	0.42	0.42	0.42
Uniform Delay (d), s/veh	56.7	0.0	57.2	56.5	0.0	56.1	61.7	11.3	11.3	63.0	17.1	17.1
Incr Delay (d2), s/veh	15.7	0.0	30.8	0.4	0.0	0.1	24.2	0.5	0.5	3.6	1.2	1.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.0	5.7	0.4	0.0	0.1	2.3	3.4	3.5	0.5	12.1	12.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	72.4	0.0	88.1	56.8	0.0	56.1	85.9	11.8	11.7	66.7	18.3	18.4
LnGrp LOS	E		F	E		E	F	B	B	E	B	B
Approach Vol, veh/h	279		16				605			1339		
Approach Delay, s/veh	80.0		56.8				18.7			18.9		
Approach LOS	E		E				B			B		
Timer - Assigned Phs	1	2	4		5	6	8					
Phs Duration (G+Y+Rc), s	8.5	86.4	19.7		11.3	83.5	15.4					
Change Period (Y+Rc), s	6.0	6.3	6.1		6.0	6.3	6.1					
Max Green Setting (Gmax), s	6.0	46.8	14.7		6.8	46.0	38.0					
Max Q Clear Time (g_c+I1), s	3.1	10.9	13.4		6.1	33.7	3.0					
Green Ext Time (p_c), s	0.0	3.1	0.2		0.0	6.5	0.0					
Intersection Summary												
HCM 7th Control Delay, s/veh			26.7									
HCM 7th LOS			C									

HCM 7th Signalized Intersection Summary
 11: San Marcos Blvd & E. Mission Road

Existing AM
 12/09/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↑↑	↗	↙↗	↑↑	↗	↙	↑↑	↗	↙	↑↗	
Traffic Volume (veh/h)	24	402	37	388	633	42	11	76	572	44	276	59
Future Volume (veh/h)	24	402	37	388	633	42	11	76	572	44	276	59
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	1.00		1.00	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	1742	1673	1870	1870	1742	1742	1742	1870	1742	1870
Adj Flow Rate, veh/h	30	502	46	451	736	49	16	109	0	47	297	63
Peak Hour Factor	0.80	0.80	0.80	0.86	0.86	0.86	0.70	0.70	0.70	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	36	910	363	577	1502	652	20	639		57	577	120
Arrive On Green	0.02	0.26	0.26	0.19	0.42	0.42	0.01	0.19	0.00	0.03	0.21	0.21
Sat Flow, veh/h	1781	3554	1415	3092	3554	1542	1659	3311	1477	1781	2704	563
Grp Volume(v), veh/h	30	502	46	451	736	49	16	109	0	47	180	180
Grp Sat Flow(s),veh/h/ln	1781	1777	1415	1546	1777	1542	1659	1655	1477	1781	1655	1611
Q Serve(g_s), s	0.9	6.9	1.4	7.8	8.4	1.1	0.5	1.5	0.0	1.5	5.4	5.5
Cycle Q Clear(g_c), s	0.9	6.9	1.4	7.8	8.4	1.1	0.5	1.5	0.0	1.5	5.4	5.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.35
Lane Grp Cap(c), veh/h	36	910	363	577	1502	652	20	639		57	353	344
V/C Ratio(X)	0.84	0.55	0.13	0.78	0.49	0.08	0.82	0.17		0.82	0.51	0.52
Avail Cap(c_a), veh/h	210	1586	632	773	2056	892	166	1649		143	792	771
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.4	18.0	16.0	21.7	11.8	9.6	27.6	18.9	0.0	26.9	19.4	19.5
Incr Delay (d2), s/veh	38.1	0.5	0.2	3.7	0.2	0.0	53.6	0.1	0.0	23.9	1.1	1.2
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	0.7	2.4	0.4	2.7	2.6	0.3	0.5	0.5	0.0	0.9	1.9	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	65.5	18.6	16.2	25.4	12.0	9.7	81.3	19.0	0.0	50.8	20.6	20.7
LnGrp LOS	E	B	B	C	B	A	F	B		D	C	C
Approach Vol, veh/h		578			1236			125			407	
Approach Delay, s/veh		20.8			16.8			27.0			24.1	
Approach LOS		C			B			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.8	16.1	14.4	19.6	4.7	17.3	5.1	29.0				
Change Period (Y+Rc), s	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3				
Max Green Setting (Gmax), s	4.5	27.9	14.0	25.0	5.6	26.8	6.6	32.4				
Max Q Clear Time (g_c+I1), s	3.5	3.5	9.8	8.9	2.5	7.5	2.9	10.4				
Green Ext Time (p_c), s	0.0	0.5	0.7	2.8	0.0	1.8	0.0	4.8				

Intersection Summary												
HCM 7th Control Delay, s/veh			19.6									
HCM 7th LOS			B									

Notes
 User approved changes to right turn type.
 Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 7th Signalized Intersection Summary
 12: Twin Oaks Valley Rd & San Marcos Blvd

Existing AM
 12/09/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↗	↖↗	↑↑		↖↗	↑↑	↗	↖↗	↑↑	
Traffic Volume (veh/h)	178	423	251	355	322	17	197	423	535	88	753	225
Future Volume (veh/h)	178	423	251	355	322	17	197	423	535	88	753	225
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	196	465	276	386	350	18	216	465	588	94	801	239
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.91	0.91	0.91	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	249	1172	613	230	1114	57	230	1185	619	199	858	256
Arrive On Green	0.07	0.33	0.33	0.07	0.32	0.32	0.07	0.33	0.33	0.06	0.32	0.32
Sat Flow, veh/h	3456	3554	1537	3456	3433	176	3456	3554	1540	3456	2677	799
Grp Volume(v), veh/h	196	465	276	386	180	188	216	465	588	94	532	508
Grp Sat Flow(s),veh/h/ln	1728	1777	1537	1728	1777	1832	1728	1777	1540	1728	1777	1699
Q Serve(g_s), s	7.5	13.6	17.8	9.0	10.3	10.4	8.4	13.5	45.0	3.6	39.2	39.2
Cycle Q Clear(g_c), s	7.5	13.6	17.8	9.0	10.3	10.4	8.4	13.5	45.0	3.6	39.2	39.2
Prop In Lane	1.00		1.00	1.00		0.10	1.00		1.00	1.00		0.47
Lane Grp Cap(c), veh/h	249	1172	613	230	577	595	230	1185	619	199	569	544
V/C Ratio(X)	0.79	0.40	0.45	1.68	0.31	0.32	0.94	0.39	0.95	0.47	0.93	0.93
Avail Cap(c_a), veh/h	333	1172	613	230	577	595	230	1185	619	205	579	554
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.81	0.81	0.81	0.93	0.93	0.93	0.67	0.67	0.67
Uniform Delay (d), s/veh	61.6	34.9	30.0	63.0	34.3	34.3	62.7	34.5	39.3	61.6	44.5	44.5
Incr Delay (d2), s/veh	8.8	1.0	2.4	318.9	1.1	1.1	40.4	0.2	23.2	1.2	16.7	17.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	5.9	6.8	14.1	4.6	4.7	4.9	5.8	22.0	1.6	19.3	18.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	70.4	35.9	32.3	381.9	35.4	35.4	103.1	34.7	62.5	62.8	61.1	61.8
LnGrp LOS	E	D	C	F	D	D	F	C	E	E	E	E
Approach Vol, veh/h		937			754			1269			1134	
Approach Delay, s/veh		42.1			212.8			59.2			61.5	
Approach LOS		D			F			E			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	51.9	16.0	51.1	16.7	51.2	14.3	52.8				
Change Period (Y+Rc), s	7.0	7.4	7.0	* 7.8	7.0	7.4	6.5	7.8				
Max Green Setting (Gmax), s	9.0	44.3	9.0	* 44	13.0	40.3	8.0	45.0				
Max Q Clear Time (g_c+I1), s	11.0	19.8	10.4	41.2	9.5	12.4	5.6	47.0				
Green Ext Time (p_c), s	0.0	3.9	0.0	1.6	0.2	1.9	0.0	0.0				

Intersection Summary												
HCM 7th Control Delay, s/veh			84.2									
HCM 7th LOS			F									

Notes
 * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 13: Twin Oaks Valley Rd & SR 78 WB Ramps

Existing AM
 12/09/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↔		↔		↑↑↑	↗		↑↑↑	↗
Traffic Volume (veh/h)	0	0	0	711	0	207	0	1179	406	0	1136	330
Future Volume (veh/h)	0	0	0	711	0	207	0	1179	406	0	1136	330
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	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
Work Zone On Approach				No			No			No		
Adj Sat Flow, veh/h/ln				1870	0	1870	0	1870	1870	0	1870	1870
Adj Flow Rate, veh/h				817	0	238	0	1268	437	0	1209	0
Peak Hour Factor				0.87	0.87	0.87	0.93	0.93	0.93	0.94	0.94	0.94
Percent Heavy Veh, %				2	0	2	0	2	2	0	2	2
Cap, veh/h				904	0	730	0	3381	1430	0	3381	
Arrive On Green				0.26	0.00	0.26	0.00	1.00	1.00	0.00	0.66	0.00
Sat Flow, veh/h				3456	0	2790	0	5274	1533	0	5274	1585
Grp Volume(v), veh/h				817	0	238	0	1268	437	0	1209	0
Grp Sat Flow(s),veh/h/ln				1728	0	1395	0	1702	1533	0	1702	1585
Q Serve(g_s), s				29.7	0.0	9.0	0.0	0.0	0.0	0.0	13.6	0.0
Cycle Q Clear(g_c), s				29.7	0.0	9.0	0.0	0.0	0.0	0.0	13.6	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				904	0	730	0	3381	1430	0	3381	
V/C Ratio(X)				0.90	0.00	0.33	0.00	0.38	0.31	0.00	0.36	
Avail Cap(c_a), veh/h				1579	0	1275	0	3381	1430	0	3381	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.63	0.63	0.00	0.48	0.00
Uniform Delay (d), s/veh				46.4	0.0	38.7	0.0	0.0	0.0	0.0	9.7	0.0
Incr Delay (d2), s/veh				2.0	0.0	0.1	0.0	0.2	0.3	0.0	0.1	0.0
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				13.0	0.0	3.1	0.0	0.1	0.1	0.0	4.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				48.4	0.0	38.8	0.0	0.2	0.3	0.0	9.9	0.0
LnGrp LOS				D		D		A	A		A	
Approach Vol, veh/h					1055			1705			1209	
Approach Delay, s/veh					46.2			0.2			9.9	
Approach LOS					D			A			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		91.4				91.4		38.6				
Change Period (Y+Rc), s		5.3				5.3		4.6				
Max Green Setting (Gmax), s		60.7				60.7		59.4				
Max Q Clear Time (g_c+I1), s		2.0				15.6		31.7				
Green Ext Time (p_c), s		9.5				6.1		2.3				
Intersection Summary												
HCM 7th Control Delay, s/veh											15.4	
HCM 7th LOS											B	
Notes												
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 7th Signalized Intersection Summary
 14: Twin Oaks Valley Rd & SR 78 EB Ramps

Existing AM
 12/09/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	505	6	814	0	0	0	0	1086	454	316	1515	0
Future Volume (veh/h)	505	6	814	0	0	0	0	1086	454	316	1515	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99				1.00		0.98	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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	360	0	1060				0	1307	423	347	1665	0
Peak Hour Factor	0.94	0.94	0.94				0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	567	0	1000				0	2545	702	413	3091	0
Arrive On Green	0.32	0.00	0.32				0.00	0.45	0.45	0.16	0.81	0.00
Sat Flow, veh/h	1781	0	3140				0	5611	1548	3456	5274	0
Grp Volume(v), veh/h	360	0	1060				0	1307	423	347	1665	0
Grp Sat Flow(s),veh/h/ln	1781	0	1570				0	1870	1548	1728	1702	0
Q Serve(g_s), s	22.4	0.0	41.4				0.0	21.6	26.7	12.7	14.6	0.0
Cycle Q Clear(g_c), s	22.4	0.0	41.4				0.0	21.6	26.7	12.7	14.6	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	567	0	1000				0	2545	702	413	3091	0
V/C Ratio(X)	0.63	0.00	1.06				0.00	0.51	0.60	0.84	0.54	0.00
Avail Cap(c_a), veh/h	567	0	1000				0	2545	702	659	3091	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.82	0.82	0.00
Uniform Delay (d), s/veh	37.8	0.0	44.3				0.0	25.3	26.7	53.5	6.4	0.0
Incr Delay (d2), s/veh	2.3	0.0	45.7				0.0	0.7	3.8	4.6	0.6	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.2	0.0	22.3				0.0	9.4	10.2	5.4	3.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	40.2	0.0	90.0				0.0	26.0	30.5	58.0	7.0	0.0
LnGrp LOS	D		F					C	C	E	A	
Approach Vol, veh/h		1420						1730			2012	
Approach Delay, s/veh		77.4						27.1			15.8	
Approach LOS		E						C			B	
Timer - Assigned Phs	1	2		4				6				
Phs Duration (G+Y+Rc), s	19.7	64.3		46.0				84.0				
Change Period (Y+Rc), s	4.2	5.3		4.6				5.3				
Max Green Setting (Gmax), s	24.8	49.7		41.4				78.7				
Max Q Clear Time (g_c+I1), s	14.7	28.7		43.4				16.6				
Green Ext Time (p_c), s	0.9	10.7		0.0				18.2				

Intersection Summary		
HCM 7th Control Delay, s/veh		36.5
HCM 7th LOS		D

Notes
 User approved volume balancing among the lanes for turning movement.

HCM 7th Signalized Intersection Summary
 1: Twin Oaks Valley Rd & Deer Springs Rd

Existing PM
 12/09/2025



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	29	152	72	937	732	30
Future Volume (veh/h)	29	152	72	937	732	30
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	34	179	83	1077	904	37
Peak Hour Factor	0.85	0.85	0.87	0.87	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	256	228	125	1301	1030	842
Arrive On Green	0.14	0.14	0.07	0.70	0.55	0.55
Sat Flow, veh/h	1781	1585	1781	1870	1870	1529
Grp Volume(v), veh/h	34	179	83	1077	904	37
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1529
Q Serve(g_s), s	1.1	7.3	3.0	27.7	28.2	0.7
Cycle Q Clear(g_c), s	1.1	7.3	3.0	27.7	28.2	0.7
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	256	228	125	1301	1030	842
V/C Ratio(X)	0.13	0.79	0.66	0.83	0.88	0.04
Avail Cap(c_a), veh/h	637	567	345	1817	1315	1075
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.1	27.7	30.4	7.3	13.1	6.9
Incr Delay (d2), s/veh	0.2	5.9	5.9	2.3	5.8	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.4	1.4	6.2	11.3	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	25.3	33.7	36.3	9.7	18.9	7.0
LnGrp LOS	C	C	D	A	B	A
Approach Vol, veh/h	213			1160	941	
Approach Delay, s/veh	32.3			11.6	18.4	
Approach LOS	C			B	B	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		52.5		14.6	9.7	42.8
Change Period (Y+Rc), s		5.8		5.0	5.0	5.8
Max Green Setting (Gmax), s		65.2		24.0	13.0	47.2
Max Q Clear Time (g_c+I1), s		29.7		9.3	5.0	30.2
Green Ext Time (p_c), s		10.5		0.5	0.1	6.7
Intersection Summary						
HCM 7th Control Delay, s/veh			16.3			
HCM 7th LOS			B			

HCM 7th Signalized Intersection Summary
 2: Twin Oaks Valley Rd & Buena Creek Rd

Existing PM
 12/09/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↔		↖	↗		↖	↕	↗
Traffic Volume (veh/h)	363	0	187	1	0	0	176	582	1	0	700	330
Future Volume (veh/h)	363	0	187	1	0	0	176	582	1	0	700	330
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	0.99		1.00	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	399	0	205	4	0	0	202	669	1	0	745	351
Peak Hour Factor	0.91	0.91	0.91	0.25	0.25	0.25	0.87	0.87	0.87	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	535	0	405	142	0	0	224	1139	2	2	786	647
Arrive On Green	0.26	0.00	0.26	0.26	0.00	0.00	0.13	0.61	0.61	0.00	0.42	0.42
Sat Flow, veh/h	1716	0	1540	222	0	0	1781	1867	3	1781	1870	1539
Grp Volume(v), veh/h	399	0	205	4	0	0	202	0	670	0	745	351
Grp Sat Flow(s),veh/h/ln	1716	0	1540	222	0	0	1781	0	1870	1781	1870	1539
Q Serve(g_s), s	0.0	0.0	9.7	0.3	0.0	0.0	9.6	0.0	18.7	0.0	33.0	14.7
Cycle Q Clear(g_c), s	18.3	0.0	9.7	18.5	0.0	0.0	9.6	0.0	18.7	0.0	33.0	14.7
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	535	0	405	142	0	0	224	0	1141	2	786	647
V/C Ratio(X)	0.75	0.00	0.51	0.03	0.00	0.00	0.90	0.00	0.59	0.00	0.95	0.54
Avail Cap(c_a), veh/h	592	0	466	204	0	0	224	0	1141	347	802	660
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	30.0	0.0	26.9	38.8	0.0	0.0	37.0	0.0	10.2	0.0	24.0	18.7
Incr Delay (d2), s/veh	4.6	0.0	1.0	0.1	0.0	0.0	34.8	0.0	0.8	0.0	20.0	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.2	0.0	3.6	0.1	0.0	0.0	6.1	0.0	6.2	0.0	17.1	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	34.7	0.0	27.9	38.9	0.0	0.0	71.7	0.0	11.0	0.0	44.0	19.6
LnGrp LOS	C		C	D			E		B		D	B
Approach Vol, veh/h		604			4			872			1096	
Approach Delay, s/veh		32.4			38.9			25.0			36.2	
Approach LOS		C			D			C			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	58.2		27.7	16.3	41.9		27.7				
Change Period (Y+Rc), s	5.8	5.8		* 5.1	5.5	5.8		5.1				
Max Green Setting (Gmax), s	16.7	30.6		* 27	10.8	36.8		26.0				
Max Q Clear Time (g_c+I1), s	0.0	20.7		20.5	11.6	35.0		20.3				
Green Ext Time (p_c), s	0.0	2.9		0.0	0.0	1.1		1.6				

Intersection Summary		
HCM 7th Control Delay, s/veh		31.5
HCM 7th LOS		C

Notes
 * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 3: Twin Oaks Valley Rd & Olive Street

Existing PM
 12/09/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↖	↗		↖	↗		↖	↗	
Traffic Volume (veh/h)	0	2	3	17	0	74	0	856	19	112	550	0
Future Volume (veh/h)	0	2	3	17	0	74	0	856	19	112	550	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.88	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										
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	6	10	21	0	91	0	951	21	123	604	0
Peak Hour Factor	0.31	0.31	0.31	0.81	0.81	0.81	0.90	0.90	0.90	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	28	46	150	0	117	2	1041	23	154	1324	0
Arrive On Green	0.00	0.05	0.05	0.08	0.00	0.08	0.00	0.57	0.57	0.09	0.71	0.00
Sat Flow, veh/h	0	602	1004	1781	0	1396	1781	1821	40	1781	1870	0
Grp Volume(v), veh/h	0	0	16	21	0	91	0	0	972	123	604	0
Grp Sat Flow(s),veh/h/ln	0	0	1606	1781	0	1396	1781	0	1861	1781	1870	0
Q Serve(g_s), s	0.0	0.0	0.9	1.0	0.0	5.9	0.0	0.0	43.2	6.2	12.8	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.9	1.0	0.0	5.9	0.0	0.0	43.2	6.2	12.8	0.0
Prop In Lane	0.00		0.62	1.00		1.00	1.00		0.02	1.00		0.00
Lane Grp Cap(c), veh/h	0	0	74	150	0	117	2	0	1064	154	1324	0
V/C Ratio(X)	0.00	0.00	0.22	0.14	0.00	0.77	0.00	0.00	0.91	0.80	0.46	0.00
Avail Cap(c_a), veh/h	0	0	314	359	0	281	97	0	1379	205	1499	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	42.4	39.1	0.0	41.4	0.0	0.0	17.7	41.4	5.8	0.0
Incr Delay (d2), s/veh	0.0	0.0	1.4	0.4	0.0	10.3	0.0	0.0	7.9	15.1	0.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.4	0.4	0.0	2.3	0.0	0.0	17.4	3.3	3.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	43.8	39.6	0.0	51.7	0.0	0.0	25.6	56.4	6.1	0.0
LnGrp LOS			D	D		D			C	E	A	
Approach Vol, veh/h		16			112			972			727	
Approach Delay, s/veh		43.8			49.4			25.6			14.6	
Approach LOS		D			D			C			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.6	59.0		8.9	0.0	71.6		11.8				
Change Period (Y+Rc), s	4.6	6.3		4.6	4.6	6.3		4.0				
Max Green Setting (Gmax), s	10.6	68.3		18.0	5.0	73.9		18.6				
Max Q Clear Time (g_c+I1), s	8.2	45.2		2.9	0.0	14.8		7.9				
Green Ext Time (p_c), s	0.1	7.6		0.0	0.0	4.1		0.3				
Intersection Summary												
HCM 7th Control Delay, s/veh				22.9								
HCM 7th LOS				C								

HCM 7th Signalized Intersection Summary
 4: Twin Oaks Valley Rd & E. La Cienega Road

Existing PM
 12/09/2025



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	59	46	702	78	122	547
Future Volume (veh/h)	59	46	702	78	122	547
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00		0.96	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	88	69	798	89	131	588
Peak Hour Factor	0.67	0.67	0.88	0.88	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	203	181	1143	128	167	2072
Arrive On Green	0.11	0.11	0.36	0.36	0.09	0.58
Sat Flow, veh/h	1781	1585	3299	357	1781	3647
Grp Volume(v), veh/h	88	69	442	445	131	588
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1787	1781	1777
Q Serve(g_s), s	2.1	1.8	9.6	9.6	3.3	3.7
Cycle Q Clear(g_c), s	2.1	1.8	9.6	9.6	3.3	3.7
Prop In Lane	1.00	1.00		0.20	1.00	
Lane Grp Cap(c), veh/h	203	181	634	637	167	2072
V/C Ratio(X)	0.43	0.38	0.70	0.70	0.78	0.28
Avail Cap(c_a), veh/h	1102	981	876	881	197	2615
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.7	18.6	12.5	12.5	20.1	4.7
Incr Delay (d2), s/veh	1.5	1.3	1.5	1.4	16.0	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.7	2.8	2.8	1.8	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	20.1	19.9	13.9	13.9	36.1	4.8
LnGrp LOS	C	B	B	B	D	A
Approach Vol, veh/h	157		887			719
Approach Delay, s/veh	20.0		13.9			10.5
Approach LOS	C		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	10.2	23.3			33.6	11.7
Change Period (Y+Rc), s	6.0	7.2			7.2	6.5
Max Green Setting (Gmax), s	5.0	22.3			33.3	28.0
Max Q Clear Time (g_c+I1), s	5.3	11.6			5.7	4.1
Green Ext Time (p_c), s	0.0	3.7			3.6	0.4
Intersection Summary						
HCM 7th Control Delay, s/veh			13.1			
HCM 7th LOS			B			

HCM 7th Signalized Intersection Summary
 5: Twin Oaks Valley Rd & Del Roy Dr

Existing PM
 12/09/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷		↶	↑↑		↶	↷	
Traffic Volume (veh/h)	5	0	22	23	0	12	37	792	3	3	580	13
Future Volume (veh/h)	5	0	22	23	0	12	37	792	3	3	580	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.94	1.00		0.93
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	7	0	29	29	0	15	39	843	3	3	659	15
Peak Hour Factor	0.75	0.75	0.75	0.80	0.80	0.80	0.94	0.94	0.94	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	20	0	220	70	0	311	89	1288	5	9	1099	25
Arrive On Green	0.01	0.00	0.14	0.04	0.00	0.20	0.05	0.35	0.35	0.00	0.31	0.31
Sat Flow, veh/h	1781	0	1551	1781	0	1561	1781	3631	13	1781	3545	81
Grp Volume(v), veh/h	7	0	29	29	0	15	39	413	433	3	330	344
Grp Sat Flow(s),veh/h/ln	1781	0	1551	1781	0	1561	1781	1777	1867	1781	1777	1849
Q Serve(g_s), s	0.2	0.0	0.8	0.8	0.0	0.4	1.1	10.1	10.1	0.1	8.1	8.1
Cycle Q Clear(g_c), s	0.2	0.0	0.8	0.8	0.0	0.4	1.1	10.1	10.1	0.1	8.1	8.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.01	1.00		0.04
Lane Grp Cap(c), veh/h	20	0	220	70	0	311	89	630	662	9	551	573
V/C Ratio(X)	0.35	0.00	0.13	0.41	0.00	0.05	0.44	0.65	0.65	0.34	0.60	0.60
Avail Cap(c_a), veh/h	207	0	1022	207	0	1073	224	871	915	207	853	888
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	25.3	0.0	19.4	24.2	0.0	16.7	23.8	14.0	14.0	25.6	15.1	15.1
Incr Delay (d2), s/veh	10.4	0.0	0.3	3.8	0.0	0.1	3.4	1.2	1.1	21.8	1.1	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	0.1	0.0	0.3	0.4	0.0	0.1	0.5	3.1	3.3	0.1	2.6	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	35.8	0.0	19.6	28.0	0.0	16.8	27.2	15.2	15.1	47.4	16.1	16.1
LnGrp LOS	D		B	C		B	C	B	B	D	B	B
Approach Vol, veh/h		36			44			885			677	
Approach Delay, s/veh		22.8			24.2			15.7			16.3	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.8	24.5	8.0	13.3	8.1	22.2	5.1	16.3				
Change Period (Y+Rc), s	5.5	6.2	6.0	6.0	5.5	6.2	4.5	6.0				
Max Green Setting (Gmax), s	6.0	25.3	6.0	34.0	6.5	24.8	6.0	35.5				
Max Q Clear Time (g_c+I1), s	2.1	12.1	2.8	2.8	3.1	10.1	2.2	2.4				
Green Ext Time (p_c), s	0.0	3.9	0.0	0.1	0.0	3.1	0.0	0.0				
Intersection Summary												
HCM 7th Control Delay, s/veh			16.3									
HCM 7th LOS			B									

HCM 7th Signalized Intersection Summary
 7: Twin Oaks Valley Rd & Windy Wy

Existing PM
 12/09/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗					↖	↕		↖	↗	
Traffic Volume (veh/h)	32	0	33	0	0	0	46	780	0	2	679	8
Future Volume (veh/h)	32	0	33	0	0	0	46	780	0	2	679	8
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.94				1.00		1.00	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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	45	0	46				50	848	0	2	746	9
Peak Hour Factor	0.71	0.71	0.71				0.92	0.92	0.92	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2				2	2	2	2	2	2
Cap, veh/h	92	0	78				80	2917	0	5	2798	34
Arrive On Green	0.05	0.00	0.05				0.04	0.82	0.00	0.00	0.78	0.78
Sat Flow, veh/h	1781	0	1497				1781	3647	0	1781	3594	43
Grp Volume(v), veh/h	45	0	46				50	848	0	2	369	386
Grp Sat Flow(s),veh/h/ln	1781	0	1497				1781	1777	0	1781	1777	1861
Q Serve(g_s), s	3.2	0.0	3.9				3.6	7.3	0.0	0.1	7.5	7.5
Cycle Q Clear(g_c), s	3.2	0.0	3.9				3.6	7.3	0.0	0.1	7.5	7.5
Prop In Lane	1.00		1.00				1.00		0.00	1.00		0.02
Lane Grp Cap(c), veh/h	92	0	78				80	2917	0	5	1383	1449
V/C Ratio(X)	0.49	0.00	0.59				0.62	0.29	0.00	0.42	0.27	0.27
Avail Cap(c_a), veh/h	370	0	311				219	2917	0	123	1383	1449
HCM Platoon Ratio	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				0.77	0.77	0.00	0.97	0.97	0.97
Uniform Delay (d), s/veh	60.0	0.0	60.3				61.0	2.7	0.0	64.7	4.0	4.0
Incr Delay (d2), s/veh	3.9	0.0	7.0				6.0	0.2	0.0	48.1	0.5	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	1.6				1.7	1.7	0.0	0.1	2.2	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	63.9	0.0	67.3				67.0	2.9	0.0	112.9	4.5	4.5
LnGrp LOS	E		E				E	A		F	A	A
Approach Vol, veh/h		91						898			757	
Approach Delay, s/veh		65.6						6.5			4.8	
Approach LOS		E						A			A	
Timer - Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	5.3	112.9		11.7	10.8	107.4						
Change Period (Y+Rc), s	5.0	6.2		5.0	5.0	6.2						
Max Green Setting (Gmax), s	9.0	77.8		27.0	16.0	70.8						
Max Q Clear Time (g_c+I1), s	2.1	9.3		5.9	5.6	9.5						
Green Ext Time (p_c), s	0.0	6.5		0.3	0.0	4.7						
Intersection Summary												
HCM 7th Control Delay, s/veh			8.8									
HCM 7th LOS			A									

HCM 7th Signalized Intersection Summary
8: Twin Oaks Valley Rd & Borden Rd

Existing PM
12/09/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	196	458	230	153	210	60	202	605	248	58	541	107
Future Volume (veh/h)	196	458	230	153	210	60	202	605	248	58	541	107
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.96	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	218	509	256	166	228	65	220	658	270	64	601	119
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.92	0.92	0.92	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	244	747	374	191	817	226	246	1256	710	82	962	410
Arrive On Green	0.14	0.33	0.33	0.11	0.30	0.30	0.14	0.35	0.35	0.05	0.27	0.27
Sat Flow, veh/h	1781	2269	1136	1781	2728	756	1781	3554	1527	1781	3554	1516
Grp Volume(v), veh/h	218	398	367	166	146	147	220	658	270	64	601	119
Grp Sat Flow(s),veh/h/ln	1781	1777	1628	1781	1777	1707	1781	1777	1527	1781	1777	1516
Q Serve(g_s), s	16.9	27.1	27.3	12.8	8.8	9.2	17.0	20.6	16.2	5.0	20.8	8.7
Cycle Q Clear(g_c), s	16.9	27.1	27.3	12.8	8.8	9.2	17.0	20.6	16.2	5.0	20.8	8.7
Prop In Lane	1.00		0.70	1.00		0.44	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	244	585	536	191	532	511	246	1256	710	82	962	410
V/C Ratio(X)	0.89	0.68	0.68	0.87	0.27	0.29	0.90	0.52	0.38	0.78	0.62	0.29
Avail Cap(c_a), veh/h	319	585	536	256	532	511	323	1256	710	151	962	410
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	59.4	40.6	40.7	61.6	37.4	37.6	59.4	35.9	24.7	66.1	44.8	40.4
Incr Delay (d2), s/veh	21.6	6.3	7.0	20.8	1.3	1.4	21.5	1.6	1.5	14.8	3.1	1.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.1	12.9	12.0	6.9	4.1	4.1	9.0	9.0	6.0	2.6	9.4	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	81.0	46.9	47.6	82.4	38.7	39.0	80.9	37.5	26.3	80.9	47.9	42.2
LnGrp LOS	F	D	D	F	D	D	F	D	C	F	D	D
Approach Vol, veh/h		983			459			1148			784	
Approach Delay, s/veh		54.7			54.6			43.2			49.7	
Approach LOS		D			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.9	52.2	23.9	44.0	24.1	48.0	12.3	55.6				
Change Period (Y+Rc), s	* 4.9	* 6.1	4.6	* 6.1	* 4.9	* 6.1	5.9	* 6.1				
Max Green Setting (Gmax), s	* 20	* 46	25.4	* 37	* 25	* 41	11.9	* 50				
Max Q Clear Time (g_c+I1), s	14.8	29.3	19.0	22.8	18.9	11.2	7.0	22.6				
Green Ext Time (p_c), s	0.2	4.7	0.3	3.5	0.3	1.8	0.0	5.4				
Intersection Summary												
HCM 7th Control Delay, s/veh			49.6									
HCM 7th LOS			D									
Notes												
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 7th Signalized Intersection Summary
 9: Woodward St & Borden Rd

Existing PM
 12/09/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	147	585	35	19	273	31	67	93	23	25	73	80
Future Volume (veh/h)	147	585	35	19	273	31	67	93	23	25	73	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.94	1.00		0.97	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	160	636	38	21	303	34	82	113	28	27	80	88
Peak Hour Factor	0.92	0.92	0.92	0.90	0.90	0.90	0.82	0.82	0.82	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	239	1031	62	61	680	75	206	365	91	75	336	273
Arrive On Green	0.13	0.30	0.30	0.03	0.21	0.21	0.12	0.25	0.25	0.04	0.18	0.18
Sat Flow, veh/h	1781	3396	203	1781	3201	355	1781	1436	356	1781	1870	1521
Grp Volume(v), veh/h	160	332	342	21	167	170	82	0	141	27	80	88
Grp Sat Flow(s),veh/h/ln	1781	1777	1822	1781	1777	1780	1781	0	1792	1781	1870	1521
Q Serve(g_s), s	5.1	9.6	9.6	0.7	4.9	5.0	2.5	0.0	3.8	0.9	2.2	3.0
Cycle Q Clear(g_c), s	5.1	9.6	9.6	0.7	4.9	5.0	2.5	0.0	3.8	0.9	2.2	3.0
Prop In Lane	1.00		0.11	1.00		0.20	1.00		0.20	1.00		1.00
Lane Grp Cap(c), veh/h	239	540	553	61	377	378	206	0	456	75	336	273
V/C Ratio(X)	0.67	0.62	0.62	0.34	0.44	0.45	0.40	0.00	0.31	0.36	0.24	0.32
Avail Cap(c_a), veh/h	549	1396	1432	209	1075	1077	537	0	1276	209	978	795
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.6	17.8	17.8	28.1	20.4	20.5	24.5	0.0	18.0	27.8	21.0	21.3
Incr Delay (d2), s/veh	3.2	1.1	1.1	3.3	0.8	0.8	1.2	0.0	0.4	2.9	0.4	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	2.2	3.6	3.7	0.3	1.9	2.0	1.0	0.0	1.4	0.4	0.9	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	27.8	18.9	18.9	31.4	21.2	21.3	25.7	0.0	18.4	30.6	21.3	22.0
LnGrp LOS	C	B	B	C	C	C	C		B	C	C	C
Approach Vol, veh/h		834			358			223			195	
Approach Delay, s/veh		20.6			21.9			21.1			22.9	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.2	23.9	12.1	16.5	12.6	18.5	7.6	21.0				
Change Period (Y+Rc), s	5.1	* 5.8	5.2	5.8	4.6	* 5.8	5.1	* 5.8				
Max Green Setting (Gmax), s	7.0	* 47	18.0	31.2	18.4	* 36	7.0	* 43				
Max Q Clear Time (g_c+I1), s	2.7	11.6	4.5	5.0	7.1	7.0	2.9	5.8				
Green Ext Time (p_c), s	0.0	4.5	0.1	0.7	0.3	2.0	0.0	0.8				

Intersection Summary												
HCM 7th Control Delay, s/veh				21.3								
HCM 7th LOS				C								

Notes
 * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 10: Twin Oaks Valley Rd & Richmar Road

Existing PM
 12/09/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	198	9	73	19	6	3	115	930	18	35	833	167
Future Volume (veh/h)	198	9	73	19	6	3	115	930	18	35	833	167
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.96	1.00		0.96	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	233	11	86	27	9	4	121	979	19	37	886	178
Peak Hour Factor	0.85	0.85	0.85	0.70	0.70	0.70	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	245	24	186	195	132	59	134	1889	37	61	1431	287
Arrive On Green	0.14	0.14	0.14	0.11	0.11	0.11	0.08	0.53	0.53	0.03	0.49	0.49
Sat Flow, veh/h	1781	173	1350	1781	1208	537	1781	3563	69	1781	2927	588
Grp Volume(v), veh/h	233	0	97	27	0	13	121	488	510	37	538	526
Grp Sat Flow(s),veh/h/ln	1781	0	1523	1781	0	1745	1781	1777	1855	1781	1777	1738
Q Serve(g_s), s	16.9	0.0	7.6	1.8	0.0	0.9	8.8	23.1	23.1	2.7	28.8	28.9
Cycle Q Clear(g_c), s	16.9	0.0	7.6	1.8	0.0	0.9	8.8	23.1	23.1	2.7	28.8	28.9
Prop In Lane	1.00		0.89	1.00		0.31	1.00		0.04	1.00		0.34
Lane Grp Cap(c), veh/h	245	0	210	195	0	191	134	942	983	61	869	849
V/C Ratio(X)	0.95	0.00	0.46	0.14	0.00	0.07	0.90	0.52	0.52	0.61	0.62	0.62
Avail Cap(c_a), veh/h	245	0	210	521	0	510	134	942	983	82	869	849
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	0.78	0.78	0.78	0.68	0.68	0.68
Uniform Delay (d), s/veh	55.6	0.0	51.6	52.3	0.0	51.9	59.6	19.8	19.8	61.9	24.4	24.4
Incr Delay (d2), s/veh	43.7	0.0	1.6	0.3	0.0	0.1	41.6	1.6	1.5	6.6	2.3	2.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.5	0.0	3.0	0.8	0.0	0.4	5.4	9.4	9.8	1.3	12.0	11.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	99.3	0.0	53.2	52.6	0.0	52.1	101.2	21.4	21.3	68.5	26.6	26.7
LnGrp LOS	F		D	D		D	F	C	C	E	C	C
Approach Vol, veh/h		330			40			1119			1101	
Approach Delay, s/veh		85.7			52.5			30.0			28.1	
Approach LOS		F			D			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.4	75.2		24.0	15.8	69.8		20.4				
Change Period (Y+Rc), s	6.0	6.3		6.1	6.0	6.3		6.1				
Max Green Setting (Gmax), s	6.0	43.6		17.9	9.8	39.8		38.0				
Max Q Clear Time (g_c+I1), s	4.7	25.1		18.9	10.8	30.9		3.8				
Green Ext Time (p_c), s	0.0	5.7		0.0	0.0	4.2		0.1				
Intersection Summary												
HCM 7th Control Delay, s/veh			36.6									
HCM 7th LOS			D									

HCM 7th Signalized Intersection Summary
 11: San Marcos Blvd & E. Mission Road

Existing PM
 12/09/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↕	↘	↙↘	↕	↘	↙	↕	↘	↙	↕↘	
Traffic Volume (veh/h)	97	971	47	264	677	84	56	235	691	29	140	61
Future Volume (veh/h)	97	971	47	264	677	84	56	235	691	29	140	61
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		0.94
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	1742	1742	1870	1870	1742	1742	1742	1870	1742	1870
Adj Flow Rate, veh/h	102	1022	49	297	761	94	62	261	0	35	171	74
Peak Hour Factor	0.95	0.95	0.95	0.89	0.89	0.89	0.90	0.90	0.90	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	133	1278	515	394	1448	628	76	665		42	401	164
Arrive On Green	0.07	0.36	0.36	0.12	0.41	0.41	0.05	0.20	0.00	0.02	0.18	0.18
Sat Flow, veh/h	1781	3554	1433	3219	3554	1542	1659	3311	1477	1781	2248	920
Grp Volume(v), veh/h	102	1022	49	297	761	94	62	261	0	35	123	122
Grp Sat Flow(s),veh/h/ln	1781	1777	1433	1610	1777	1542	1659	1655	1477	1781	1655	1513
Q Serve(g_s), s	3.6	16.4	1.4	5.7	10.2	2.4	2.3	4.3	0.0	1.2	4.2	4.6
Cycle Q Clear(g_c), s	3.6	16.4	1.4	5.7	10.2	2.4	2.3	4.3	0.0	1.2	4.2	4.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.61
Lane Grp Cap(c), veh/h	133	1278	515	394	1448	628	76	665		42	295	270
V/C Ratio(X)	0.77	0.80	0.10	0.75	0.53	0.15	0.82	0.39		0.83	0.42	0.45
Avail Cap(c_a), veh/h	346	1442	581	457	1448	628	191	1683		127	768	702
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	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.8	18.2	13.4	26.9	14.1	11.8	30.0	22.0	0.0	30.8	23.1	23.2
Incr Delay (d2), s/veh	8.9	3.0	0.1	6.0	0.4	0.1	18.5	0.4	0.0	32.5	0.9	1.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	6.0	0.4	2.3	3.4	0.7	1.2	1.5	0.0	0.9	1.5	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	37.7	21.2	13.5	32.8	14.5	12.0	48.5	22.3	0.0	63.3	24.0	24.4
LnGrp LOS	D	C	B	C	B	B	D	C		E	C	C
Approach Vol, veh/h		1173			1152			323			280	
Approach Delay, s/veh		22.3			19.0			27.4			29.1	
Approach LOS		C			B			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.5	18.0	11.8	28.1	6.9	16.6	8.7	31.1				
Change Period (Y+Rc), s	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3				
Max Green Setting (Gmax), s	4.5	32.2	9.0	25.7	7.3	29.4	12.3	22.4				
Max Q Clear Time (g_c+I1), s	3.2	6.3	7.7	18.4	4.3	6.6	5.6	12.2				
Green Ext Time (p_c), s	0.0	1.5	0.1	3.8	0.0	1.2	0.1	3.6				

Intersection Summary												
HCM 7th Control Delay, s/veh											22.2	
HCM 7th LOS											C	

Notes
 Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 7th Signalized Intersection Summary
 12: Twin Oaks Valley Rd & San Marcos Blvd

Existing PM
 12/09/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↔↔	↑↑		↔↔	↑↑	↗	↔↔	↑↑	
Traffic Volume (veh/h)	266	588	332	313	429	91	357	657	306	79	619	248
Future Volume (veh/h)	266	588	332	313	429	91	357	657	306	79	619	248
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	277	612	346	337	461	98	376	692	322	83	652	261
Peak Hour Factor	0.96	0.96	0.96	0.93	0.93	0.93	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	325	1236	640	230	929	196	230	1124	593	196	743	297
Arrive On Green	0.09	0.35	0.35	0.07	0.32	0.32	0.07	0.32	0.32	0.06	0.30	0.30
Sat Flow, veh/h	3456	3554	1536	3456	2901	612	3456	3554	1540	3456	2454	982
Grp Volume(v), veh/h	277	612	346	337	281	278	376	692	322	83	472	441
Grp Sat Flow(s),veh/h/ln	1728	1777	1536	1728	1777	1736	1728	1777	1540	1728	1777	1659
Q Serve(g_s), s	10.7	18.3	23.0	9.0	17.2	17.5	9.0	22.3	22.0	3.1	34.1	34.1
Cycle Q Clear(g_c), s	10.7	18.3	23.0	9.0	17.2	17.5	9.0	22.3	22.0	3.1	34.1	34.1
Prop In Lane	1.00		1.00	1.00		0.35	1.00		1.00	1.00		0.59
Lane Grp Cap(c), veh/h	325	1236	640	230	569	556	230	1124	593	196	538	502
V/C Ratio(X)	0.85	0.50	0.54	1.46	0.49	0.50	1.63	0.62	0.54	0.42	0.88	0.88
Avail Cap(c_a), veh/h	333	1236	640	230	569	556	230	1185	619	205	579	541
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.82	0.82	0.82	0.89	0.89	0.89	0.71	0.71	0.71
Uniform Delay (d), s/veh	60.2	34.7	29.9	63.0	37.0	37.1	63.0	39.2	32.5	61.6	44.7	44.7
Incr Delay (d2), s/veh	18.5	1.4	3.3	226.8	2.5	2.6	301.4	0.8	0.8	1.0	10.2	10.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	8.0	8.8	11.1	7.7	7.7	13.5	9.6	8.1	1.4	16.0	15.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	78.7	36.1	33.1	289.8	39.5	39.8	364.4	40.0	33.3	62.6	54.9	55.6
LnGrp LOS	E	D	C	F	D	D	F	D	C	E	D	E
Approach Vol, veh/h		1235			896			1390			996	
Approach Delay, s/veh		44.8			133.7			126.2			55.8	
Approach LOS		D			F			F			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	54.3	16.0	48.7	19.7	50.6	14.1	50.5				
Change Period (Y+Rc), s	7.0	7.4	7.0	* 7.8	7.0	7.4	6.5	7.8				
Max Green Setting (Gmax), s	9.0	44.3	9.0	* 44	13.0	40.3	8.0	45.0				
Max Q Clear Time (g_c+I1), s	11.0	25.0	11.0	36.1	12.7	19.5	5.1	24.3				
Green Ext Time (p_c), s	0.0	4.9	0.0	3.3	0.0	3.0	0.0	5.5				

Intersection Summary												
HCM 7th Control Delay, s/veh											89.9	
HCM 7th LOS											F	

Notes
 * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 13: Twin Oaks Valley Rd & SR 78 WB Ramps

Existing PM
 12/09/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↔↔		↔↔		↑↑↑	↗		↑↑↑	↗
Traffic Volume (veh/h)	0	0	0	655	0	463	0	1051	543	0	1132	299
Future Volume (veh/h)	0	0	0	655	0	463	0	1051	543	0	1132	299
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	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
Work Zone On Approach				No			No			No		
Adj Sat Flow, veh/h/ln				1870	0	1870	0	1870	1870	0	1870	1870
Adj Flow Rate, veh/h				720	0	509	0	1251	646	0	1192	0
Peak Hour Factor				0.91	0.91	0.91	0.84	0.84	0.84	0.95	0.95	0.95
Percent Heavy Veh, %				2	0	2	0	2	2	0	2	2
Cap, veh/h				822	0	663	0	3503	1429	0	3503	
Arrive On Green				0.24	0.00	0.24	0.00	1.00	1.00	0.00	0.69	0.00
Sat Flow, veh/h				3456	0	2790	0	5274	1534	0	5274	1585
Grp Volume(v), veh/h				720	0	509	0	1251	646	0	1192	0
Grp Sat Flow(s),veh/h/ln				1728	0	1395	0	1702	1534	0	1702	1585
Q Serve(g_s), s				26.1	0.0	22.1	0.0	0.0	0.0	0.0	12.4	0.0
Cycle Q Clear(g_c), s				26.1	0.0	22.1	0.0	0.0	0.0	0.0	12.4	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				822	0	663	0	3503	1429	0	3503	
V/C Ratio(X)				0.88	0.00	0.77	0.00	0.36	0.45	0.00	0.34	
Avail Cap(c_a), veh/h				1579	0	1275	0	3503	1429	0	3503	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.52	0.52	0.00	0.43	0.00
Uniform Delay (d), s/veh				47.7	0.0	46.2	0.0	0.0	0.0	0.0	8.4	0.0
Incr Delay (d2), s/veh				1.2	0.0	0.7	0.0	0.1	0.5	0.0	0.1	0.0
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				11.3	0.0	7.7	0.0	0.0	0.2	0.0	4.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				48.9	0.0	46.9	0.0	0.1	0.5	0.0	8.5	0.0
LnGrp LOS				D		D		A	A		A	
Approach Vol, veh/h					1229			1897			1192	
Approach Delay, s/veh					48.1			0.3			8.5	
Approach LOS					D			A			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		94.5				94.5		35.5				
Change Period (Y+Rc), s		5.3				5.3		4.6				
Max Green Setting (Gmax), s		60.7				60.7		59.4				
Max Q Clear Time (g_c+I1), s		2.0				14.4		28.1				
Green Ext Time (p_c), s		10.5				6.0		2.8				

Intersection Summary

HCM 7th Control Delay, s/veh	16.1
HCM 7th LOS	B

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 7th Signalized Intersection Summary
 14: Twin Oaks Valley Rd & SR 78 EB Ramps

Existing PM
 12/09/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	39	212	0	0	0	0	1507	869	346	1407	0
Future Volume (veh/h)	102	39	212	0	0	0	0	1507	869	346	1407	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98				1.00		0.98	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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	95	0	306				0	2286	707	360	1466	0
Peak Hour Factor	0.85	0.85	0.85				0.84	0.84	0.84	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	263	0	459				0	3484	964	425	3962	0
Arrive On Green	0.15	0.00	0.15				0.00	0.62	0.62	0.16	1.00	0.00
Sat Flow, veh/h	1781	0	3106				0	5611	1553	3456	5274	0
Grp Volume(v), veh/h	95	0	306				0	2286	707	360	1466	0
Grp Sat Flow(s),veh/h/ln	1781	0	1553				0	1870	1553	1728	1702	0
Q Serve(g_s), s	6.2	0.0	12.1				0.0	33.9	41.2	13.2	0.0	0.0
Cycle Q Clear(g_c), s	6.2	0.0	12.1				0.0	33.9	41.2	13.2	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	263	0	459				0	3484	964	425	3962	0
V/C Ratio(X)	0.36	0.00	0.67				0.00	0.66	0.73	0.85	0.37	0.00
Avail Cap(c_a), veh/h	526	0	917				0	3484	964	633	3962	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.85	0.85	0.00
Uniform Delay (d), s/veh	49.9	0.0	52.4				0.0	15.8	17.2	53.2	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.0	1.7				0.0	1.0	4.9	6.0	0.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	4.8				0.0	13.3	14.5	5.7	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	50.7	0.0	54.0				0.0	16.8	22.1	59.2	0.2	0.0
LnGrp LOS	D		D					B	C	E	A	
Approach Vol, veh/h		401						2993			1826	
Approach Delay, s/veh		53.2						18.0			11.9	
Approach LOS		D						B			B	
Timer - Assigned Phs	1	2		4				6				
Phs Duration (G+Y+Rc), s	20.2	86.0		23.8				106.2				
Change Period (Y+Rc), s	4.2	5.3		4.6				5.3				
Max Green Setting (Gmax), s	23.8	53.7		38.4				81.7				
Max Q Clear Time (g_c+I1), s	15.2	43.2		14.1				2.0				
Green Ext Time (p_c), s	0.8	9.6		1.5				14.8				

Intersection Summary		
HCM 7th Control Delay, s/veh		18.6
HCM 7th LOS		B

Notes
 User approved volume balancing among the lanes for turning movement.



APPENDIX E

K&D FACTORS DEFINITIONS

PEAK HOUR VOLUME DATA

Peak hour volume data consists of hourly volume relationships and data location. The hourly volumes are expressed as a percentage of the Annual Average Daily Traffic (AADT). The percentages are shown for both the AM and the PM peak periods.

The principle data described here are the K factor, the D factor and their product (KD). The K factor is the percentage of AADT during the peak hour for both directions of travel. The D factor is the percentage of the peak hour travel in the peak direction. KD multiplied with the AADT gives the one way peak period directional flow rate or the design hourly volume (DHV). The design hourly volume is used for either Operational Analysis or Design Analysis. Refer to the 2016 Highway Capacity Manual, 6th Edition A Guide for Multimodal Mobility Analysis for more details.

Following is a glossary of terms used in this listing of peak hour volume data:

Dir	Indicates direction of travel for peak volume.
AADT	Annual Average Daily Traffic in vehicles per day (vpd).
AM Peak	Represents the morning peak period for traffic analysis.
CS	Control Station Number, Caltrans identification number for monitoring site.
CO	County abbreviation used by Caltrans.
D	D factor. The percentage of traffic in the peak direction during the peak hour. Values in this book are derived by dividing the measured PHV by the sum of both directions of travel during the peak hour.
DAY	Day of week for the peak volume.
DDHV	The directional design hour volume, in vehicles per hour (vph) $DDHV=AADT \times K \times D$. See Equation (3-1) on Page 3-13 of the 2016 Highway Capacity Manual.
DI	Caltrans has twelve transportation districts statewide. This abbreviation identifies the district in which the count station is located.
HR	The ending time for the peak hour volume listed. The volume observed from 1 to 2 would be recorded as 2.

K	The percentage of the AADT in both directions during the peak hour. Values in this table are derived by dividing the measured 2-way PHV by the AADT.
KD	The product of K and D. The percentage of AADT in the peak direction during the peak hour. Values in this table are derived by dividing the measured 1-way PHV by the AADT.
LEG	For traffic counting purposes, a highway intersection or interchange is assigned two legs according to increasing postmiles (route direction) and with a postmile reference at the center of the intersection or interchange. The volume of traffic on each leg is denoted by an A, B or O. A = ahead leg, B = back leg, and O – traffic volume being same for both back and ahead legs.
MNTH	The month that the peak volume occurred.
PHV	Peak Hour Volume in the peak direction. A one way volume in vehicles per hour (vph) as used here. The PHV is analogous to the DDHV as used for design purposes.
PM	The Post Mile is the mileage measured from the county line, or from the beginning of a route. Each postmile along a route in a county is a unique location on the state highway system.
PM Peak	Represents the afternoon peak period for traffic analysis.
PRE	The postmile may have a prefix like R, T, L, M, etc. When a length of highway is changed due to construction or realignment, new postmile values are assigned. To distinguish the new values from the old, an alpha code is prefixed to the new postmile.
RTE	The state highway route number.
YR	The year when the count was made. Traffic counting is on a 3-year cycle.



APPENDIX F
OPENING YEAR ANALYSIS WORKSHEETS

HCM 7th Signalized Intersection Summary
 1: Twin Oaks Valley Rd & Deer Springs Rd

Opening Year AM
 12/10/2025



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	33	81	93	528	1364	39
Future Volume (veh/h)	33	81	93	528	1364	39
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	40	98	97	550	1392	40
Peak Hour Factor	0.83	0.83	0.96	0.96	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	137	122	104	1578	1400	1149
Arrive On Green	0.08	0.08	0.06	0.84	0.75	0.75
Sat Flow, veh/h	1781	1585	1781	1870	1870	1535
Grp Volume(v), veh/h	40	98	97	550	1392	40
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1535
Q Serve(g_s), s	2.9	8.3	7.4	8.9	99.9	0.9
Cycle Q Clear(g_c), s	2.9	8.3	7.4	8.9	99.9	0.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	137	122	104	1578	1400	1149
V/C Ratio(X)	0.29	0.80	0.93	0.35	0.99	0.03
Avail Cap(c_a), veh/h	313	279	104	1579	1400	1150
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.5	62.0	64.0	2.4	16.9	4.4
Incr Delay (d2), s/veh	1.2	11.4	65.7	0.1	22.6	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	7.5	5.2	1.9	45.1	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	60.6	73.4	129.6	2.5	39.5	4.4
LnGrp LOS	E	E	F	A	D	A
Approach Vol, veh/h	138			647	1432	
Approach Delay, s/veh	69.7			21.5	38.5	
Approach LOS	E			C	D	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		121.0		15.5	13.0	108.0
Change Period (Y+Rc), s		5.8		5.0	5.0	5.8
Max Green Setting (Gmax), s		115.2		24.0	8.0	102.2
Max Q Clear Time (g_c+I1), s		10.9		10.3	9.4	101.9
Green Ext Time (p_c), s		3.6		0.3	0.0	0.3
Intersection Summary						
HCM 7th Control Delay, s/veh			35.5			
HCM 7th LOS			D			

HCM 7th Signalized Intersection Summary
 2: Twin Oaks Valley Rd & Buena Creek Rd

Opening Year AM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↔		↖	↗		↖	↕	↗
Traffic Volume (veh/h)	295	0	232	1	1	0	105	352	1	1	972	291
Future Volume (veh/h)	295	0	232	1	1	0	105	352	1	1	972	291
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	317	0	249	2	2	0	112	374	1	1	1012	303
Peak Hour Factor	0.93	0.93	0.93	0.50	0.50	0.50	0.94	0.94	0.94	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	274	0	354	44	31	0	124	1032	3	145	1063	877
Arrive On Green	0.23	0.00	0.23	0.23	0.23	0.00	0.07	0.55	0.55	0.08	0.57	0.57
Sat Flow, veh/h	939	0	1550	0	134	0	1781	1864	5	1781	1870	1543
Grp Volume(v), veh/h	317	0	249	4	0	0	112	0	375	1	1012	303
Grp Sat Flow(s),veh/h/ln	939	0	1550	134	0	0	1781	0	1869	1781	1870	1543
Q Serve(g_s), s	0.0	0.0	18.1	0.0	0.0	0.0	7.6	0.0	13.7	0.1	62.4	12.9
Cycle Q Clear(g_c), s	28.0	0.0	18.1	28.0	0.0	0.0	7.6	0.0	13.7	0.1	62.4	12.9
Prop In Lane	1.00		1.00	0.50		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	274	0	354	75	0	0	124	0	1034	145	1063	877
V/C Ratio(X)	1.16	0.00	0.70	0.05	0.00	0.00	0.91	0.00	0.36	0.01	0.95	0.35
Avail Cap(c_a), veh/h	274	0	354	75	0	0	124	0	1034	243	1118	922
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.2	0.0	43.4	39.3	0.0	0.0	56.6	0.0	15.3	51.7	24.9	14.2
Incr Delay (d2), s/veh	104.3	0.0	6.1	0.3	0.0	0.0	53.1	0.0	0.2	0.0	16.4	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.4	0.0	7.5	0.1	0.0	0.0	5.2	0.0	5.5	0.0	29.4	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	154.6	0.0	49.5	39.6	0.0	0.0	109.7	0.0	15.5	51.7	41.3	14.5
LnGrp LOS	F		D	D			F		B	D	D	B
Approach Vol, veh/h		566			4			487			1316	
Approach Delay, s/veh		108.4			39.6			37.1			35.1	
Approach LOS		F			D			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.8	73.6		33.1	14.0	75.4		33.1				
Change Period (Y+Rc), s	5.8	5.8		* 5.1	5.5	5.8		5.1				
Max Green Setting (Gmax), s	16.7	64.7		* 28	8.5	73.2		26.9				
Max Q Clear Time (g_c+I1), s	2.1	15.7		30.0	9.6	64.4		30.0				
Green Ext Time (p_c), s	0.0	2.2		0.0	0.0	5.2		0.0				

Intersection Summary		
HCM 7th Control Delay, s/veh		53.0
HCM 7th LOS		D

Notes
 User approved pedestrian interval to be less than phase max green.
 * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 3: Twin Oaks Valley Rd & Olive Street

Opening Year AM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	4	6	40	0	93	2	448	10	64	1012	0
Future Volume (veh/h)	0	4	6	40	0	93	2	448	10	64	1012	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.92	1.00		0.91	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		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	0	6	10	61	0	141	2	498	11	73	1150	0
Peak Hour Factor	0.63	0.63	0.63	0.66	0.66	0.66	0.90	0.90	0.90	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	27	44	210	0	170	5	1097	24	101	1228	0
Arrive On Green	0.00	0.04	0.04	0.12	0.00	0.12	0.00	0.60	0.60	0.06	0.66	0.00
Sat Flow, veh/h	0	597	995	1781	0	1440	1781	1821	40	1781	1870	0
Grp Volume(v), veh/h	0	0	16	61	0	141	2	0	509	73	1150	0
Grp Sat Flow(s),veh/h/ln	0	0	1592	1781	0	1440	1781	0	1861	1781	1870	0
Q Serve(g_s), s	0.0	0.0	1.1	3.4	0.0	10.5	0.1	0.0	16.4	4.4	60.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	1.1	3.4	0.0	10.5	0.1	0.0	16.4	4.4	60.0	0.0
Prop In Lane	0.00		0.62	1.00		1.00	1.00		0.02	1.00		0.00
Lane Grp Cap(c), veh/h	0	0	71	210	0	170	5	0	1121	101	1228	0
V/C Ratio(X)	0.00	0.00	0.22	0.29	0.00	0.83	0.42	0.00	0.45	0.72	0.94	0.00
Avail Cap(c_a), veh/h	0	0	262	301	0	243	81	0	1300	203	1434	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	50.5	44.1	0.0	47.3	54.5	0.0	11.9	50.8	16.8	0.0
Incr Delay (d2), s/veh	0.0	0.0	1.6	0.8	0.0	14.9	48.8	0.0	0.3	9.2	10.8	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.5	1.5	0.0	4.4	0.1	0.0	6.1	2.2	24.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	52.1	44.9	0.0	62.1	103.3	0.0	12.2	60.0	27.5	0.0
LnGrp LOS			D	D		E	F		B	E	C	
Approach Vol, veh/h		16			202			511			1223	
Approach Delay, s/veh		52.1			56.9			12.6			29.5	
Approach LOS		D			E			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.8	72.3		9.5	4.9	78.2		16.9				
Change Period (Y+Rc), s	4.6	6.3		4.6	4.6	6.3		4.0				
Max Green Setting (Gmax), s	12.5	76.5		18.0	5.0	84.0		18.5				
Max Q Clear Time (g_c+I1), s	6.4	18.4		3.1	2.1	62.0		12.5				
Green Ext Time (p_c), s	0.1	3.2		0.0	0.0	9.9		0.5				
Intersection Summary												
HCM 7th Control Delay, s/veh			28.1									
HCM 7th LOS			C									

HCM 7th Signalized Intersection Summary
 4: Twin Oaks Valley Rd & E. La Cienega Road

Opening Year AM
 12/10/2025



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↷	↶↷		↶	↶↷
Traffic Volume (veh/h)	136	209	514	34	68	796
Future Volume (veh/h)	136	209	514	34	68	796
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00		0.95	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	181	279	571	38	71	829
Peak Hour Factor	0.75	0.75	0.90	0.90	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	421	374	931	62	115	1669
Arrive On Green	0.24	0.24	0.28	0.28	0.06	0.47
Sat Flow, veh/h	1781	1585	3463	224	1781	3647
Grp Volume(v), veh/h	181	279	301	308	71	829
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1816	1781	1777
Q Serve(g_s), s	4.0	7.6	6.9	6.9	1.8	7.5
Cycle Q Clear(g_c), s	4.0	7.6	6.9	6.9	1.8	7.5
Prop In Lane	1.00	1.00		0.12	1.00	
Lane Grp Cap(c), veh/h	421	374	491	502	115	1669
V/C Ratio(X)	0.43	0.75	0.61	0.61	0.62	0.50
Avail Cap(c_a), veh/h	1071	953	851	870	191	2542
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.1	16.5	14.7	14.7	21.2	8.5
Incr Delay (d2), s/veh	0.7	3.0	1.2	1.2	5.3	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	2.7	2.2	2.2	0.8	1.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	15.8	19.4	15.9	15.9	26.5	8.8
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	460		609			900
Approach Delay, s/veh	18.0		15.9			10.2
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.0	20.1			29.1	17.5
Change Period (Y+Rc), s	6.0	7.2			7.2	6.5
Max Green Setting (Gmax), s	5.0	22.3			33.3	28.0
Max Q Clear Time (g_c+I1), s	3.8	8.9			9.5	9.6
Green Ext Time (p_c), s	0.0	2.7			5.3	1.4
Intersection Summary						
HCM 7th Control Delay, s/veh			13.8			
HCM 7th LOS			B			

HCM 7th Signalized Intersection Summary
 5: Twin Oaks Valley Rd & Del Roy Dr

Opening Year AM
 12/10/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	0	39	3	0	3	19	527	22	12	912	9
Future Volume (veh/h)	14	0	39	3	0	3	19	527	22	12	912	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.93	1.00		0.93
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	16	0	45	6	0	6	22	613	26	12	940	9
Peak Hour Factor	0.87	0.87	0.87	0.50	0.50	0.50	0.86	0.86	0.86	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	42	0	234	17	0	256	56	1295	55	33	1301	12
Arrive On Green	0.02	0.00	0.15	0.01	0.00	0.16	0.03	0.37	0.37	0.02	0.36	0.36
Sat Flow, veh/h	1781	0	1553	1781	0	1556	1781	3461	147	1781	3603	35
Grp Volume(v), veh/h	16	0	45	6	0	6	22	314	325	12	464	485
Grp Sat Flow(s),veh/h/ln	1781	0	1553	1781	0	1556	1781	1777	1831	1781	1777	1861
Q Serve(g_s), s	0.5	0.0	1.3	0.2	0.0	0.2	0.6	7.1	7.1	0.4	11.9	11.9
Cycle Q Clear(g_c), s	0.5	0.0	1.3	0.2	0.0	0.2	0.6	7.1	7.1	0.4	11.9	11.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.08	1.00		0.02
Lane Grp Cap(c), veh/h	42	0	234	17	0	256	56	665	685	33	642	672
V/C Ratio(X)	0.38	0.00	0.19	0.35	0.00	0.02	0.39	0.47	0.47	0.37	0.72	0.72
Avail Cap(c_a), veh/h	202	0	997	202	0	1043	202	849	875	202	849	889
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	25.5	0.0	19.7	26.1	0.0	18.6	25.2	12.6	12.6	25.7	14.6	14.6
Incr Delay (d2), s/veh	5.5	0.0	0.4	11.9	0.0	0.0	4.5	0.5	0.5	6.8	2.1	2.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.5	0.1	0.0	0.1	0.3	2.2	2.2	0.2	3.9	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	30.9	0.0	20.1	38.0	0.0	18.6	29.6	13.1	13.1	32.5	16.7	16.6
LnGrp LOS	C		C	D		B	C	B	B	C	B	B
Approach Vol, veh/h		61			12			661			961	
Approach Delay, s/veh		22.9			28.3			13.7			16.8	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.5	26.0	6.5	14.0	7.2	25.3	5.8	14.7				
Change Period (Y+Rc), s	5.5	6.2	6.0	6.0	5.5	6.2	4.5	6.0				
Max Green Setting (Gmax), s	6.0	25.3	6.0	34.0	6.0	25.3	6.0	35.5				
Max Q Clear Time (g_c+I1), s	2.4	9.1	2.2	3.3	2.6	13.9	2.5	2.2				
Green Ext Time (p_c), s	0.0	3.0	0.0	0.2	0.0	4.1	0.0	0.0				
Intersection Summary												
HCM 7th Control Delay, s/veh			15.9									
HCM 7th LOS			B									

HCM 7th Signalized Intersection Summary
 7: Twin Oaks Valley Rd & Windy Wy

Opening Year AM
 12/10/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	0	31	0	0	0	22	570	2	3	936	37
Future Volume (veh/h)	21	0	31	0	0	0	22	570	2	3	936	37
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.93				1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	24	0	36				24	620	2	3	985	39
Peak Hour Factor	0.87	0.87	0.87				0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2				2	2	2	2	2	2
Cap, veh/h	85	0	70				56	2993	10	7	2771	110
Arrive On Green	0.05	0.00	0.05				0.03	0.82	0.82	0.00	0.80	0.80
Sat Flow, veh/h	1781	0	1470				1781	3633	12	1781	3479	138
Grp Volume(v), veh/h	24	0	36				24	303	319	3	503	521
Grp Sat Flow(s),veh/h/ln	1781	0	1470				1781	1777	1868	1781	1777	1840
Q Serve(g_s), s	1.7	0.0	3.1				1.7	4.7	4.7	0.2	10.4	10.4
Cycle Q Clear(g_c), s	1.7	0.0	3.1				1.7	4.7	4.7	0.2	10.4	10.4
Prop In Lane	1.00		1.00				1.00		0.01	1.00		0.07
Lane Grp Cap(c), veh/h	85	0	70				56	1464	1539	7	1415	1466
V/C Ratio(X)	0.28	0.00	0.51				0.43	0.21	0.21	0.43	0.36	0.36
Avail Cap(c_a), veh/h	343	0	283				137	1464	1539	96	1415	1466
HCM Platoon Ratio	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				0.89	0.89	0.89	0.93	0.93	0.93
Uniform Delay (d), s/veh	59.8	0.0	60.4				61.8	2.4	2.4	64.6	3.8	3.8
Incr Delay (d2), s/veh	1.8	0.0	5.7				4.6	0.3	0.3	33.8	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
%ile BackOfQ(50%),veh/ln	0.8	0.0	1.3				0.8	1.1	1.2	0.2	2.9	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	61.5	0.0	66.1				66.5	2.7	2.7	98.4	4.4	4.4
LnGrp LOS	E		E				E	A	A	F	A	A
Approach Vol, veh/h		60						646			1027	
Approach Delay, s/veh		64.3						5.1			4.7	
Approach LOS		E						A			A	
Timer - Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	5.5	113.3		11.2	9.1	109.7						
Change Period (Y+Rc), s	5.0	6.2		5.0	5.0	6.2						
Max Green Setting (Gmax), s	7.0	81.8		25.0	10.0	78.8						
Max Q Clear Time (g_c+I1), s	2.2	6.7		5.1	3.7	12.4						
Green Ext Time (p_c), s	0.0	3.7		0.2	0.0	7.3						
Intersection Summary												
HCM 7th Control Delay, s/veh			6.9									
HCM 7th LOS			A									

HCM 7th Signalized Intersection Summary
 8: Twin Oaks Valley Rd & Borden Rd

Opening Year AM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↖	↖↗		↖	↖↗	↖	↖	↖↗	↖
Traffic Volume (veh/h)	67	259	202	242	370	78	102	435	95	43	772	172
Future Volume (veh/h)	67	259	202	242	370	78	102	435	95	43	772	172
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	81	312	243	288	440	93	113	483	106	45	813	181
Peak Hour Factor	0.83	0.83	0.83	0.84	0.84	0.84	0.90	0.90	0.90	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	102	587	444	314	1246	261	136	1105	759	73	1013	438
Arrive On Green	0.06	0.31	0.31	0.18	0.43	0.43	0.08	0.31	0.31	0.04	0.28	0.28
Sat Flow, veh/h	1781	1900	1438	1781	2910	610	1781	3554	1540	1781	3554	1538
Grp Volume(v), veh/h	81	291	264	288	267	266	113	483	106	45	813	181
Grp Sat Flow(s),veh/h/ln	1781	1777	1562	1781	1777	1743	1781	1777	1540	1781	1777	1538
Q Serve(g_s), s	6.4	19.2	19.9	22.5	14.3	14.6	8.9	15.3	5.4	3.5	30.0	13.5
Cycle Q Clear(g_c), s	6.4	19.2	19.9	22.5	14.3	14.6	8.9	15.3	5.4	3.5	30.0	13.5
Prop In Lane	1.00		0.92	1.00		0.35	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	102	549	483	314	761	747	136	1105	759	73	1013	438
V/C Ratio(X)	0.80	0.53	0.55	0.92	0.35	0.36	0.83	0.44	0.14	0.62	0.80	0.41
Avail Cap(c_a), veh/h	169	549	483	392	761	747	181	1105	759	117	1013	438
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	65.9	40.4	40.6	57.2	27.2	27.3	64.4	38.9	20.0	66.7	46.9	41.0
Incr Delay (d2), s/veh	13.2	3.6	4.4	22.9	1.3	1.3	20.9	1.3	0.4	8.1	6.7	2.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	9.0	8.3	12.1	6.4	6.4	4.7	6.8	2.0	1.7	13.9	5.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	79.1	44.0	45.1	80.1	28.5	28.6	85.4	40.1	20.3	74.9	53.6	43.9
LnGrp LOS	E	D	D	F	C	C	F	D	C	E	D	D
Approach Vol, veh/h		636			821			702			1039	
Approach Delay, s/veh		48.9			46.6			44.4			52.8	
Approach LOS		D			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	29.9	49.8	15.4	46.4	13.0	66.7	11.7	50.1				
Change Period (Y+Rc), s	* 4.9	* 6.1	4.6	* 6.1	* 4.9	* 6.1	5.9	* 6.1				
Max Green Setting (Gmax), s	* 31	* 43	14.4	* 40	* 13	* 61	9.3	* 44				
Max Q Clear Time (g_c+I1), s	24.5	21.9	10.9	32.0	8.4	16.6	5.5	17.3				
Green Ext Time (p_c), s	0.5	3.6	0.1	3.5	0.1	3.7	0.0	3.4				

Intersection Summary												
HCM 7th Control Delay, s/veh											48.6	
HCM 7th LOS											D	

Notes
 * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 9: Woodward St & Borden Rd

Opening Year AM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	298	43	16	506	20	56	33	14	36	134	123
Future Volume (veh/h)	52	298	43	16	506	20	56	33	14	36	134	123
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.95	1.00		0.97	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	80	458	66	21	657	26	67	39	17	42	156	143
Peak Hour Factor	0.65	0.65	0.65	0.77	0.77	0.77	0.84	0.84	0.84	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	205	1138	163	60	1018	40	172	280	122	100	351	286
Arrive On Green	0.12	0.37	0.37	0.03	0.29	0.29	0.10	0.23	0.23	0.06	0.19	0.19
Sat Flow, veh/h	1781	3100	444	1781	3477	137	1781	1220	532	1781	1870	1523
Grp Volume(v), veh/h	80	261	263	21	336	347	67	0	56	42	156	143
Grp Sat Flow(s),veh/h/ln	1781	1777	1767	1781	1777	1837	1781	0	1752	1781	1870	1523
Q Serve(g_s), s	2.9	7.6	7.7	0.8	11.4	11.5	2.5	0.0	1.8	1.6	5.1	5.9
Cycle Q Clear(g_c), s	2.9	7.6	7.7	0.8	11.4	11.5	2.5	0.0	1.8	1.6	5.1	5.9
Prop In Lane	1.00		0.25	1.00		0.07	1.00		0.30	1.00		1.00
Lane Grp Cap(c), veh/h	205	653	649	60	520	538	172	0	403	100	351	286
V/C Ratio(X)	0.39	0.40	0.41	0.35	0.64	0.65	0.39	0.00	0.14	0.42	0.44	0.50
Avail Cap(c_a), veh/h	471	1199	1192	179	923	954	461	0	1023	228	839	683
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.5	16.3	16.4	32.9	21.4	21.4	29.5	0.0	21.3	31.7	25.0	25.3
Incr Delay (d2), s/veh	1.2	0.4	0.4	3.5	1.3	1.3	1.4	0.0	0.2	2.8	0.9	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	1.2	2.9	2.9	0.4	4.6	4.7	1.0	0.0	0.7	0.7	2.2	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	29.7	16.7	16.8	36.3	22.8	22.7	30.9	0.0	21.5	34.5	25.9	26.7
LnGrp LOS	C	B	B	D	C	C	C		C	C	C	C
Approach Vol, veh/h		604			704			123			341	
Approach Delay, s/veh		18.5			23.2			26.6			27.3	
Approach LOS		B			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.4	31.3	11.9	18.9	12.6	26.2	9.0	21.8				
Change Period (Y+Rc), s	5.1	* 5.8	5.2	5.8	4.6	* 5.8	5.1	* 5.8				
Max Green Setting (Gmax), s	7.0	* 47	18.0	31.2	18.4	* 36	8.9	* 41				
Max Q Clear Time (g_c+I1), s	2.8	9.7	4.5	7.9	4.9	13.5	3.6	3.8				
Green Ext Time (p_c), s	0.0	3.4	0.1	1.3	0.1	4.2	0.0	0.3				

Intersection Summary												
HCM 7th Control Delay, s/veh				22.6								
HCM 7th LOS				C								

Notes
 * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 10: Twin Oaks Valley Rd & Richmar Road

Opening Year AM
 12/10/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	123	12	108	22	2	2	56	531	19	24	1086	170
Future Volume (veh/h)	123	12	108	22	2	2	56	531	19	24	1086	170
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.96	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	145	14	127	23	2	2	57	542	19	26	1155	181
Peak Hour Factor	0.85	0.85	0.85	0.94	0.94	0.94	0.98	0.98	0.98	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	191	16	147	144	68	68	73	2081	73	50	1783	278
Arrive On Green	0.11	0.11	0.11	0.08	0.08	0.08	0.04	0.59	0.59	0.03	0.58	0.58
Sat Flow, veh/h	1781	151	1371	1781	840	840	1781	3498	122	1781	3063	478
Grp Volume(v), veh/h	145	0	141	23	0	4	57	275	286	26	668	668
Grp Sat Flow(s),veh/h/ln	1781	0	1522	1781	0	1681	1781	1777	1843	1781	1777	1764
Q Serve(g_s), s	10.3	0.0	11.8	1.6	0.0	0.3	4.1	9.6	9.7	1.9	32.7	33.1
Cycle Q Clear(g_c), s	10.3	0.0	11.8	1.6	0.0	0.3	4.1	9.6	9.7	1.9	32.7	33.1
Prop In Lane	1.00		0.90	1.00		0.50	1.00		0.07	1.00		0.27
Lane Grp Cap(c), veh/h	191	0	163	144	0	136	73	1057	1097	50	1034	1027
V/C Ratio(X)	0.76	0.00	0.86	0.16	0.00	0.03	0.78	0.26	0.26	0.52	0.65	0.65
Avail Cap(c_a), veh/h	201	0	172	521	0	491	93	1057	1097	82	1034	1027
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	0.89	0.89	0.89	0.41	0.41	0.41
Uniform Delay (d), s/veh	56.4	0.0	57.1	55.6	0.0	55.0	61.7	12.6	12.6	62.3	18.2	18.3
Incr Delay (d2), s/veh	14.6	0.0	32.5	0.5	0.0	0.1	24.2	0.5	0.5	3.4	1.3	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.0	6.0	0.7	0.0	0.1	2.3	3.8	3.9	0.9	12.7	12.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	70.9	0.0	89.5	56.1	0.0	55.1	85.9	13.1	13.1	65.7	19.5	19.6
LnGrp LOS	E		F	E		E	F	B	B	E	B	B
Approach Vol, veh/h		286			27			618			1362	
Approach Delay, s/veh		80.1			56.0			19.9			20.4	
Approach LOS		F			E			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.7	83.6		20.1	11.3	82.0		16.6				
Change Period (Y+Rc), s	6.0	6.3		6.1	6.0	6.3		6.1				
Max Green Setting (Gmax), s	6.0	46.8		14.7	6.8	46.0		38.0				
Max Q Clear Time (g_c+I1), s	3.9	11.7		13.8	6.1	35.1		3.6				
Green Ext Time (p_c), s	0.0	3.2		0.1	0.0	6.0		0.1				
Intersection Summary												
HCM 7th Control Delay, s/veh			28.1									
HCM 7th LOS			C									

HCM 7th Signalized Intersection Summary
 11: San Marcos Blvd & E. Mission Road

Opening Year AM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	407	37	393	641	43	12	76	579	45	278	59
Future Volume (veh/h)	25	407	37	393	641	43	12	76	579	45	278	59
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	1.00		1.00	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	1742	1673	1870	1870	1742	1742	1742	1870	1742	1870
Adj Flow Rate, veh/h	31	509	46	457	745	50	17	109	0	48	299	63
Peak Hour Factor	0.80	0.80	0.80	0.86	0.86	0.86	0.70	0.70	0.70	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	36	914	364	581	1509	655	21	636		59	576	119
Arrive On Green	0.02	0.26	0.26	0.19	0.42	0.42	0.01	0.19	0.00	0.03	0.21	0.21
Sat Flow, veh/h	1781	3554	1415	3092	3554	1543	1659	3311	1477	1781	2707	560
Grp Volume(v), veh/h	31	509	46	457	745	50	17	109	0	48	181	181
Grp Sat Flow(s),veh/h/ln	1781	1777	1415	1546	1777	1543	1659	1655	1477	1781	1655	1612
Q Serve(g_s), s	1.0	7.0	1.4	7.9	8.6	1.1	0.6	1.6	0.0	1.5	5.4	5.6
Cycle Q Clear(g_c), s	1.0	7.0	1.4	7.9	8.6	1.1	0.6	1.6	0.0	1.5	5.4	5.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.35
Lane Grp Cap(c), veh/h	36	914	364	581	1509	655	21	636		59	352	343
V/C Ratio(X)	0.85	0.56	0.13	0.79	0.49	0.08	0.82	0.17		0.82	0.51	0.53
Avail Cap(c_a), veh/h	208	1575	627	768	2041	886	165	1638		142	787	766
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	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.5	18.2	16.1	21.8	11.8	9.6	27.8	19.0	0.0	27.1	19.6	19.7
Incr Delay (d2), s/veh	38.6	0.5	0.2	4.0	0.3	0.0	52.8	0.1	0.0	23.2	1.2	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	2.5	0.4	2.8	2.6	0.3	0.5	0.5	0.0	1.0	1.9	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	66.1	18.7	16.2	25.8	12.1	9.7	80.6	19.2	0.0	50.3	20.8	21.0
LnGrp LOS	E	B	B	C	B	A	F	B		D	C	C
Approach Vol, veh/h		586			1252			126			410	
Approach Delay, s/veh		21.0			17.0			27.5			24.3	
Approach LOS		C			B			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.9	16.1	14.6	19.8	4.7	17.3	5.2	29.3				
Change Period (Y+Rc), s	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3				
Max Green Setting (Gmax), s	4.5	27.9	14.0	25.0	5.6	26.8	6.6	32.4				
Max Q Clear Time (g_c+I1), s	3.5	3.6	9.9	9.0	2.6	7.6	3.0	10.6				
Green Ext Time (p_c), s	0.0	0.5	0.7	2.9	0.0	1.8	0.0	4.9				

Intersection Summary												
HCM 7th Control Delay, s/veh											19.8	
HCM 7th LOS											B	

Notes
 User approved changes to right turn type.
 Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 7th Signalized Intersection Summary
 12: Twin Oaks Valley Rd & San Marcos Blvd

Opening Year AM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↖	↖↗	↑↑		↖↗	↑↑	↖	↖↗	↑↑	
Traffic Volume (veh/h)	182	431	257	359	328	17	201	427	542	89	761	229
Future Volume (veh/h)	182	431	257	359	328	17	201	427	542	89	761	229
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	200	474	282	390	357	18	221	469	596	95	810	244
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.91	0.91	0.91	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	253	1167	611	230	1107	56	230	1189	621	199	859	259
Arrive On Green	0.07	0.33	0.33	0.07	0.32	0.32	0.07	0.33	0.33	0.06	0.32	0.32
Sat Flow, veh/h	3456	3554	1537	3456	3437	173	3456	3554	1540	3456	2670	804
Grp Volume(v), veh/h	200	474	282	390	184	191	221	469	596	95	539	515
Grp Sat Flow(s),veh/h/ln	1728	1777	1537	1728	1777	1833	1728	1777	1540	1728	1777	1697
Q Serve(g_s), s	7.7	14.0	18.3	9.0	10.6	10.7	8.6	13.7	45.2	3.6	39.9	39.9
Cycle Q Clear(g_c), s	7.7	14.0	18.3	9.0	10.6	10.7	8.6	13.7	45.2	3.6	39.9	39.9
Prop In Lane	1.00		1.00	1.00		0.09	1.00		1.00	1.00		0.47
Lane Grp Cap(c), veh/h	253	1167	611	230	572	590	230	1189	621	199	572	546
V/C Ratio(X)	0.79	0.41	0.46	1.69	0.32	0.32	0.96	0.39	0.96	0.48	0.94	0.94
Avail Cap(c_a), veh/h	333	1167	611	230	572	590	230	1189	621	205	579	553
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.80	0.80	0.80	0.93	0.93	0.93	0.67	0.67	0.67
Uniform Delay (d), s/veh	61.6	35.1	30.2	63.0	34.6	34.6	62.8	34.4	39.5	61.6	44.6	44.6
Incr Delay (d2), s/veh	9.2	1.0	2.5	326.4	1.2	1.2	45.8	0.2	25.1	1.2	18.1	18.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	6.1	7.0	14.3	4.7	4.9	5.2	5.8	22.7	1.6	19.8	19.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	70.8	36.2	32.7	389.4	35.8	35.8	108.6	34.6	64.6	62.8	62.6	63.4
LnGrp LOS	E	D	C	F	D	D	F	C	E	E	E	E
Approach Vol, veh/h		956			765			1286			1149	
Approach Delay, s/veh		42.4			216.0			61.2			63.0	
Approach LOS		D			F			E			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	51.8	16.0	51.2	16.9	50.9	14.3	53.0				
Change Period (Y+Rc), s	7.0	7.4	7.0	* 7.8	7.0	7.4	6.5	7.8				
Max Green Setting (Gmax), s	9.0	44.3	9.0	* 44	13.0	40.3	8.0	45.0				
Max Q Clear Time (g_c+I1), s	11.0	20.3	10.6	41.9	9.7	12.7	5.6	47.2				
Green Ext Time (p_c), s	0.0	3.9	0.0	1.3	0.2	2.0	0.0	0.0				

Intersection Summary												
HCM 7th Control Delay, s/veh				85.9								
HCM 7th LOS				F								

Notes
 * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 13: Twin Oaks Valley Rd & SR 78 WB Ramps

Opening Year AM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↔↔		↔↔		↑↑↑	↗		↑↑↑	↗
Traffic Volume (veh/h)	0	0	0	719	0	210	0	1194	411	0	1150	334
Future Volume (veh/h)	0	0	0	719	0	210	0	1194	411	0	1150	334
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	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
Work Zone On Approach				No			No			No		
Adj Sat Flow, veh/h/ln				1870	0	1870	0	1870	1870	0	1870	1870
Adj Flow Rate, veh/h				826	0	241	0	1284	442	0	1223	0
Peak Hour Factor				0.87	0.87	0.87	0.93	0.93	0.93	0.94	0.94	0.94
Percent Heavy Veh, %				2	0	2	0	2	2	0	2	2
Cap, veh/h				914	0	738	0	3367	1430	0	3367	
Arrive On Green				0.26	0.00	0.26	0.00	1.00	1.00	0.00	0.66	0.00
Sat Flow, veh/h				3456	0	2790	0	5274	1533	0	5274	1585
Grp Volume(v), veh/h				826	0	241	0	1284	442	0	1223	0
Grp Sat Flow(s),veh/h/ln				1728	0	1395	0	1702	1533	0	1702	1585
Q Serve(g_s), s				30.0	0.0	9.0	0.0	0.0	0.0	0.0	13.9	0.0
Cycle Q Clear(g_c), s				30.0	0.0	9.0	0.0	0.0	0.0	0.0	13.9	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				914	0	738	0	3367	1430	0	3367	
V/C Ratio(X)				0.90	0.00	0.33	0.00	0.38	0.31	0.00	0.36	
Avail Cap(c_a), veh/h				1579	0	1275	0	3367	1430	0	3367	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.61	0.61	0.00	0.45	0.00
Uniform Delay (d), s/veh				46.2	0.0	38.5	0.0	0.0	0.0	0.0	9.9	0.0
Incr Delay (d2), s/veh				2.2	0.0	0.1	0.0	0.2	0.3	0.0	0.1	0.0
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				13.1	0.0	3.1	0.0	0.1	0.1	0.0	4.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				48.4	0.0	38.6	0.0	0.2	0.3	0.0	10.1	0.0
LnGrp LOS				D		D		A	A		B	
Approach Vol, veh/h					1067			1726			1223	
Approach Delay, s/veh					46.2			0.2			10.1	
Approach LOS					D			A			B	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		91.0				91.0		39.0				
Change Period (Y+Rc), s		5.3				5.3		4.6				
Max Green Setting (Gmax), s		60.7				60.7		59.4				
Max Q Clear Time (g_c+I1), s		2.0				15.9		32.0				
Green Ext Time (p_c), s		9.7				6.2		2.3				

Intersection Summary		
HCM 7th Control Delay, s/veh		15.4
HCM 7th LOS		B

Notes
 Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 7th Signalized Intersection Summary
 14: Twin Oaks Valley Rd & SR 78 EB Ramps

Opening Year AM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	513	6	824	0	0	0	0	1112	460	321	1552	0
Future Volume (veh/h)	513	6	824	0	0	0	0	1112	460	321	1552	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99				1.00		0.98	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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	366	0	1074				0	1332	432	353	1705	0
Peak Hour Factor	0.94	0.94	0.94				0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	567	0	1000				0	2536	700	419	3091	0
Arrive On Green	0.32	0.00	0.32				0.00	0.45	0.45	0.16	0.81	0.00
Sat Flow, veh/h	1781	0	3140				0	5611	1548	3456	5274	0
Grp Volume(v), veh/h	366	0	1074				0	1332	432	353	1705	0
Grp Sat Flow(s),veh/h/ln	1781	0	1570				0	1870	1548	1728	1702	0
Q Serve(g_s), s	22.9	0.0	41.4				0.0	22.2	27.6	12.9	15.2	0.0
Cycle Q Clear(g_c), s	22.9	0.0	41.4				0.0	22.2	27.6	12.9	15.2	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	567	0	1000				0	2536	700	419	3091	0
V/C Ratio(X)	0.65	0.00	1.07				0.00	0.53	0.62	0.84	0.55	0.00
Avail Cap(c_a), veh/h	567	0	1000				0	2536	700	659	3091	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.81	0.81	0.00
Uniform Delay (d), s/veh	38.0	0.0	44.3				0.0	25.6	27.1	53.3	6.5	0.0
Incr Delay (d2), s/veh	2.5	0.0	50.5				0.0	0.8	4.1	4.8	0.6	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.4	0.0	22.9				0.0	9.6	10.5	5.5	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	40.5	0.0	94.8				0.0	26.4	31.1	58.1	7.1	0.0
LnGrp LOS	D		F					C	C	E	A	
Approach Vol, veh/h		1440						1764			2058	
Approach Delay, s/veh		81.0						27.6			15.8	
Approach LOS		F						C			B	
Timer - Assigned Phs	1	2		4				6				
Phs Duration (G+Y+Rc), s	20.0	64.0		46.0				84.0				
Change Period (Y+Rc), s	4.2	5.3		4.6				5.3				
Max Green Setting (Gmax), s	24.8	49.7		41.4				78.7				
Max Q Clear Time (g_c+I1), s	14.9	29.6		43.4				17.2				
Green Ext Time (p_c), s	0.9	10.7		0.0				19.0				
Intersection Summary												
HCM 7th Control Delay, s/veh			37.6									
HCM 7th LOS			D									
Notes												
User approved volume balancing among the lanes for turning movement.												

HCM 7th Signalized Intersection Summary
 1: Twin Oaks Valley Rd & Deer Springs Rd

Opening Year PM
 12/10/2025



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	158	74	948	746	31
Future Volume (veh/h)	30	158	74	948	746	31
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	35	186	85	1090	921	38
Peak Hour Factor	0.85	0.85	0.87	0.87	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	263	234	124	1303	1038	848
Arrive On Green	0.15	0.15	0.07	0.70	0.55	0.55
Sat Flow, veh/h	1781	1585	1781	1870	1870	1529
Grp Volume(v), veh/h	35	186	85	1090	921	38
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1529
Q Serve(g_s), s	1.2	7.9	3.2	29.4	29.9	0.8
Cycle Q Clear(g_c), s	1.2	7.9	3.2	29.4	29.9	0.8
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	263	234	124	1303	1038	848
V/C Ratio(X)	0.13	0.80	0.68	0.84	0.89	0.04
Avail Cap(c_a), veh/h	617	549	334	1759	1273	1041
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.7	28.5	31.5	7.6	13.5	7.0
Incr Delay (d2), s/veh	0.2	6.0	6.5	2.8	6.8	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.4	1.5	7.0	12.3	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	25.9	34.6	38.0	10.4	20.4	7.1
LnGrp LOS	C	C	D	B	C	A
Approach Vol, veh/h	221			1175	959	
Approach Delay, s/veh	33.2			12.4	19.8	
Approach LOS	C			B	B	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		54.1		15.2	9.8	44.3
Change Period (Y+Rc), s		5.8		5.0	5.0	5.8
Max Green Setting (Gmax), s		65.2		24.0	13.0	47.2
Max Q Clear Time (g_c+I1), s		31.4		9.9	5.2	31.9
Green Ext Time (p_c), s		10.7		0.5	0.1	6.5
Intersection Summary						
HCM 7th Control Delay, s/veh			17.4			
HCM 7th LOS			B			

HCM 7th Signalized Intersection Summary
 2: Twin Oaks Valley Rd & Buena Creek Rd

Opening Year PM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↖	↗		↖	↕	↗
Traffic Volume (veh/h)	395	0	202	1	0	0	190	606	1	0	712	359
Future Volume (veh/h)	395	0	202	1	0	0	190	606	1	0	712	359
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	0.99		1.00	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	434	0	222	4	0	0	218	697	1	0	757	382
Peak Hour Factor	0.91	0.91	0.91	0.25	0.25	0.25	0.87	0.87	0.87	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	557	0	423	128	0	0	218	1124	2	2	781	642
Arrive On Green	0.27	0.00	0.27	0.27	0.00	0.00	0.12	0.60	0.60	0.00	0.42	0.42
Sat Flow, veh/h	1732	0	1542	169	0	0	1781	1867	3	1781	1870	1539
Grp Volume(v), veh/h	434	0	222	4	0	0	218	0	698	0	757	382
Grp Sat Flow(s),veh/h/ln	1732	0	1542	169	0	0	1781	0	1870	1781	1870	1539
Q Serve(g_s), s	0.0	0.0	10.8	0.3	0.0	0.0	10.8	0.0	20.9	0.0	34.9	17.0
Cycle Q Clear(g_c), s	20.6	0.0	10.8	20.9	0.0	0.0	10.8	0.0	20.9	0.0	34.9	17.0
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	557	0	423	128	0	0	218	0	1126	2	781	642
V/C Ratio(X)	0.78	0.00	0.53	0.03	0.00	0.00	1.00	0.00	0.62	0.00	0.97	0.59
Avail Cap(c_a), veh/h	586	0	455	166	0	0	218	0	1126	337	781	642
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	0.00	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	30.7	0.0	27.1	40.7	0.0	0.0	38.7	0.0	11.1	0.0	25.1	19.9
Incr Delay (d2), s/veh	6.4	0.0	1.0	0.1	0.0	0.0	60.7	0.0	1.0	0.0	24.9	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	9.5	0.0	4.0	0.1	0.0	0.0	8.1	0.0	7.2	0.0	19.0	5.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	37.1	0.0	28.1	40.8	0.0	0.0	99.4	0.0	12.2	0.0	50.0	21.4
LnGrp LOS	D		C	D			F		B		D	C
Approach Vol, veh/h		656			4			916			1139	
Approach Delay, s/veh		34.1			40.8			32.9			40.4	
Approach LOS		C			D			C			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	58.9		29.3	16.3	42.6		29.3				
Change Period (Y+Rc), s	5.8	5.8		* 5.1	5.5	5.8		5.1				
Max Green Setting (Gmax), s	16.7	30.6		* 27	10.8	36.8		26.0				
Max Q Clear Time (g_c+I1), s	0.0	22.9		22.9	12.8	36.9		22.6				
Green Ext Time (p_c), s	0.0	2.6		0.0	0.0	0.0		1.2				

Intersection Summary		
HCM 7th Control Delay, s/veh		36.4
HCM 7th LOS		D

Notes
 * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 3: Twin Oaks Valley Rd & Olive Street

Opening Year PM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↖	↗		↖	↗		↖	↗	
Traffic Volume (veh/h)	0	4	6	17	0	75	0	866	19	114	566	0
Future Volume (veh/h)	0	4	6	17	0	75	0	866	19	114	566	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.88	1.00		0.96	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										
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	13	19	21	0	93	0	962	21	125	622	0
Peak Hour Factor	0.31	0.31	0.31	0.81	0.81	0.81	0.90	0.90	0.90	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	39	57	151	0	119	2	1041	23	154	1318	0
Arrive On Green	0.00	0.06	0.06	0.08	0.00	0.08	0.00	0.57	0.57	0.09	0.70	0.00
Sat Flow, veh/h	0	655	957	1781	0	1397	1781	1822	40	1781	1870	0
Grp Volume(v), veh/h	0	0	32	21	0	93	0	0	983	125	622	0
Grp Sat Flow(s),veh/h/ln	0	0	1612	1781	0	1397	1781	0	1861	1781	1870	0
Q Serve(g_s), s	0.0	0.0	1.9	1.1	0.0	6.5	0.0	0.0	47.4	6.8	14.6	0.0
Cycle Q Clear(g_c), s	0.0	0.0	1.9	1.1	0.0	6.5	0.0	0.0	47.4	6.8	14.6	0.0
Prop In Lane	0.00		0.59	1.00		1.00	1.00		0.02	1.00		0.00
Lane Grp Cap(c), veh/h	0	0	96	151	0	119	2	0	1063	154	1318	0
V/C Ratio(X)	0.00	0.00	0.33	0.14	0.00	0.78	0.00	0.00	0.92	0.81	0.47	0.00
Avail Cap(c_a), veh/h	0	0	293	335	0	263	90	0	1286	191	1398	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	44.6	41.9	0.0	44.3	0.0	0.0	19.3	44.4	6.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	2.0	0.4	0.0	10.7	0.0	0.0	10.1	18.6	0.3	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.8	0.5	0.0	2.5	0.0	0.0	20.1	3.7	4.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	46.6	42.3	0.0	55.0	0.0	0.0	29.3	63.0	6.7	0.0
LnGrp LOS			D	D		E			C	E	A	
Approach Vol, veh/h		32			114			983			747	
Approach Delay, s/veh		46.6			52.7			29.3			16.1	
Approach LOS		D			D			C			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.2	62.8		10.5	0.0	76.0		12.4				
Change Period (Y+Rc), s	4.6	6.3		4.6	4.6	6.3		4.0				
Max Green Setting (Gmax), s	10.6	68.3		18.0	5.0	73.9		18.6				
Max Q Clear Time (g_c+I1), s	8.8	49.4		3.9	0.0	16.6		8.5				
Green Ext Time (p_c), s	0.0	7.1		0.1	0.0	4.3		0.3				
Intersection Summary												
HCM 7th Control Delay, s/veh			25.8									
HCM 7th LOS			C									

HCM 7th Signalized Intersection Summary
 4: Twin Oaks Valley Rd & E. La Cienega Road

Opening Year PM
 12/10/2025



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↑↔		↘	↑↑
Traffic Volume (veh/h)	59	46	713	78	123	556
Future Volume (veh/h)	59	46	713	78	123	556
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00		0.96	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	88	69	810	89	132	598
Peak Hour Factor	0.67	0.67	0.88	0.88	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	203	180	1152	127	168	2079
Arrive On Green	0.11	0.11	0.36	0.36	0.09	0.59
Sat Flow, veh/h	1781	1585	3305	353	1781	3647
Grp Volume(v), veh/h	88	69	448	451	132	598
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1788	1781	1777
Q Serve(g_s), s	2.1	1.8	9.8	9.8	3.3	3.8
Cycle Q Clear(g_c), s	2.1	1.8	9.8	9.8	3.3	3.8
Prop In Lane	1.00	1.00		0.20	1.00	
Lane Grp Cap(c), veh/h	203	180	638	641	168	2079
V/C Ratio(X)	0.43	0.38	0.70	0.70	0.78	0.29
Avail Cap(c_a), veh/h	1096	975	871	876	196	2601
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.8	18.7	12.5	12.5	20.1	4.7
Incr Delay (d2), s/veh	1.5	1.3	1.6	1.6	16.3	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.7	2.9	2.9	1.9	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	20.3	20.0	14.1	14.1	36.4	4.8
LnGrp LOS	C	C	B	B	D	A
Approach Vol, veh/h	157		899			730
Approach Delay, s/veh	20.2		14.1			10.5
Approach LOS	C		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	10.3	23.5			33.8	11.7
Change Period (Y+Rc), s	6.0	7.2			7.2	6.5
Max Green Setting (Gmax), s	5.0	22.3			33.3	28.0
Max Q Clear Time (g_c+I1), s	5.3	11.8			5.8	4.1
Green Ext Time (p_c), s	0.0	3.7			3.7	0.4
Intersection Summary						
HCM 7th Control Delay, s/veh			13.2			
HCM 7th LOS			B			

HCM 7th Signalized Intersection Summary
 5: Twin Oaks Valley Rd & Del Roy Dr

Opening Year PM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑		↖	↗	
Traffic Volume (veh/h)	6	0	23	30	0	15	37	798	4	4	585	14
Future Volume (veh/h)	6	0	23	30	0	15	37	798	4	4	585	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.94	1.00		0.93
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	8	0	31	38	0	19	39	849	4	5	665	16
Peak Hour Factor	0.75	0.75	0.75	0.80	0.80	0.80	0.94	0.94	0.94	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	22	0	226	86	0	327	88	1275	6	14	1098	26
Arrive On Green	0.01	0.00	0.15	0.05	0.00	0.21	0.05	0.35	0.35	0.01	0.31	0.31
Sat Flow, veh/h	1781	0	1552	1781	0	1562	1781	3626	17	1781	3539	85
Grp Volume(v), veh/h	8	0	31	38	0	19	39	416	437	5	334	347
Grp Sat Flow(s),veh/h/ln	1781	0	1552	1781	0	1562	1781	1777	1866	1781	1777	1848
Q Serve(g_s), s	0.2	0.0	0.9	1.1	0.0	0.5	1.1	10.5	10.5	0.1	8.5	8.5
Cycle Q Clear(g_c), s	0.2	0.0	0.9	1.1	0.0	0.5	1.1	10.5	10.5	0.1	8.5	8.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.01	1.00		0.05
Lane Grp Cap(c), veh/h	22	0	226	86	0	327	88	625	656	14	551	573
V/C Ratio(X)	0.36	0.00	0.14	0.44	0.00	0.06	0.44	0.67	0.67	0.35	0.61	0.61
Avail Cap(c_a), veh/h	201	0	994	201	0	1045	218	847	889	201	830	863
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.0	0.0	19.8	24.6	0.0	16.8	24.5	14.6	14.6	26.2	15.5	15.5
Incr Delay (d2), s/veh	9.3	0.0	0.3	3.5	0.0	0.1	3.5	1.2	1.2	13.9	1.1	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	0.2	0.0	0.3	0.5	0.0	0.2	0.5	3.4	3.5	0.1	2.8	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	35.3	0.0	20.1	28.0	0.0	16.9	28.0	15.8	15.7	40.1	16.6	16.6
LnGrp LOS	D		C	C		B	C	B	B	D	B	B
Approach Vol, veh/h		39			57			892			686	
Approach Delay, s/veh		23.2			24.3			16.3			16.8	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.9	24.9	8.6	13.7	8.1	22.7	5.2	17.1				
Change Period (Y+Rc), s	5.5	6.2	6.0	6.0	5.5	6.2	4.5	6.0				
Max Green Setting (Gmax), s	6.0	25.3	6.0	34.0	6.5	24.8	6.0	35.5				
Max Q Clear Time (g_c+I1), s	2.1	12.5	3.1	2.9	3.1	10.5	2.2	2.5				
Green Ext Time (p_c), s	0.0	3.8	0.0	0.1	0.0	3.1	0.0	0.1				
Intersection Summary												
HCM 7th Control Delay, s/veh			16.9									
HCM 7th LOS			B									

HCM 7th Signalized Intersection Summary
 7: Twin Oaks Valley Rd & Windy Wy

Opening Year PM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗					↖	↕		↖	↗	
Traffic Volume (veh/h)	37	0	37	0	0	0	52	791	0	2	689	9
Future Volume (veh/h)	37	0	37	0	0	0	52	791	0	2	689	9
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.94				1.00		1.00	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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	52	0	52				57	860	0	2	757	10
Peak Hour Factor	0.71	0.71	0.71				0.92	0.92	0.92	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2				2	2	2	2	2	2
Cap, veh/h	94	0	79				84	2914	0	5	2785	37
Arrive On Green	0.05	0.00	0.05				0.05	0.82	0.00	0.00	0.78	0.78
Sat Flow, veh/h	1781	0	1497				1781	3647	0	1781	3589	47
Grp Volume(v), veh/h	52	0	52				57	860	0	2	375	392
Grp Sat Flow(s),veh/h/ln	1781	0	1497				1781	1777	0	1781	1777	1860
Q Serve(g_s), s	3.7	0.0	4.4				4.1	7.5	0.0	0.1	7.8	7.8
Cycle Q Clear(g_c), s	3.7	0.0	4.4				4.1	7.5	0.0	0.1	7.8	7.8
Prop In Lane	1.00		1.00				1.00		0.00	1.00		0.03
Lane Grp Cap(c), veh/h	94	0	79				84	2914	0	5	1379	1443
V/C Ratio(X)	0.56	0.00	0.66				0.68	0.30	0.00	0.42	0.27	0.27
Avail Cap(c_a), veh/h	370	0	311				219	2914	0	123	1379	1443
HCM Platoon Ratio	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				0.76	0.76	0.00	0.96	0.96	0.96
Uniform Delay (d), s/veh	60.1	0.0	60.4				61.0	2.8	0.0	64.7	4.1	4.1
Incr Delay (d2), s/veh	5.1	0.0	9.1				7.2	0.2	0.0	47.7	0.5	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	1.9				2.0	1.7	0.0	0.1	2.3	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	65.2	0.0	69.5				68.2	3.0	0.0	112.4	4.6	4.6
LnGrp LOS	E		E				E	A		F	A	A
Approach Vol, veh/h		104						917			769	
Approach Delay, s/veh		67.3						7.0			4.9	
Approach LOS		E						A			A	
Timer - Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	5.3	112.8		11.8	11.1	107.1						
Change Period (Y+Rc), s	5.0	6.2		5.0	5.0	6.2						
Max Green Setting (Gmax), s	9.0	77.8		27.0	16.0	70.8						
Max Q Clear Time (g_c+I1), s	2.1	9.5		6.4	6.1	9.8						
Green Ext Time (p_c), s	0.0	6.6		0.4	0.1	4.8						
Intersection Summary												
HCM 7th Control Delay, s/veh			9.6									
HCM 7th LOS			A									

HCM 7th Signalized Intersection Summary
 8: Twin Oaks Valley Rd & Borden Rd

Opening Year PM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	199	463	232	155	212	61	204	614	251	58	549	109
Future Volume (veh/h)	199	463	232	155	212	61	204	614	251	58	549	109
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.96	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	221	514	258	168	230	66	222	667	273	64	610	121
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.92	0.92	0.92	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	247	746	373	193	813	227	248	1254	711	82	957	408
Arrive On Green	0.14	0.33	0.33	0.11	0.30	0.30	0.14	0.35	0.35	0.05	0.27	0.27
Sat Flow, veh/h	1781	2270	1135	1781	2724	760	1781	3554	1527	1781	3554	1515
Grp Volume(v), veh/h	221	402	370	168	148	148	222	667	273	64	610	121
Grp Sat Flow(s),veh/h/ln	1781	1777	1628	1781	1777	1707	1781	1777	1527	1781	1777	1515
Q Serve(g_s), s	17.1	27.5	27.7	13.0	8.9	9.4	17.2	21.0	16.4	5.0	21.2	8.9
Cycle Q Clear(g_c), s	17.1	27.5	27.7	13.0	8.9	9.4	17.2	21.0	16.4	5.0	21.2	8.9
Prop In Lane	1.00		0.70	1.00		0.45	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	247	584	535	193	530	510	248	1254	711	82	957	408
V/C Ratio(X)	0.90	0.69	0.69	0.87	0.28	0.29	0.90	0.53	0.38	0.78	0.64	0.30
Avail Cap(c_a), veh/h	319	584	535	255	530	510	323	1254	711	151	957	408
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	59.4	40.8	40.9	61.6	37.6	37.8	59.4	36.1	24.8	66.2	45.2	40.7
Incr Delay (d2), s/veh	22.1	6.5	7.2	21.3	1.3	1.4	21.9	1.6	1.6	14.8	3.2	1.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.3	13.1	12.2	7.1	4.1	4.2	9.1	9.2	6.1	2.6	9.6	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	81.5	47.3	48.1	82.9	38.9	39.2	81.3	37.8	26.3	81.0	48.4	42.5
LnGrp LOS	F	D	D	F	D	D	F	D	C	F	D	D
Approach Vol, veh/h		993			464			1162			795	
Approach Delay, s/veh		55.2			54.9			43.4			50.2	
Approach LOS		E			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.1	52.2	24.1	43.9	24.3	48.0	12.3	55.6				
Change Period (Y+Rc), s	* 4.9	* 6.1	4.6	* 6.1	* 4.9	* 6.1	5.9	* 6.1				
Max Green Setting (Gmax), s	* 20	* 46	25.4	* 37	* 25	* 41	11.9	* 50				
Max Q Clear Time (g_c+I1), s	15.0	29.7	19.2	23.2	19.1	11.4	7.0	23.0				
Green Ext Time (p_c), s	0.2	4.7	0.3	3.5	0.3	1.8	0.0	5.5				
Intersection Summary												
HCM 7th Control Delay, s/veh			50.0									
HCM 7th LOS			D									
Notes												
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 7th Signalized Intersection Summary
 9: Woodward St & Borden Rd

Opening Year PM
 12/10/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	149	592	36	19	276	32	67	94	24	26	74	81
Future Volume (veh/h)	149	592	36	19	276	32	67	94	24	26	74	81
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.94	1.00		0.97	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	162	643	39	21	307	36	82	115	29	29	81	89
Peak Hour Factor	0.92	0.92	0.92	0.90	0.90	0.90	0.82	0.82	0.82	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	238	1035	63	61	682	79	205	360	91	80	335	273
Arrive On Green	0.13	0.30	0.30	0.03	0.21	0.21	0.12	0.25	0.25	0.04	0.18	0.18
Sat Flow, veh/h	1781	3392	206	1781	3184	369	1781	1430	361	1781	1870	1521
Grp Volume(v), veh/h	162	336	346	21	170	173	82	0	144	29	81	89
Grp Sat Flow(s),veh/h/ln	1781	1777	1821	1781	1777	1776	1781	0	1791	1781	1870	1521
Q Serve(g_s), s	5.2	9.7	9.7	0.7	5.0	5.1	2.6	0.0	3.9	0.9	2.2	3.1
Cycle Q Clear(g_c), s	5.2	9.7	9.7	0.7	5.0	5.1	2.6	0.0	3.9	0.9	2.2	3.1
Prop In Lane	1.00		0.11	1.00		0.21	1.00		0.20	1.00		1.00
Lane Grp Cap(c), veh/h	238	542	555	61	380	380	205	0	450	80	335	273
V/C Ratio(X)	0.68	0.62	0.62	0.34	0.45	0.46	0.40	0.00	0.32	0.36	0.24	0.33
Avail Cap(c_a), veh/h	548	1393	1428	208	1072	1072	536	0	1272	208	975	793
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.7	17.8	17.8	28.2	20.4	20.5	24.5	0.0	18.2	27.8	21.1	21.4
Incr Delay (d2), s/veh	3.4	1.2	1.1	3.3	0.8	0.9	1.3	0.0	0.4	2.8	0.4	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	2.2	3.7	3.8	0.3	2.0	2.0	1.0	0.0	1.5	0.4	0.9	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	28.1	19.0	19.0	31.5	21.2	21.3	25.8	0.0	18.6	30.5	21.4	22.1
LnGrp LOS	C	B	B	C	C	C	C		B	C	C	C
Approach Vol, veh/h		844			364			226			199	
Approach Delay, s/veh		20.7			21.9			21.2			23.1	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.2	24.0	12.1	16.5	12.6	18.6	7.8	20.8				
Change Period (Y+Rc), s	5.1	* 5.8	5.2	5.8	4.6	* 5.8	5.1	* 5.8				
Max Green Setting (Gmax), s	7.0	* 47	18.0	31.2	18.4	* 36	7.0	* 43				
Max Q Clear Time (g_c+I1), s	2.7	11.7	4.6	5.1	7.2	7.1	2.9	5.9				
Green Ext Time (p_c), s	0.0	4.5	0.1	0.7	0.3	2.0	0.0	0.8				
Intersection Summary												
HCM 7th Control Delay, s/veh			21.3									
HCM 7th LOS			C									
Notes												
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 7th Signalized Intersection Summary
 10: Twin Oaks Valley Rd & Richmar Road

Opening Year PM
 12/10/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	198	15	74	34	10	5	116	941	31	61	842	167
Future Volume (veh/h)	198	15	74	34	10	5	116	941	31	61	842	167
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.96	1.00		0.96	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	233	18	87	49	14	7	122	991	33	65	896	178
Peak Hour Factor	0.85	0.85	0.85	0.70	0.70	0.70	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	245	36	176	208	135	68	134	1790	60	82	1413	281
Arrive On Green	0.14	0.14	0.14	0.12	0.12	0.12	0.08	0.51	0.51	0.05	0.48	0.48
Sat Flow, veh/h	1781	264	1278	1781	1158	579	1781	3504	117	1781	2933	582
Grp Volume(v), veh/h	233	0	105	49	0	21	122	502	522	65	543	531
Grp Sat Flow(s),veh/h/ln	1781	0	1542	1781	0	1737	1781	1777	1844	1781	1777	1739
Q Serve(g_s), s	16.9	0.0	8.2	3.2	0.0	1.4	8.8	25.1	25.1	4.7	29.6	29.7
Cycle Q Clear(g_c), s	16.9	0.0	8.2	3.2	0.0	1.4	8.8	25.1	25.1	4.7	29.6	29.7
Prop In Lane	1.00		0.83	1.00		0.33	1.00		0.06	1.00		0.33
Lane Grp Cap(c), veh/h	245	0	212	208	0	203	134	908	942	82	856	837
V/C Ratio(X)	0.95	0.00	0.49	0.24	0.00	0.10	0.91	0.55	0.55	0.79	0.63	0.63
Avail Cap(c_a), veh/h	245	0	212	521	0	508	134	908	942	82	856	837
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	0.77	0.77	0.77	0.66	0.66	0.66
Uniform Delay (d), s/veh	55.6	0.0	51.9	52.1	0.0	51.3	59.7	21.7	21.7	61.4	25.1	25.1
Incr Delay (d2), s/veh	43.7	0.0	1.8	0.6	0.0	0.2	43.0	1.9	1.8	28.2	2.4	2.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.5	0.0	3.3	1.5	0.0	0.6	5.5	10.4	10.7	2.7	12.4	12.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	99.3	0.0	53.6	52.7	0.0	51.5	102.6	23.6	23.5	89.6	27.5	27.6
LnGrp LOS	F		D	D		D	F	C	C	F	C	C
Approach Vol, veh/h		338			70			1146			1139	
Approach Delay, s/veh		85.1			52.4			31.9			31.1	
Approach LOS		F			D			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.0	72.7		24.0	15.8	68.9		21.3				
Change Period (Y+Rc), s	6.0	6.3		6.1	6.0	6.3		6.1				
Max Green Setting (Gmax), s	6.0	43.6		17.9	9.8	39.8		38.0				
Max Q Clear Time (g_c+I1), s	6.7	27.1		18.9	10.8	31.7		5.2				
Green Ext Time (p_c), s	0.0	5.6		0.0	0.0	4.0		0.2				
Intersection Summary												
HCM 7th Control Delay, s/veh			38.8									
HCM 7th LOS			D									

HCM 7th Signalized Intersection Summary
 11: San Marcos Blvd & E. Mission Road

Opening Year PM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	97	983	47	267	685	85	56	237	699	29	141	62
Future Volume (veh/h)	97	983	47	267	685	85	56	237	699	29	141	62
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		0.95
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	1742	1742	1870	1870	1742	1742	1742	1870	1742	1870
Adj Flow Rate, veh/h	102	1035	49	300	770	96	62	263	0	35	172	76
Peak Hour Factor	0.95	0.95	0.95	0.89	0.89	0.89	0.90	0.90	0.90	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	133	1282	517	396	1454	631	76	666		42	399	167
Arrive On Green	0.07	0.36	0.36	0.12	0.41	0.41	0.05	0.20	0.00	0.02	0.18	0.18
Sat Flow, veh/h	1781	3554	1433	3219	3554	1542	1659	3311	1477	1781	2233	933
Grp Volume(v), veh/h	102	1035	49	300	770	96	62	263	0	35	125	123
Grp Sat Flow(s),veh/h/ln	1781	1777	1433	1610	1777	1542	1659	1655	1477	1781	1655	1510
Q Serve(g_s), s	3.6	16.8	1.4	5.7	10.4	2.5	2.4	4.4	0.0	1.2	4.3	4.6
Cycle Q Clear(g_c), s	3.6	16.8	1.4	5.7	10.4	2.5	2.4	4.4	0.0	1.2	4.3	4.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.62
Lane Grp Cap(c), veh/h	133	1282	517	396	1454	631	76	666		42	296	270
V/C Ratio(X)	0.77	0.81	0.09	0.76	0.53	0.15	0.82	0.39		0.83	0.42	0.46
Avail Cap(c_a), veh/h	344	1432	577	454	1454	631	190	1671		126	763	696
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	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.0	18.4	13.5	27.0	14.2	11.9	30.2	22.1	0.0	31.0	23.3	23.4
Incr Delay (d2), s/veh	8.9	3.2	0.1	6.3	0.4	0.1	18.5	0.4	0.0	32.4	1.0	1.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	6.2	0.4	2.3	3.5	0.7	1.2	1.5	0.0	0.9	1.6	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	37.9	21.6	13.6	33.3	14.6	12.0	48.6	22.5	0.0	63.5	24.2	24.6
LnGrp LOS	D	C	B	C	B	B	D	C		E	C	C
Approach Vol, veh/h		1186			1166			325			283	
Approach Delay, s/veh		22.7			19.2			27.5			29.2	
Approach LOS		C			B			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.5	18.1	11.8	28.3	6.9	16.7	8.8	31.4				
Change Period (Y+Rc), s	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3				
Max Green Setting (Gmax), s	4.5	32.2	9.0	25.7	7.3	29.4	12.3	22.4				
Max Q Clear Time (g_c+I1), s	3.2	6.4	7.7	18.8	4.4	6.6	5.6	12.4				
Green Ext Time (p_c), s	0.0	1.5	0.1	3.7	0.0	1.2	0.1	3.7				
Intersection Summary												
HCM 7th Control Delay, s/veh			22.5									
HCM 7th LOS			C									
Notes												
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 7th Signalized Intersection Summary
 12: Twin Oaks Valley Rd & San Marcos Blvd

Opening Year PM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	271	599	339	316	438	92	365	665	310	80	626	253
Future Volume (veh/h)	271	599	339	316	438	92	365	665	310	80	626	253
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	282	624	353	340	471	99	384	700	326	84	659	266
Peak Hour Factor	0.96	0.96	0.96	0.93	0.93	0.93	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	329	1228	636	230	922	192	230	1131	596	196	746	301
Arrive On Green	0.10	0.35	0.35	0.07	0.32	0.32	0.07	0.32	0.32	0.06	0.30	0.30
Sat Flow, veh/h	3456	3554	1536	3456	2907	607	3456	3554	1541	3456	2447	988
Grp Volume(v), veh/h	282	624	353	340	286	284	384	700	326	84	478	447
Grp Sat Flow(s),veh/h/ln	1728	1777	1536	1728	1777	1737	1728	1777	1541	1728	1777	1658
Q Serve(g_s), s	10.9	18.8	23.7	9.0	17.7	18.0	9.0	22.6	22.3	3.2	34.6	34.6
Cycle Q Clear(g_c), s	10.9	18.8	23.7	9.0	17.7	18.0	9.0	22.6	22.3	3.2	34.6	34.6
Prop In Lane	1.00		1.00	1.00		0.35	1.00		1.00	1.00		0.60
Lane Grp Cap(c), veh/h	329	1228	636	230	563	551	230	1131	596	196	541	505
V/C Ratio(X)	0.86	0.51	0.55	1.48	0.51	0.51	1.67	0.62	0.55	0.43	0.88	0.88
Avail Cap(c_a), veh/h	333	1228	636	230	563	551	230	1185	619	205	579	540
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.81	0.81	0.81	0.89	0.89	0.89	0.67	0.67	0.67
Uniform Delay (d), s/veh	60.2	35.1	30.3	63.0	37.5	37.6	63.0	39.1	32.4	61.6	44.7	44.7
Incr Delay (d2), s/veh	19.1	1.5	3.5	232.2	2.6	2.8	316.5	0.8	0.8	1.0	10.3	10.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	8.2	9.1	11.3	7.9	7.9	14.0	9.7	8.2	1.4	16.3	15.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	79.3	36.6	33.7	295.2	40.2	40.4	379.5	39.9	33.2	62.5	54.9	55.6
LnGrp LOS	E	D	C	F	D	D	F	D	C	E	D	E
Approach Vol, veh/h		1259			910			1410			1009	
Approach Delay, s/veh		45.3			135.5			130.8			55.9	
Approach LOS		D			F			F			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	54.1	16.0	48.9	19.9	50.2	14.2	50.8				
Change Period (Y+Rc), s	7.0	7.4	7.0	* 7.8	7.0	7.4	6.5	7.8				
Max Green Setting (Gmax), s	9.0	44.3	9.0	* 44	13.0	40.3	8.0	45.0				
Max Q Clear Time (g_c+I1), s	11.0	25.7	11.0	36.6	12.9	20.0	5.2	24.6				
Green Ext Time (p_c), s	0.0	5.0	0.0	3.2	0.0	3.0	0.0	5.6				
Intersection Summary												
HCM 7th Control Delay, s/veh			91.8									
HCM 7th LOS			F									
Notes												
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 7th Signalized Intersection Summary
 13: Twin Oaks Valley Rd & SR 78 WB Ramps

Opening Year PM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↔↔		↔↔		↑↑↑	↗		↑↑↑	↗
Traffic Volume (veh/h)	0	0	0	663	0	469	0	1064	550	0	1145	303
Future Volume (veh/h)	0	0	0	663	0	469	0	1064	550	0	1145	303
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	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
Work Zone On Approach				No			No			No		
Adj Sat Flow, veh/h/ln				1870	0	1870	0	1870	1870	0	1870	1870
Adj Flow Rate, veh/h				729	0	515	0	1267	655	0	1205	0
Peak Hour Factor				0.91	0.91	0.91	0.84	0.84	0.84	0.95	0.95	0.95
Percent Heavy Veh, %				2	0	2	0	2	2	0	2	2
Cap, veh/h				831	0	671	0	3489	1429	0	3489	
Arrive On Green				0.24	0.00	0.24	0.00	1.00	1.00	0.00	0.68	0.00
Sat Flow, veh/h				3456	0	2790	0	5274	1533	0	5274	1585
Grp Volume(v), veh/h				729	0	515	0	1267	655	0	1205	0
Grp Sat Flow(s),veh/h/ln				1728	0	1395	0	1702	1533	0	1702	1585
Q Serve(g_s), s				26.4	0.0	22.4	0.0	0.0	0.0	0.0	12.7	0.0
Cycle Q Clear(g_c), s				26.4	0.0	22.4	0.0	0.0	0.0	0.0	12.7	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				831	0	671	0	3489	1429	0	3489	
V/C Ratio(X)				0.88	0.00	0.77	0.00	0.36	0.46	0.00	0.35	
Avail Cap(c_a), veh/h				1579	0	1275	0	3489	1429	0	3489	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.48	0.48	0.00	0.41	0.00
Uniform Delay (d), s/veh				47.5	0.0	46.0	0.0	0.0	0.0	0.0	8.5	0.0
Incr Delay (d2), s/veh				1.2	0.0	0.7	0.0	0.1	0.5	0.0	0.1	0.0
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				11.5	0.0	7.8	0.0	0.0	0.2	0.0	4.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				48.7	0.0	46.7	0.0	0.1	0.5	0.0	8.6	0.0
LnGrp LOS				D		D		A	A		A	
Approach Vol, veh/h					1244			1922			1205	
Approach Delay, s/veh					47.9			0.3			8.6	
Approach LOS					D			A			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		94.1				94.1		35.9				
Change Period (Y+Rc), s		5.3				5.3		4.6				
Max Green Setting (Gmax), s		60.7				60.7		59.4				
Max Q Clear Time (g_c+I1), s		2.0				14.7		28.4				
Green Ext Time (p_c), s		10.7				6.1		2.9				

Intersection Summary

HCM 7th Control Delay, s/veh	16.1
HCM 7th LOS	B

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 7th Signalized Intersection Summary
 14: Twin Oaks Valley Rd & SR 78 EB Ramps

Opening Year PM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	104	39	214	0	0	0	0	1543	880	352	1441	0
Future Volume (veh/h)	104	39	214	0	0	0	0	1543	880	352	1441	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98				1.00		0.98	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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	97	0	310				0	2327	721	367	1501	0
Peak Hour Factor	0.85	0.85	0.85				0.84	0.84	0.84	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	265	0	463				0	3466	959	432	3956	0
Arrive On Green	0.15	0.00	0.15				0.00	0.62	0.62	0.17	1.00	0.00
Sat Flow, veh/h	1781	0	3106				0	5611	1553	3456	5274	0
Grp Volume(v), veh/h	97	0	310				0	2327	721	367	1501	0
Grp Sat Flow(s),veh/h/ln	1781	0	1553				0	1870	1553	1728	1702	0
Q Serve(g_s), s	6.4	0.0	12.3				0.0	35.2	43.1	13.4	0.0	0.0
Cycle Q Clear(g_c), s	6.4	0.0	12.3				0.0	35.2	43.1	13.4	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	265	0	463				0	3466	959	432	3956	0
V/C Ratio(X)	0.37	0.00	0.67				0.00	0.67	0.75	0.85	0.38	0.00
Avail Cap(c_a), veh/h	526	0	918				0	3466	959	633	3956	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.84	0.84	0.00
Uniform Delay (d), s/veh	49.8	0.0	52.3				0.0	16.2	17.7	53.0	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.0	1.7				0.0	1.1	5.4	6.2	0.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	4.9				0.0	13.9	15.2	5.8	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	50.6	0.0	54.0				0.0	17.3	23.2	59.3	0.2	0.0
LnGrp LOS	D		D					B	C	E	A	
Approach Vol, veh/h		407						3048			1868	
Approach Delay, s/veh		53.2						18.7			11.8	
Approach LOS		D						B			B	
Timer - Assigned Phs	1	2		4				6				
Phs Duration (G+Y+Rc), s	20.4	85.6		24.0				106.0				
Change Period (Y+Rc), s	4.2	5.3		4.6				5.3				
Max Green Setting (Gmax), s	23.8	53.7		38.4				81.7				
Max Q Clear Time (g_c+I1), s	15.4	45.1		14.3				2.0				
Green Ext Time (p_c), s	0.8	8.0		1.5				15.4				

Intersection Summary												
HCM 7th Control Delay, s/veh			18.9									
HCM 7th LOS			B									

Notes
 User approved volume balancing among the lanes for turning movement.



APPENDIX G

OPENING YEAR + PROJECT ANALYSIS WORKSHEETS

HCM 7th Signalized Intersection Summary
 1: Twin Oaks Valley Rd & Deer Springs Rd

Opening Year + Project AM
 12/10/2025



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	33	81	93	542	1369	39
Future Volume (veh/h)	33	81	93	542	1369	39
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	40	98	97	565	1397	40
Peak Hour Factor	0.83	0.83	0.96	0.96	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	137	122	104	1578	1400	1149
Arrive On Green	0.08	0.08	0.06	0.84	0.75	0.75
Sat Flow, veh/h	1781	1585	1781	1870	1870	1535
Grp Volume(v), veh/h	40	98	97	565	1397	40
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1535
Q Serve(g_s), s	2.9	8.3	7.4	9.2	101.3	0.9
Cycle Q Clear(g_c), s	2.9	8.3	7.4	9.2	101.3	0.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	137	122	104	1578	1400	1149
V/C Ratio(X)	0.29	0.80	0.93	0.36	1.00	0.03
Avail Cap(c_a), veh/h	313	279	104	1578	1400	1149
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.5	62.0	64.0	2.4	17.0	4.4
Incr Delay (d2), s/veh	1.2	11.4	65.7	0.1	23.5	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.4	5.2	2.0	45.9	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	60.6	73.4	129.7	2.5	40.5	4.4
LnGrp LOS	E	E	F	A	D	A
Approach Vol, veh/h	138			662	1437	
Approach Delay, s/veh	69.7			21.2	39.5	
Approach LOS	E			C	D	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		121.0		15.5	13.0	108.0
Change Period (Y+Rc), s		5.8		5.0	5.0	5.8
Max Green Setting (Gmax), s		115.2		24.0	8.0	102.2
Max Q Clear Time (g_c+I1), s		11.2		10.3	9.4	103.3
Green Ext Time (p_c), s		3.7		0.3	0.0	0.0
Intersection Summary						
HCM 7th Control Delay, s/veh			36.0			
HCM 7th LOS			D			

HCM 7th Signalized Intersection Summary
 2: Twin Oaks Valley Rd & Buena Creek Rd

Opening Year + Project AM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↔		↖	↗		↖	↕	↗
Traffic Volume (veh/h)	291	0	238	1	1	0	121	366	1	1	977	291
Future Volume (veh/h)	291	0	238	1	1	0	121	366	1	1	977	291
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	313	0	256	2	2	0	129	389	1	1	1018	303
Peak Hour Factor	0.93	0.93	0.93	0.50	0.50	0.50	0.94	0.94	0.94	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	278	0	365	46	32	0	137	1013	3	151	1035	877
Arrive On Green	0.23	0.00	0.23	0.23	0.23	0.00	0.08	0.54	0.54	0.08	0.55	0.55
Sat Flow, veh/h	940	0	1585	0	138	0	1781	1865	5	1781	1870	1585
Grp Volume(v), veh/h	313	0	256	4	0	0	129	0	390	1	1018	303
Grp Sat Flow(s),veh/h/ln	940	0	1585	138	0	0	1781	0	1869	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	17.5	0.0	0.0	0.0	8.5	0.0	14.2	0.1	62.9	12.5
Cycle Q Clear(g_c), s	27.2	0.0	17.5	27.2	0.0	0.0	8.5	0.0	14.2	0.1	62.9	12.5
Prop In Lane	1.00		1.00	0.50		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	278	0	365	77	0	0	137	0	1015	151	1035	877
V/C Ratio(X)	1.13	0.00	0.70	0.05	0.00	0.00	0.94	0.00	0.38	0.01	0.98	0.35
Avail Cap(c_a), veh/h	278	0	365	77	0	0	137	0	1015	252	1037	879
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.4	0.0	41.7	37.7	0.0	0.0	54.2	0.0	15.6	49.4	25.8	14.6
Incr Delay (d2), s/veh	92.6	0.0	5.9	0.3	0.0	0.0	58.3	0.0	0.2	0.0	23.9	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.4	0.0	7.4	0.1	0.0	0.0	5.9	0.0	5.7	0.0	31.6	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	141.0	0.0	47.5	38.0	0.0	0.0	112.5	0.0	15.8	49.5	49.7	14.8
LnGrp LOS	F		D	D			F		B	D	D	B
Approach Vol, veh/h		569			4			519			1322	
Approach Delay, s/veh		98.9			38.0			39.8			41.7	
Approach LOS		F			D			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.8	69.9		32.3	14.6	71.1		32.3				
Change Period (Y+Rc), s	5.8	5.8		* 5.1	5.5	5.8		5.1				
Max Green Setting (Gmax), s	16.7	57.5		* 27	9.1	65.4		26.1				
Max Q Clear Time (g_c+I1), s	2.1	16.2		29.2	10.5	64.9		29.2				
Green Ext Time (p_c), s	0.0	2.3		0.0	0.0	0.3		0.0				

Intersection Summary

HCM 7th Control Delay, s/veh	54.8
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 3: Twin Oaks Valley Rd & Olive Street

Opening Year + Project AM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	4	6	40	0	93	2	478	10	64	1023	0
Future Volume (veh/h)	0	4	6	40	0	93	2	478	10	64	1023	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.92	1.00		0.91	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	0	6	10	61	0	141	2	531	11	73	1162	0
Peak Hour Factor	0.63	0.63	0.63	0.66	0.66	0.66	0.90	0.90	0.90	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	27	44	209	0	169	5	1107	23	100	1235	0
Arrive On Green	0.00	0.04	0.04	0.12	0.00	0.12	0.00	0.61	0.61	0.06	0.66	0.00
Sat Flow, veh/h	0	596	994	1781	0	1439	1781	1824	38	1781	1870	0
Grp Volume(v), veh/h	0	0	16	61	0	141	2	0	542	73	1162	0
Grp Sat Flow(s),veh/h/ln	0	0	1590	1781	0	1439	1781	0	1862	1781	1870	0
Q Serve(g_s), s	0.0	0.0	1.1	3.5	0.0	10.7	0.1	0.0	18.0	4.5	62.1	0.0
Cycle Q Clear(g_c), s	0.0	0.0	1.1	3.5	0.0	10.7	0.1	0.0	18.0	4.5	62.1	0.0
Prop In Lane	0.00		0.62	1.00		1.00	1.00		0.02	1.00		0.00
Lane Grp Cap(c), veh/h	0	0	71	209	0	169	5	0	1130	100	1235	0
V/C Ratio(X)	0.00	0.00	0.23	0.29	0.00	0.83	0.42	0.00	0.48	0.73	0.94	0.00
Avail Cap(c_a), veh/h	0	0	257	295	0	239	80	0	1277	200	1408	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	51.4	45.0	0.0	48.2	55.5	0.0	12.2	51.8	17.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	1.6	0.8	0.0	15.8	48.8	0.0	0.3	9.7	11.7	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.5	1.6	0.0	4.5	0.1	0.0	6.7	2.2	25.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	53.0	45.7	0.0	64.0	104.4	0.0	12.5	61.5	28.6	0.0
LnGrp LOS			D	D		E	F		B	E	C	
Approach Vol, veh/h		16			202			544			1235	
Approach Delay, s/veh		53.0			58.5			12.8			30.6	
Approach LOS		D			E			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.9	74.0		9.6	4.9	80.0		17.1				
Change Period (Y+Rc), s	4.6	6.3		4.6	4.6	6.3		4.0				
Max Green Setting (Gmax), s	12.5	76.5		18.0	5.0	84.0		18.5				
Max Q Clear Time (g_c+I1), s	6.5	20.0		3.1	2.1	64.1		12.7				
Green Ext Time (p_c), s	0.1	3.5		0.0	0.0	9.6		0.4				
Intersection Summary												
HCM 7th Control Delay, s/veh			28.7									
HCM 7th LOS			C									

HCM 7th Signalized Intersection Summary
 4: Twin Oaks Valley Rd & E. La Cienega Road

Opening Year + Project AM
 12/10/2025

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	136	209	544	34	68	807
Future Volume (veh/h)	136	209	544	34	68	807
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00		0.95	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	181	279	604	38	71	841
Peak Hour Factor	0.75	0.75	0.90	0.90	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	419	373	960	60	114	1687
Arrive On Green	0.24	0.24	0.28	0.28	0.06	0.47
Sat Flow, veh/h	1781	1585	3477	212	1781	3647
Grp Volume(v), veh/h	181	279	317	325	71	841
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1819	1781	1777
Q Serve(g_s), s	4.1	7.7	7.3	7.4	1.8	7.7
Cycle Q Clear(g_c), s	4.1	7.7	7.3	7.4	1.8	7.7
Prop In Lane	1.00	1.00		0.12	1.00	
Lane Grp Cap(c), veh/h	419	373	504	516	114	1687
V/C Ratio(X)	0.43	0.75	0.63	0.63	0.62	0.50
Avail Cap(c_a), veh/h	1056	939	839	858	188	2505
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.4	16.8	14.8	14.8	21.6	8.5
Incr Delay (d2), s/veh	0.7	3.0	1.3	1.3	5.4	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	2.7	2.3	2.4	0.8	1.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	16.1	19.8	16.0	16.0	27.0	8.8
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	460		642			912
Approach Delay, s/veh	18.3		16.0			10.2
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.0	20.6			29.6	17.6
Change Period (Y+Rc), s	6.0	7.2			7.2	6.5
Max Green Setting (Gmax), s	5.0	22.3			33.3	28.0
Max Q Clear Time (g_c+I1), s	3.8	9.4			9.7	9.7
Green Ext Time (p_c), s	0.0	2.8			5.4	1.4
Intersection Summary						
HCM 7th Control Delay, s/veh			13.9			
HCM 7th LOS			B			

HCM 7th Signalized Intersection Summary
5: Twin Oaks Valley Rd & Del Roy Dr

Opening Year + Project AM
12/10/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	0	39	3	0	3	19	557	22	12	923	9
Future Volume (veh/h)	14	0	39	3	0	3	19	557	22	12	923	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.93	1.00		0.93
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	16	0	45	6	0	6	22	648	26	12	952	9
Peak Hour Factor	0.87	0.87	0.87	0.50	0.50	0.50	0.86	0.86	0.86	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	42	0	234	17	0	256	56	1304	52	33	1307	12
Arrive On Green	0.02	0.00	0.15	0.01	0.00	0.16	0.03	0.38	0.38	0.02	0.36	0.36
Sat Flow, veh/h	1781	0	1553	1781	0	1556	1781	3471	139	1781	3604	34
Grp Volume(v), veh/h	16	0	45	6	0	6	22	331	343	12	469	492
Grp Sat Flow(s),veh/h/ln	1781	0	1553	1781	0	1556	1781	1777	1833	1781	1777	1861
Q Serve(g_s), s	0.5	0.0	1.3	0.2	0.0	0.2	0.6	7.6	7.6	0.4	12.2	12.2
Cycle Q Clear(g_c), s	0.5	0.0	1.3	0.2	0.0	0.2	0.6	7.6	7.6	0.4	12.2	12.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.08	1.00		0.02
Lane Grp Cap(c), veh/h	42	0	234	17	0	256	56	667	689	33	644	675
V/C Ratio(X)	0.38	0.00	0.19	0.35	0.00	0.02	0.39	0.50	0.50	0.37	0.73	0.73
Avail Cap(c_a), veh/h	201	0	994	201	0	1040	201	846	873	201	846	886
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	25.6	0.0	19.7	26.2	0.0	18.6	25.2	12.7	12.7	25.8	14.7	14.7
Incr Delay (d2), s/veh	5.5	0.0	0.4	11.9	0.0	0.0	4.5	0.6	0.6	6.8	2.2	2.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.5	0.1	0.0	0.1	0.3	2.3	2.4	0.2	4.0	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	31.0	0.0	20.1	38.1	0.0	18.7	29.7	13.3	13.3	32.5	16.9	16.8
LnGrp LOS	C		C	D		B	C	B	B	C	B	B
Approach Vol, veh/h		61			12			696			973	
Approach Delay, s/veh		23.0			28.4			13.8			17.0	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.5	26.2	6.5	14.0	7.2	25.5	5.8	14.7				
Change Period (Y+Rc), s	5.5	6.2	6.0	6.0	5.5	6.2	4.5	6.0				
Max Green Setting (Gmax), s	6.0	25.3	6.0	34.0	6.0	25.3	6.0	35.5				
Max Q Clear Time (g_c+I1), s	2.4	9.6	2.2	3.3	2.6	14.2	2.5	2.2				
Green Ext Time (p_c), s	0.0	3.2	0.0	0.2	0.0	4.1	0.0	0.0				
Intersection Summary												
HCM 7th Control Delay, s/veh			16.0									
HCM 7th LOS			B									

HCM 7th Signalized Intersection Summary
6: Twin Oaks Valley Rd & Project Driveway

Opening Year + Project AM
12/10/2025



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	112	41	565	957	11
Future Volume (veh/h)	30	112	41	565	957	11
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	122	45	614	1040	12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	192	171	84	2490	2004	23
Arrive On Green	0.11	0.11	0.05	0.70	0.56	0.56
Sat Flow, veh/h	1781	1585	1781	3647	3689	41
Grp Volume(v), veh/h	33	122	45	614	514	538
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1777	1777	1860
Q Serve(g_s), s	0.8	3.5	1.2	2.9	8.5	8.5
Cycle Q Clear(g_c), s	0.8	3.5	1.2	2.9	8.5	8.5
Prop In Lane	1.00	1.00	1.00			0.02
Lane Grp Cap(c), veh/h	192	171	84	2490	991	1037
V/C Ratio(X)	0.17	0.71	0.53	0.25	0.52	0.52
Avail Cap(c_a), veh/h	687	611	209	2490	991	1037
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.0	20.3	21.9	2.5	6.5	6.5
Incr Delay (d2), s/veh	0.4	5.5	5.2	0.2	1.9	1.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	3.3	0.5	0.1	2.1	2.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	19.5	25.7	27.0	2.8	8.4	8.3
LnGrp LOS	B	C	C	A	A	A
Approach Vol, veh/h	155			659	1052	
Approach Delay, s/veh	24.4			4.4	8.4	
Approach LOS	C			A	A	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		37.4		9.6	6.7	30.7
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		32.9		18.1	5.5	22.9
Max Q Clear Time (g_c+I1), s		4.9		5.5	3.2	10.5
Green Ext Time (p_c), s		3.8		0.3	0.0	5.0
Intersection Summary						
HCM 7th Control Delay, s/veh			8.3			
HCM 7th LOS			A			

HCM 7th Signalized Intersection Summary
 7: Twin Oaks Valley Rd & Windy Wy

Opening Year + Project AM
 12/10/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	0	31	0	0	0	22	611	2	3	1048	37
Future Volume (veh/h)	21	0	31	0	0	0	22	611	2	3	1048	37
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.93				1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	24	0	36				24	664	2	3	1103	39
Peak Hour Factor	0.87	0.87	0.87				0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2				2	2	2	2	2	2
Cap, veh/h	85	0	70				56	2993	9	7	2785	98
Arrive On Green	0.05	0.00	0.05				0.03	0.82	0.82	0.00	0.80	0.80
Sat Flow, veh/h	1781	0	1470				1781	3634	11	1781	3497	124
Grp Volume(v), veh/h	24	0	36				24	325	341	3	560	582
Grp Sat Flow(s),veh/h/ln	1781	0	1470				1781	1777	1868	1781	1777	1843
Q Serve(g_s), s	1.7	0.0	3.1				1.7	5.1	5.1	0.2	12.2	12.2
Cycle Q Clear(g_c), s	1.7	0.0	3.1				1.7	5.1	5.1	0.2	12.2	12.2
Prop In Lane	1.00		1.00				1.00		0.01	1.00		0.07
Lane Grp Cap(c), veh/h	85	0	70				56	1464	1539	7	1415	1468
V/C Ratio(X)	0.28	0.00	0.51				0.43	0.22	0.22	0.43	0.40	0.40
Avail Cap(c_a), veh/h	343	0	283				137	1464	1539	96	1415	1468
HCM Platoon Ratio	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				0.87	0.87	0.87	0.90	0.90	0.90
Uniform Delay (d), s/veh	59.8	0.0	60.4				61.8	2.5	2.5	64.6	3.9	3.9
Incr Delay (d2), s/veh	1.8	0.0	5.7				4.5	0.3	0.3	32.8	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
%ile BackOfQ(50%),veh/ln	0.8	0.0	1.3				0.8	1.2	1.3	0.2	3.4	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	61.5	0.0	66.1				66.4	2.8	2.8	97.4	4.7	4.7
LnGrp LOS	E		E				E	A	A	F	A	A
Approach Vol, veh/h		60						690			1145	
Approach Delay, s/veh		64.3						5.0			4.9	
Approach LOS		E						A			A	
Timer - Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	5.5	113.3		11.2	9.1	109.7						
Change Period (Y+Rc), s	5.0	6.2		5.0	5.0	6.2						
Max Green Setting (Gmax), s	7.0	81.8		25.0	10.0	78.8						
Max Q Clear Time (g_c+I1), s	2.2	7.1		5.1	3.7	14.2						
Green Ext Time (p_c), s	0.0	4.0		0.2	0.0	8.7						
Intersection Summary												
HCM 7th Control Delay, s/veh			6.8									
HCM 7th LOS			A									

HCM 7th Signalized Intersection Summary
 8: Twin Oaks Valley Rd & Borden Rd

Opening Year + Project AM
 12/10/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	259	202	242	370	84	102	467	95	60	860	179
Future Volume (veh/h)	70	259	202	242	370	84	102	467	95	60	860	179
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	84	312	243	288	440	100	113	519	106	63	905	188
Peak Hour Factor	0.83	0.83	0.83	0.84	0.84	0.84	0.90	0.90	0.90	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	105	586	443	314	1220	275	136	1098	755	80	1020	441
Arrive On Green	0.06	0.31	0.31	0.18	0.43	0.43	0.08	0.31	0.31	0.05	0.29	0.29
Sat Flow, veh/h	1781	1900	1438	1781	2866	646	1781	3554	1540	1781	3554	1538
Grp Volume(v), veh/h	84	291	264	288	271	269	113	519	106	63	905	188
Grp Sat Flow(s),veh/h/ln	1781	1777	1562	1781	1777	1735	1781	1777	1540	1781	1777	1538
Q Serve(g_s), s	6.6	19.3	20.0	22.6	14.7	15.0	8.9	16.8	5.4	5.0	34.7	14.1
Cycle Q Clear(g_c), s	6.6	19.3	20.0	22.6	14.7	15.0	8.9	16.8	5.4	5.0	34.7	14.1
Prop In Lane	1.00		0.92	1.00		0.37	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	105	548	481	314	756	738	136	1098	755	80	1020	441
V/C Ratio(X)	0.80	0.53	0.55	0.92	0.36	0.36	0.83	0.47	0.14	0.78	0.89	0.43
Avail Cap(c_a), veh/h	168	548	481	389	756	738	180	1098	755	116	1020	441
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	66.2	40.8	41.0	57.6	27.7	27.8	64.9	39.8	20.3	67.3	48.6	41.2
Incr Delay (d2), s/veh	13.1	3.7	4.4	23.2	1.3	1.4	21.3	1.5	0.4	19.1	11.4	3.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	9.1	8.4	12.2	6.6	6.6	4.8	7.4	2.0	2.7	16.6	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	79.3	44.4	45.5	80.9	29.1	29.2	86.2	41.3	20.7	86.4	59.9	44.2
LnGrp LOS	E	D	D	F	C	C	F	D	C	F	E	D
Approach Vol, veh/h		639			828			738			1156	
Approach Delay, s/veh		49.4			47.1			45.2			58.8	
Approach LOS		D			D			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	30.0	50.0	15.5	47.0	13.3	66.7	12.3	50.1				
Change Period (Y+Rc), s	* 4.9	* 6.1	4.6	* 6.1	* 4.9	* 6.1	5.9	* 6.1				
Max Green Setting (Gmax), s	* 31	* 43	14.4	* 40	* 13	* 61	9.3	* 44				
Max Q Clear Time (g_c+I1), s	24.6	22.0	10.9	36.7	8.6	17.0	7.0	18.8				
Green Ext Time (p_c), s	0.5	3.6	0.1	1.9	0.1	3.7	0.0	3.6				
Intersection Summary												
HCM 7th Control Delay, s/veh			51.2									
HCM 7th LOS			D									
Notes												
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 7th Signalized Intersection Summary
 9: Woodward St & Borden Rd

Opening Year + Project AM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	308	50	16	509	20	59	33	14	36	134	123
Future Volume (veh/h)	52	308	50	16	509	20	59	33	14	36	134	123
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.95	1.00		0.97	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	80	474	77	21	661	26	70	39	17	42	156	143
Peak Hour Factor	0.65	0.65	0.65	0.77	0.77	0.77	0.84	0.84	0.84	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	205	1119	181	60	1022	40	172	280	122	100	351	286
Arrive On Green	0.11	0.37	0.37	0.03	0.29	0.29	0.10	0.23	0.23	0.06	0.19	0.19
Sat Flow, veh/h	1781	3042	491	1781	3478	137	1781	1220	532	1781	1870	1523
Grp Volume(v), veh/h	80	276	275	21	337	350	70	0	56	42	156	143
Grp Sat Flow(s),veh/h/ln	1781	1777	1756	1781	1777	1837	1781	0	1752	1781	1870	1523
Q Serve(g_s), s	2.9	8.1	8.2	0.8	11.5	11.6	2.6	0.0	1.8	1.6	5.1	5.9
Cycle Q Clear(g_c), s	2.9	8.1	8.2	0.8	11.5	11.6	2.6	0.0	1.8	1.6	5.1	5.9
Prop In Lane	1.00		0.28	1.00		0.07	1.00		0.30	1.00		1.00
Lane Grp Cap(c), veh/h	205	654	646	60	522	540	172	0	403	100	351	286
V/C Ratio(X)	0.39	0.42	0.43	0.35	0.65	0.65	0.41	0.00	0.14	0.42	0.44	0.50
Avail Cap(c_a), veh/h	470	1196	1182	179	921	952	460	0	1021	228	838	682
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.6	16.5	16.5	32.9	21.4	21.5	29.6	0.0	21.3	31.8	25.1	25.4
Incr Delay (d2), s/veh	1.2	0.4	0.4	3.5	1.4	1.3	1.5	0.0	0.2	2.8	0.9	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	1.2	3.1	3.1	0.4	4.6	4.8	1.1	0.0	0.7	0.7	2.2	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	29.8	16.9	17.0	36.4	22.8	22.8	31.1	0.0	21.5	34.6	26.0	26.7
LnGrp LOS	C	B	B	D	C	C	C		C	C	C	C
Approach Vol, veh/h		631			708			126			341	
Approach Delay, s/veh		18.6			23.2			26.9			27.4	
Approach LOS		B			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.4	31.4	11.9	18.9	12.6	26.3	9.0	21.8				
Change Period (Y+Rc), s	5.1	* 5.8	5.2	5.8	4.6	* 5.8	5.1	* 5.8				
Max Green Setting (Gmax), s	7.0	* 47	18.0	31.2	18.4	* 36	8.9	* 41				
Max Q Clear Time (g_c+I1), s	2.8	10.2	4.6	7.9	4.9	13.6	3.6	3.8				
Green Ext Time (p_c), s	0.0	3.6	0.1	1.3	0.1	4.2	0.0	0.3				

Intersection Summary												
HCM 7th Control Delay, s/veh				22.6								
HCM 7th LOS				C								

Notes
 * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 10: Twin Oaks Valley Rd & Richmar Road

Opening Year + Project AM
 12/10/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	123	12	108	22	2	2	56	563	19	24	1174	170
Future Volume (veh/h)	123	12	108	22	2	2	56	563	19	24	1174	170
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.96	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	145	14	127	23	2	2	57	574	19	26	1249	181
Peak Hour Factor	0.85	0.85	0.85	0.94	0.94	0.94	0.98	0.98	0.98	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	191	16	147	144	68	68	73	2086	69	50	1805	260
Arrive On Green	0.11	0.11	0.11	0.08	0.08	0.08	0.04	0.59	0.59	0.03	0.58	0.58
Sat Flow, veh/h	1781	151	1371	1781	840	840	1781	3506	116	1781	3101	446
Grp Volume(v), veh/h	145	0	141	23	0	4	57	291	302	26	712	718
Grp Sat Flow(s),veh/h/ln	1781	0	1522	1781	0	1681	1781	1777	1845	1781	1777	1771
Q Serve(g_s), s	10.3	0.0	11.8	1.6	0.0	0.3	4.1	10.3	10.3	1.9	36.3	37.1
Cycle Q Clear(g_c), s	10.3	0.0	11.8	1.6	0.0	0.3	4.1	10.3	10.3	1.9	36.3	37.1
Prop In Lane	1.00		0.90	1.00		0.50	1.00		0.06	1.00		0.25
Lane Grp Cap(c), veh/h	191	0	163	144	0	136	73	1057	1098	50	1034	1031
V/C Ratio(X)	0.76	0.00	0.86	0.16	0.00	0.03	0.78	0.27	0.28	0.52	0.69	0.70
Avail Cap(c_a), veh/h	201	0	172	521	0	491	93	1057	1098	82	1034	1031
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	0.90	0.90	0.90	0.27	0.27	0.27
Uniform Delay (d), s/veh	56.4	0.0	57.1	55.6	0.0	55.0	61.7	12.7	12.8	62.3	19.0	19.1
Incr Delay (d2), s/veh	14.6	0.0	32.5	0.5	0.0	0.1	24.4	0.6	0.6	2.2	1.0	1.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.0	6.0	0.7	0.0	0.1	2.3	4.0	4.2	0.9	14.0	14.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	70.9	0.0	89.5	56.1	0.0	55.1	86.2	13.3	13.3	64.6	20.0	20.2
LnGrp LOS	E		F	E		E	F	B	B	E	B	C
Approach Vol, veh/h		286			27			650			1456	
Approach Delay, s/veh		80.1			56.0			19.7			20.9	
Approach LOS		F			E			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.7	83.6		20.1	11.3	82.0		16.6				
Change Period (Y+Rc), s	6.0	6.3		6.1	6.0	6.3		6.1				
Max Green Setting (Gmax), s	6.0	46.8		14.7	6.8	46.0		38.0				
Max Q Clear Time (g_c+I1), s	3.9	12.3		13.8	6.1	39.1		3.6				
Green Ext Time (p_c), s	0.0	3.4		0.1	0.0	4.6		0.1				
Intersection Summary												
HCM 7th Control Delay, s/veh			28.0									
HCM 7th LOS			C									

HCM 7th Signalized Intersection Summary
 11: San Marcos Blvd & E. Mission Road

Opening Year + Project AM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	407	37	393	641	46	12	76	579	52	278	59
Future Volume (veh/h)	25	407	37	393	641	46	12	76	579	52	278	59
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	1.00		1.00	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	1742	1673	1870	1870	1742	1742	1742	1870	1742	1870
Adj Flow Rate, veh/h	31	509	46	457	745	53	17	109	0	56	299	63
Peak Hour Factor	0.80	0.80	0.80	0.86	0.86	0.86	0.70	0.70	0.70	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	36	910	363	579	1504	653	21	632		70	589	122
Arrive On Green	0.02	0.26	0.26	0.19	0.42	0.42	0.01	0.19	0.00	0.04	0.22	0.22
Sat Flow, veh/h	1781	3554	1415	3092	3554	1542	1659	3311	1477	1781	2708	560
Grp Volume(v), veh/h	31	509	46	457	745	53	17	109	0	56	181	181
Grp Sat Flow(s),veh/h/ln	1781	1777	1415	1546	1777	1542	1659	1655	1477	1781	1655	1612
Q Serve(g_s), s	1.0	7.1	1.4	8.0	8.7	1.2	0.6	1.6	0.0	1.8	5.5	5.6
Cycle Q Clear(g_c), s	1.0	7.1	1.4	8.0	8.7	1.2	0.6	1.6	0.0	1.8	5.5	5.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.35
Lane Grp Cap(c), veh/h	36	910	363	579	1504	653	21	632		70	360	351
V/C Ratio(X)	0.85	0.56	0.13	0.79	0.50	0.08	0.82	0.17		0.81	0.50	0.52
Avail Cap(c_a), veh/h	206	1560	621	760	2022	877	163	1622		141	779	759
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	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.8	18.4	16.3	22.1	12.0	9.8	28.1	19.3	0.0	27.2	19.6	19.6
Incr Delay (d2), s/veh	38.9	0.5	0.2	4.2	0.3	0.1	53.1	0.1	0.0	19.0	1.1	1.2
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	0.8	2.5	0.4	2.8	2.7	0.3	0.5	0.5	0.0	1.0	1.9	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	66.7	18.9	16.4	26.2	12.2	9.9	81.1	19.4	0.0	46.2	20.7	20.8
LnGrp LOS	E	B	B	C	B	A	F	B		D	C	C
Approach Vol, veh/h		586			1255			126			418	
Approach Delay, s/veh		21.3			17.2			27.7			24.2	
Approach LOS		C			B			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.2	16.2	14.7	19.9	4.7	17.7	5.2	29.4				
Change Period (Y+Rc), s	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3				
Max Green Setting (Gmax), s	4.5	27.9	14.0	25.0	5.6	26.8	6.6	32.4				
Max Q Clear Time (g_c+I1), s	3.8	3.6	10.0	9.1	2.6	7.6	3.0	10.7				
Green Ext Time (p_c), s	0.0	0.5	0.7	2.9	0.0	1.8	0.0	4.9				
Intersection Summary												
HCM 7th Control Delay, s/veh			20.0									
HCM 7th LOS			B									
Notes												
User approved changes to right turn type.												
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 7th Signalized Intersection Summary
 12: Twin Oaks Valley Rd & San Marcos Blvd

Opening Year + Project AM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	186	431	257	359	328	17	201	455	542	89	836	242
Future Volume (veh/h)	186	431	257	359	328	17	201	455	542	89	836	242
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	204	474	282	390	357	18	221	500	596	95	889	257
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.91	0.91	0.91	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	256	1153	604	230	1089	55	230	1204	628	199	880	254
Arrive On Green	0.07	0.32	0.32	0.07	0.32	0.32	0.07	0.34	0.34	0.06	0.33	0.33
Sat Flow, veh/h	3456	3554	1537	3456	3437	173	3456	3554	1541	3456	2701	779
Grp Volume(v), veh/h	204	474	282	390	184	191	221	500	596	95	584	562
Grp Sat Flow(s),veh/h/ln	1728	1777	1537	1728	1777	1833	1728	1777	1541	1728	1777	1703
Q Serve(g_s), s	7.8	14.0	18.5	9.0	10.6	10.7	8.6	14.6	45.7	3.6	44.0	44.0
Cycle Q Clear(g_c), s	7.8	14.0	18.5	9.0	10.6	10.7	8.6	14.6	45.7	3.6	44.0	44.0
Prop In Lane	1.00		1.00	1.00		0.09	1.00		1.00	1.00		0.46
Lane Grp Cap(c), veh/h	256	1153	604	230	563	581	230	1204	628	199	579	555
V/C Ratio(X)	0.80	0.41	0.47	1.69	0.33	0.33	0.96	0.42	0.95	0.48	1.01	1.01
Avail Cap(c_a), veh/h	333	1166	610	230	563	581	230	1204	628	205	579	555
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.80	0.80	0.80	0.93	0.93	0.93	0.60	0.60	0.60
Uniform Delay (d), s/veh	61.5	35.5	30.6	63.0	35.1	35.2	62.8	34.4	38.9	61.6	45.5	45.5
Incr Delay (d2), s/veh	9.7	1.1	2.6	326.4	1.2	1.2	45.8	0.2	23.0	1.1	31.2	32.6
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	3.7	6.1	7.1	14.3	4.7	4.9	5.2	6.2	22.2	1.6	23.7	22.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	71.2	36.6	33.2	389.4	36.4	36.4	108.6	34.6	61.9	62.7	76.7	78.1
LnGrp LOS	E	D	C	F	D	D	F	C	E	E	F	F
Approach Vol, veh/h		960			765			1317			1241	
Approach Delay, s/veh		43.0			216.3			59.4			76.2	
Approach LOS		D			F			E			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	51.2	16.0	51.8	17.0	50.2	14.3	53.5				
Change Period (Y+Rc), s	7.0	7.4	7.0	* 7.8	7.0	7.4	6.5	7.8				
Max Green Setting (Gmax), s	9.0	44.3	9.0	* 44	13.0	40.3	8.0	45.0				
Max Q Clear Time (g_c+I1), s	11.0	20.5	10.6	46.0	9.8	12.7	5.6	47.7				
Green Ext Time (p_c), s	0.0	3.9	0.0	0.0	0.2	2.0	0.0	0.0				
Intersection Summary												
HCM 7th Control Delay, s/veh			88.6									
HCM 7th LOS			F									
Notes												
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 7th Signalized Intersection Summary
 13: Twin Oaks Valley Rd & SR 78 WB Ramps

Opening Year + Project AM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↔↔		↔↔		↑↑↑	↗		↑↑↑	↗
Traffic Volume (veh/h)	0	0	0	719	0	223	0	1209	411	0	1197	362
Future Volume (veh/h)	0	0	0	719	0	223	0	1209	411	0	1197	362
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	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
Work Zone On Approach				No			No			No		
Adj Sat Flow, veh/h/ln				1870	0	1870	0	1870	1870	0	1870	1870
Adj Flow Rate, veh/h				826	0	256	0	1300	442	0	1273	0
Peak Hour Factor				0.87	0.87	0.87	0.93	0.93	0.93	0.94	0.94	0.94
Percent Heavy Veh, %				2	0	2	0	2	2	0	2	2
Cap, veh/h				915	0	738	0	3366	1430	0	3366	
Arrive On Green				0.26	0.00	0.26	0.00	1.00	1.00	0.00	0.66	0.00
Sat Flow, veh/h				3456	0	2790	0	5274	1533	0	5274	1585
Grp Volume(v), veh/h				826	0	256	0	1300	442	0	1273	0
Grp Sat Flow(s),veh/h/ln				1728	0	1395	0	1702	1533	0	1702	1585
Q Serve(g_s), s				30.0	0.0	9.7	0.0	0.0	0.0	0.0	14.7	0.0
Cycle Q Clear(g_c), s				30.0	0.0	9.7	0.0	0.0	0.0	0.0	14.7	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				915	0	738	0	3366	1430	0	3366	
V/C Ratio(X)				0.90	0.00	0.35	0.00	0.39	0.31	0.00	0.38	
Avail Cap(c_a), veh/h				1579	0	1275	0	3366	1430	0	3366	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.59	0.59	0.00	0.34	0.00
Uniform Delay (d), s/veh				46.2	0.0	38.7	0.0	0.0	0.0	0.0	10.1	0.0
Incr Delay (d2), s/veh				2.1	0.0	0.1	0.0	0.2	0.3	0.0	0.1	0.0
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				13.1	0.0	3.3	0.0	0.1	0.1	0.0	5.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				48.3	0.0	38.8	0.0	0.2	0.3	0.0	10.2	0.0
LnGrp LOS				D		D		A	A		B	
Approach Vol, veh/h					1082			1742			1273	
Approach Delay, s/veh					46.1			0.2			10.2	
Approach LOS					D			A			B	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		91.0				91.0		39.0				
Change Period (Y+Rc), s		5.3				5.3		4.6				
Max Green Setting (Gmax), s		60.7				60.7		59.4				
Max Q Clear Time (g_c+I1), s		2.0				16.7		32.0				
Green Ext Time (p_c), s		9.9				6.5		2.4				

Intersection Summary		
HCM 7th Control Delay, s/veh		15.4
HCM 7th LOS		B

Notes
 Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 7th Signalized Intersection Summary
 14: Twin Oaks Valley Rd & SR 78 EB Ramps

Opening Year + Project AM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	523	6	824	0	0	0	0	1117	460	357	1563	0
Future Volume (veh/h)	523	6	824	0	0	0	0	1117	460	357	1563	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99				1.00		0.98	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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	373	0	1077				0	1335	433	392	1718	0
Peak Hour Factor	0.94	0.94	0.94				0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	567	0	1000				0	2473	682	457	3091	0
Arrive On Green	0.32	0.00	0.32				0.00	0.44	0.44	0.18	0.81	0.00
Sat Flow, veh/h	1781	0	3140				0	5611	1548	3456	5274	0
Grp Volume(v), veh/h	373	0	1077				0	1335	433	392	1718	0
Grp Sat Flow(s),veh/h/ln	1781	0	1570				0	1870	1548	1728	1702	0
Q Serve(g_s), s	23.5	0.0	41.4				0.0	22.7	28.2	14.3	15.4	0.0
Cycle Q Clear(g_c), s	23.5	0.0	41.4				0.0	22.7	28.2	14.3	15.4	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	567	0	1000				0	2473	682	457	3091	0
V/C Ratio(X)	0.66	0.00	1.08				0.00	0.54	0.63	0.86	0.56	0.00
Avail Cap(c_a), veh/h	567	0	1000				0	2473	682	659	3091	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.81	0.81	0.00
Uniform Delay (d), s/veh	38.2	0.0	44.3				0.0	26.7	28.2	52.4	6.5	0.0
Incr Delay (d2), s/veh	2.8	0.0	51.5				0.0	0.9	4.5	6.3	0.6	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.7	0.0	23.1				0.0	9.9	10.9	6.2	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	41.0	0.0	95.8				0.0	27.5	32.7	58.7	7.1	0.0
LnGrp LOS	D		F				C	C	E	A		
Approach Vol, veh/h		1450						1768			2110	
Approach Delay, s/veh		81.7						28.8			16.7	
Approach LOS		F						C			B	
Timer - Assigned Phs	1	2	4	6								
Phs Duration (G+Y+Rc), s	21.4	62.6	46.0	84.0								
Change Period (Y+Rc), s	4.2	5.3	4.6	5.3								
Max Green Setting (Gmax), s	24.8	49.7	41.4	78.7								
Max Q Clear Time (g_c+I1), s	16.3	30.2	43.4	17.4								
Green Ext Time (p_c), s	0.9	10.5	0.0	19.2								

Intersection Summary		
HCM 7th Control Delay, s/veh		38.4
HCM 7th LOS		D

Notes
 User approved volume balancing among the lanes for turning movement.

HCM 7th Signalized Intersection Summary
 1: Twin Oaks Valley Rd & Deer Springs Rd

Opening Year + Project PM
 12/10/2025



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	158	74	955	763	31
Future Volume (veh/h)	30	158	74	955	763	31
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	35	186	85	1098	942	38
Peak Hour Factor	0.85	0.85	0.87	0.87	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	262	233	122	1311	1050	859
Arrive On Green	0.15	0.15	0.07	0.70	0.56	0.56
Sat Flow, veh/h	1781	1585	1781	1870	1870	1529
Grp Volume(v), veh/h	35	186	85	1098	942	38
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1529
Q Serve(g_s), s	1.2	8.0	3.3	30.2	31.6	0.8
Cycle Q Clear(g_c), s	1.2	8.0	3.3	30.2	31.6	0.8
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	262	233	122	1311	1050	859
V/C Ratio(X)	0.13	0.80	0.69	0.84	0.90	0.04
Avail Cap(c_a), veh/h	602	536	326	1718	1244	1017
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.3	29.2	32.3	7.7	13.7	7.0
Incr Delay (d2), s/veh	0.2	6.2	6.9	3.0	7.9	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	7.2	1.6	7.3	13.3	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	26.6	35.4	39.2	10.6	21.6	7.0
LnGrp LOS	C	D	D	B	C	A
Approach Vol, veh/h	221			1183	980	
Approach Delay, s/veh	34.0			12.7	21.1	
Approach LOS	C			B	C	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		55.5		15.4	9.9	45.7
Change Period (Y+Rc), s		5.8		5.0	5.0	5.8
Max Green Setting (Gmax), s		65.2		24.0	13.0	47.2
Max Q Clear Time (g_c+I1), s		32.2		10.0	5.3	33.6
Green Ext Time (p_c), s		10.7		0.5	0.1	6.3
Intersection Summary						
HCM 7th Control Delay, s/veh			18.1			
HCM 7th LOS			B			

HCM 7th Signalized Intersection Summary
 2: Twin Oaks Valley Rd & Buena Creek Rd

Opening Year + Project PM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	395	0	220	1	0	0	198	613	1	0	729	359
Future Volume (veh/h)	395	0	220	1	0	0	198	613	1	0	729	359
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	0.99		1.00	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	434	0	242	4	0	0	228	705	1	0	776	382
Peak Hour Factor	0.91	0.91	0.91	0.25	0.25	0.25	0.87	0.87	0.87	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	557	0	423	127	0	0	218	1124	2	2	780	642
Arrive On Green	0.27	0.00	0.27	0.27	0.00	0.00	0.12	0.60	0.60	0.00	0.42	0.42
Sat Flow, veh/h	1732	0	1542	167	0	0	1781	1867	3	1781	1870	1539
Grp Volume(v), veh/h	434	0	242	4	0	0	228	0	706	0	776	382
Grp Sat Flow(s),veh/h/ln	1732	0	1542	167	0	0	1781	0	1870	1781	1870	1539
Q Serve(g_s), s	0.0	0.0	11.9	0.3	0.0	0.0	10.8	0.0	21.3	0.0	36.4	17.0
Cycle Q Clear(g_c), s	20.6	0.0	11.9	20.9	0.0	0.0	10.8	0.0	21.3	0.0	36.4	17.0
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	557	0	423	127	0	0	218	0	1126	2	780	642
V/C Ratio(X)	0.78	0.00	0.57	0.03	0.00	0.00	1.05	0.00	0.63	0.00	0.99	0.59
Avail Cap(c_a), veh/h	586	0	454	164	0	0	218	0	1126	337	780	642
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	0.00	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	30.7	0.0	27.5	40.7	0.0	0.0	38.7	0.0	11.2	0.0	25.6	19.9
Incr Delay (d2), s/veh	6.4	0.0	1.5	0.1	0.0	0.0	73.3	0.0	1.1	0.0	30.8	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	9.5	0.0	4.4	0.1	0.0	0.0	8.9	0.0	7.4	0.0	20.9	5.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	37.1	0.0	29.1	40.8	0.0	0.0	112.0	0.0	12.3	0.0	56.3	21.4
LnGrp LOS	D		C	D			F		B		E	C
Approach Vol, veh/h		676			4			934			1158	
Approach Delay, s/veh		34.2			40.8			36.7			44.8	
Approach LOS		C			D			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	58.9		29.3	16.3	42.6		29.3				
Change Period (Y+Rc), s	5.8	5.8		* 5.1	5.5	5.8		5.1				
Max Green Setting (Gmax), s	16.7	30.6		* 27	10.8	36.8		26.0				
Max Q Clear Time (g_c+I1), s	0.0	23.3		22.9	12.8	38.4		22.6				
Green Ext Time (p_c), s	0.0	2.6		0.0	0.0	0.0		1.2				

Intersection Summary												
HCM 7th Control Delay, s/veh				39.5								
HCM 7th LOS				D								

Notes
 * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 3: Twin Oaks Valley Rd & Olive Street

Opening Year + Project PM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	4	6	17	0	75	0	881	19	114	601	0
Future Volume (veh/h)	0	4	6	17	0	75	0	881	19	114	601	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.88	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	0	13	19	21	0	93	0	979	21	125	660	0
Peak Hour Factor	0.31	0.31	0.31	0.81	0.81	0.81	0.90	0.90	0.90	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	39	57	151	0	118	2	1052	23	154	1326	0
Arrive On Green	0.00	0.06	0.06	0.08	0.00	0.08	0.00	0.58	0.58	0.09	0.71	0.00
Sat Flow, veh/h	0	654	956	1781	0	1396	1781	1823	39	1781	1870	0
Grp Volume(v), veh/h	0	0	32	21	0	93	0	0	1000	125	660	0
Grp Sat Flow(s),veh/h/ln	0	0	1610	1781	0	1396	1781	0	1862	1781	1870	0
Q Serve(g_s), s	0.0	0.0	1.9	1.1	0.0	6.6	0.0	0.0	49.8	7.0	16.1	0.0
Cycle Q Clear(g_c), s	0.0	0.0	1.9	1.1	0.0	6.6	0.0	0.0	49.8	7.0	16.1	0.0
Prop In Lane	0.00		0.59	1.00		1.00	1.00		0.02	1.00		0.00
Lane Grp Cap(c), veh/h	0	0	95	151	0	118	2	0	1075	154	1326	0
V/C Ratio(X)	0.00	0.00	0.34	0.14	0.00	0.79	0.00	0.00	0.93	0.81	0.50	0.00
Avail Cap(c_a), veh/h	0	0	286	327	0	256	88	0	1254	186	1363	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	45.8	43.0	0.0	45.5	0.0	0.0	19.6	45.5	6.6	0.0
Incr Delay (d2), s/veh	0.0	0.0	2.0	0.4	0.0	10.8	0.0	0.0	11.3	19.8	0.3	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.8	0.5	0.0	2.6	0.0	0.0	21.4	3.8	4.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	47.8	43.4	0.0	56.3	0.0	0.0	30.8	65.3	6.9	0.0
LnGrp LOS			D	D		E			C	E	A	
Approach Vol, veh/h		32			114			1000			785	
Approach Delay, s/veh		47.8			54.0			30.8			16.2	
Approach LOS		D			D			C			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.4	64.8		10.6	0.0	78.2		12.6				
Change Period (Y+Rc), s	4.6	6.3		4.6	4.6	6.3		4.0				
Max Green Setting (Gmax), s	10.6	68.3		18.0	5.0	73.9		18.6				
Max Q Clear Time (g_c+I1), s	9.0	51.8		3.9	0.0	18.1		8.6				
Green Ext Time (p_c), s	0.0	6.8		0.1	0.0	4.6		0.3				
Intersection Summary												
HCM 7th Control Delay, s/veh			26.5									
HCM 7th LOS			C									

HCM 7th Signalized Intersection Summary
 4: Twin Oaks Valley Rd & E. La Cienega Road

Opening Year + Project PM
 12/10/2025



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↶	↕↔		↶	↗↗
Traffic Volume (veh/h)	59	46	728	78	123	591
Future Volume (veh/h)	59	46	728	78	123	591
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00		0.96	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	88	69	827	89	132	635
Peak Hour Factor	0.67	0.67	0.88	0.88	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	202	180	1166	125	168	2088
Arrive On Green	0.11	0.11	0.36	0.36	0.09	0.59
Sat Flow, veh/h	1781	1585	3313	346	1781	3647
Grp Volume(v), veh/h	88	69	456	460	132	635
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1789	1781	1777
Q Serve(g_s), s	2.1	1.8	10.1	10.1	3.3	4.1
Cycle Q Clear(g_c), s	2.1	1.8	10.1	10.1	3.3	4.1
Prop In Lane	1.00	1.00		0.19	1.00	
Lane Grp Cap(c), veh/h	202	180	643	648	168	2088
V/C Ratio(X)	0.44	0.38	0.71	0.71	0.78	0.30
Avail Cap(c_a), veh/h	1089	969	865	871	195	2585
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.9	18.8	12.5	12.5	20.3	4.7
Incr Delay (d2), s/veh	1.5	1.3	1.7	1.7	16.5	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.7	3.0	3.0	1.9	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	20.4	20.2	14.3	14.3	36.8	4.8
LnGrp LOS	C	C	B	B	D	A
Approach Vol, veh/h	157		916			767
Approach Delay, s/veh	20.3		14.3			10.3
Approach LOS	C		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	10.3	23.8			34.1	11.7
Change Period (Y+Rc), s	6.0	7.2			7.2	6.5
Max Green Setting (Gmax), s	5.0	22.3			33.3	28.0
Max Q Clear Time (g_c+I1), s	5.3	12.1			6.1	4.1
Green Ext Time (p_c), s	0.0	3.7			4.0	0.4
Intersection Summary						
HCM 7th Control Delay, s/veh			13.1			
HCM 7th LOS			B			

HCM 7th Signalized Intersection Summary
5: Twin Oaks Valley Rd & Del Roy Dr

Opening Year + Project PM
12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	0	23	30	0	15	37	813	4	4	620	14
Future Volume (veh/h)	6	0	23	30	0	15	37	813	4	4	620	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.94	1.00		0.93
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	8	0	31	38	0	19	39	865	4	5	705	16
Peak Hour Factor	0.75	0.75	0.75	0.80	0.80	0.80	0.94	0.94	0.94	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	22	0	225	86	0	327	88	1284	6	14	1109	25
Arrive On Green	0.01	0.00	0.15	0.05	0.00	0.21	0.05	0.35	0.35	0.01	0.31	0.31
Sat Flow, veh/h	1781	0	1552	1781	0	1562	1781	3626	17	1781	3545	80
Grp Volume(v), veh/h	8	0	31	38	0	19	39	424	445	5	353	368
Grp Sat Flow(s),veh/h/ln	1781	0	1552	1781	0	1562	1781	1777	1866	1781	1777	1849
Q Serve(g_s), s	0.2	0.0	0.9	1.1	0.0	0.5	1.1	10.8	10.8	0.1	9.1	9.1
Cycle Q Clear(g_c), s	0.2	0.0	0.9	1.1	0.0	0.5	1.1	10.8	10.8	0.1	9.1	9.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.01	1.00		0.04
Lane Grp Cap(c), veh/h	22	0	225	86	0	327	88	629	661	14	556	578
V/C Ratio(X)	0.36	0.00	0.14	0.44	0.00	0.06	0.44	0.67	0.67	0.35	0.64	0.64
Avail Cap(c_a), veh/h	200	0	989	200	0	1039	217	843	885	200	826	859
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.1	0.0	19.9	24.7	0.0	16.9	24.6	14.6	14.6	26.3	15.7	15.7
Incr Delay (d2), s/veh	9.3	0.0	0.3	3.5	0.0	0.1	3.5	1.3	1.2	13.9	1.2	1.2
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	0.2	0.0	0.3	0.5	0.0	0.2	0.5	3.4	3.6	0.1	3.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	35.5	0.0	20.2	28.2	0.0	17.0	28.1	15.9	15.8	40.3	16.9	16.9
LnGrp LOS	D		C	C		B	C	B	B	D	B	B
Approach Vol, veh/h		39			57			908			726	
Approach Delay, s/veh		23.3			24.4			16.4			17.1	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.9	25.1	8.6	13.7	8.1	22.9	5.2	17.2				
Change Period (Y+Rc), s	5.5	6.2	6.0	6.0	5.5	6.2	4.5	6.0				
Max Green Setting (Gmax), s	6.0	25.3	6.0	34.0	6.5	24.8	6.0	35.5				
Max Q Clear Time (g_c+I1), s	2.1	12.8	3.1	2.9	3.1	11.1	2.2	2.5				
Green Ext Time (p_c), s	0.0	3.9	0.0	0.1	0.0	3.3	0.0	0.1				
Intersection Summary												
HCM 7th Control Delay, s/veh			17.1									
HCM 7th LOS			B									

HCM 7th Signalized Intersection Summary
6: Twin Oaks Valley Rd & Project Driveway

Opening Year + Project PM
12/10/2025



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	57	132	841	632	35
Future Volume (veh/h)	15	57	132	841	632	35
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	16	62	143	914	687	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	131	117	182	2455	1609	89
Arrive On Green	0.07	0.07	0.10	0.69	0.47	0.47
Sat Flow, veh/h	1781	1585	1781	3647	3509	189
Grp Volume(v), veh/h	16	62	143	914	357	368
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1777	1777	1828
Q Serve(g_s), s	0.3	1.4	3.0	4.1	5.1	5.1
Cycle Q Clear(g_c), s	0.3	1.4	3.0	4.1	5.1	5.1
Prop In Lane	1.00	1.00	1.00			0.10
Lane Grp Cap(c), veh/h	131	117	182	2455	837	861
V/C Ratio(X)	0.12	0.53	0.79	0.37	0.43	0.43
Avail Cap(c_a), veh/h	839	746	233	2455	837	861
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.5	17.1	16.7	2.5	6.7	6.7
Incr Delay (d2), s/veh	0.4	3.7	12.6	0.4	1.6	1.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.1	1.5	0.1	1.3	1.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	17.0	20.8	29.4	2.9	8.3	8.2
LnGrp LOS	B	C	C	A	A	A
Approach Vol, veh/h	78			1057	725	
Approach Delay, s/veh	20.0			6.5	8.3	
Approach LOS	B			A	A	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		30.9		7.3	8.4	22.5
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		18.0		18.0	5.0	18.0
Max Q Clear Time (g_c+I1), s		6.1		3.4	5.0	7.1
Green Ext Time (p_c), s		4.4		0.1	0.0	3.0
Intersection Summary						
HCM 7th Control Delay, s/veh			7.7			
HCM 7th LOS			A			

HCM 7th Signalized Intersection Summary
 7: Twin Oaks Valley Rd & Windy Wy

Opening Year + Project PM
 12/10/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	0	37	0	0	0	52	923	0	2	746	9
Future Volume (veh/h)	37	0	37	0	0	0	52	923	0	2	746	9
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.94				1.00		1.00	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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	52	0	52				57	1003	0	2	820	10
Peak Hour Factor	0.71	0.71	0.71				0.92	0.92	0.92	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2				2	2	2	2	2	2
Cap, veh/h	94	0	79				84	2914	0	5	2788	34
Arrive On Green	0.05	0.00	0.05				0.05	0.82	0.00	0.00	0.78	0.78
Sat Flow, veh/h	1781	0	1497				1781	3647	0	1781	3594	44
Grp Volume(v), veh/h	52	0	52				57	1003	0	2	405	425
Grp Sat Flow(s),veh/h/ln	1781	0	1497				1781	1777	0	1781	1777	1861
Q Serve(g_s), s	3.7	0.0	4.4				4.1	9.2	0.0	0.1	8.6	8.6
Cycle Q Clear(g_c), s	3.7	0.0	4.4				4.1	9.2	0.0	0.1	8.6	8.6
Prop In Lane	1.00		1.00				1.00		0.00	1.00		0.02
Lane Grp Cap(c), veh/h	94	0	79				84	2914	0	5	1379	1444
V/C Ratio(X)	0.56	0.00	0.66				0.68	0.34	0.00	0.42	0.29	0.29
Avail Cap(c_a), veh/h	370	0	311				219	2914	0	123	1379	1444
HCM Platoon Ratio	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				0.66	0.66	0.00	0.93	0.93	0.93
Uniform Delay (d), s/veh	60.1	0.0	60.4				61.0	2.9	0.0	64.7	4.2	4.2
Incr Delay (d2), s/veh	5.1	0.0	9.1				6.3	0.2	0.0	46.4	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
%ile BackOfQ(50%),veh/ln	1.8	0.0	1.9				2.0	2.1	0.0	0.1	2.6	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	65.2	0.0	69.5				67.3	3.1	0.0	111.1	4.7	4.7
LnGrp LOS	E		E				E	A		F	A	A
Approach Vol, veh/h		104						1060			832	
Approach Delay, s/veh		67.3						6.6			5.0	
Approach LOS		E						A			A	
Timer - Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	5.3	112.8		11.8	11.1	107.1						
Change Period (Y+Rc), s	5.0	6.2		5.0	5.0	6.2						
Max Green Setting (Gmax), s	9.0	77.8		27.0	16.0	70.8						
Max Q Clear Time (g_c+I1), s	2.1	11.2		6.4	6.1	10.6						
Green Ext Time (p_c), s	0.0	8.2		0.4	0.1	5.4						
Intersection Summary												
HCM 7th Control Delay, s/veh			9.1									
HCM 7th LOS			A									

HCM 7th Signalized Intersection Summary
8: Twin Oaks Valley Rd & Borden Rd

Opening Year + Project PM
12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	207	463	232	155	212	81	204	718	251	67	594	112
Future Volume (veh/h)	207	463	232	155	212	81	204	718	251	67	594	112
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.96	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	230	514	258	168	230	88	222	780	273	74	660	124
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.92	0.92	0.92	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	255	741	370	193	733	271	247	1245	706	93	971	414
Arrive On Green	0.14	0.33	0.33	0.11	0.29	0.29	0.14	0.35	0.35	0.05	0.27	0.27
Sat Flow, veh/h	1781	2270	1135	1781	2517	930	1781	3554	1527	1781	3554	1516
Grp Volume(v), veh/h	230	402	370	168	160	158	222	780	273	74	660	124
Grp Sat Flow(s),veh/h/ln	1781	1777	1628	1781	1777	1670	1781	1777	1527	1781	1777	1516
Q Serve(g_s), s	17.9	27.8	28.0	13.1	9.9	10.5	17.3	25.8	16.7	5.8	23.4	9.1
Cycle Q Clear(g_c), s	17.9	27.8	28.0	13.1	9.9	10.5	17.3	25.8	16.7	5.8	23.4	9.1
Prop In Lane	1.00		0.70	1.00		0.56	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	255	580	531	193	517	486	247	1245	706	93	971	414
V/C Ratio(X)	0.90	0.69	0.70	0.87	0.31	0.33	0.90	0.63	0.39	0.79	0.68	0.30
Avail Cap(c_a), veh/h	316	580	531	253	517	486	320	1245	706	150	971	414
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.5	41.4	41.5	62.0	39.0	39.2	59.9	38.2	25.2	66.2	45.8	40.7
Incr Delay (d2), s/veh	23.9	6.7	7.4	21.8	1.5	1.8	22.3	2.4	1.6	13.8	3.8	1.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.8	13.3	12.4	7.1	4.6	4.6	9.2	11.4	6.2	3.0	10.6	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	83.5	48.1	48.9	83.8	40.6	41.0	82.2	40.6	26.8	80.0	49.7	42.5
LnGrp LOS	F	D	D	F	D	D	F	D	C	E	D	D
Approach Vol, veh/h		1002			486			1275			858	
Approach Delay, s/veh		56.5			55.6			44.9			51.3	
Approach LOS		E			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.2	52.2	24.2	44.7	25.1	47.2	13.3	55.6				
Change Period (Y+Rc), s	* 4.9	* 6.1	4.6	* 6.1	* 4.9	* 6.1	5.9	* 6.1				
Max Green Setting (Gmax), s	* 20	* 46	25.4	* 37	* 25	* 41	11.9	* 50				
Max Q Clear Time (g_c+I1), s	15.1	30.0	19.3	25.4	19.9	12.5	7.8	27.8				
Green Ext Time (p_c), s	0.2	4.6	0.3	3.5	0.3	2.0	0.0	6.1				

Intersection Summary												
HCM 7th Control Delay, s/veh			51.1									
HCM 7th LOS			D									

Notes
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 9: Woodward St & Borden Rd

Opening Year + Project PM
 12/10/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	149	597	40	19	288	32	75	94	24	26	74	81
Future Volume (veh/h)	149	597	40	19	288	32	75	94	24	26	74	81
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.94	1.00		0.97	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	162	649	43	21	320	36	91	115	29	29	81	89
Peak Hour Factor	0.92	0.92	0.92	0.90	0.90	0.90	0.82	0.82	0.82	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	237	1037	69	61	696	77	205	358	90	80	334	272
Arrive On Green	0.13	0.31	0.31	0.03	0.22	0.22	0.12	0.25	0.25	0.04	0.18	0.18
Sat Flow, veh/h	1781	3371	223	1781	3200	356	1781	1430	361	1781	1870	1521
Grp Volume(v), veh/h	162	342	350	21	176	180	91	0	144	29	81	89
Grp Sat Flow(s),veh/h/ln	1781	1777	1817	1781	1777	1780	1781	0	1791	1781	1870	1521
Q Serve(g_s), s	5.2	9.9	9.9	0.7	5.2	5.3	2.9	0.0	3.9	1.0	2.2	3.1
Cycle Q Clear(g_c), s	5.2	9.9	9.9	0.7	5.2	5.3	2.9	0.0	3.9	1.0	2.2	3.1
Prop In Lane	1.00		0.12	1.00		0.20	1.00		0.20	1.00		1.00
Lane Grp Cap(c), veh/h	237	547	559	61	386	387	205	0	449	80	334	272
V/C Ratio(X)	0.68	0.63	0.63	0.34	0.46	0.46	0.44	0.00	0.32	0.36	0.24	0.33
Avail Cap(c_a), veh/h	545	1386	1417	207	1067	1069	533	0	1266	207	971	789
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.9	17.8	17.9	28.4	20.4	20.5	24.8	0.0	18.4	27.9	21.2	21.5
Incr Delay (d2), s/veh	3.5	1.2	1.2	3.3	0.8	0.9	1.5	0.0	0.4	2.8	0.4	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	2.3	3.8	3.8	0.3	2.0	2.1	1.2	0.0	1.5	0.4	0.9	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	28.3	19.0	19.0	31.6	21.3	21.4	26.3	0.0	18.8	30.7	21.6	22.2
LnGrp LOS	C	B	B	C	C	C	C		B	C	C	C
Approach Vol, veh/h		854			377			235			199	
Approach Delay, s/veh		20.8			21.9			21.7			23.2	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.2	24.3	12.1	16.5	12.6	18.9	7.8	20.9				
Change Period (Y+Rc), s	5.1	* 5.8	5.2	5.8	4.6	* 5.8	5.1	* 5.8				
Max Green Setting (Gmax), s	7.0	* 47	18.0	31.2	18.4	* 36	7.0	* 43				
Max Q Clear Time (g_c+I1), s	2.7	11.9	4.9	5.1	7.2	7.3	3.0	5.9				
Green Ext Time (p_c), s	0.0	4.6	0.1	0.7	0.3	2.1	0.0	0.8				
Intersection Summary												
HCM 7th Control Delay, s/veh			21.4									
HCM 7th LOS			C									
Notes												
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 7th Signalized Intersection Summary
 10: Twin Oaks Valley Rd & Richmar Road

Opening Year + Project PM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	198	15	74	34	10	5	116	1045	31	61	887	167
Future Volume (veh/h)	198	15	74	34	10	5	116	1045	31	61	887	167
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.96	1.00		0.96	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	233	18	87	49	14	7	122	1100	33	65	944	178
Peak Hour Factor	0.85	0.85	0.85	0.70	0.70	0.70	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	245	36	176	208	135	68	134	1797	54	82	1427	269
Arrive On Green	0.14	0.14	0.14	0.12	0.12	0.12	0.08	0.51	0.51	0.05	0.48	0.48
Sat Flow, veh/h	1781	264	1278	1781	1158	579	1781	3518	106	1781	2963	558
Grp Volume(v), veh/h	233	0	105	49	0	21	122	555	578	65	566	556
Grp Sat Flow(s),veh/h/ln	1781	0	1542	1781	0	1737	1781	1777	1847	1781	1777	1744
Q Serve(g_s), s	16.9	0.0	8.2	3.2	0.0	1.4	8.8	28.9	28.9	4.7	31.5	31.6
Cycle Q Clear(g_c), s	16.9	0.0	8.2	3.2	0.0	1.4	8.8	28.9	28.9	4.7	31.5	31.6
Prop In Lane	1.00		0.83	1.00		0.33	1.00		0.06	1.00		0.32
Lane Grp Cap(c), veh/h	245	0	212	208	0	203	134	908	943	82	856	840
V/C Ratio(X)	0.95	0.00	0.49	0.24	0.00	0.10	0.91	0.61	0.61	0.79	0.66	0.66
Avail Cap(c_a), veh/h	245	0	212	521	0	508	134	908	943	82	856	840
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	0.71	0.71	0.71	0.62	0.62	0.62
Uniform Delay (d), s/veh	55.6	0.0	51.9	52.1	0.0	51.3	59.7	22.6	22.6	61.4	25.6	25.6
Incr Delay (d2), s/veh	43.7	0.0	1.8	0.6	0.0	0.2	40.7	2.2	2.1	26.8	2.5	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	10.5	0.0	3.3	1.5	0.0	0.6	5.4	12.0	12.4	2.7	13.2	13.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	99.3	0.0	53.6	52.7	0.0	51.5	100.4	24.8	24.7	88.2	28.1	28.2
LnGrp LOS	F		D	D		D	F	C	C	F	C	C
Approach Vol, veh/h		338			70			1255			1187	
Approach Delay, s/veh		85.1			52.4			32.1			31.4	
Approach LOS		F			D			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.0	72.7		24.0	15.8	68.9		21.3				
Change Period (Y+Rc), s	6.0	6.3		6.1	6.0	6.3		6.1				
Max Green Setting (Gmax), s	6.0	43.6		17.9	9.8	39.8		38.0				
Max Q Clear Time (g_c+I1), s	6.7	30.9		18.9	10.8	33.6		5.2				
Green Ext Time (p_c), s	0.0	5.5		0.0	0.0	3.4		0.2				
Intersection Summary												
HCM 7th Control Delay, s/veh			38.6									
HCM 7th LOS			D									

HCM 7th Signalized Intersection Summary
 11: San Marcos Blvd & E. Mission Road

Opening Year + Project PM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	97	983	47	267	685	93	56	237	699	33	141	62
Future Volume (veh/h)	97	983	47	267	685	93	56	237	699	33	141	62
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		0.95
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	1742	1742	1870	1870	1742	1742	1742	1870	1742	1870
Adj Flow Rate, veh/h	102	1035	49	300	770	104	62	263	0	40	172	76
Peak Hour Factor	0.95	0.95	0.95	0.89	0.89	0.89	0.90	0.90	0.90	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	133	1282	517	396	1454	631	76	653		49	399	167
Arrive On Green	0.07	0.36	0.36	0.12	0.41	0.41	0.05	0.20	0.00	0.03	0.18	0.18
Sat Flow, veh/h	1781	3554	1433	3219	3554	1542	1659	3311	1477	1781	2233	933
Grp Volume(v), veh/h	102	1035	49	300	770	104	62	263	0	40	125	123
Grp Sat Flow(s),veh/h/ln	1781	1777	1433	1610	1777	1542	1659	1655	1477	1781	1655	1510
Q Serve(g_s), s	3.6	16.8	1.4	5.7	10.4	2.7	2.4	4.4	0.0	1.4	4.3	4.6
Cycle Q Clear(g_c), s	3.6	16.8	1.4	5.7	10.4	2.7	2.4	4.4	0.0	1.4	4.3	4.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.62
Lane Grp Cap(c), veh/h	133	1282	517	396	1454	631	76	653		49	296	270
V/C Ratio(X)	0.77	0.81	0.09	0.76	0.53	0.16	0.82	0.40		0.82	0.42	0.46
Avail Cap(c_a), veh/h	344	1432	577	454	1454	631	190	1671		126	763	696
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	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.0	18.4	13.5	27.0	14.2	11.9	30.2	22.3	0.0	30.9	23.3	23.4
Incr Delay (d2), s/veh	8.9	3.2	0.1	6.3	0.4	0.1	18.5	0.4	0.0	27.6	1.0	1.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	6.2	0.4	2.3	3.5	0.8	1.2	1.6	0.0	0.9	1.6	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	37.9	21.6	13.6	33.3	14.6	12.1	48.6	22.7	0.0	58.4	24.2	24.6
LnGrp LOS	D	C	B	C	B	B	D	C		E	C	C
Approach Vol, veh/h		1186			1174			325			288	
Approach Delay, s/veh		22.7			19.1			27.7			29.1	
Approach LOS		C			B			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.7	17.9	11.8	28.3	6.9	16.7	8.8	31.4				
Change Period (Y+Rc), s	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3				
Max Green Setting (Gmax), s	4.5	32.2	9.0	25.7	7.3	29.4	12.3	22.4				
Max Q Clear Time (g_c+I1), s	3.4	6.4	7.7	18.8	4.4	6.6	5.6	12.4				
Green Ext Time (p_c), s	0.0	1.5	0.1	3.7	0.0	1.2	0.1	3.7				
Intersection Summary												
HCM 7th Control Delay, s/veh			22.5									
HCM 7th LOS			C									
Notes												
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 7th Signalized Intersection Summary
 12: Twin Oaks Valley Rd & San Marcos Blvd

Opening Year + Project PM
 12/10/2025

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	286	599	339	316	438	92	365	754	310	80	665	259	
Future Volume (veh/h)	286	599	339	316	438	92	365	754	310	80	665	259	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Width 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	
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	
Adj Flow Rate, veh/h	298	624	353	340	471	99	384	794	326	84	700	273	
Peak Hour Factor	0.96	0.96	0.96	0.93	0.93	0.93	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	333	1202	625	230	897	187	230	1158	608	196	773	301	
Arrive On Green	0.10	0.34	0.34	0.07	0.31	0.31	0.07	0.33	0.33	0.06	0.31	0.31	
Sat Flow, veh/h	3456	3554	1535	3456	2907	606	3456	3554	1541	3456	2475	965	
Grp Volume(v), veh/h	298	624	353	340	287	283	384	794	326	84	503	470	
Grp Sat Flow(s),veh/h/ln	1728	1777	1535	1728	1777	1737	1728	1777	1541	1728	1777	1663	
Q Serve(g_s), s	11.5	19.0	24.0	9.0	17.9	18.2	9.0	26.2	22.0	3.2	36.6	36.6	
Cycle Q Clear(g_c), s	11.5	19.0	24.0	9.0	17.9	18.2	9.0	26.2	22.0	3.2	36.6	36.6	
Prop In Lane	1.00		1.00	1.00		0.35	1.00		1.00	1.00		0.58	
Lane Grp Cap(c), veh/h	333	1202	625	230	548	536	230	1158	608	196	555	519	
V/C Ratio(X)	0.90	0.52	0.56	1.48	0.52	0.53	1.67	0.69	0.54	0.43	0.91	0.91	
Avail Cap(c_a), veh/h	333	1202	625	230	548	536	230	1185	619	205	579	542	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	1.00	0.81	0.81	0.81	0.86	0.86	0.86	0.64	0.64	0.64	
Uniform Delay (d), s/veh	60.3	35.9	31.0	63.0	38.5	38.6	63.0	39.5	31.6	61.6	44.5	44.5	
Incr Delay (d2), s/veh	25.2	1.6	3.7	232.2	2.9	3.0	316.0	1.4	0.8	0.9	12.3	13.0	
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	6.1	8.3	9.2	11.3	8.1	8.0	14.0	11.3	8.1	1.4	17.5	16.5	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d), s/veh	85.6	37.5	34.7	295.2	41.3	41.6	379.0	40.9	32.4	62.5	56.8	57.5	
LnGrp LOS	F	D	C	F	D	D	F	D	C	E	E	E	
Approach Vol, veh/h	1275				910			1504				1057	
Approach Delay, s/veh	47.9				136.3			125.4				57.6	
Approach LOS	D				F			F				E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8					
Phs Duration (G+Y+Rc), s	16.0	53.1	16.0	49.9	20.0	49.1	14.2	51.8					
Change Period (Y+Rc), s	7.0	7.4	7.0	* 7.8	7.0	7.4	6.5	7.8					
Max Green Setting (Gmax), s	9.0	44.3	9.0	* 44	13.0	40.3	8.0	45.0					
Max Q Clear Time (g_c+I1), s	11.0	26.0	11.0	38.6	13.5	20.2	5.2	28.2					
Green Ext Time (p_c), s	0.0	4.9	0.0	2.7	0.0	3.0	0.0	5.8					
Intersection Summary													
HCM 7th Control Delay, s/veh					91.6								
HCM 7th LOS					F								
Notes													
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.													

HCM 7th Signalized Intersection Summary
 13: Twin Oaks Valley Rd & SR 78 WB Ramps

Opening Year + Project PM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↔↔		↔↔		↑↑↑	↗		↑↑↑	↗
Traffic Volume (veh/h)	0	0	0	663	0	511	0	1111	550	0	1170	317
Future Volume (veh/h)	0	0	0	663	0	511	0	1111	550	0	1170	317
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	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
Work Zone On Approach				No			No			No		
Adj Sat Flow, veh/h/ln				1870	0	1870	0	1870	1870	0	1870	1870
Adj Flow Rate, veh/h				729	0	562	0	1323	655	0	1232	0
Peak Hour Factor				0.91	0.91	0.91	0.84	0.84	0.84	0.95	0.95	0.95
Percent Heavy Veh, %				2	0	2	0	2	2	0	2	2
Cap, veh/h				834	0	673	0	3485	1429	0	3485	
Arrive On Green				0.24	0.00	0.24	0.00	1.00	1.00	0.00	0.68	0.00
Sat Flow, veh/h				3456	0	2790	0	5274	1533	0	5274	1585
Grp Volume(v), veh/h				729	0	562	0	1323	655	0	1232	0
Grp Sat Flow(s),veh/h/ln				1728	0	1395	0	1702	1533	0	1702	1585
Q Serve(g_s), s				26.4	0.0	24.9	0.0	0.0	0.0	0.0	13.1	0.0
Cycle Q Clear(g_c), s				26.4	0.0	24.9	0.0	0.0	0.0	0.0	13.1	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				834	0	673	0	3485	1429	0	3485	
V/C Ratio(X)				0.87	0.00	0.83	0.00	0.38	0.46	0.00	0.35	
Avail Cap(c_a), veh/h				1579	0	1275	0	3485	1429	0	3485	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.45	0.45	0.00	0.34	0.00
Uniform Delay (d), s/veh				47.4	0.0	46.8	0.0	0.0	0.0	0.0	8.6	0.0
Incr Delay (d2), s/veh				1.2	0.0	1.1	0.0	0.1	0.5	0.0	0.1	0.0
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				11.5	0.0	8.7	0.0	0.0	0.2	0.0	4.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				48.6	0.0	47.9	0.0	0.1	0.5	0.0	8.7	0.0
LnGrp LOS				D		D		A	A		A	
Approach Vol, veh/h					1291			1978			1232	
Approach Delay, s/veh					48.3			0.3			8.7	
Approach LOS					D			A			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		94.0				94.0		36.0				
Change Period (Y+Rc), s		5.3				5.3		4.6				
Max Green Setting (Gmax), s		60.7				60.7		59.4				
Max Q Clear Time (g_c+I1), s		2.0				15.1		28.4				
Green Ext Time (p_c), s		11.4				6.2		3.0				

Intersection Summary		
HCM 7th Control Delay, s/veh		16.4
HCM 7th LOS		B

Notes
 Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 7th Signalized Intersection Summary
 14: Twin Oaks Valley Rd & SR 78 EB Ramps

Opening Year + Project PM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	137	39	214	0	0	0	0	1557	880	370	1448	0
Future Volume (veh/h)	137	39	214	0	0	0	0	1557	880	370	1448	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98				1.00		0.98	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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	123	0	324				0	2338	726	385	1508	0
Peak Hour Factor	0.85	0.85	0.85				0.84	0.84	0.84	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	273	0	477				0	3413	944	449	3934	0
Arrive On Green	0.15	0.00	0.15				0.00	0.61	0.61	0.17	1.00	0.00
Sat Flow, veh/h	1781	0	3108				0	5611	1553	3456	5274	0
Grp Volume(v), veh/h	123	0	324				0	2338	726	385	1508	0
Grp Sat Flow(s),veh/h/ln	1781	0	1554				0	1870	1553	1728	1702	0
Q Serve(g_s), s	8.2	0.0	12.8				0.0	36.4	44.7	14.1	0.0	0.0
Cycle Q Clear(g_c), s	8.2	0.0	12.8				0.0	36.4	44.7	14.1	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	273	0	477				0	3413	944	449	3934	0
V/C Ratio(X)	0.45	0.00	0.68				0.00	0.69	0.77	0.86	0.38	0.00
Avail Cap(c_a), veh/h	526	0	918				0	3413	944	633	3934	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.84	0.84	0.00
Uniform Delay (d), s/veh	50.0	0.0	52.0				0.0	17.1	18.7	52.6	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.0	1.7				0.0	1.1	6.0	7.0	0.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	5.1				0.0	14.5	16.0	6.1	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	51.2	0.0	53.7				0.0	18.2	24.7	59.6	0.2	0.0
LnGrp LOS	D		D					B	C	E	A	
Approach Vol, veh/h		447						3064			1893	
Approach Delay, s/veh		53.0						19.8			12.3	
Approach LOS		D						B			B	
Timer - Assigned Phs	1	2		4				6				
Phs Duration (G+Y+Rc), s	21.1	84.4		24.5				105.5				
Change Period (Y+Rc), s	4.2	5.3		4.6				5.3				
Max Green Setting (Gmax), s	23.8	53.7		38.4				81.7				
Max Q Clear Time (g_c+I1), s	16.1	46.7		14.8				2.0				
Green Ext Time (p_c), s	0.8	6.6		1.7				15.6				

Intersection Summary												
HCM 7th Control Delay, s/veh			19.9									
HCM 7th LOS			B									

Notes
 User approved volume balancing among the lanes for turning movement.



APPENDIX H

EXPLANATION OF DECREASE IN DELAY WITH THE ADDITION OF PROJECT TRAFFIC

Explanation of Intersection Delay Decrease with the Addition of Project Traffic:

For purposes of this report, a decrease in delay was not shown in the report tables. Where a project induced decrease occurred, the previous scenario's (without project) delay was shown. This reduces any confusion on behalf of the reviewer while still showing there is no significant change in delay due to the project.

Under the HCM unsignalized/signalized methodology, it is possible to have better LOS or a decrease in delay with the project (in comparison to base conditions without the project), because the delay reported for the entire intersection is a weighted average of the different traffic movements on each approach based upon volumes. Therefore, the project-generated traffic may have been added to those movements with very good LOS, so that this benefit is further exemplified in the weighted average reported for the entire intersection.

Typically when the delay improves when volume is added it is due to the effect of volumes being added to movements that previously had lower delays than the intersection average delay, and therefore by adding more volume to those movements the intersection average delay actually decreases.





APPENDIX I

HORIZON YEAR ANALYSIS WORKSHEETS

HCM 7th Signalized Intersection Summary
 1: Twin Oaks Valley Rd & Deer Springs Rd

Horizon Year AM
 12/10/2025



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	40	100	120	600	1500	50
Future Volume (veh/h)	40	100	120	600	1500	50
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	48	120	125	625	1531	51
Peak Hour Factor	0.83	0.83	0.96	0.96	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	162	144	103	1554	1379	1132
Arrive On Green	0.09	0.09	0.06	0.83	0.74	0.74
Sat Flow, veh/h	1781	1585	1781	1870	1870	1535
Grp Volume(v), veh/h	48	120	125	625	1531	51
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1535
Q Serve(g_s), s	3.5	10.3	8.0	11.8	102.2	1.3
Cycle Q Clear(g_c), s	3.5	10.3	8.0	11.8	102.2	1.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	162	144	103	1554	1379	1132
V/C Ratio(X)	0.30	0.83	1.22	0.40	1.11	0.05
Avail Cap(c_a), veh/h	308	274	103	1554	1379	1132
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.8	62.0	65.3	3.0	18.2	5.0
Incr Delay (d2), s/veh	1.0	11.5	157.9	0.2	60.4	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.5	8.1	2.8	61.2	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	59.9	73.5	223.2	3.1	78.6	5.0
LnGrp LOS	E	E	F	A	F	A
Approach Vol, veh/h	168			750	1582	
Approach Delay, s/veh	69.6			39.8	76.3	
Approach LOS	E			D	E	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		121.0		17.6	13.0	108.0
Change Period (Y+Rc), s		5.8		5.0	5.0	5.8
Max Green Setting (Gmax), s		115.2		24.0	8.0	102.2
Max Q Clear Time (g_c+I1), s		13.8		12.3	10.0	104.2
Green Ext Time (p_c), s		4.3		0.3	0.0	0.0
Intersection Summary						
HCM 7th Control Delay, s/veh			64.9			
HCM 7th LOS			E			

HCM 7th Signalized Intersection Summary
 2: Twin Oaks Valley Rd & Buena Creek Rd

Horizon Year AM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↔		↖	↘		↙	↕	↗
Traffic Volume (veh/h)	470	0	350	5	5	0	160	450	5	5	1060	460
Future Volume (veh/h)	470	0	350	5	5	0	160	450	5	5	1060	460
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	505	0	376	10	10	0	170	479	5	5	1104	479
Peak Hour Factor	0.93	0.93	0.93	0.50	0.50	0.50	0.94	0.94	0.94	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	266	0	344	43	30	0	120	1046	11	141	1086	896
Arrive On Green	0.22	0.00	0.22	0.22	0.22	0.00	0.07	0.57	0.57	0.08	0.58	0.58
Sat Flow, veh/h	939	0	1549	0	134	0	1781	1847	19	1781	1870	1543
Grp Volume(v), veh/h	505	0	376	20	0	0	170	0	484	5	1104	479
Grp Sat Flow(s),veh/h/ln	939	0	1549	134	0	0	1781	0	1866	1781	1870	1543
Q Serve(g_s), s	0.0	0.0	28.0	0.0	0.0	0.0	8.5	0.0	19.2	0.3	73.2	23.8
Cycle Q Clear(g_c), s	28.0	0.0	28.0	28.0	0.0	0.0	8.5	0.0	19.2	0.3	73.2	23.8
Prop In Lane	1.00		1.00	0.50		0.00	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	266	0	344	72	0	0	120	0	1057	141	1086	896
V/C Ratio(X)	1.90	0.00	1.09	0.28	0.00	0.00	1.42	0.00	0.46	0.04	1.02	0.53
Avail Cap(c_a), veh/h	266	0	344	72	0	0	120	0	1057	236	1086	896
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.1	0.0	49.0	41.3	0.0	0.0	58.8	0.0	16.0	53.6	26.4	16.1
Incr Delay (d2), s/veh	419.1	0.0	75.8	2.0	0.0	0.0	228.9	0.0	0.3	0.1	31.6	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	39.5	0.0	18.0	0.5	0.0	0.0	11.4	0.0	7.7	0.1	38.3	7.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	471.2	0.0	124.8	43.3	0.0	0.0	287.7	0.0	16.3	53.7	58.0	16.7
LnGrp LOS	F		F	D			F		B	D	F	B
Approach Vol, veh/h		881			20			654			1588	
Approach Delay, s/veh		323.4			43.3			86.9			45.6	
Approach LOS		F			D			F			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.8	77.2		33.1	14.0	79.0		33.1				
Change Period (Y+Rc), s	5.8	5.8		* 5.1	5.5	5.8		5.1				
Max Green Setting (Gmax), s	16.7	64.7		* 28	8.5	73.2		26.9				
Max Q Clear Time (g_c+I1), s	2.3	21.2		30.0	10.5	75.2		30.0				
Green Ext Time (p_c), s	0.0	3.0		0.0	0.0	0.0		0.0				

Intersection Summary		
HCM 7th Control Delay, s/veh		132.0
HCM 7th LOS		F

Notes
 User approved pedestrian interval to be less than phase max green.
 * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 3: Twin Oaks Valley Rd & Olive Street

Horizon Year AM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔		↖	↗		↖	↗		↖	↗		
Traffic Volume (veh/h)	0	20	30	40	0	100	10	540	10	70	1100	0	
Future Volume (veh/h)	0	20	30	40	0	100	10	540	10	70	1100	0	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Width 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	
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.91	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	0	32	48	61	0	152	11	600	11	80	1250	0	
Peak Hour Factor	0.63	0.63	0.63	0.66	0.66	0.66	0.90	0.90	0.90	0.88	0.88	0.88	
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2	
Cap, veh/h	0	48	72	215	0	174	22	1095	20	101	1202	0	
Arrive On Green	0.00	0.07	0.07	0.12	0.00	0.12	0.01	0.60	0.60	0.06	0.64	0.00	
Sat Flow, veh/h	0	646	968	1781	0	1443	1781	1829	34	1781	1870	0	
Grp Volume(v), veh/h	0	0	80	61	0	152	11	0	611	80	1250	0	
Grp Sat Flow(s),veh/h/ln	0	0	1614	1781	0	1443	1781	0	1863	1781	1870	0	
Q Serve(g_s), s	0.0	0.0	6.3	4.1	0.0	13.5	0.8	0.0	25.6	5.8	84.0	0.0	
Cycle Q Clear(g_c), s	0.0	0.0	6.3	4.1	0.0	13.5	0.8	0.0	25.6	5.8	84.0	0.0	
Prop In Lane	0.00		0.60	1.00		1.00	1.00		0.02	1.00		0.00	
Lane Grp Cap(c), veh/h	0	0	120	215	0	174	22	0	1115	101	1202	0	
V/C Ratio(X)	0.00	0.00	0.67	0.28	0.00	0.87	0.49	0.00	0.55	0.79	1.04	0.00	
Avail Cap(c_a), veh/h	0	0	222	252	0	204	68	0	1115	170	1202	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	
Uniform Delay (d), s/veh	0.0	0.0	58.9	52.3	0.0	56.4	64.1	0.0	15.7	60.9	23.3	0.0	
Incr Delay (d2), s/veh	0.0	0.0	6.2	0.7	0.0	28.2	15.6	0.0	0.6	12.8	36.9	0.0	
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	0.0	0.0	2.8	1.8	0.0	6.2	0.5	0.0	10.2	2.9	44.0	0.0	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d), s/veh	0.0	0.0	65.1	53.0	0.0	84.7	79.7	0.0	16.2	73.7	60.2	0.0	
LnGrp LOS			E	D		F	E		B	E	F		
Approach Vol, veh/h	80						213		622		1330		
Approach Delay, s/veh	65.1						75.6		17.4		61.0		
Approach LOS	E						E		B		E		
Timer - Assigned Phs	1	2	4		5	6	8						
Phs Duration (G+Y+Rc), s	12.0	84.5	14.3		6.2	90.3	19.8						
Change Period (Y+Rc), s	4.6	6.3	4.6		4.6	6.3	4.0						
Max Green Setting (Gmax), s	12.5	76.5	18.0		5.0	84.0	18.5						
Max Q Clear Time (g_c+I1), s	7.8	27.6	8.3		2.8	86.0	15.5						
Green Ext Time (p_c), s	0.1	4.1	0.2		0.0	0.0	0.3						
Intersection Summary													
HCM 7th Control Delay, s/veh			50.4										
HCM 7th LOS			D										

HCM 7th Signalized Intersection Summary
 4: Twin Oaks Valley Rd & E. La Cienega Road

Horizon Year AM
 12/10/2025

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	140	220	570	40	70	880
Future Volume (veh/h)	140	220	570	40	70	880
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00		0.95	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	187	293	633	44	73	917
Peak Hour Factor	0.75	0.75	0.90	0.90	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	432	385	972	67	115	1694
Arrive On Green	0.24	0.24	0.29	0.29	0.06	0.48
Sat Flow, veh/h	1781	1585	3451	233	1781	3647
Grp Volume(v), veh/h	187	293	335	342	73	917
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1814	1781	1777
Q Serve(g_s), s	4.3	8.4	8.0	8.1	2.0	8.9
Cycle Q Clear(g_c), s	4.3	8.4	8.0	8.1	2.0	8.9
Prop In Lane	1.00	1.00		0.13	1.00	
Lane Grp Cap(c), veh/h	432	385	515	525	115	1694
V/C Ratio(X)	0.43	0.76	0.65	0.65	0.64	0.54
Avail Cap(c_a), veh/h	1021	909	811	828	182	2423
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.6	17.2	15.2	15.2	22.3	9.0
Incr Delay (d2), s/veh	0.7	3.1	1.4	1.4	5.7	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	3.0	2.6	2.7	0.9	2.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	16.3	20.3	16.6	16.6	28.0	9.3
LnGrp LOS	B	C	B	B	C	A
Approach Vol, veh/h	480		677			990
Approach Delay, s/veh	18.8		16.6			10.7
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.1	21.3			30.5	18.4
Change Period (Y+Rc), s	6.0	7.2			7.2	6.5
Max Green Setting (Gmax), s	5.0	22.3			33.3	28.0
Max Q Clear Time (g_c+I1), s	4.0	10.1			10.9	10.4
Green Ext Time (p_c), s	0.0	2.9			5.9	1.5
Intersection Summary						
HCM 7th Control Delay, s/veh			14.3			
HCM 7th LOS			B			

HCM 7th Signalized Intersection Summary
 5: Twin Oaks Valley Rd & Del Roy Dr

Horizon Year AM
 12/10/2025

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	20	0	40	10	0	10	20	560	60	30	960	10	
Future Volume (veh/h)	20	0	40	10	0	10	20	560	60	30	960	10	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Width 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	
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.93	1.00		0.93	
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	23	0	46	20	0	20	23	651	70	31	990	10	
Peak Hour Factor	0.87	0.87	0.87	0.50	0.50	0.50	0.86	0.86	0.86	0.97	0.97	0.97	
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2	
Cap, veh/h	57	0	245	51	0	282	57	1123	121	73	1292	13	
Arrive On Green	0.03	0.00	0.16	0.03	0.00	0.18	0.03	0.35	0.35	0.04	0.36	0.36	
Sat Flow, veh/h	1781	0	1555	1781	0	1559	1781	3209	344	1781	3601	36	
Grp Volume(v), veh/h	23	0	46	20	0	20	23	360	361	31	489	511	
Grp Sat Flow(s),veh/h/ln	1781	0	1555	1781	0	1559	1781	1777	1776	1781	1777	1860	
Q Serve(g_s), s	0.7	0.0	1.4	0.6	0.0	0.6	0.7	9.3	9.3	1.0	13.6	13.6	
Cycle Q Clear(g_c), s	0.7	0.0	1.4	0.6	0.0	0.6	0.7	9.3	9.3	1.0	13.6	13.6	
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.19	1.00		0.02	
Lane Grp Cap(c), veh/h	57	0	245	51	0	282	57	622	622	73	638	668	
V/C Ratio(X)	0.40	0.00	0.19	0.39	0.00	0.07	0.40	0.58	0.58	0.42	0.77	0.77	
Avail Cap(c_a), veh/h	191	0	943	191	0	987	191	802	802	191	802	840	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	26.6	0.0	20.5	26.7	0.0	19.1	26.6	14.8	14.9	26.2	15.9	15.9	
Incr Delay (d2), s/veh	4.5	0.0	0.4	4.8	0.0	0.1	4.5	0.9	0.9	3.9	3.5	3.3	
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.5	0.3	0.0	0.2	0.3	3.0	3.0	0.4	4.8	5.0	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d), s/veh	31.1	0.0	20.9	31.6	0.0	19.2	31.1	15.7	15.7	30.1	19.4	19.2	
LnGrp LOS	C		C	C		B	C	B	B	C	B	B	
Approach Vol, veh/h	69						40		744			1031	
Approach Delay, s/veh	24.3						25.4		16.2			19.6	
Approach LOS	C						C		B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8					
Phs Duration (G+Y+Rc), s	7.8	25.8	7.6	14.8	7.3	26.3	6.3	16.1					
Change Period (Y+Rc), s	5.5	6.2	6.0	6.0	5.5	6.2	4.5	6.0					
Max Green Setting (Gmax), s	6.0	25.3	6.0	34.0	6.0	25.3	6.0	35.5					
Max Q Clear Time (g_c+I1), s	3.0	11.3	2.6	3.4	2.7	15.6	2.7	2.6					
Green Ext Time (p_c), s	0.0	3.3	0.0	0.2	0.0	3.9	0.0	0.1					
Intersection Summary													
HCM 7th Control Delay, s/veh			18.6										
HCM 7th LOS			B										

HCM 7th Signalized Intersection Summary
 7: Twin Oaks Valley Rd & Windy Wy

Horizon Year AM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗					↖	↕		↖	↗	
Traffic Volume (veh/h)	40	0	60	0	0	0	40	630	5	5	1030	70
Future Volume (veh/h)	40	0	60	0	0	0	40	630	5	5	1030	70
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.94				1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	46	0	69				43	685	5	5	1084	74
Peak Hour Factor	0.87	0.87	0.87				0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2				2	2	2	2	2	2
Cap, veh/h	112	0	94				76	2913	21	11	2592	177
Arrive On Green	0.06	0.00	0.06				0.04	0.81	0.81	0.01	0.77	0.77
Sat Flow, veh/h	1781	0	1487				1781	3615	26	1781	3367	230
Grp Volume(v), veh/h	46	0	69				43	337	353	5	572	586
Grp Sat Flow(s),veh/h/ln	1781	0	1487				1781	1777	1865	1781	1777	1820
Q Serve(g_s), s	3.2	0.0	5.9				3.1	5.9	5.9	0.4	14.2	14.2
Cycle Q Clear(g_c), s	3.2	0.0	5.9				3.1	5.9	5.9	0.4	14.2	14.2
Prop In Lane	1.00		1.00				1.00		0.01	1.00		0.13
Lane Grp Cap(c), veh/h	112	0	94				76	1432	1503	11	1368	1401
V/C Ratio(X)	0.41	0.00	0.73				0.57	0.24	0.24	0.44	0.42	0.42
Avail Cap(c_a), veh/h	343	0	286				137	1432	1503	96	1368	1401
HCM Platoon Ratio	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				0.86	0.86	0.86	0.92	0.92	0.92
Uniform Delay (d), s/veh	58.6	0.0	59.8				61.1	3.0	3.0	64.4	5.1	5.1
Incr Delay (d2), s/veh	2.4	0.0	10.5				5.7	0.3	0.3	22.9	0.9	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
%ile BackOfQ(50%),veh/ln	1.5	0.0	2.5				1.5	1.6	1.6	0.2	4.3	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	60.9	0.0	70.4				66.7	3.4	3.3	87.3	5.9	5.9
LnGrp LOS	E		E				E	A	A	F	A	A
Approach Vol, veh/h		115						733			1163	
Approach Delay, s/veh		66.6						7.1			6.3	
Approach LOS		E						A			A	
Timer - Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	5.8	111.0		13.2	10.5	106.3						
Change Period (Y+Rc), s	5.0	6.2		5.0	5.0	6.2						
Max Green Setting (Gmax), s	7.0	81.8		25.0	10.0	78.8						
Max Q Clear Time (g_c+I1), s	2.4	7.9		7.9	5.1	16.2						
Green Ext Time (p_c), s	0.0	4.2		0.4	0.0	9.0						
Intersection Summary												
HCM 7th Control Delay, s/veh			10.0									
HCM 7th LOS			B									

HCM 7th Signalized Intersection Summary
 8: Twin Oaks Valley Rd & Borden Rd

Horizon Year AM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕		↖	↕	↗	↖	↕	↗
Traffic Volume (veh/h)	70	280	220	260	400	90	110	480	100	50	820	190
Future Volume (veh/h)	70	280	220	260	400	90	110	480	100	50	820	190
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	84	337	265	310	476	107	122	533	111	53	863	200
Peak Hour Factor	0.83	0.83	0.83	0.84	0.84	0.84	0.90	0.90	0.90	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	105	568	437	335	1236	276	145	1093	771	76	989	428
Arrive On Green	0.06	0.30	0.30	0.19	0.43	0.43	0.08	0.31	0.31	0.04	0.28	0.28
Sat Flow, veh/h	1781	1886	1449	1781	2872	641	1781	3554	1540	1781	3554	1537
Grp Volume(v), veh/h	84	317	285	310	293	290	122	533	111	53	863	200
Grp Sat Flow(s),veh/h/ln	1781	1777	1558	1781	1777	1736	1781	1777	1540	1781	1777	1537
Q Serve(g_s), s	6.7	21.8	22.4	24.5	16.1	16.4	9.7	17.5	5.6	4.2	33.2	15.5
Cycle Q Clear(g_c), s	6.7	21.8	22.4	24.5	16.1	16.4	9.7	17.5	5.6	4.2	33.2	15.5
Prop In Lane	1.00		0.93	1.00		0.37	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	105	535	469	335	765	747	145	1093	771	76	989	428
V/C Ratio(X)	0.80	0.59	0.61	0.93	0.38	0.39	0.84	0.49	0.14	0.69	0.87	0.47
Avail Cap(c_a), veh/h	166	535	469	386	765	747	179	1093	771	116	989	428
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	66.7	42.6	42.8	57.3	27.9	27.9	65.0	40.4	19.7	67.7	49.3	42.9
Incr Delay (d2), s/veh	13.5	4.8	5.7	26.1	1.5	1.5	24.7	1.6	0.4	10.7	10.5	3.6
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	3.4	10.3	9.5	13.5	7.3	7.2	5.3	7.8	2.1	2.1	15.8	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	80.2	47.4	48.6	83.3	29.3	29.4	89.7	42.0	20.1	78.4	59.9	46.6
LnGrp LOS	F	D	D	F	C	C	F	D	C	E	E	D
Approach Vol, veh/h		686			893			766			1116	
Approach Delay, s/veh		51.9			48.1			46.4			58.4	
Approach LOS		D			D			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	31.8	49.3	16.3	46.0	13.3	67.8	12.1	50.2				
Change Period (Y+Rc), s	* 4.9	* 6.1	4.6	* 6.1	* 4.9	* 6.1	5.9	* 6.1				
Max Green Setting (Gmax), s	* 31	* 43	14.4	* 40	* 13	* 61	9.3	* 44				
Max Q Clear Time (g_c+I1), s	26.5	24.4	11.7	35.2	8.7	18.4	6.2	19.5				
Green Ext Time (p_c), s	0.4	3.8	0.1	2.5	0.1	4.1	0.0	3.7				

Intersection Summary												
HCM 7th Control Delay, s/veh			51.8									
HCM 7th LOS			D									

Notes
 * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 9: Woodward St & Borden Rd

Horizon Year AM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	320	50	20	550	20	60	40	20	40	150	130
Future Volume (veh/h)	60	320	50	20	550	20	60	40	20	40	150	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.95	1.00		0.97	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	92	492	77	26	714	26	71	48	24	47	174	151
Peak Hour Factor	0.65	0.65	0.65	0.77	0.77	0.77	0.84	0.84	0.84	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	198	1130	176	70	1062	39	170	265	133	106	357	291
Arrive On Green	0.11	0.37	0.37	0.04	0.30	0.30	0.10	0.23	0.23	0.06	0.19	0.19
Sat Flow, veh/h	1781	3060	476	1781	3490	127	1781	1161	580	1781	1870	1524
Grp Volume(v), veh/h	92	284	285	26	363	377	71	0	72	47	174	151
Grp Sat Flow(s),veh/h/ln	1781	1777	1759	1781	1777	1840	1781	0	1741	1781	1870	1524
Q Serve(g_s), s	3.5	8.6	8.7	1.0	12.8	12.9	2.7	0.0	2.4	1.8	6.0	6.4
Cycle Q Clear(g_c), s	3.5	8.6	8.7	1.0	12.8	12.9	2.7	0.0	2.4	1.8	6.0	6.4
Prop In Lane	1.00		0.27	1.00		0.07	1.00		0.33	1.00		1.00
Lane Grp Cap(c), veh/h	198	656	650	70	541	560	170	0	398	106	357	291
V/C Ratio(X)	0.46	0.43	0.44	0.37	0.67	0.67	0.42	0.00	0.18	0.44	0.49	0.52
Avail Cap(c_a), veh/h	456	1160	1149	174	893	925	446	0	985	221	813	662
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.9	17.0	17.0	33.6	21.8	21.8	30.6	0.0	22.3	32.6	25.9	26.1
Incr Delay (d2), s/veh	1.7	0.5	0.5	3.2	1.5	1.4	1.6	0.0	0.2	2.9	1.0	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	1.5	3.3	3.3	0.5	5.1	5.3	1.2	0.0	0.9	0.8	2.6	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	31.6	17.5	17.5	36.8	23.3	23.3	32.2	0.0	22.5	35.6	26.9	27.5
LnGrp LOS	C	B	B	D	C	C	C		C	D	C	C
Approach Vol, veh/h		661			766			143			372	
Approach Delay, s/veh		19.4			23.7			27.4			28.3	
Approach LOS		B			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.9	32.3	12.0	19.5	12.6	27.7	9.4	22.2				
Change Period (Y+Rc), s	5.1	* 5.8	5.2	5.8	4.6	* 5.8	5.1	* 5.8				
Max Green Setting (Gmax), s	7.0	* 47	18.0	31.2	18.4	* 36	8.9	* 41				
Max Q Clear Time (g_c+I1), s	3.0	10.7	4.7	8.4	5.5	14.9	3.8	4.4				
Green Ext Time (p_c), s	0.0	3.7	0.1	1.4	0.1	4.5	0.0	0.3				
Intersection Summary												
HCM 7th Control Delay, s/veh			23.4									
HCM 7th LOS			C									
Notes												
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 7th Signalized Intersection Summary
 10: Twin Oaks Valley Rd & Richmar Road

Horizon Year AM
 12/10/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	50	110	90	10	10	60	570	80	100	1170	170
Future Volume (veh/h)	130	50	110	90	10	10	60	570	80	100	1170	170
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.97	1.00		0.96	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	153	59	129	96	11	11	61	582	82	106	1245	181
Peak Hour Factor	0.85	0.85	0.85	0.94	0.94	0.94	0.98	0.98	0.98	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	201	57	124	189	89	89	78	1701	239	82	1701	246
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.04	0.55	0.55	0.05	0.55	0.55
Sat Flow, veh/h	1781	501	1095	1781	845	845	1781	3112	437	1781	3100	448
Grp Volume(v), veh/h	153	0	188	96	0	22	61	332	332	106	710	716
Grp Sat Flow(s),veh/h/ln	1781	0	1596	1781	0	1689	1781	1777	1773	1781	1777	1770
Q Serve(g_s), s	10.8	0.0	14.7	6.6	0.0	1.5	4.4	13.5	13.6	6.0	39.1	39.8
Cycle Q Clear(g_c), s	10.8	0.0	14.7	6.6	0.0	1.5	4.4	13.5	13.6	6.0	39.1	39.8
Prop In Lane	1.00		0.69	1.00		0.50	1.00		0.25	1.00		0.25
Lane Grp Cap(c), veh/h	201	0	180	189	0	179	78	971	969	82	975	971
V/C Ratio(X)	0.76	0.00	1.04	0.51	0.00	0.12	0.78	0.34	0.34	1.29	0.73	0.74
Avail Cap(c_a), veh/h	201	0	180	521	0	494	93	971	969	82	975	971
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	0.88	0.88	0.88	0.31	0.31	0.31
Uniform Delay (d), s/veh	55.9	0.0	57.7	54.9	0.0	52.7	61.5	16.4	16.5	62.0	22.0	22.2
Incr Delay (d2), s/veh	15.4	0.0	78.5	2.1	0.0	0.3	26.2	0.8	0.9	155.5	1.5	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	5.7	0.0	9.9	3.1	0.0	0.7	2.5	5.4	5.5	6.2	15.5	15.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	71.3	0.0	136.2	57.0	0.0	53.0	87.7	17.3	17.3	217.5	23.6	23.8
LnGrp LOS	E		F	E		D	F	B	B	F	C	C
Approach Vol, veh/h		341			118			725			1532	
Approach Delay, s/veh		107.1			56.3			23.2			37.1	
Approach LOS		F			E			C			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.0	77.3		20.8	11.7	77.6		19.9				
Change Period (Y+Rc), s	6.0	6.3		6.1	6.0	6.3		6.1				
Max Green Setting (Gmax), s	6.0	46.8		14.7	6.8	46.0		38.0				
Max Q Clear Time (g_c+I1), s	8.0	15.6		16.7	6.4	41.8		8.6				
Green Ext Time (p_c), s	0.0	4.0		0.0	0.0	3.0		0.4				
Intersection Summary												
HCM 7th Control Delay, s/veh			43.0									
HCM 7th LOS			D									

HCM 7th Signalized Intersection Summary
 11: San Marcos Blvd & E. Mission Road

Horizon Year AM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷	↷	↶↷	↷	↷	↶	↷	↷	↶	↷	↷
Traffic Volume (veh/h)	30	440	40	430	700	50	20	80	630	50	290	60
Future Volume (veh/h)	30	440	40	430	700	50	20	80	630	50	290	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	1.00		1.00	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	1742	1673	1870	1870	1742	1742	1742	1870	1742	1870
Adj Flow Rate, veh/h	38	550	50	500	814	58	29	114	0	54	312	65
Peak Hour Factor	0.80	0.80	0.80	0.86	0.86	0.86	0.70	0.70	0.70	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	46	932	372	611	1544	670	32	625		67	562	115
Arrive On Green	0.03	0.26	0.26	0.20	0.43	0.43	0.02	0.19	0.00	0.04	0.21	0.21
Sat Flow, veh/h	1781	3554	1416	3092	3554	1543	1659	3311	1477	1781	2712	555
Grp Volume(v), veh/h	38	550	50	500	814	58	29	114	0	54	188	189
Grp Sat Flow(s),veh/h/ln	1781	1777	1416	1546	1777	1543	1659	1655	1477	1781	1655	1613
Q Serve(g_s), s	1.3	8.0	1.6	9.2	10.0	1.3	1.0	1.7	0.0	1.8	6.0	6.2
Cycle Q Clear(g_c), s	1.3	8.0	1.6	9.2	10.0	1.3	1.0	1.7	0.0	1.8	6.0	6.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.34
Lane Grp Cap(c), veh/h	46	932	372	611	1544	670	32	625		67	343	334
V/C Ratio(X)	0.83	0.59	0.13	0.82	0.53	0.09	0.90	0.18		0.81	0.55	0.57
Avail Cap(c_a), veh/h	198	1497	596	729	1940	842	157	1556		135	747	728
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	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.8	19.1	16.7	22.8	12.3	9.9	29.0	20.2	0.0	28.3	21.1	21.1
Incr Delay (d2), s/veh	30.0	0.6	0.2	6.2	0.3	0.1	50.4	0.1	0.0	19.6	1.4	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	0.9	2.9	0.5	3.4	3.1	0.4	0.8	0.6	0.0	1.0	2.1	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	58.8	19.7	16.9	29.0	12.6	9.9	79.4	20.4	0.0	47.9	22.4	22.6
LnGrp LOS	E	B	B	C	B	A	E	C		D	C	C
Approach Vol, veh/h	638				1372		143				431	
Approach Delay, s/veh	21.8				18.5		32.3				25.7	
Approach LOS	C				B		C				C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.2	16.5	15.7	20.9	5.2	17.6	5.5	31.1				
Change Period (Y+Rc), s	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3				
Max Green Setting (Gmax), s	4.5	27.9	14.0	25.0	5.6	26.8	6.6	32.4				
Max Q Clear Time (g_c+I1), s	3.8	3.7	11.2	10.0	3.0	8.2	3.3	12.0				
Green Ext Time (p_c), s	0.0	0.5	0.6	3.1	0.0	1.8	0.0	5.3				

Intersection Summary												
HCM 7th Control Delay, s/veh			21.3									
HCM 7th LOS			C									

Notes
 User approved changes to right turn type.
 Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 7th Signalized Intersection Summary
 12: Twin Oaks Valley Rd & San Marcos Blvd

Horizon Year AM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↔↔	↑↑		↔↔	↑↑	↗	↔↔	↑↑	
Traffic Volume (veh/h)	210	490	300	390	370	20	230	460	590	100	820	260
Future Volume (veh/h)	210	490	300	390	370	20	230	460	590	100	820	260
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	231	538	330	424	402	22	253	505	648	106	872	277
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.91	0.91	0.91	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	282	1153	604	230	1058	58	230	1202	627	201	858	272
Arrive On Green	0.08	0.32	0.32	0.07	0.31	0.31	0.07	0.34	0.34	0.06	0.33	0.33
Sat Flow, veh/h	3456	3554	1537	3456	3420	186	3456	3554	1541	3456	2633	835
Grp Volume(v), veh/h	231	538	330	424	208	216	253	505	648	106	588	561
Grp Sat Flow(s),veh/h/ln	1728	1777	1537	1728	1777	1830	1728	1777	1541	1728	1777	1691
Q Serve(g_s), s	8.9	16.3	22.5	9.0	12.4	12.5	9.0	14.8	45.7	4.0	44.0	44.0
Cycle Q Clear(g_c), s	8.9	16.3	22.5	9.0	12.4	12.5	9.0	14.8	45.7	4.0	44.0	44.0
Prop In Lane	1.00		1.00	1.00		0.10	1.00		1.00	1.00		0.49
Lane Grp Cap(c), veh/h	282	1153	604	230	550	566	230	1202	627	201	579	551
V/C Ratio(X)	0.82	0.47	0.55	1.84	0.38	0.38	1.10	0.42	1.03	0.53	1.01	1.02
Avail Cap(c_a), veh/h	333	1166	610	230	550	566	230	1202	627	205	579	551
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.72	0.72	0.72	0.90	0.90	0.90	0.51	0.51	0.51
Uniform Delay (d), s/veh	61.0	36.3	31.9	63.0	36.5	36.5	63.0	34.5	40.3	61.8	45.5	45.5
Incr Delay (d2), s/veh	12.9	1.4	3.5	390.1	1.4	1.4	85.0	0.2	43.2	1.2	30.5	32.0
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	4.3	7.1	8.7	16.4	5.5	5.7	6.6	6.3	27.3	1.8	23.5	22.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	73.9	37.7	35.4	453.1	37.9	37.9	148.0	34.7	83.5	63.0	76.0	77.5
LnGrp LOS	E	D	D	F	D	D	F	C	F	E	F	F
Approach Vol, veh/h		1099			848			1406			1255	
Approach Delay, s/veh		44.6			245.5			77.6			75.6	
Approach LOS		D			F			E			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	51.2	16.0	51.8	18.0	49.2	14.3	53.5				
Change Period (Y+Rc), s	7.0	7.4	7.0	* 7.8	7.0	7.4	6.5	7.8				
Max Green Setting (Gmax), s	9.0	44.3	9.0	* 44	13.0	40.3	8.0	45.0				
Max Q Clear Time (g_c+I1), s	11.0	24.5	11.0	46.0	10.9	14.5	6.0	47.7				
Green Ext Time (p_c), s	0.0	4.4	0.0	0.0	0.2	2.2	0.0	0.0				

Intersection Summary

HCM 7th Control Delay, s/veh	100.1
HCM 7th LOS	F

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 13: Twin Oaks Valley Rd & SR 78 WB Ramps

Horizon Year AM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↔↔		↔↔		↑↑↑	↗		↑↑↑	↗
Traffic Volume (veh/h)	0	0	0	780	0	230	0	1300	450	0	1250	360
Future Volume (veh/h)	0	0	0	780	0	230	0	1300	450	0	1250	360
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	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
Work Zone On Approach				No			No			No		
Adj Sat Flow, veh/h/ln				1870	0	1870	0	1870	1870	0	1870	1870
Adj Flow Rate, veh/h				897	0	264	0	1398	484	0	1330	0
Peak Hour Factor				0.87	0.87	0.87	0.93	0.93	0.93	0.94	0.94	0.94
Percent Heavy Veh, %				2	0	2	0	2	2	0	2	2
Cap, veh/h				987	0	797	0	3259	1431	0	3259	
Arrive On Green				0.29	0.00	0.29	0.00	1.00	1.00	0.00	0.64	0.00
Sat Flow, veh/h				3456	0	2790	0	5274	1532	0	5274	1585
Grp Volume(v), veh/h				897	0	264	0	1398	484	0	1330	0
Grp Sat Flow(s),veh/h/ln				1728	0	1395	0	1702	1532	0	1702	1585
Q Serve(g_s), s				32.6	0.0	9.7	0.0	0.0	0.0	0.0	16.6	0.0
Cycle Q Clear(g_c), s				32.6	0.0	9.7	0.0	0.0	0.0	0.0	16.6	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				987	0	797	0	3259	1431	0	3259	
V/C Ratio(X)				0.91	0.00	0.33	0.00	0.43	0.34	0.00	0.41	
Avail Cap(c_a), veh/h				1579	0	1275	0	3259	1431	0	3259	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.43	0.43	0.00	0.09	0.00
Uniform Delay (d), s/veh				44.8	0.0	36.6	0.0	0.0	0.0	0.0	11.5	0.0
Incr Delay (d2), s/veh				3.4	0.0	0.1	0.0	0.2	0.3	0.0	0.0	0.0
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				14.4	0.0	3.4	0.0	0.1	0.1	0.0	5.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				48.2	0.0	36.7	0.0	0.2	0.3	0.0	11.5	0.0
LnGrp LOS				D		D		A	A		B	
Approach Vol, veh/h					1161			1882			1330	
Approach Delay, s/veh					45.6			0.2			11.5	
Approach LOS					D			A			B	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		88.3				88.3		41.7				
Change Period (Y+Rc), s		5.3				5.3		4.6				
Max Green Setting (Gmax), s		60.7				60.7		59.4				
Max Q Clear Time (g_c+I1), s		2.0				18.6		34.6				
Green Ext Time (p_c), s		11.3				6.9		2.6				

Intersection Summary

HCM 7th Control Delay, s/veh	15.7
HCM 7th LOS	B

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 7th Signalized Intersection Summary
 14: Twin Oaks Valley Rd & SR 78 EB Ramps

Horizon Year AM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	570	10	900	0	0	0	0	1300	500	360	1820	0
Future Volume (veh/h)	570	10	900	0	0	0	0	1300	500	360	1820	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99				1.00		0.98	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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	408	0	1177				0	1511	495	396	2000	0
Peak Hour Factor	0.94	0.94	0.94				0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	567	0	1000				0	2466	680	461	3091	0
Arrive On Green	0.32	0.00	0.32				0.00	0.44	0.44	0.18	0.81	0.00
Sat Flow, veh/h	1781	0	3140				0	5611	1548	3456	5274	0
Grp Volume(v), veh/h	408	0	1177				0	1511	495	396	2000	0
Grp Sat Flow(s),veh/h/ln	1781	0	1570				0	1870	1548	1728	1702	0
Q Serve(g_s), s	26.3	0.0	41.4				0.0	26.9	34.3	14.5	20.7	0.0
Cycle Q Clear(g_c), s	26.3	0.0	41.4				0.0	26.9	34.3	14.5	20.7	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	567	0	1000				0	2466	680	461	3091	0
V/C Ratio(X)	0.72	0.00	1.18				0.00	0.61	0.73	0.86	0.65	0.00
Avail Cap(c_a), veh/h	567	0	1000				0	2466	680	659	3091	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.78	0.78	0.00
Uniform Delay (d), s/veh	39.2	0.0	44.3				0.0	27.9	30.0	52.3	7.0	0.0
Incr Delay (d2), s/veh	4.4	0.0	90.2				0.0	1.1	6.7	6.3	0.8	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.2	0.0	28.5				0.0	11.7	13.4	6.2	4.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	43.6	0.0	134.5				0.0	29.1	36.7	58.5	7.8	0.0
LnGrp LOS	D		F					C	D	E	A	
Approach Vol, veh/h		1585						2006			2396	
Approach Delay, s/veh		111.1						31.0			16.2	
Approach LOS		F						C			B	
Timer - Assigned Phs	1	2		4				6				
Phs Duration (G+Y+Rc), s	21.6	62.4		46.0				84.0				
Change Period (Y+Rc), s	4.2	5.3		4.6				5.3				
Max Green Setting (Gmax), s	24.8	49.7		41.4				78.7				
Max Q Clear Time (g_c+I1), s	16.5	36.3		43.4				22.7				
Green Ext Time (p_c), s	0.9	9.3		0.0				24.8				

Intersection Summary		
HCM 7th Control Delay, s/veh		46.3
HCM 7th LOS		D

Notes
 User approved volume balancing among the lanes for turning movement.

HCM 7th Signalized Intersection Summary
 1: Twin Oaks Valley Rd & Deer Springs Rd

Horizon Year PM
 12/10/2025



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	40	200	90	1030	850	40
Future Volume (veh/h)	40	200	90	1030	850	40
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	47	235	103	1184	1049	49
Peak Hour Factor	0.85	0.85	0.87	0.87	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	311	277	133	1303	1053	861
Arrive On Green	0.17	0.17	0.07	0.70	0.56	0.56
Sat Flow, veh/h	1781	1585	1781	1870	1870	1529
Grp Volume(v), veh/h	47	235	103	1184	1049	49
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1529
Q Serve(g_s), s	1.9	12.1	4.8	43.9	46.8	1.2
Cycle Q Clear(g_c), s	1.9	12.1	4.8	43.9	46.8	1.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	311	277	133	1303	1053	861
V/C Ratio(X)	0.15	0.85	0.78	0.91	1.00	0.06
Avail Cap(c_a), veh/h	510	454	276	1454	1053	861
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.4	33.6	38.1	10.5	18.3	8.3
Incr Delay (d2), s/veh	0.2	8.0	9.4	8.1	26.9	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	10.6	2.3	14.3	25.3	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	29.6	41.6	47.5	18.6	45.1	8.3
LnGrp LOS	C	D	D	B	D	A
Approach Vol, veh/h	282			1287	1098	
Approach Delay, s/veh	39.6			20.9	43.5	
Approach LOS	D			C	D	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		64.2		19.6	11.2	53.0
Change Period (Y+Rc), s		5.8		5.0	5.0	5.8
Max Green Setting (Gmax), s		65.2		24.0	13.0	47.2
Max Q Clear Time (g_c+I1), s		45.9		14.1	6.8	48.8
Green Ext Time (p_c), s		9.7		0.6	0.1	0.0
Intersection Summary						
HCM 7th Control Delay, s/veh			32.2			
HCM 7th LOS			C			

HCM 7th Signalized Intersection Summary
 2: Twin Oaks Valley Rd & Buena Creek Rd

Horizon Year PM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↗	↖		↖	↕	↗
Traffic Volume (veh/h)	630	0	310	5	0	0	290	780	5	0	800	570
Future Volume (veh/h)	630	0	310	5	0	0	290	780	5	0	800	570
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		1.00	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	692	0	341	20	0	0	333	897	6	0	851	606
Peak Hour Factor	0.91	0.91	0.91	0.25	0.25	0.25	0.87	0.87	0.87	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	609	0	460	79	0	0	211	1081	7	2	756	622
Arrive On Green	0.30	0.00	0.30	0.30	0.00	0.00	0.12	0.58	0.58	0.00	0.40	0.40
Sat Flow, veh/h	1781	0	1545	0	0	0	1781	1855	12	1781	1870	1539
Grp Volume(v), veh/h	692	0	341	20	0	0	333	0	903	0	851	606
Grp Sat Flow(s),veh/h/ln	1781	0	1545	0	0	0	1781	0	1868	1781	1870	1539
Q Serve(g_s), s	0.0	0.0	18.1	0.0	0.0	0.0	10.8	0.0	35.6	0.0	36.8	35.3
Cycle Q Clear(g_c), s	27.1	0.0	18.1	27.1	0.0	0.0	10.8	0.0	35.6	0.0	36.8	35.3
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	609	0	460	79	0	0	211	0	1089	2	756	622
V/C Ratio(X)	1.14	0.00	0.74	0.25	0.00	0.00	1.58	0.00	0.83	0.00	1.13	0.97
Avail Cap(c_a), veh/h	609	0	460	79	0	0	211	0	1089	327	756	622
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	0.00	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	33.8	0.0	28.8	45.6	0.0	0.0	40.1	0.0	15.3	0.0	27.1	26.7
Incr Delay (d2), s/veh	80.2	0.0	6.4	1.7	0.0	0.0	281.1	0.0	5.5	0.0	73.3	29.7
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	27.2	0.0	7.3	0.5	0.0	0.0	21.0	0.0	13.9	0.0	30.0	16.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	114.0	0.0	35.2	47.2	0.0	0.0	321.3	0.0	20.8	0.0	100.5	56.4
LnGrp LOS	F		D	D			F		C		F	E
Approach Vol, veh/h		1033			20			1236			1457	
Approach Delay, s/veh		88.0			47.2			101.8			82.2	
Approach LOS		F			D			F			F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	58.9		32.2	16.3	42.6		32.2				
Change Period (Y+Rc), s	5.8	5.8		* 5.1	5.5	5.8		5.1				
Max Green Setting (Gmax), s	16.7	30.6		* 27	10.8	36.8		26.0				
Max Q Clear Time (g_c+I1), s	0.0	37.6		29.1	12.8	38.8		29.1				
Green Ext Time (p_c), s	0.0	0.0		0.0	0.0	0.0		0.0				

Intersection Summary

HCM 7th Control Delay, s/veh	90.1
HCM 7th LOS	F

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 3: Twin Oaks Valley Rd & Olive Street

Horizon Year PM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↖	↗		↖	↗		↖	↗	
Traffic Volume (veh/h)	0	20	30	20	0	80	0	940	20	130	680	0
Future Volume (veh/h)	0	20	30	20	0	80	0	940	20	130	680	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.88	1.00		0.96	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	0	65	97	25	0	99	0	1044	22	143	747	0
Peak Hour Factor	0.31	0.31	0.31	0.81	0.81	0.81	0.90	0.90	0.90	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	79	117	155	0	122	1	1005	21	152	1260	0
Arrive On Green	0.00	0.12	0.12	0.09	0.00	0.09	0.00	0.55	0.55	0.09	0.67	0.00
Sat Flow, veh/h	0	659	984	1781	0	1400	1781	1823	38	1781	1870	0
Grp Volume(v), veh/h	0	0	162	25	0	99	0	0	1066	143	747	0
Grp Sat Flow(s),veh/h/ln	0	0	1643	1781	0	1400	1781	0	1862	1781	1870	0
Q Serve(g_s), s	0.0	0.0	11.9	1.6	0.0	8.6	0.0	0.0	68.3	9.9	26.9	0.0
Cycle Q Clear(g_c), s	0.0	0.0	11.9	1.6	0.0	8.6	0.0	0.0	68.3	9.9	26.9	0.0
Prop In Lane	0.00		0.60	1.00		1.00	1.00		0.02	1.00		0.00
Lane Grp Cap(c), veh/h	0	0	196	155	0	122	1	0	1026	152	1260	0
V/C Ratio(X)	0.00	0.00	0.83	0.16	0.00	0.81	0.00	0.00	1.04	0.94	0.59	0.00
Avail Cap(c_a), veh/h	0	0	239	267	0	210	72	0	1026	152	1260	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	53.3	52.4	0.0	55.6	0.0	0.0	27.8	56.4	11.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	17.7	0.5	0.0	12.2	0.0	0.0	38.8	54.8	0.7	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	5.9	0.7	0.0	3.4	0.0	0.0	38.2	6.7	9.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	71.0	52.9	0.0	67.8	0.0	0.0	66.6	111.2	11.7	0.0
LnGrp LOS			E	D		E			F	F	B	
Approach Vol, veh/h		162			124			1066			890	
Approach Delay, s/veh		71.0			64.8			66.6			27.7	
Approach LOS		E			E			E			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.2	74.6		19.4	0.0	89.8		14.8				
Change Period (Y+Rc), s	4.6	6.3		4.6	4.6	6.3		4.0				
Max Green Setting (Gmax), s	10.6	68.3		18.0	5.0	73.9		18.6				
Max Q Clear Time (g_c+I1), s	11.9	70.3		13.9	0.0	28.9		10.6				
Green Ext Time (p_c), s	0.0	0.0		0.3	0.0	5.6		0.3				
Intersection Summary												
HCM 7th Control Delay, s/veh			51.4									
HCM 7th LOS			D									

HCM 7th Signalized Intersection Summary
 4: Twin Oaks Valley Rd & E. La Cienega Road

Horizon Year PM
 12/10/2025



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↶	↕↗		↶	↕↗
Traffic Volume (veh/h)	60	50	790	80	130	620
Future Volume (veh/h)	60	50	790	80	130	620
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00		0.96	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	90	75	898	91	140	667
Peak Hour Factor	0.67	0.67	0.88	0.88	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	199	177	1210	123	178	2131
Arrive On Green	0.11	0.11	0.37	0.37	0.10	0.60
Sat Flow, veh/h	1781	1585	3336	329	1781	3647
Grp Volume(v), veh/h	90	75	492	497	140	667
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1794	1781	1777
Q Serve(g_s), s	2.2	2.1	11.4	11.4	3.6	4.4
Cycle Q Clear(g_c), s	2.2	2.1	11.4	11.4	3.6	4.4
Prop In Lane	1.00	1.00		0.18	1.00	
Lane Grp Cap(c), veh/h	199	177	663	670	178	2131
V/C Ratio(X)	0.45	0.42	0.74	0.74	0.78	0.31
Avail Cap(c_a), veh/h	1050	934	834	842	187	2491
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.7	19.7	12.9	12.9	20.9	4.7
Incr Delay (d2), s/veh	1.6	1.6	2.7	2.7	18.6	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.8	3.6	3.6	2.1	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	21.3	21.3	15.6	15.6	39.5	4.8
LnGrp LOS	C	C	B	B	D	A
Approach Vol, veh/h	165		989			807
Approach Delay, s/veh	21.3		15.6			10.8
Approach LOS	C		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	10.8	24.9			35.7	11.8
Change Period (Y+Rc), s	6.0	7.2			7.2	6.5
Max Green Setting (Gmax), s	5.0	22.3			33.3	28.0
Max Q Clear Time (g_c+I1), s	5.6	13.4			6.4	4.2
Green Ext Time (p_c), s	0.0	3.7			4.2	0.5
Intersection Summary						
HCM 7th Control Delay, s/veh			14.1			
HCM 7th LOS			B			

HCM 7th Signalized Intersection Summary
 5: Twin Oaks Valley Rd & Del Roy Dr

Horizon Year PM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	30	80	0	40	40	840	10	10	620	20
Future Volume (veh/h)	10	0	30	80	0	40	40	840	10	10	620	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.94	1.00		0.93
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	13	0	40	100	0	50	43	894	11	11	705	23
Peak Hour Factor	0.75	0.75	0.75	0.80	0.80	0.80	0.94	0.94	0.94	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	35	0	246	145	0	385	91	1234	15	30	1082	35
Arrive On Green	0.02	0.00	0.16	0.08	0.00	0.25	0.05	0.34	0.34	0.02	0.31	0.31
Sat Flow, veh/h	1781	0	1555	1781	0	1566	1781	3591	44	1781	3502	114
Grp Volume(v), veh/h	13	0	40	100	0	50	43	442	463	11	357	371
Grp Sat Flow(s),veh/h/ln	1781	0	1555	1781	0	1566	1781	1777	1859	1781	1777	1840
Q Serve(g_s), s	0.4	0.0	1.3	3.2	0.0	1.5	1.4	12.9	12.9	0.4	10.3	10.3
Cycle Q Clear(g_c), s	0.4	0.0	1.3	3.2	0.0	1.5	1.4	12.9	12.9	0.4	10.3	10.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.02	1.00		0.06
Lane Grp Cap(c), veh/h	35	0	246	145	0	385	91	610	639	30	549	568
V/C Ratio(X)	0.37	0.00	0.16	0.69	0.00	0.13	0.47	0.72	0.72	0.37	0.65	0.65
Avail Cap(c_a), veh/h	180	0	891	180	0	937	195	758	793	180	743	769
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	28.7	0.0	21.6	26.5	0.0	17.4	27.4	17.0	17.0	28.9	17.7	17.7
Incr Delay (d2), s/veh	6.5	0.0	0.3	7.8	0.0	0.2	3.7	2.6	2.5	7.4	1.3	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.5	1.6	0.0	0.5	0.6	4.6	4.8	0.2	3.6	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	35.3	0.0	21.9	34.3	0.0	17.6	31.1	19.7	19.5	36.3	19.0	19.0
LnGrp LOS	D		C	C		B	C	B	B	D	B	B
Approach Vol, veh/h		53			150			948			739	
Approach Delay, s/veh		25.2			28.7			20.1			19.3	
Approach LOS		C			C			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.5	26.6	10.8	15.4	8.5	24.5	5.7	20.6				
Change Period (Y+Rc), s	5.5	6.2	6.0	6.0	5.5	6.2	4.5	6.0				
Max Green Setting (Gmax), s	6.0	25.3	6.0	34.0	6.5	24.8	6.0	35.5				
Max Q Clear Time (g_c+I1), s	2.4	14.9	5.2	3.3	3.4	12.3	2.4	3.5				
Green Ext Time (p_c), s	0.0	3.7	0.0	0.2	0.0	3.2	0.0	0.2				
Intersection Summary												
HCM 7th Control Delay, s/veh			20.6									
HCM 7th LOS			C									

HCM 7th Signalized Intersection Summary
 7: Twin Oaks Valley Rd & Windy Wy

Horizon Year PM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗					↖	↕		↖	↗	
Traffic Volume (veh/h)	70	0	70	0	0	0	100	870	0	5	760	20
Future Volume (veh/h)	70	0	70	0	0	0	100	870	0	5	760	20
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96				1.00		1.00	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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	99	0	99				109	946	0	5	835	22
Peak Hour Factor	0.71	0.71	0.71				0.92	0.92	0.92	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2				2	2	2	2	2	2
Cap, veh/h	150	0	129				134	2788	0	11	2530	67
Arrive On Green	0.08	0.00	0.08				0.08	0.78	0.00	0.01	0.72	0.72
Sat Flow, veh/h	1781	0	1529				1781	3647	0	1781	3533	93
Grp Volume(v), veh/h	99	0	99				109	946	0	5	420	437
Grp Sat Flow(s),veh/h/ln	1781	0	1529				1781	1777	0	1781	1777	1850
Q Serve(g_s), s	7.0	0.0	8.2				7.8	10.2	0.0	0.4	11.4	11.4
Cycle Q Clear(g_c), s	7.0	0.0	8.2				7.8	10.2	0.0	0.4	11.4	11.4
Prop In Lane	1.00		1.00				1.00		0.00	1.00		0.05
Lane Grp Cap(c), veh/h	150	0	129				134	2788	0	11	1272	1324
V/C Ratio(X)	0.66	0.00	0.77				0.82	0.34	0.00	0.44	0.33	0.33
Avail Cap(c_a), veh/h	370	0	318				219	2788	0	123	1272	1324
HCM Platoon Ratio	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				0.70	0.70	0.00	0.85	0.85	0.85
Uniform Delay (d), s/veh	57.7	0.0	58.3				59.2	4.1	0.0	64.4	6.9	6.9
Incr Delay (d2), s/veh	4.8	0.0	9.1				8.2	0.2	0.0	21.3	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
%ile BackOfQ(50%),veh/ln	3.4	0.0	3.5				3.8	2.8	0.0	0.2	3.9	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	62.5	0.0	67.4				67.4	4.3	0.0	85.7	7.5	7.4
LnGrp LOS	E		E				E	A		F	A	A
Approach Vol, veh/h		198						1055			862	
Approach Delay, s/veh		64.9						10.9			7.9	
Approach LOS		E						B			A	
Timer - Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	5.8	108.2		16.0	14.8	99.3						
Change Period (Y+Rc), s	5.0	6.2		5.0	5.0	6.2						
Max Green Setting (Gmax), s	9.0	77.8		27.0	16.0	70.8						
Max Q Clear Time (g_c+I1), s	2.4	12.2		10.2	9.8	13.4						
Green Ext Time (p_c), s	0.0	7.5		0.7	0.1	5.6						
Intersection Summary												
HCM 7th Control Delay, s/veh			14.7									
HCM 7th LOS			B									

HCM 7th Signalized Intersection Summary
8: Twin Oaks Valley Rd & Borden Rd

Horizon Year PM
12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	220	500	250	170	230	70	220	680	270	60	610	120
Future Volume (veh/h)	220	500	250	170	230	70	220	680	270	60	610	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.96	1.00		0.95
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	244	556	278	185	250	76	239	739	293	67	678	133
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.92	0.92	0.92	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	268	734	366	209	778	230	264	1245	721	85	922	393
Arrive On Green	0.15	0.32	0.32	0.12	0.29	0.29	0.15	0.35	0.35	0.05	0.26	0.26
Sat Flow, veh/h	1781	2271	1133	1781	2682	794	1781	3554	1527	1781	3554	1514
Grp Volume(v), veh/h	244	435	399	185	163	163	239	739	293	67	678	133
Grp Sat Flow(s),veh/h/ln	1781	1777	1628	1781	1777	1699	1781	1777	1527	1781	1777	1514
Q Serve(g_s), s	19.2	31.3	31.4	14.6	10.2	10.7	18.8	24.3	18.0	5.3	24.9	10.2
Cycle Q Clear(g_c), s	19.2	31.3	31.4	14.6	10.2	10.7	18.8	24.3	18.0	5.3	24.9	10.2
Prop In Lane	1.00		0.70	1.00		0.47	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	268	574	526	209	515	493	264	1245	721	85	922	393
V/C Ratio(X)	0.91	0.76	0.76	0.89	0.32	0.33	0.91	0.59	0.41	0.79	0.74	0.34
Avail Cap(c_a), veh/h	313	574	526	251	515	493	317	1245	721	149	922	393
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	59.6	43.3	43.3	62.0	39.6	39.8	59.8	38.0	25.0	67.2	48.3	42.9
Incr Delay (d2), s/veh	26.6	9.0	9.9	25.9	1.6	1.8	25.4	2.1	1.7	14.5	5.2	2.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.7	15.2	14.1	8.1	4.8	4.8	10.2	10.7	6.7	2.7	11.5	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	86.2	52.3	53.2	87.9	41.2	41.6	85.2	40.1	26.7	81.7	53.5	45.2
LnGrp LOS	F	D	D	F	D	D	F	D	C	F	D	D
Approach Vol, veh/h		1078			511			1271			878	
Approach Delay, s/veh		60.3			58.2			45.5			54.4	
Approach LOS		E			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.6	52.2	25.7	43.1	26.4	47.5	12.7	56.1				
Change Period (Y+Rc), s	* 4.9	* 6.1	4.6	* 6.1	* 4.9	* 6.1	5.9	* 6.1				
Max Green Setting (Gmax), s	* 20	* 46	25.4	* 37	* 25	* 41	11.9	* 50				
Max Q Clear Time (g_c+I1), s	16.6	33.4	20.8	26.9	21.2	12.7	7.3	26.3				
Green Ext Time (p_c), s	0.2	4.5	0.3	3.3	0.3	2.0	0.0	6.0				

Intersection Summary												
HCM 7th Control Delay, s/veh			53.6									
HCM 7th LOS			D									

Notes
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 9: Woodward St & Borden Rd

Horizon Year PM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	640	40	20	300	40	70	100	30	30	80	90
Future Volume (veh/h)	160	640	40	20	300	40	70	100	30	30	80	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.94	1.00		0.97	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	174	696	43	22	333	44	85	122	37	33	88	99
Peak Hour Factor	0.92	0.92	0.92	0.90	0.90	0.90	0.82	0.82	0.82	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	235	1055	65	64	700	91	204	334	101	88	332	270
Arrive On Green	0.13	0.31	0.31	0.04	0.22	0.22	0.11	0.24	0.24	0.05	0.18	0.18
Sat Flow, veh/h	1781	3388	209	1781	3134	409	1781	1365	414	1781	1870	1521
Grp Volume(v), veh/h	174	365	374	22	187	190	85	0	159	33	88	99
Grp Sat Flow(s),veh/h/ln	1781	1777	1820	1781	1777	1767	1781	0	1779	1781	1870	1521
Q Serve(g_s), s	5.7	10.8	10.8	0.7	5.5	5.7	2.7	0.0	4.5	1.1	2.5	3.5
Cycle Q Clear(g_c), s	5.7	10.8	10.8	0.7	5.5	5.7	2.7	0.0	4.5	1.1	2.5	3.5
Prop In Lane	1.00		0.11	1.00		0.23	1.00		0.23	1.00		1.00
Lane Grp Cap(c), veh/h	235	553	567	64	397	394	204	0	435	88	332	270
V/C Ratio(X)	0.74	0.66	0.66	0.35	0.47	0.48	0.42	0.00	0.37	0.38	0.26	0.37
Avail Cap(c_a), veh/h	540	1373	1407	205	1057	1051	528	0	1246	205	962	782
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.3	18.1	18.1	28.6	20.5	20.5	25.0	0.0	19.0	27.9	21.5	21.9
Incr Delay (d2), s/veh	4.5	1.3	1.3	3.2	0.9	0.9	1.4	0.0	0.5	2.7	0.4	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	2.5	4.1	4.2	0.3	2.2	2.2	1.1	0.0	1.7	0.5	1.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	29.8	19.4	19.4	31.8	21.3	21.4	26.4	0.0	19.5	30.6	22.0	22.8
LnGrp LOS	C	B	B	C	C	C	C		B	C	C	C
Approach Vol, veh/h		913			399			244			220	
Approach Delay, s/veh		21.4			22.0			21.9			23.6	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.3	24.7	12.1	16.6	12.6	19.3	8.1	20.6				
Change Period (Y+Rc), s	5.1	* 5.8	5.2	5.8	4.6	* 5.8	5.1	* 5.8				
Max Green Setting (Gmax), s	7.0	* 47	18.0	31.2	18.4	* 36	7.0	* 43				
Max Q Clear Time (g_c+I1), s	2.7	12.8	4.7	5.5	7.7	7.7	3.1	6.5				
Green Ext Time (p_c), s	0.0	5.0	0.1	0.8	0.3	2.2	0.0	0.9				

Intersection Summary												
HCM 7th Control Delay, s/veh				21.9								
HCM 7th LOS				C								

Notes
 * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 10: Twin Oaks Valley Rd & Richmar Road

Horizon Year PM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	200	60	80	140	40	20	120	1020	130	250	910	170	
Future Volume (veh/h)	200	60	80	140	40	20	120	1020	130	250	910	170	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Width 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	
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.97	1.00		0.96	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	235	71	94	200	57	29	126	1074	137	266	968	181	
Peak Hour Factor	0.85	0.85	0.85	0.70	0.70	0.70	0.95	0.95	0.95	0.94	0.94	0.94	
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2	
Cap, veh/h	245	97	128	303	197	100	134	1443	184	82	1271	237	
Arrive On Green	0.14	0.14	0.14	0.17	0.17	0.17	0.08	0.46	0.46	0.05	0.43	0.43	
Sat Flow, veh/h	1781	702	929	1781	1156	588	1781	3154	402	1781	2966	554	
Grp Volume(v), veh/h	235	0	165	200	0	86	126	604	607	266	579	570	
Grp Sat Flow(s),veh/h/ln	1781	0	1631	1781	0	1744	1781	1777	1779	1781	1777	1743	
Q Serve(g_s), s	17.0	0.0	12.6	13.6	0.0	5.6	9.1	36.3	36.5	6.0	36.0	36.1	
Cycle Q Clear(g_c), s	17.0	0.0	12.6	13.6	0.0	5.6	9.1	36.3	36.5	6.0	36.0	36.1	
Prop In Lane	1.00		0.57	1.00		0.34	1.00		0.23	1.00		0.32	
Lane Grp Cap(c), veh/h	245	0	225	303	0	297	134	813	814	82	761	747	
V/C Ratio(X)	0.96	0.00	0.73	0.66	0.00	0.29	0.94	0.74	0.75	3.24	0.76	0.76	
Avail Cap(c_a), veh/h	245	0	225	521	0	510	134	813	814	82	761	747	
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	0.70	0.70	0.70	0.55	0.55	0.55	
Uniform Delay (d), s/veh	55.7	0.0	53.8	50.4	0.0	47.1	59.8	29.0	29.0	62.0	31.5	31.6	
Incr Delay (d2), s/veh	45.8	0.0	11.8	2.5	0.0	0.5	47.5	4.3	4.4	1023.1	4.0	4.1	
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	10.8	0.0	5.9	6.3	0.0	2.5	5.8	15.6	15.8	26.0	15.6	15.3	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d), s/veh	101.4	0.0	65.6	52.9	0.0	47.6	107.3	33.3	33.4	1085.1	35.5	35.7	
LnGrp LOS	F		E	D		D	F	C	C	F	D	D	
Approach Vol, veh/h	400						286		1337		1415		
Approach Delay, s/veh	86.6						51.3		40.3		232.9		
Approach LOS	F						D		D		F		
Timer - Assigned Phs	1	2	4		5	6	8						
Phs Duration (G+Y+Rc), s	12.0	65.8	24.0		15.8	62.0	28.2						
Change Period (Y+Rc), s	6.0	6.3	6.1		6.0	6.3	6.1						
Max Green Setting (Gmax), s	6.0	43.6	17.9		9.8	39.8	38.0						
Max Q Clear Time (g_c+I1), s	8.0	38.5	19.0		11.1	38.1	15.6						
Green Ext Time (p_c), s	0.0	3.1	0.0		0.0	1.1	1.0						
Intersection Summary													
HCM 7th Control Delay, s/veh			125.9										
HCM 7th LOS			F										

HCM 7th Signalized Intersection Summary
 11: San Marcos Blvd & E. Mission Road

Horizon Year PM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘↗	↑↑	↗	↘	↑↑	↗	↘	↑↑	
Traffic Volume (veh/h)	100	1070	50	290	740	90	60	250	760	30	150	70
Future Volume (veh/h)	100	1070	50	290	740	90	60	250	760	30	150	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		0.95
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	1742	1742	1870	1870	1742	1742	1742	1870	1742	1870
Adj Flow Rate, veh/h	105	1126	53	326	831	101	67	278	0	37	183	85
Peak Hour Factor	0.95	0.95	0.95	0.89	0.89	0.89	0.90	0.90	0.90	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	136	1294	522	414	1478	641	83	679		45	396	174
Arrive On Green	0.08	0.36	0.36	0.13	0.42	0.42	0.05	0.21	0.00	0.03	0.18	0.18
Sat Flow, veh/h	1781	3554	1433	3219	3554	1542	1659	3311	1477	1781	2195	964
Grp Volume(v), veh/h	105	1126	53	326	831	101	67	278	0	37	135	133
Grp Sat Flow(s),veh/h/ln	1781	1777	1433	1610	1777	1542	1659	1655	1477	1781	1655	1503
Q Serve(g_s), s	3.9	19.8	1.6	6.6	12.0	2.7	2.7	4.9	0.0	1.4	4.9	5.3
Cycle Q Clear(g_c), s	3.9	19.8	1.6	6.6	12.0	2.7	2.7	4.9	0.0	1.4	4.9	5.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.64
Lane Grp Cap(c), veh/h	136	1294	522	414	1478	641	83	679		45	299	271
V/C Ratio(X)	0.77	0.87	0.10	0.79	0.56	0.16	0.81	0.41		0.82	0.45	0.49
Avail Cap(c_a), veh/h	326	1361	549	432	1478	641	180	1588		119	725	658
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.4	19.9	14.1	28.4	14.9	12.3	31.6	23.1	0.0	32.6	24.6	24.7
Incr Delay (d2), s/veh	8.8	6.2	0.1	9.1	0.5	0.1	16.5	0.4	0.0	29.7	1.1	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	1.9	7.9	0.5	2.8	4.1	0.8	1.4	1.7	0.0	0.9	1.8	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	39.2	26.0	14.2	37.5	15.4	12.4	48.1	23.5	0.0	62.2	25.6	26.1
LnGrp LOS	D	C	B	D	B	B	D	C		E	C	C
Approach Vol, veh/h		1284			1258			345			305	
Approach Delay, s/veh		26.6			20.9			28.3			30.3	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.7	19.1	12.6	29.7	7.4	17.4	9.1	33.2				
Change Period (Y+Rc), s	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3				
Max Green Setting (Gmax), s	4.5	32.2	9.0	25.7	7.3	29.4	12.3	22.4				
Max Q Clear Time (g_c+I1), s	3.4	6.9	8.6	21.8	4.7	7.3	5.9	14.0				
Green Ext Time (p_c), s	0.0	1.6	0.1	2.5	0.0	1.3	0.1	3.5				

Intersection Summary		
HCM 7th Control Delay, s/veh		24.9
HCM 7th LOS		C

Notes
 Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 7th Signalized Intersection Summary
 12: Twin Oaks Valley Rd & San Marcos Blvd

Horizon Year PM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↗	↖↗	↑↑		↖↗	↑↑	↗	↖↗	↑↑	
Traffic Volume (veh/h)	310	680	390	340	500	100	420	720	340	90	680	290
Future Volume (veh/h)	310	680	390	340	500	100	420	720	340	90	680	290
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	323	708	406	366	538	108	442	758	358	95	716	305
Peak Hour Factor	0.96	0.96	0.96	0.93	0.93	0.93	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	333	1176	614	230	884	177	230	1180	618	199	768	327
Arrive On Green	0.10	0.33	0.33	0.07	0.30	0.30	0.07	0.33	0.33	0.06	0.32	0.32
Sat Flow, veh/h	3456	3554	1535	3456	2932	586	3456	3554	1542	3456	2404	1024
Grp Volume(v), veh/h	323	708	406	366	325	321	442	758	358	95	529	492
Grp Sat Flow(s),veh/h/ln	1728	1777	1535	1728	1777	1741	1728	1777	1542	1728	1777	1651
Q Serve(g_s), s	12.6	22.5	29.3	9.0	21.1	21.3	9.0	24.4	24.5	3.6	39.0	39.0
Cycle Q Clear(g_c), s	12.6	22.5	29.3	9.0	21.1	21.3	9.0	24.4	24.5	3.6	39.0	39.0
Prop In Lane	1.00		1.00	1.00		0.34	1.00		1.00	1.00		0.62
Lane Grp Cap(c), veh/h	333	1176	614	230	536	525	230	1180	618	199	567	527
V/C Ratio(X)	0.97	0.60	0.66	1.59	0.61	0.61	1.92	0.64	0.58	0.48	0.93	0.93
Avail Cap(c_a), veh/h	333	1176	614	230	536	525	230	1185	620	205	579	538
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.76	0.76	0.76	0.86	0.86	0.86	0.44	0.44	0.44
Uniform Delay (d), s/veh	60.8	37.7	33.3	63.0	40.3	40.4	63.0	38.3	31.8	61.6	44.5	44.5
Incr Delay (d2), s/veh	41.3	2.3	5.5	280.1	3.9	4.0	426.9	1.0	1.2	0.8	12.0	12.7
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	7.3	9.9	11.4	12.8	9.6	9.5	17.5	10.5	9.0	1.6	18.4	17.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	102.1	40.0	38.8	343.1	44.2	44.4	489.9	39.3	32.9	62.4	56.5	57.2
LnGrp LOS	F	D	D	F	D	D	F	D	C	E	E	E
Approach Vol, veh/h		1437			1012			1558			1116	
Approach Delay, s/veh		53.6			152.3			165.7			57.3	
Approach LOS		D			F			F			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	52.1	16.0	50.9	20.0	48.1	14.3	52.6				
Change Period (Y+Rc), s	7.0	7.4	7.0	* 7.8	7.0	7.4	6.5	7.8				
Max Green Setting (Gmax), s	9.0	44.3	9.0	* 44	13.0	40.3	8.0	45.0				
Max Q Clear Time (g_c+I1), s	11.0	31.3	11.0	41.0	14.6	23.3	5.6	26.5				
Green Ext Time (p_c), s	0.0	4.9	0.0	1.7	0.0	3.3	0.0	5.9				

Intersection Summary

HCM 7th Control Delay, s/veh	108.0
HCM 7th LOS	F

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 13: Twin Oaks Valley Rd & SR 78 WB Ramps

Horizon Year PM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↔↔		↔↔		↑↑↑	↗		↑↑↑	↗
Traffic Volume (veh/h)	0	0	0	720	0	510	0	1160	600	0	1240	330
Future Volume (veh/h)	0	0	0	720	0	510	0	1160	600	0	1240	330
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	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
Work Zone On Approach				No			No			No		
Adj Sat Flow, veh/h/ln				1870	0	1870	0	1870	1870	0	1870	1870
Adj Flow Rate, veh/h				791	0	560	0	1381	714	0	1305	0
Peak Hour Factor				0.91	0.91	0.91	0.84	0.84	0.84	0.95	0.95	0.95
Percent Heavy Veh, %				2	0	2	0	2	2	0	2	2
Cap, veh/h				897	0	724	0	3392	1430	0	3392	
Arrive On Green				0.26	0.00	0.26	0.00	1.00	1.00	0.00	0.66	0.00
Sat Flow, veh/h				3456	0	2790	0	5274	1533	0	5274	1585
Grp Volume(v), veh/h				791	0	560	0	1381	714	0	1305	0
Grp Sat Flow(s),veh/h/ln				1728	0	1395	0	1702	1533	0	1702	1585
Q Serve(g_s), s				28.6	0.0	24.2	0.0	0.0	0.0	0.0	15.0	0.0
Cycle Q Clear(g_c), s				28.6	0.0	24.2	0.0	0.0	0.0	0.0	15.0	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				897	0	724	0	3392	1430	0	3392	
V/C Ratio(X)				0.88	0.00	0.77	0.00	0.41	0.50	0.00	0.38	
Avail Cap(c_a), veh/h				1579	0	1275	0	3392	1430	0	3392	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(l)				1.00	0.00	1.00	0.00	0.18	0.18	0.00	0.19	0.00
Uniform Delay (d), s/veh				46.2	0.0	44.6	0.0	0.0	0.0	0.0	9.8	0.0
Incr Delay (d2), s/veh				1.2	0.0	0.7	0.0	0.1	0.2	0.0	0.1	0.0
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				12.4	0.0	8.4	0.0	0.0	0.1	0.0	5.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				47.4	0.0	45.3	0.0	0.1	0.2	0.0	9.9	0.0
LnGrp LOS				D		D		A	A		A	
Approach Vol, veh/h					1351			2095			1305	
Approach Delay, s/veh					46.5			0.1			9.9	
Approach LOS					D			A			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		91.7				91.7		38.3				
Change Period (Y+Rc), s		5.3				5.3		4.6				
Max Green Setting (Gmax), s		60.7				60.7		59.4				
Max Q Clear Time (g_c+I1), s		2.0				17.0		30.6				
Green Ext Time (p_c), s		12.6				6.8		3.2				

Intersection Summary		
HCM 7th Control Delay, s/veh		16.0
HCM 7th LOS		B

Notes
 Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 7th Signalized Intersection Summary
 14: Twin Oaks Valley Rd & SR 78 EB Ramps

Horizon Year PM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	40	230	0	0	0	0	1810	960	400	1690	0
Future Volume (veh/h)	120	40	230	0	0	0	0	1810	960	400	1690	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98				1.00		0.98	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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	110	0	336				0	2633	825	417	1760	0
Peak Hour Factor	0.85	0.85	0.85				0.84	0.84	0.84	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	279	0	486				0	3354	928	475	3918	0
Arrive On Green	0.16	0.00	0.16				0.00	0.60	0.60	0.27	1.00	0.00
Sat Flow, veh/h	1781	0	3109				0	5611	1552	3456	5274	0
Grp Volume(v), veh/h	110	0	336				0	2633	825	417	1760	0
Grp Sat Flow(s),veh/h/ln	1781	0	1555				0	1870	1552	1728	1702	0
Q Serve(g_s), s	7.2	0.0	13.3				0.0	46.2	59.3	15.0	0.0	0.0
Cycle Q Clear(g_c), s	7.2	0.0	13.3				0.0	46.2	59.3	15.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	279	0	486				0	3354	928	475	3918	0
V/C Ratio(X)	0.39	0.00	0.69				0.00	0.79	0.89	0.88	0.45	0.00
Avail Cap(c_a), veh/h	526	0	918				0	3354	928	633	3918	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.82	0.82	0.00
Uniform Delay (d), s/veh	49.3	0.0	51.9				0.0	19.8	22.4	46.1	0.0	0.0
Incr Delay (d2), s/veh	0.9	0.0	1.8				0.0	1.9	12.4	9.0	0.3	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.0	5.3				0.0	18.7	22.5	6.0	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	50.2	0.0	53.6				0.0	21.7	34.9	55.1	0.3	0.0
LnGrp LOS	D		D					C	C	E	A	
Approach Vol, veh/h		446						3458			2177	
Approach Delay, s/veh		52.8						24.9			10.8	
Approach LOS		D						C			B	
Timer - Assigned Phs	1	2		4				6				
Phs Duration (G+Y+Rc), s	22.1	83.0		24.9				105.1				
Change Period (Y+Rc), s	4.2	5.3		4.6				5.3				
Max Green Setting (Gmax), s	23.8	53.7		38.4				81.7				
Max Q Clear Time (g_c+I1), s	17.0	61.3		15.3				2.0				
Green Ext Time (p_c), s	0.9	0.0		1.7				21.1				
Intersection Summary												
HCM 7th Control Delay, s/veh			21.9									
HCM 7th LOS			C									
Notes												
User approved volume balancing among the lanes for turning movement.												



APPENDIX J

HORIZON YEAR + PROJECT ANALYSIS WORKSHEETS

HCM 7th Signalized Intersection Summary
 1: Twin Oaks Valley Rd & Deer Springs Rd

Horizon Year + Project AM
 12/10/2025



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	40	100	120	614	1505	50
Future Volume (veh/h)	40	100	120	614	1505	50
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	48	120	125	640	1536	51
Peak Hour Factor	0.83	0.83	0.96	0.96	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	162	144	103	1554	1379	1132
Arrive On Green	0.09	0.09	0.06	0.83	0.74	0.74
Sat Flow, veh/h	1781	1585	1781	1870	1870	1535
Grp Volume(v), veh/h	48	120	125	640	1536	51
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1535
Q Serve(g_s), s	3.5	10.3	8.0	12.2	102.2	1.3
Cycle Q Clear(g_c), s	3.5	10.3	8.0	12.2	102.2	1.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	162	144	103	1554	1379	1132
V/C Ratio(X)	0.30	0.83	1.22	0.41	1.11	0.05
Avail Cap(c_a), veh/h	308	274	103	1554	1379	1132
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.8	62.0	65.3	3.0	18.2	5.0
Incr Delay (d2), s/veh	1.0	11.5	157.9	0.2	61.9	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.5	8.1	2.9	61.7	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	59.9	73.5	223.2	3.2	80.1	5.0
LnGrp LOS	E	E	F	A	F	A
Approach Vol, veh/h	168			765	1587	
Approach Delay, s/veh	69.6			39.1	77.7	
Approach LOS	E			D	E	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		121.0		17.6	13.0	108.0
Change Period (Y+Rc), s		5.8		5.0	5.0	5.8
Max Green Setting (Gmax), s		115.2		24.0	8.0	102.2
Max Q Clear Time (g_c+I1), s		14.2		12.3	10.0	104.2
Green Ext Time (p_c), s		4.5		0.3	0.0	0.0
Intersection Summary						
HCM 7th Control Delay, s/veh			65.4			
HCM 7th LOS			E			

HCM 7th Signalized Intersection Summary
2: Twin Oaks Valley Rd & Buena Creek Rd

Horizon Year + Project AM
12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↖	↖		↖	↕	↗
Traffic Volume (veh/h)	470	0	356	5	5	0	176	464	5	5	1065	460
Future Volume (veh/h)	470	0	356	5	5	0	176	464	5	5	1065	460
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	505	0	383	10	10	0	187	494	5	5	1109	479
Peak Hour Factor	0.93	0.93	0.93	0.50	0.50	0.50	0.94	0.94	0.94	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	266	0	344	43	30	0	120	1046	11	141	1086	896
Arrive On Green	0.22	0.00	0.22	0.22	0.22	0.00	0.07	0.57	0.57	0.08	0.58	0.58
Sat Flow, veh/h	939	0	1549	0	134	0	1781	1848	19	1781	1870	1543
Grp Volume(v), veh/h	505	0	383	20	0	0	187	0	499	5	1109	479
Grp Sat Flow(s),veh/h/ln	939	0	1549	134	0	0	1781	0	1866	1781	1870	1543
Q Serve(g_s), s	0.0	0.0	28.0	0.0	0.0	0.0	8.5	0.0	20.0	0.3	73.2	23.8
Cycle Q Clear(g_c), s	28.0	0.0	28.0	28.0	0.0	0.0	8.5	0.0	20.0	0.3	73.2	23.8
Prop In Lane	1.00		1.00	0.50		0.00	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	266	0	344	72	0	0	120	0	1057	141	1086	896
V/C Ratio(X)	1.90	0.00	1.11	0.28	0.00	0.00	1.56	0.00	0.47	0.04	1.02	0.53
Avail Cap(c_a), veh/h	266	0	344	72	0	0	120	0	1057	236	1086	896
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.1	0.0	49.0	41.3	0.0	0.0	58.8	0.0	16.2	53.6	26.4	16.1
Incr Delay (d2), s/veh	419.1	0.0	82.7	2.0	0.0	0.0	287.4	0.0	0.3	0.1	32.8	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	39.5	0.0	18.7	0.5	0.0	0.0	13.3	0.0	8.0	0.1	38.7	7.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	471.2	0.0	131.7	43.3	0.0	0.0	346.2	0.0	16.5	53.7	59.3	16.7
LnGrp LOS	F		F	D			F		B	D	F	B
Approach Vol, veh/h		888			20			686			1593	
Approach Delay, s/veh		324.8			43.3			106.4			46.5	
Approach LOS		F			D			F			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.8	77.2		33.1	14.0	79.0		33.1				
Change Period (Y+Rc), s	5.8	5.8		* 5.1	5.5	5.8		5.1				
Max Green Setting (Gmax), s	16.7	64.7		* 28	8.5	73.2		26.9				
Max Q Clear Time (g_c+I1), s	2.3	22.0		30.0	10.5	75.2		30.0				
Green Ext Time (p_c), s	0.0	3.1		0.0	0.0	0.0		0.0				

Intersection Summary

HCM 7th Control Delay, s/veh	136.9
HCM 7th LOS	F

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 3: Twin Oaks Valley Rd & Olive Street

Horizon Year + Project AM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔		↖	↗		↖	↗		↖	↗		
Traffic Volume (veh/h)	0	20	30	40	0	100	10	570	10	70	1111	0	
Future Volume (veh/h)	0	20	30	40	0	100	10	570	10	70	1111	0	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Width 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	
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.91	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	0	32	48	61	0	152	11	633	11	80	1262	0	
Peak Hour Factor	0.63	0.63	0.63	0.66	0.66	0.66	0.90	0.90	0.90	0.88	0.88	0.88	
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2	
Cap, veh/h	0	48	72	215	0	174	22	1096	19	101	1202	0	
Arrive On Green	0.00	0.07	0.07	0.12	0.00	0.12	0.01	0.60	0.60	0.06	0.64	0.00	
Sat Flow, veh/h	0	646	968	1781	0	1443	1781	1831	32	1781	1870	0	
Grp Volume(v), veh/h	0	0	80	61	0	152	11	0	644	80	1262	0	
Grp Sat Flow(s),veh/h/ln	0	0	1614	1781	0	1443	1781	0	1863	1781	1870	0	
Q Serve(g_s), s	0.0	0.0	6.3	4.1	0.0	13.5	0.8	0.0	27.7	5.8	84.0	0.0	
Cycle Q Clear(g_c), s	0.0	0.0	6.3	4.1	0.0	13.5	0.8	0.0	27.7	5.8	84.0	0.0	
Prop In Lane	0.00		0.60	1.00		1.00	1.00		0.02	1.00		0.00	
Lane Grp Cap(c), veh/h	0	0	120	215	0	174	22	0	1115	101	1202	0	
V/C Ratio(X)	0.00	0.00	0.67	0.28	0.00	0.87	0.49	0.00	0.58	0.79	1.05	0.00	
Avail Cap(c_a), veh/h	0	0	222	252	0	204	68	0	1115	170	1202	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	
Uniform Delay (d), s/veh	0.0	0.0	58.9	52.3	0.0	56.4	64.1	0.0	16.1	60.9	23.3	0.0	
Incr Delay (d2), s/veh	0.0	0.0	6.2	0.7	0.0	28.2	15.6	0.0	0.7	12.8	40.0	0.0	
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	0.0	0.0	2.8	1.8	0.0	6.2	0.5	0.0	11.1	2.9	45.1	0.0	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d), s/veh	0.0	0.0	65.1	53.0	0.0	84.7	79.7	0.0	16.8	73.7	63.4	0.0	
LnGrp LOS			E	D		F	E		B	E	F		
Approach Vol, veh/h	80						213		655			1342	
Approach Delay, s/veh	65.1						75.6		17.9			64.0	
Approach LOS	E						E		B			E	
Timer - Assigned Phs	1	2	4		5	6	8						
Phs Duration (G+Y+Rc), s	12.0	84.5	14.3		6.2	90.3	19.8						
Change Period (Y+Rc), s	4.6	6.3	4.6		4.6	6.3	4.0						
Max Green Setting (Gmax), s	12.5	76.5	18.0		5.0	84.0	18.5						
Max Q Clear Time (g_c+I1), s	7.8	29.7	8.3		2.8	86.0	15.5						
Green Ext Time (p_c), s	0.1	4.5	0.2		0.0	0.0	0.3						
Intersection Summary													
HCM 7th Control Delay, s/veh			51.9										
HCM 7th LOS			D										

HCM 7th Signalized Intersection Summary
 4: Twin Oaks Valley Rd & E. La Cienega Road

Horizon Year + Project AM
 12/10/2025

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	140	220	600	40	70	891
Future Volume (veh/h)	140	220	600	40	70	891
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00		0.95	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	187	293	667	44	73	928
Peak Hour Factor	0.75	0.75	0.90	0.90	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	431	383	1000	66	114	1712
Arrive On Green	0.24	0.24	0.30	0.30	0.06	0.48
Sat Flow, veh/h	1781	1585	3465	222	1781	3647
Grp Volume(v), veh/h	187	293	351	360	73	928
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1817	1781	1777
Q Serve(g_s), s	4.4	8.5	8.6	8.6	2.0	9.1
Cycle Q Clear(g_c), s	4.4	8.5	8.6	8.6	2.0	9.1
Prop In Lane	1.00	1.00		0.12	1.00	
Lane Grp Cap(c), veh/h	431	383	527	539	114	1712
V/C Ratio(X)	0.43	0.76	0.67	0.67	0.64	0.54
Avail Cap(c_a), veh/h	1006	895	799	817	180	2388
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.9	17.5	15.3	15.3	22.6	9.0
Incr Delay (d2), s/veh	0.7	3.2	1.5	1.4	5.9	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	3.1	2.8	2.9	0.9	2.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	16.6	20.7	16.7	16.7	28.5	9.3
LnGrp LOS	B	C	B	B	C	A
Approach Vol, veh/h	480		711			1001
Approach Delay, s/veh	19.1		16.7			10.7
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.2	21.9			31.1	18.5
Change Period (Y+Rc), s	6.0	7.2			7.2	6.5
Max Green Setting (Gmax), s	5.0	22.3			33.3	28.0
Max Q Clear Time (g_c+I1), s	4.0	10.6			11.1	10.5
Green Ext Time (p_c), s	0.0	3.0			6.0	1.5
Intersection Summary						
HCM 7th Control Delay, s/veh			14.5			
HCM 7th LOS			B			

HCM 7th Signalized Intersection Summary
5: Twin Oaks Valley Rd & Del Roy Dr

Horizon Year + Project AM
12/10/2025

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	20	0	40	10	0	10	20	590	60	30	971	10	
Future Volume (veh/h)	20	0	40	10	0	10	20	590	60	30	971	10	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Width 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	
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.93	1.00		0.93	
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	23	0	46	20	0	20	23	686	70	31	1001	10	
Peak Hour Factor	0.87	0.87	0.87	0.50	0.50	0.50	0.86	0.86	0.86	0.97	0.97	0.97	
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2	
Cap, veh/h	57	0	245	51	0	281	57	1134	116	73	1297	13	
Arrive On Green	0.03	0.00	0.16	0.03	0.00	0.18	0.03	0.35	0.35	0.04	0.36	0.36	
Sat Flow, veh/h	1781	0	1555	1781	0	1559	1781	3228	329	1781	3601	36	
Grp Volume(v), veh/h	23	0	46	20	0	20	23	377	379	31	494	517	
Grp Sat Flow(s),veh/h/ln	1781	0	1555	1781	0	1559	1781	1777	1780	1781	1777	1861	
Q Serve(g_s), s	0.7	0.0	1.4	0.6	0.0	0.6	0.7	9.8	9.9	1.0	13.8	13.8	
Cycle Q Clear(g_c), s	0.7	0.0	1.4	0.6	0.0	0.6	0.7	9.8	9.9	1.0	13.8	13.8	
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.18	1.00		0.02	
Lane Grp Cap(c), veh/h	57	0	245	51	0	281	57	624	626	73	640	670	
V/C Ratio(X)	0.40	0.00	0.19	0.39	0.00	0.07	0.40	0.60	0.61	0.42	0.77	0.77	
Avail Cap(c_a), veh/h	190	0	940	190	0	984	190	800	801	190	800	837	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	26.7	0.0	20.6	26.8	0.0	19.1	26.7	15.0	15.0	26.3	15.9	15.9	
Incr Delay (d2), s/veh	4.5	0.0	0.4	4.8	0.0	0.1	4.5	0.9	0.9	3.9	3.7	3.5	
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.5	0.3	0.0	0.2	0.3	3.2	3.2	0.4	4.9	5.1	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d), s/veh	31.1	0.0	20.9	31.7	0.0	19.2	31.1	16.0	16.0	30.2	19.6	19.5	
LnGrp LOS	C		C	C		B	C	B	B	C	B	B	
Approach Vol, veh/h	69						40		779			1042	
Approach Delay, s/veh	24.3						25.4		16.4			19.8	
Approach LOS	C						C		B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8					
Phs Duration (G+Y+Rc), s	7.8	26.0	7.6	14.8	7.3	26.4	6.3	16.1					
Change Period (Y+Rc), s	5.5	6.2	6.0	6.0	5.5	6.2	4.5	6.0					
Max Green Setting (Gmax), s	6.0	25.3	6.0	34.0	6.0	25.3	6.0	35.5					
Max Q Clear Time (g_c+I1), s	3.0	11.9	2.6	3.4	2.7	15.8	2.7	2.6					
Green Ext Time (p_c), s	0.0	3.5	0.0	0.2	0.0	3.9	0.0	0.1					
Intersection Summary													
HCM 7th Control Delay, s/veh			18.7										
HCM 7th LOS			B										

HCM 7th Signalized Intersection Summary
6: Twin Oaks Valley Rd & Project Driveway

Horizon Year + Project AM
12/10/2025



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	112	41	610	1030	11
Future Volume (veh/h)	30	112	41	610	1030	11
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	122	45	663	1120	12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	192	171	84	2490	2006	21
Arrive On Green	0.11	0.11	0.05	0.70	0.56	0.56
Sat Flow, veh/h	1781	1585	1781	3647	3693	39
Grp Volume(v), veh/h	33	122	45	663	553	579
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1777	1777	1861
Q Serve(g_s), s	0.8	3.5	1.2	3.2	9.4	9.4
Cycle Q Clear(g_c), s	0.8	3.5	1.2	3.2	9.4	9.4
Prop In Lane	1.00	1.00	1.00			0.02
Lane Grp Cap(c), veh/h	192	171	84	2490	991	1037
V/C Ratio(X)	0.17	0.71	0.53	0.27	0.56	0.56
Avail Cap(c_a), veh/h	687	611	209	2490	991	1037
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.0	20.3	21.9	2.6	6.7	6.7
Incr Delay (d2), s/veh	0.4	5.5	5.2	0.3	2.3	2.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	3.3	0.5	0.1	2.4	2.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	19.5	25.7	27.0	2.8	8.9	8.8
LnGrp LOS	B	C	C	A	A	A
Approach Vol, veh/h	155			708	1132	
Approach Delay, s/veh	24.4			4.4	8.9	
Approach LOS	C			A	A	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		37.4		9.6	6.7	30.7
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		32.9		18.1	5.5	22.9
Max Q Clear Time (g_c+I1), s		5.2		5.5	3.2	11.4
Green Ext Time (p_c), s		4.2		0.3	0.0	5.2
Intersection Summary						
HCM 7th Control Delay, s/veh			8.5			
HCM 7th LOS			A			

HCM 7th Signalized Intersection Summary
 7: Twin Oaks Valley Rd & Windy Wy

Horizon Year + Project AM
 12/10/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	0	60	0	0	0	40	671	5	5	1142	70
Future Volume (veh/h)	40	0	60	0	0	0	40	671	5	5	1142	70
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.94				1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	46	0	69				43	729	5	5	1202	74
Peak Hour Factor	0.87	0.87	0.87				0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2				2	2	2	2	2	2
Cap, veh/h	112	0	94				76	2915	20	11	2612	161
Arrive On Green	0.06	0.00	0.06				0.04	0.81	0.81	0.01	0.77	0.77
Sat Flow, veh/h	1781	0	1487				1781	3617	25	1781	3393	209
Grp Volume(v), veh/h	46	0	69				43	358	376	5	629	647
Grp Sat Flow(s),veh/h/ln	1781	0	1487				1781	1777	1865	1781	1777	1825
Q Serve(g_s), s	3.2	0.0	5.9				3.1	6.4	6.4	0.4	16.4	16.4
Cycle Q Clear(g_c), s	3.2	0.0	5.9				3.1	6.4	6.4	0.4	16.4	16.4
Prop In Lane	1.00		1.00				1.00		0.01	1.00		0.11
Lane Grp Cap(c), veh/h	112	0	94				76	1432	1503	11	1368	1405
V/C Ratio(X)	0.41	0.00	0.73				0.57	0.25	0.25	0.44	0.46	0.46
Avail Cap(c_a), veh/h	343	0	286				137	1432	1503	96	1368	1405
HCM Platoon Ratio	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				0.84	0.84	0.84	0.88	0.88	0.88
Uniform Delay (d), s/veh	58.6	0.0	59.8				61.1	3.1	3.1	64.4	5.3	5.3
Incr Delay (d2), s/veh	2.4	0.0	10.5				5.5	0.4	0.3	22.0	1.0	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	2.5				1.5	1.7	1.8	0.2	5.0	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	60.9	0.0	70.4				66.6	3.4	3.4	86.4	6.3	6.3
LnGrp LOS	E		E				E	A	A	F	A	A
Approach Vol, veh/h		115						777			1281	
Approach Delay, s/veh		66.6						6.9			6.6	
Approach LOS		E						A			A	
Timer - Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	5.8	111.0		13.2	10.5	106.3						
Change Period (Y+Rc), s	5.0	6.2		5.0	5.0	6.2						
Max Green Setting (Gmax), s	7.0	81.8		25.0	10.0	78.8						
Max Q Clear Time (g_c+I1), s	2.4	8.4		7.9	5.1	18.4						
Green Ext Time (p_c), s	0.0	4.6		0.4	0.0	10.6						
Intersection Summary												
HCM 7th Control Delay, s/veh			9.9									
HCM 7th LOS			A									

HCM 7th Signalized Intersection Summary
8: Twin Oaks Valley Rd & Borden Rd

Horizon Year + Project AM
12/10/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	280	220	260	400	96	110	512	100	67	908	197
Future Volume (veh/h)	73	280	220	260	400	96	110	512	100	67	908	197
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	88	337	265	310	476	114	122	569	111	71	956	207
Peak Hour Factor	0.83	0.83	0.83	0.84	0.84	0.84	0.90	0.90	0.90	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	109	541	415	333	1168	278	144	1136	789	90	1060	459
Arrive On Green	0.06	0.29	0.29	0.19	0.41	0.41	0.08	0.32	0.32	0.05	0.30	0.30
Sat Flow, veh/h	1781	1885	1449	1781	2833	673	1781	3554	1541	1781	3554	1539
Grp Volume(v), veh/h	88	317	285	310	297	293	122	569	111	71	956	207
Grp Sat Flow(s),veh/h/ln	1781	1777	1557	1781	1777	1729	1781	1777	1541	1781	1777	1539
Q Serve(g_s), s	7.2	22.8	23.5	25.2	17.4	17.6	9.9	19.1	5.6	5.8	38.0	16.1
Cycle Q Clear(g_c), s	7.2	22.8	23.5	25.2	17.4	17.6	9.9	19.1	5.6	5.8	38.0	16.1
Prop In Lane	1.00		0.93	1.00		0.39	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	109	509	446	333	733	713	144	1136	789	90	1060	459
V/C Ratio(X)	0.81	0.62	0.64	0.93	0.41	0.41	0.85	0.50	0.14	0.79	0.90	0.45
Avail Cap(c_a), veh/h	182	509	446	364	733	713	150	1136	789	151	1060	459
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	68.2	45.6	45.8	58.9	30.5	30.6	66.8	40.5	19.3	69.1	49.6	41.9
Incr Delay (d2), s/veh	13.0	5.6	6.8	29.0	1.7	1.7	33.3	1.6	0.4	14.2	12.2	3.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	10.9	10.0	14.1	7.9	7.8	5.8	8.5	2.1	3.0	18.2	6.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	81.2	51.2	52.6	87.9	32.2	32.3	100.1	42.1	19.7	83.4	61.8	45.0
LnGrp LOS	F	D	D	F	C	C	F	D	B	F	E	D
Approach Vol, veh/h		690			900			802			1234	
Approach Delay, s/veh		55.6			51.4			47.8			60.2	
Approach LOS		E			D			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	32.4	48.3	16.5	50.0	13.9	66.8	13.3	53.2				
Change Period (Y+Rc), s	* 4.9	* 6.1	4.6	* 6.1	* 4.9	* 6.1	5.9	* 6.1				
Max Green Setting (Gmax), s	* 30	* 42	12.4	* 44	* 15	* 57	12.5	* 43				
Max Q Clear Time (g_c+I1), s	27.2	25.5	11.9	40.0	9.2	19.6	7.8	21.1				
Green Ext Time (p_c), s	0.3	3.6	0.0	2.3	0.1	4.1	0.0	3.8				

Intersection Summary												
HCM 7th Control Delay, s/veh			54.4									
HCM 7th LOS			D									

Notes
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 9: Woodward St & Borden Rd

Horizon Year + Project AM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	330	57	20	553	20	63	40	20	40	150	130
Future Volume (veh/h)	60	330	57	20	553	20	63	40	20	40	150	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.95	1.00		0.97	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	92	508	88	26	718	26	75	48	24	47	174	151
Peak Hour Factor	0.65	0.65	0.65	0.77	0.77	0.77	0.84	0.84	0.84	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	198	1113	192	70	1065	39	170	265	133	106	357	291
Arrive On Green	0.11	0.37	0.37	0.04	0.31	0.31	0.10	0.23	0.23	0.06	0.19	0.19
Sat Flow, veh/h	1781	3008	518	1781	3491	126	1781	1161	580	1781	1870	1524
Grp Volume(v), veh/h	92	299	297	26	365	379	75	0	72	47	174	151
Grp Sat Flow(s),veh/h/ln	1781	1777	1750	1781	1777	1840	1781	0	1741	1781	1870	1524
Q Serve(g_s), s	3.5	9.2	9.3	1.0	12.9	13.0	2.9	0.0	2.4	1.8	6.0	6.4
Cycle Q Clear(g_c), s	3.5	9.2	9.3	1.0	12.9	13.0	2.9	0.0	2.4	1.8	6.0	6.4
Prop In Lane	1.00		0.30	1.00		0.07	1.00		0.33	1.00		1.00
Lane Grp Cap(c), veh/h	198	657	647	70	542	562	170	0	398	106	357	291
V/C Ratio(X)	0.46	0.45	0.46	0.37	0.67	0.67	0.44	0.00	0.18	0.45	0.49	0.52
Avail Cap(c_a), veh/h	456	1158	1141	173	892	923	446	0	983	220	811	661
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.0	17.2	17.2	33.7	21.9	21.9	30.7	0.0	22.3	32.7	26.0	26.1
Incr Delay (d2), s/veh	1.7	0.5	0.5	3.2	1.5	1.4	1.8	0.0	0.2	2.9	1.0	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	1.5	3.5	3.5	0.5	5.2	5.4	1.2	0.0	0.9	0.8	2.6	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	31.7	17.7	17.7	36.9	23.3	23.3	32.5	0.0	22.6	35.6	27.0	27.6
LnGrp LOS	C	B	B	D	C	C	C		C	D	C	C
Approach Vol, veh/h		688			770			147			372	
Approach Delay, s/veh		19.5			23.8			27.7			28.3	
Approach LOS		B			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.9	32.4	12.1	19.5	12.6	27.8	9.4	22.2				
Change Period (Y+Rc), s	5.1	* 5.8	5.2	5.8	4.6	* 5.8	5.1	* 5.8				
Max Green Setting (Gmax), s	7.0	* 47	18.0	31.2	18.4	* 36	8.9	* 41				
Max Q Clear Time (g_c+I1), s	3.0	11.3	4.9	8.4	5.5	15.0	3.8	4.4				
Green Ext Time (p_c), s	0.0	3.9	0.1	1.4	0.1	4.5	0.0	0.3				
Intersection Summary												
HCM 7th Control Delay, s/veh			23.4									
HCM 7th LOS			C									
Notes												
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 7th Signalized Intersection Summary
 10: Twin Oaks Valley Rd & Richmar Road

Horizon Year + Project AM
 12/10/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	50	110	90	10	10	60	602	80	100	1258	170
Future Volume (veh/h)	130	50	110	90	10	10	60	602	80	100	1258	170
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.97	1.00		0.96	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	153	59	129	96	11	11	61	614	82	106	1338	181
Peak Hour Factor	0.85	0.85	0.85	0.94	0.94	0.94	0.98	0.98	0.98	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	201	57	124	189	89	89	78	1714	228	82	1719	231
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.04	0.55	0.55	0.05	0.55	0.55
Sat Flow, veh/h	1781	501	1095	1781	845	845	1781	3136	418	1781	3133	420
Grp Volume(v), veh/h	153	0	188	96	0	22	61	347	349	106	754	765
Grp Sat Flow(s),veh/h/ln	1781	0	1596	1781	0	1689	1781	1777	1777	1781	1777	1776
Q Serve(g_s), s	10.8	0.0	14.7	6.6	0.0	1.5	4.4	14.3	14.4	6.0	43.2	44.4
Cycle Q Clear(g_c), s	10.8	0.0	14.7	6.6	0.0	1.5	4.4	14.3	14.4	6.0	43.2	44.4
Prop In Lane	1.00		0.69	1.00		0.50	1.00		0.24	1.00		0.24
Lane Grp Cap(c), veh/h	201	0	180	189	0	179	78	971	971	82	975	975
V/C Ratio(X)	0.76	0.00	1.04	0.51	0.00	0.12	0.78	0.36	0.36	1.29	0.77	0.79
Avail Cap(c_a), veh/h	201	0	180	521	0	494	93	971	971	82	975	975
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	0.88	0.88	0.88	0.29	0.29	0.29
Uniform Delay (d), s/veh	55.9	0.0	57.7	54.9	0.0	52.7	61.5	16.6	16.6	62.0	23.0	23.3
Incr Delay (d2), s/veh	15.4	0.0	78.5	2.1	0.0	0.3	26.2	0.9	0.9	154.1	1.8	1.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	0.0	9.9	3.1	0.0	0.7	2.5	5.8	5.8	6.2	17.1	17.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	71.3	0.0	136.2	57.0	0.0	53.0	87.7	17.5	17.5	216.1	24.8	25.2
LnGrp LOS	E		F	E		D	F	B	B	F	C	C
Approach Vol, veh/h		341			118			757			1625	
Approach Delay, s/veh		107.1			56.3			23.2			37.4	
Approach LOS		F			E			C			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.0	77.3		20.8	11.7	77.6		19.9				
Change Period (Y+Rc), s	6.0	6.3		6.1	6.0	6.3		6.1				
Max Green Setting (Gmax), s	6.0	46.8		14.7	6.8	46.0		38.0				
Max Q Clear Time (g_c+I1), s	8.0	16.4		16.7	6.4	46.4		8.6				
Green Ext Time (p_c), s	0.0	4.2		0.0	0.0	0.0		0.4				
Intersection Summary												
HCM 7th Control Delay, s/veh			42.8									
HCM 7th LOS			D									

HCM 7th Signalized Intersection Summary
 11: San Marcos Blvd & E. Mission Road

Horizon Year + Project AM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	440	40	430	700	53	20	80	630	57	290	60
Future Volume (veh/h)	30	440	40	430	700	53	20	80	630	57	290	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	1.00		1.00	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	1742	1673	1870	1870	1742	1742	1742	1870	1742	1870
Adj Flow Rate, veh/h	38	550	50	500	814	62	29	114	0	61	312	65
Peak Hour Factor	0.80	0.80	0.80	0.86	0.86	0.86	0.70	0.70	0.70	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	46	931	371	611	1542	670	32	613		77	566	116
Arrive On Green	0.03	0.26	0.26	0.20	0.43	0.43	0.02	0.19	0.00	0.04	0.21	0.21
Sat Flow, veh/h	1781	3554	1416	3092	3554	1543	1659	3311	1477	1781	2712	555
Grp Volume(v), veh/h	38	550	50	500	814	62	29	114	0	61	188	189
Grp Sat Flow(s),veh/h/ln	1781	1777	1416	1546	1777	1543	1659	1655	1477	1781	1655	1613
Q Serve(g_s), s	1.3	8.0	1.6	9.2	10.0	1.4	1.0	1.7	0.0	2.0	6.0	6.2
Cycle Q Clear(g_c), s	1.3	8.0	1.6	9.2	10.0	1.4	1.0	1.7	0.0	2.0	6.0	6.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.34
Lane Grp Cap(c), veh/h	46	931	371	611	1542	670	32	613		77	345	336
V/C Ratio(X)	0.83	0.59	0.13	0.82	0.53	0.09	0.90	0.19		0.80	0.55	0.56
Avail Cap(c_a), veh/h	197	1492	595	727	1934	840	156	1551		135	745	726
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	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.9	19.2	16.8	22.9	12.4	9.9	29.1	20.5	0.0	28.2	21.0	21.1
Incr Delay (d2), s/veh	30.0	0.6	0.2	6.3	0.3	0.1	50.3	0.1	0.0	16.9	1.3	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	0.9	2.9	0.5	3.4	3.1	0.4	0.8	0.6	0.0	1.1	2.2	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	58.9	19.8	17.0	29.2	12.7	10.0	79.4	20.6	0.0	45.1	22.4	22.6
LnGrp LOS	E	B	B	C	B	B	E	C		D	C	C
Approach Vol, veh/h		638			1376			143			438	
Approach Delay, s/veh		21.9			18.5			32.5			25.6	
Approach LOS		C			B			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.6	16.3	15.8	20.9	5.2	17.7	5.5	31.1				
Change Period (Y+Rc), s	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3				
Max Green Setting (Gmax), s	4.5	27.9	14.0	25.0	5.6	26.8	6.6	32.4				
Max Q Clear Time (g_c+I1), s	4.0	3.7	11.2	10.0	3.0	8.2	3.3	12.0				
Green Ext Time (p_c), s	0.0	0.5	0.6	3.1	0.0	1.8	0.0	5.4				
Intersection Summary												
HCM 7th Control Delay, s/veh			21.3									
HCM 7th LOS			C									
Notes												
User approved changes to right turn type.												
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 7th Signalized Intersection Summary
 12: Twin Oaks Valley Rd & San Marcos Blvd

Horizon Year + Project AM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↔↔	↑↑		↔↔	↑↑	↗	↔↔	↑↑	
Traffic Volume (veh/h)	214	490	300	390	370	20	230	488	590	100	895	273
Future Volume (veh/h)	214	490	300	390	370	20	230	488	590	100	895	273
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	235	538	330	424	402	22	253	536	648	106	952	290
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.91	0.91	0.91	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	286	1153	604	230	1054	57	230	1202	627	201	869	263
Arrive On Green	0.08	0.32	0.32	0.07	0.31	0.31	0.07	0.34	0.34	0.06	0.33	0.33
Sat Flow, veh/h	3456	3554	1537	3456	3420	186	3456	3554	1541	3456	2666	808
Grp Volume(v), veh/h	235	538	330	424	208	216	253	536	648	106	633	609
Grp Sat Flow(s),veh/h/ln	1728	1777	1537	1728	1777	1830	1728	1777	1541	1728	1777	1697
Q Serve(g_s), s	9.0	16.3	22.5	9.0	12.4	12.5	9.0	15.9	45.7	4.0	44.0	44.0
Cycle Q Clear(g_c), s	9.0	16.3	22.5	9.0	12.4	12.5	9.0	15.9	45.7	4.0	44.0	44.0
Prop In Lane	1.00		1.00	1.00		0.10	1.00		1.00	1.00		0.48
Lane Grp Cap(c), veh/h	286	1153	604	230	548	564	230	1202	627	201	579	553
V/C Ratio(X)	0.82	0.47	0.55	1.84	0.38	0.38	1.10	0.45	1.03	0.53	1.09	1.10
Avail Cap(c_a), veh/h	333	1166	610	230	548	564	230	1202	627	205	579	553
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.72	0.72	0.72	0.90	0.90	0.90	0.42	0.42	0.42
Uniform Delay (d), s/veh	60.9	36.3	31.9	63.0	36.6	36.6	63.0	34.8	40.3	61.8	45.5	45.5
Incr Delay (d2), s/veh	13.4	1.4	3.5	390.1	1.4	1.4	85.0	0.2	43.2	1.0	53.9	57.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	7.1	8.7	16.4	5.5	5.7	6.6	6.7	27.3	1.8	27.3	26.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	74.3	37.7	35.4	453.1	38.0	38.0	148.0	35.1	83.5	62.8	99.4	102.8
LnGrp LOS	E	D	D	F	D	D	F	D	F	E	F	F
Approach Vol, veh/h		1103			848			1437			1348	
Approach Delay, s/veh		44.8			245.6			76.8			98.0	
Approach LOS		D			F			E			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	51.2	16.0	51.8	18.2	49.0	14.3	53.5				
Change Period (Y+Rc), s	7.0	7.4	7.0	* 7.8	7.0	7.4	6.5	7.8				
Max Green Setting (Gmax), s	9.0	44.3	9.0	* 44	13.0	40.3	8.0	45.0				
Max Q Clear Time (g_c+I1), s	11.0	24.5	11.0	46.0	11.0	14.5	6.0	47.7				
Green Ext Time (p_c), s	0.0	4.4	0.0	0.0	0.1	2.2	0.0	0.0				

Intersection Summary												
HCM 7th Control Delay, s/veh				105.6								
HCM 7th LOS				F								

Notes
 * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 13: Twin Oaks Valley Rd & SR 78 WB Ramps

Horizon Year + Project AM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↔↔		↔↔		↑↑↑	↗		↑↑↑	↗
Traffic Volume (veh/h)	0	0	0	780	0	243	0	1315	450	0	1297	388
Future Volume (veh/h)	0	0	0	780	0	243	0	1315	450	0	1297	388
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	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
Work Zone On Approach				No			No			No		
Adj Sat Flow, veh/h/ln				1870	0	1870	0	1870	1870	0	1870	1870
Adj Flow Rate, veh/h				897	0	279	0	1414	484	0	1380	0
Peak Hour Factor				0.87	0.87	0.87	0.93	0.93	0.93	0.94	0.94	0.94
Percent Heavy Veh, %				2	0	2	0	2	2	0	2	2
Cap, veh/h				988	0	798	0	3258	1431	0	3258	
Arrive On Green				0.29	0.00	0.29	0.00	1.00	1.00	0.00	0.64	0.00
Sat Flow, veh/h				3456	0	2790	0	5274	1532	0	5274	1585
Grp Volume(v), veh/h				897	0	279	0	1414	484	0	1380	0
Grp Sat Flow(s),veh/h/ln				1728	0	1395	0	1702	1532	0	1702	1585
Q Serve(g_s), s				32.5	0.0	10.3	0.0	0.0	0.0	0.0	17.4	0.0
Cycle Q Clear(g_c), s				32.5	0.0	10.3	0.0	0.0	0.0	0.0	17.4	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				988	0	798	0	3258	1431	0	3258	
V/C Ratio(X)				0.91	0.00	0.35	0.00	0.43	0.34	0.00	0.42	
Avail Cap(c_a), veh/h				1579	0	1275	0	3258	1431	0	3258	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.41	0.41	0.00	0.09	0.00
Uniform Delay (d), s/veh				44.8	0.0	36.8	0.0	0.0	0.0	0.0	11.7	0.0
Incr Delay (d2), s/veh				3.4	0.0	0.1	0.0	0.2	0.3	0.0	0.0	0.0
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				14.3	0.0	3.6	0.0	0.1	0.1	0.0	6.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				48.2	0.0	36.9	0.0	0.2	0.3	0.0	11.7	0.0
LnGrp LOS				D		D		A	A		B	
Approach Vol, veh/h					1176			1898			1380	
Approach Delay, s/veh					45.5			0.2			11.7	
Approach LOS					D			A			B	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		88.2				88.2		41.8				
Change Period (Y+Rc), s		5.3				5.3		4.6				
Max Green Setting (Gmax), s		60.7				60.7		59.4				
Max Q Clear Time (g_c+I1), s		2.0				19.4		34.5				
Green Ext Time (p_c), s		11.5				7.3		2.6				

Intersection Summary		
HCM 7th Control Delay, s/veh		15.7
HCM 7th LOS		B

Notes
 Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 7th Signalized Intersection Summary
 14: Twin Oaks Valley Rd & SR 78 EB Ramps

Horizon Year + Project AM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	580	10	900	0	0	0	0	1305	500	396	1831	0
Future Volume (veh/h)	580	10	900	0	0	0	0	1305	500	396	1831	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99				1.00		0.98	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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	415	0	1181				0	1514	496	435	2012	0
Peak Hour Factor	0.94	0.94	0.94				0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	567	0	1000				0	2405	663	499	3091	0
Arrive On Green	0.32	0.00	0.32				0.00	0.43	0.43	0.19	0.81	0.00
Sat Flow, veh/h	1781	0	3140				0	5611	1547	3456	5274	0
Grp Volume(v), veh/h	415	0	1181				0	1514	496	435	2012	0
Grp Sat Flow(s),veh/h/ln	1781	0	1570				0	1870	1547	1728	1702	0
Q Serve(g_s), s	26.9	0.0	41.4				0.0	27.5	35.1	15.9	21.0	0.0
Cycle Q Clear(g_c), s	26.9	0.0	41.4				0.0	27.5	35.1	15.9	21.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	567	0	1000				0	2405	663	499	3091	0
V/C Ratio(X)	0.73	0.00	1.18				0.00	0.63	0.75	0.87	0.65	0.00
Avail Cap(c_a), veh/h	567	0	1000				0	2405	663	659	3091	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.78	0.78	0.00
Uniform Delay (d), s/veh	39.4	0.0	44.3				0.0	29.1	31.2	51.3	7.0	0.0
Incr Delay (d2), s/veh	4.8	0.0	91.8				0.0	1.3	7.6	7.8	0.8	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.5	0.0	28.7				0.0	12.1	13.9	6.9	4.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	44.2	0.0	136.1				0.0	30.3	38.8	59.1	7.9	0.0
LnGrp LOS	D		F					C	D	E	A	
Approach Vol, veh/h		1596						2010			2447	
Approach Delay, s/veh		112.2						32.4			17.0	
Approach LOS		F						C			B	
Timer - Assigned Phs	1	2		4				6				
Phs Duration (G+Y+Rc), s	23.0	61.0		46.0				84.0				
Change Period (Y+Rc), s	4.2	5.3		4.6				5.3				
Max Green Setting (Gmax), s	24.8	49.7		41.4				78.7				
Max Q Clear Time (g_c+I1), s	17.9	37.1		43.4				23.0				
Green Ext Time (p_c), s	0.9	8.9		0.0				25.0				

Intersection Summary												
HCM 7th Control Delay, s/veh			47.2									
HCM 7th LOS			D									

Notes
 User approved volume balancing among the lanes for turning movement.

HCM 7th Signalized Intersection Summary
 1: Twin Oaks Valley Rd & Deer Springs Rd

Horizon Year + Project PM
 12/10/2025



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	40	200	90	1037	867	40
Future Volume (veh/h)	40	200	90	1037	867	40
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	47	235	103	1192	1070	49
Peak Hour Factor	0.85	0.85	0.87	0.87	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	311	277	133	1303	1053	861
Arrive On Green	0.17	0.17	0.07	0.70	0.56	0.56
Sat Flow, veh/h	1781	1585	1781	1870	1870	1529
Grp Volume(v), veh/h	47	235	103	1192	1070	49
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1529
Q Serve(g_s), s	1.9	12.1	4.8	44.7	47.2	1.2
Cycle Q Clear(g_c), s	1.9	12.1	4.8	44.7	47.2	1.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	311	277	133	1303	1053	861
V/C Ratio(X)	0.15	0.85	0.78	0.91	1.02	0.06
Avail Cap(c_a), veh/h	510	454	276	1454	1053	861
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.4	33.6	38.1	10.6	18.3	8.3
Incr Delay (d2), s/veh	0.2	8.0	9.4	8.7	32.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	10.6	2.3	14.7	26.9	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	29.6	41.6	47.5	19.3	50.3	8.3
LnGrp LOS	C	D	D	B	F	A
Approach Vol, veh/h	282			1295	1119	
Approach Delay, s/veh	39.6			21.5	48.4	
Approach LOS	D			C	D	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		64.2		19.6	11.2	53.0
Change Period (Y+Rc), s		5.8		5.0	5.0	5.8
Max Green Setting (Gmax), s		65.2		24.0	13.0	47.2
Max Q Clear Time (g_c+I1), s		46.7		14.1	6.8	49.2
Green Ext Time (p_c), s		9.6		0.6	0.1	0.0
Intersection Summary						
HCM 7th Control Delay, s/veh			34.6			
HCM 7th LOS			C			

HCM 7th Signalized Intersection Summary
 2: Twin Oaks Valley Rd & Buena Creek Rd

Horizon Year + Project PM
 12/10/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	630	0	328	5	0	0	298	787	5	0	817	570
Future Volume (veh/h)	630	0	328	5	0	0	298	787	5	0	817	570
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		1.00	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	692	0	360	20	0	0	343	905	6	0	869	606
Peak Hour Factor	0.91	0.91	0.91	0.25	0.25	0.25	0.87	0.87	0.87	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	609	0	460	79	0	0	211	1081	7	2	756	622
Arrive On Green	0.30	0.00	0.30	0.30	0.00	0.00	0.12	0.58	0.58	0.00	0.40	0.40
Sat Flow, veh/h	1781	0	1545	0	0	0	1781	1855	12	1781	1870	1539
Grp Volume(v), veh/h	692	0	360	20	0	0	343	0	911	0	869	606
Grp Sat Flow(s),veh/h/ln	1781	0	1545	0	0	0	1781	0	1868	1781	1870	1539
Q Serve(g_s), s	0.0	0.0	19.4	0.0	0.0	0.0	10.8	0.0	36.2	0.0	36.8	35.3
Cycle Q Clear(g_c), s	27.1	0.0	19.4	27.1	0.0	0.0	10.8	0.0	36.2	0.0	36.8	35.3
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	609	0	460	79	0	0	211	0	1089	2	756	622
V/C Ratio(X)	1.14	0.00	0.78	0.25	0.00	0.00	1.62	0.00	0.84	0.00	1.15	0.97
Avail Cap(c_a), veh/h	609	0	460	79	0	0	211	0	1089	327	756	622
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	0.00	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	33.8	0.0	29.3	45.6	0.0	0.0	40.1	0.0	15.5	0.0	27.1	26.7
Incr Delay (d2), s/veh	80.2	0.0	8.6	1.7	0.0	0.0	301.6	0.0	5.8	0.0	82.5	29.7
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	27.2	0.0	8.1	0.5	0.0	0.0	22.2	0.0	14.2	0.0	31.9	16.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	114.0	0.0	37.9	47.2	0.0	0.0	341.7	0.0	21.3	0.0	109.7	56.4
LnGrp LOS	F		D	D			F		C		F	E
Approach Vol, veh/h		1052			20			1254			1475	
Approach Delay, s/veh		88.0			47.2			109.0			87.8	
Approach LOS		F			D			F			F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	58.9		32.2	16.3	42.6		32.2				
Change Period (Y+Rc), s	5.8	5.8		* 5.1	5.5	5.8		5.1				
Max Green Setting (Gmax), s	16.7	30.6		* 27	10.8	36.8		26.0				
Max Q Clear Time (g_c+I1), s	0.0	38.2		29.1	12.8	38.8		29.1				
Green Ext Time (p_c), s	0.0	0.0		0.0	0.0	0.0		0.0				
Intersection Summary												
HCM 7th Control Delay, s/veh			94.6									
HCM 7th LOS			F									
Notes												
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 7th Signalized Intersection Summary
 3: Twin Oaks Valley Rd & Olive Street

Horizon Year + Project PM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↖	↗		↖	↗		↖	↗	
Traffic Volume (veh/h)	0	20	30	20	0	80	0	955	20	130	715	0
Future Volume (veh/h)	0	20	30	20	0	80	0	955	20	130	715	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.88	1.00		0.96	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	0	65	97	25	0	99	0	1061	22	143	786	0
Peak Hour Factor	0.31	0.31	0.31	0.81	0.81	0.81	0.90	0.90	0.90	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	79	117	155	0	122	1	1005	21	152	1260	0
Arrive On Green	0.00	0.12	0.12	0.09	0.00	0.09	0.00	0.55	0.55	0.09	0.67	0.00
Sat Flow, veh/h	0	659	984	1781	0	1400	1781	1824	38	1781	1870	0
Grp Volume(v), veh/h	0	0	162	25	0	99	0	0	1083	143	786	0
Grp Sat Flow(s),veh/h/ln	0	0	1643	1781	0	1400	1781	0	1862	1781	1870	0
Q Serve(g_s), s	0.0	0.0	11.9	1.6	0.0	8.6	0.0	0.0	68.3	9.9	29.3	0.0
Cycle Q Clear(g_c), s	0.0	0.0	11.9	1.6	0.0	8.6	0.0	0.0	68.3	9.9	29.3	0.0
Prop In Lane	0.00		0.60	1.00		1.00	1.00		0.02	1.00		0.00
Lane Grp Cap(c), veh/h	0	0	196	155	0	122	1	0	1026	152	1260	0
V/C Ratio(X)	0.00	0.00	0.83	0.16	0.00	0.81	0.00	0.00	1.06	0.94	0.62	0.00
Avail Cap(c_a), veh/h	0	0	239	267	0	210	72	0	1026	152	1260	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	53.3	52.4	0.0	55.6	0.0	0.0	27.8	56.4	11.4	0.0
Incr Delay (d2), s/veh	0.0	0.0	17.7	0.5	0.0	12.2	0.0	0.0	44.0	54.8	1.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	5.9	0.7	0.0	3.4	0.0	0.0	39.7	6.7	10.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	71.0	52.9	0.0	67.8	0.0	0.0	71.8	111.2	12.4	0.0
LnGrp LOS			E	D		E			F	F	B	
Approach Vol, veh/h		162			124			1083			929	
Approach Delay, s/veh		71.0			64.8			71.8			27.6	
Approach LOS		E			E			E			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.2	74.6		19.4	0.0	89.8		14.8				
Change Period (Y+Rc), s	4.6	6.3		4.6	4.6	6.3		4.0				
Max Green Setting (Gmax), s	10.6	68.3		18.0	5.0	73.9		18.6				
Max Q Clear Time (g_c+I1), s	11.9	70.3		13.9	0.0	31.3		10.6				
Green Ext Time (p_c), s	0.0	0.0		0.3	0.0	6.0		0.3				
Intersection Summary												
HCM 7th Control Delay, s/veh			53.5									
HCM 7th LOS			D									

HCM 7th Signalized Intersection Summary
 4: Twin Oaks Valley Rd & E. La Cienega Road

Horizon Year + Project PM
 12/10/2025



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	60	50	805	80	130	655
Future Volume (veh/h)	60	50	805	80	130	655
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00		0.96	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	90	75	915	91	140	704
Peak Hour Factor	0.67	0.67	0.88	0.88	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	199	177	1222	122	178	2139
Arrive On Green	0.11	0.11	0.38	0.38	0.10	0.60
Sat Flow, veh/h	1781	1585	3342	323	1781	3647
Grp Volume(v), veh/h	90	75	500	506	140	704
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1795	1781	1777
Q Serve(g_s), s	2.3	2.1	11.7	11.7	3.7	4.7
Cycle Q Clear(g_c), s	2.3	2.1	11.7	11.7	3.7	4.7
Prop In Lane	1.00	1.00		0.18	1.00	
Lane Grp Cap(c), veh/h	199	177	668	675	178	2139
V/C Ratio(X)	0.45	0.42	0.75	0.75	0.79	0.33
Avail Cap(c_a), veh/h	1044	929	829	838	186	2476
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.9	19.8	12.9	12.9	21.0	4.7
Incr Delay (d2), s/veh	1.6	1.6	3.0	2.9	18.8	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.8	3.7	3.7	2.2	0.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	21.5	21.4	15.9	15.9	39.8	4.8
LnGrp LOS	C	C	B	B	D	A
Approach Vol, veh/h	165		1006			844
Approach Delay, s/veh	21.4		15.9			10.6
Approach LOS	C		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	10.8	25.2			36.0	11.8
Change Period (Y+Rc), s	6.0	7.2			7.2	6.5
Max Green Setting (Gmax), s	5.0	22.3			33.3	28.0
Max Q Clear Time (g_c+I1), s	5.7	13.7			6.7	4.3
Green Ext Time (p_c), s	0.0	3.7			4.5	0.5
Intersection Summary						
HCM 7th Control Delay, s/veh			14.1			
HCM 7th LOS			B			

HCM 7th Signalized Intersection Summary
 5: Twin Oaks Valley Rd & Del Roy Dr

Horizon Year + Project PM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	30	80	0	40	40	855	10	10	655	20
Future Volume (veh/h)	10	0	30	80	0	40	40	855	10	10	655	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.94	1.00		0.93
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	13	0	40	100	0	50	43	910	11	11	744	23
Peak Hour Factor	0.75	0.75	0.75	0.80	0.80	0.80	0.94	0.94	0.94	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	35	0	246	145	0	384	91	1242	15	30	1092	34
Arrive On Green	0.02	0.00	0.16	0.08	0.00	0.25	0.05	0.35	0.35	0.02	0.31	0.31
Sat Flow, veh/h	1781	0	1555	1781	0	1566	1781	3592	43	1781	3510	108
Grp Volume(v), veh/h	13	0	40	100	0	50	43	450	471	11	377	390
Grp Sat Flow(s),veh/h/ln	1781	0	1555	1781	0	1566	1781	1777	1859	1781	1777	1841
Q Serve(g_s), s	0.4	0.0	1.3	3.3	0.0	1.5	1.4	13.2	13.2	0.4	11.0	11.0
Cycle Q Clear(g_c), s	0.4	0.0	1.3	3.3	0.0	1.5	1.4	13.2	13.2	0.4	11.0	11.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.02	1.00		0.06
Lane Grp Cap(c), veh/h	35	0	246	145	0	384	91	614	643	30	553	573
V/C Ratio(X)	0.37	0.00	0.16	0.69	0.00	0.13	0.47	0.73	0.73	0.37	0.68	0.68
Avail Cap(c_a), veh/h	179	0	887	179	0	933	194	755	789	179	740	766
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	28.8	0.0	21.7	26.6	0.0	17.5	27.5	17.1	17.1	29.0	17.9	17.9
Incr Delay (d2), s/veh	6.5	0.0	0.3	8.0	0.0	0.2	3.7	2.9	2.8	7.4	1.6	1.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.5	1.6	0.0	0.5	0.6	4.7	4.9	0.2	3.9	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	35.4	0.0	22.0	34.6	0.0	17.7	31.2	20.0	19.8	36.4	19.5	19.5
LnGrp LOS	D		C	C		B	C	B	B	D	B	B
Approach Vol, veh/h		53			150			964			778	
Approach Delay, s/veh		25.3			29.0			20.4			19.7	
Approach LOS		C			C			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.5	26.8	10.9	15.4	8.6	24.7	5.7	20.6				
Change Period (Y+Rc), s	5.5	6.2	6.0	6.0	5.5	6.2	4.5	6.0				
Max Green Setting (Gmax), s	6.0	25.3	6.0	34.0	6.5	24.8	6.0	35.5				
Max Q Clear Time (g_c+I1), s	2.4	15.2	5.3	3.3	3.4	13.0	2.4	3.5				
Green Ext Time (p_c), s	0.0	3.7	0.0	0.2	0.0	3.3	0.0	0.2				
Intersection Summary												
HCM 7th Control Delay, s/veh			20.9									
HCM 7th LOS			C									

HCM 7th Signalized Intersection Summary
6: Twin Oaks Valley Rd & Project Driveway

Horizon Year + Project PM
12/10/2025



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	57	132	910	680	35
Future Volume (veh/h)	15	57	132	910	680	35
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	16	62	143	989	739	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	131	117	182	2455	1616	83
Arrive On Green	0.07	0.07	0.10	0.69	0.47	0.47
Sat Flow, veh/h	1781	1585	1781	3647	3524	176
Grp Volume(v), veh/h	16	62	143	989	383	394
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1777	1777	1830
Q Serve(g_s), s	0.3	1.4	3.0	4.6	5.5	5.6
Cycle Q Clear(g_c), s	0.3	1.4	3.0	4.6	5.5	5.6
Prop In Lane	1.00	1.00	1.00			0.10
Lane Grp Cap(c), veh/h	131	117	182	2455	837	862
V/C Ratio(X)	0.12	0.53	0.79	0.40	0.46	0.46
Avail Cap(c_a), veh/h	839	746	233	2455	837	862
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.5	17.1	16.7	2.5	6.8	6.8
Incr Delay (d2), s/veh	0.4	3.7	12.6	0.5	1.8	1.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.1	1.5	0.2	1.4	1.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	17.0	20.8	29.4	3.0	8.6	8.6
LnGrp LOS	B	C	C	A	A	A
Approach Vol, veh/h	78			1132	777	
Approach Delay, s/veh	20.0			6.4	8.6	
Approach LOS	B			A	A	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		30.9		7.3	8.4	22.5
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		18.0		18.0	5.0	18.0
Max Q Clear Time (g_c+I1), s		6.6		3.4	5.0	7.6
Green Ext Time (p_c), s		4.7		0.1	0.0	3.2
Intersection Summary						
HCM 7th Control Delay, s/veh			7.8			
HCM 7th LOS			A			

HCM 7th Signalized Intersection Summary
 7: Twin Oaks Valley Rd & Windy Wy

Horizon Year + Project PM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	0	70	0	0	0	100	1002	0	5	817	20
Future Volume (veh/h)	70	0	70	0	0	0	100	1002	0	5	817	20
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96				1.00		1.00	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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	99	0	99				109	1089	0	5	898	22
Peak Hour Factor	0.71	0.71	0.71				0.92	0.92	0.92	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2				2	2	2	2	2	2
Cap, veh/h	150	0	129				134	2788	0	11	2535	62
Arrive On Green	0.08	0.00	0.08				0.08	0.78	0.00	0.01	0.72	0.72
Sat Flow, veh/h	1781	0	1529				1781	3647	0	1781	3541	87
Grp Volume(v), veh/h	99	0	99				109	1089	0	5	451	469
Grp Sat Flow(s),veh/h/ln	1781	0	1529				1781	1777	0	1781	1777	1851
Q Serve(g_s), s	7.0	0.0	8.2				7.8	12.4	0.0	0.4	12.5	12.5
Cycle Q Clear(g_c), s	7.0	0.0	8.2				7.8	12.4	0.0	0.4	12.5	12.5
Prop In Lane	1.00		1.00				1.00		0.00	1.00		0.05
Lane Grp Cap(c), veh/h	150	0	129				134	2788	0	11	1272	1325
V/C Ratio(X)	0.66	0.00	0.77				0.82	0.39	0.00	0.44	0.35	0.35
Avail Cap(c_a), veh/h	370	0	318				219	2788	0	123	1272	1325
HCM Platoon Ratio	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				0.57	0.57	0.00	0.92	0.92	0.92
Uniform Delay (d), s/veh	57.7	0.0	58.3				59.2	4.3	0.0	64.4	7.0	7.0
Incr Delay (d2), s/veh	4.8	0.0	9.1				6.8	0.2	0.0	22.9	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
%ile BackOfQ(50%),veh/ln	3.4	0.0	3.5				3.7	3.4	0.0	0.2	4.3	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	62.5	0.0	67.4				66.0	4.6	0.0	87.3	7.7	7.7
LnGrp LOS	E		E				E	A		F	A	A
Approach Vol, veh/h		198						1198			925	
Approach Delay, s/veh		64.9						10.2			8.2	
Approach LOS		E						B			A	
Timer - Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	5.8	108.2		16.0	14.8	99.3						
Change Period (Y+Rc), s	5.0	6.2		5.0	5.0	6.2						
Max Green Setting (Gmax), s	9.0	77.8		27.0	16.0	70.8						
Max Q Clear Time (g_c+I1), s	2.4	14.4		10.2	9.8	14.5						
Green Ext Time (p_c), s	0.0	9.3		0.7	0.1	6.2						
Intersection Summary												
HCM 7th Control Delay, s/veh			14.0									
HCM 7th LOS			B									

HCM 7th Signalized Intersection Summary
8: Twin Oaks Valley Rd & Borden Rd

Horizon Year + Project PM
12/10/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	228	500	250	170	230	90	220	784	270	69	655	123
Future Volume (veh/h)	228	500	250	170	230	90	220	784	270	69	655	123
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.96	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	253	556	278	185	250	98	239	852	293	77	728	137
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.92	0.92	0.92	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	277	733	366	209	710	269	263	1227	713	97	927	395
Arrive On Green	0.16	0.32	0.32	0.12	0.28	0.28	0.15	0.35	0.35	0.05	0.26	0.26
Sat Flow, veh/h	1781	2271	1133	1781	2495	947	1781	3554	1526	1781	3554	1514
Grp Volume(v), veh/h	253	435	399	185	176	172	239	852	293	77	728	137
Grp Sat Flow(s),veh/h/ln	1781	1777	1628	1781	1777	1665	1781	1777	1526	1781	1777	1514
Q Serve(g_s), s	20.0	31.4	31.6	14.7	11.2	11.8	18.9	29.6	18.3	6.1	27.3	10.5
Cycle Q Clear(g_c), s	20.0	31.4	31.6	14.7	11.2	11.8	18.9	29.6	18.3	6.1	27.3	10.5
Prop In Lane	1.00		0.70	1.00		0.57	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	277	573	525	209	506	474	263	1227	713	97	927	395
V/C Ratio(X)	0.91	0.76	0.76	0.89	0.35	0.36	0.91	0.69	0.41	0.80	0.79	0.35
Avail Cap(c_a), veh/h	312	573	525	250	506	474	316	1227	713	148	927	395
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	59.6	43.5	43.6	62.3	40.7	40.9	60.1	40.4	25.6	67.0	49.3	43.1
Incr Delay (d2), s/veh	28.2	9.1	9.9	26.2	1.9	2.2	25.7	3.3	1.7	15.4	6.6	2.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.2	15.3	14.2	8.2	5.3	5.2	10.3	13.2	6.8	3.2	12.7	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	87.8	52.6	53.5	88.6	42.6	43.1	85.8	43.7	27.4	82.4	55.9	45.5
LnGrp LOS	F	D	D	F	D	D	F	D	C	F	E	D
Approach Vol, veh/h		1087			533			1384			942	
Approach Delay, s/veh		61.1			58.7			47.5			56.5	
Approach LOS		E			E			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.7	52.4	25.8	43.5	27.2	46.9	13.7	55.6				
Change Period (Y+Rc), s	* 4.9	* 6.1	4.6	* 6.1	* 4.9	* 6.1	5.9	* 6.1				
Max Green Setting (Gmax), s	* 20	* 46	25.4	* 37	* 25	* 41	11.9	* 50				
Max Q Clear Time (g_c+I1), s	16.7	33.6	20.9	29.3	22.0	13.8	8.1	31.6				
Green Ext Time (p_c), s	0.2	4.5	0.3	3.0	0.2	2.2	0.0	6.2				
Intersection Summary												
HCM 7th Control Delay, s/veh			54.9									
HCM 7th LOS			D									
Notes												
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 7th Signalized Intersection Summary
 9: Woodward St & Borden Rd

Horizon Year + Project PM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	645	44	20	312	40	78	100	30	30	80	90
Future Volume (veh/h)	160	645	44	20	312	40	78	100	30	30	80	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.94	1.00		0.97	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	174	701	48	22	347	44	95	122	37	33	88	99
Peak Hour Factor	0.92	0.92	0.92	0.90	0.90	0.90	0.82	0.82	0.82	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	235	1058	72	64	714	90	203	332	101	88	331	269
Arrive On Green	0.13	0.31	0.31	0.04	0.23	0.23	0.11	0.24	0.24	0.05	0.18	0.18
Sat Flow, veh/h	1781	3362	230	1781	3152	395	1781	1365	414	1781	1870	1520
Grp Volume(v), veh/h	174	370	379	22	194	197	95	0	159	33	88	99
Grp Sat Flow(s),veh/h/ln	1781	1777	1816	1781	1777	1771	1781	0	1779	1781	1870	1520
Q Serve(g_s), s	5.7	11.0	11.0	0.7	5.8	5.9	3.0	0.0	4.5	1.1	2.5	3.5
Cycle Q Clear(g_c), s	5.7	11.0	11.0	0.7	5.8	5.9	3.0	0.0	4.5	1.1	2.5	3.5
Prop In Lane	1.00		0.13	1.00		0.22	1.00		0.23	1.00		1.00
Lane Grp Cap(c), veh/h	235	559	571	64	403	401	203	0	433	88	331	269
V/C Ratio(X)	0.74	0.66	0.66	0.35	0.48	0.49	0.47	0.00	0.37	0.38	0.27	0.37
Avail Cap(c_a), veh/h	537	1365	1395	204	1051	1047	525	0	1239	204	956	777
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.5	18.1	18.1	28.7	20.5	20.5	25.3	0.0	19.2	28.1	21.7	22.1
Incr Delay (d2), s/veh	4.5	1.3	1.3	3.2	0.9	0.9	1.7	0.0	0.5	2.7	0.4	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	2.5	4.2	4.3	0.4	2.3	2.3	1.3	0.0	1.7	0.5	1.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	30.0	19.5	19.4	31.9	21.4	21.5	27.0	0.0	19.7	30.8	22.1	23.0
LnGrp LOS	C	B	B	C	C	C	C		B	C	C	C
Approach Vol, veh/h		923			413			254			220	
Approach Delay, s/veh		21.4			22.0			22.4			23.8	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.3	25.0	12.1	16.6	12.7	19.6	8.1	20.6				
Change Period (Y+Rc), s	5.1	* 5.8	5.2	5.8	4.6	* 5.8	5.1	* 5.8				
Max Green Setting (Gmax), s	7.0	* 47	18.0	31.2	18.4	* 36	7.0	* 43				
Max Q Clear Time (g_c+I1), s	2.7	13.0	5.0	5.5	7.7	7.9	3.1	6.5				
Green Ext Time (p_c), s	0.0	5.1	0.2	0.8	0.3	2.3	0.0	0.9				
Intersection Summary												
HCM 7th Control Delay, s/veh			22.0									
HCM 7th LOS			C									
Notes												
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 7th Signalized Intersection Summary
 10: Twin Oaks Valley Rd & Richmar Road

Horizon Year + Project PM
 12/10/2025

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	200	60	80	140	40	20	120	1124	130	250	955	170	
Future Volume (veh/h)	200	60	80	140	40	20	120	1124	130	250	955	170	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Width 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	
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.97	1.00		0.96	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	235	71	94	200	57	29	126	1183	137	266	1016	181	
Peak Hour Factor	0.85	0.85	0.85	0.70	0.70	0.70	0.95	0.95	0.95	0.94	0.94	0.94	
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2	
Cap, veh/h	245	97	128	303	197	100	134	1462	169	82	1282	228	
Arrive On Green	0.14	0.14	0.14	0.17	0.17	0.17	0.08	0.46	0.46	0.05	0.43	0.43	
Sat Flow, veh/h	1781	702	929	1781	1156	588	1781	3195	369	1781	2993	532	
Grp Volume(v), veh/h	235	0	165	200	0	86	126	656	664	266	602	595	
Grp Sat Flow(s),veh/h/ln	1781	0	1631	1781	0	1744	1781	1777	1786	1781	1777	1748	
Q Serve(g_s), s	17.0	0.0	12.6	13.6	0.0	5.6	9.1	41.3	41.7	6.0	38.1	38.3	
Cycle Q Clear(g_c), s	17.0	0.0	12.6	13.6	0.0	5.6	9.1	41.3	41.7	6.0	38.1	38.3	
Prop In Lane	1.00		0.57	1.00		0.34	1.00		0.21	1.00		0.30	
Lane Grp Cap(c), veh/h	245	0	225	303	0	297	134	813	817	82	761	749	
V/C Ratio(X)	0.96	0.00	0.73	0.66	0.00	0.29	0.94	0.81	0.81	3.24	0.79	0.79	
Avail Cap(c_a), veh/h	245	0	225	521	0	510	134	813	817	82	761	749	
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	0.62	0.62	0.62	0.49	0.49	0.49	
Uniform Delay (d), s/veh	55.7	0.0	53.8	50.4	0.0	47.1	59.8	30.3	30.4	62.0	32.1	32.2	
Incr Delay (d2), s/veh	45.8	0.0	11.8	2.5	0.0	0.5	44.1	5.4	5.5	1021.3	4.2	4.3	
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	10.8	0.0	5.9	6.3	0.0	2.5	5.7	17.9	18.2	26.0	16.4	16.3	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d), s/veh	101.4	0.0	65.6	52.9	0.0	47.6	103.9	35.7	36.0	1083.3	36.3	36.5	
LnGrp LOS	F		E	D		D	F	D	D	F	D	D	
Approach Vol, veh/h	400						286		1446		1463		
Approach Delay, s/veh	86.6						51.3		41.8		226.8		
Approach LOS	F						D		D		F		
Timer - Assigned Phs	1	2	4		5	6	8						
Phs Duration (G+Y+Rc), s	12.0	65.8	24.0		15.8	62.0	28.2						
Change Period (Y+Rc), s	6.0	6.3	6.1		6.0	6.3	6.1						
Max Green Setting (Gmax), s	6.0	43.6	17.9		9.8	39.8	38.0						
Max Q Clear Time (g_c+I1), s	8.0	43.7	19.0		11.1	40.3	15.6						
Green Ext Time (p_c), s	0.0	0.0	0.0		0.0	0.0	1.0						
Intersection Summary													
HCM 7th Control Delay, s/veh			122.8										
HCM 7th LOS			F										

HCM 7th Signalized Intersection Summary
 11: San Marcos Blvd & E. Mission Road

Horizon Year + Project PM
 12/10/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	1070	50	290	740	98	60	250	760	34	150	70
Future Volume (veh/h)	100	1070	50	290	740	98	60	250	760	34	150	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		0.95
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	1742	1742	1870	1870	1742	1742	1742	1870	1742	1870
Adj Flow Rate, veh/h	105	1126	53	326	831	110	67	278	0	41	183	85
Peak Hour Factor	0.95	0.95	0.95	0.89	0.89	0.89	0.90	0.90	0.90	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	136	1294	522	414	1478	641	83	669		50	396	174
Arrive On Green	0.08	0.36	0.36	0.13	0.42	0.42	0.05	0.20	0.00	0.03	0.18	0.18
Sat Flow, veh/h	1781	3554	1433	3219	3554	1542	1659	3311	1477	1781	2195	964
Grp Volume(v), veh/h	105	1126	53	326	831	110	67	278	0	41	135	133
Grp Sat Flow(s),veh/h/ln	1781	1777	1433	1610	1777	1542	1659	1655	1477	1781	1655	1503
Q Serve(g_s), s	3.9	19.8	1.6	6.6	12.0	3.0	2.7	4.9	0.0	1.5	4.9	5.3
Cycle Q Clear(g_c), s	3.9	19.8	1.6	6.6	12.0	3.0	2.7	4.9	0.0	1.5	4.9	5.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.64
Lane Grp Cap(c), veh/h	136	1294	522	414	1478	641	83	669		50	299	271
V/C Ratio(X)	0.77	0.87	0.10	0.79	0.56	0.17	0.81	0.42		0.82	0.45	0.49
Avail Cap(c_a), veh/h	326	1361	549	432	1478	641	180	1588		119	725	658
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.4	19.9	14.1	28.4	14.9	12.3	31.6	23.3	0.0	32.4	24.6	24.7
Incr Delay (d2), s/veh	8.8	6.2	0.1	9.1	0.5	0.1	16.5	0.4	0.0	26.2	1.1	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	1.9	7.9	0.5	2.8	4.1	0.9	1.4	1.8	0.0	1.0	1.8	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	39.2	26.0	14.2	37.5	15.4	12.5	48.1	23.7	0.0	58.6	25.6	26.1
LnGrp LOS	D	C	B	D	B	B	D	C		E	C	C
Approach Vol, veh/h		1284			1267			345			309	
Approach Delay, s/veh		26.6			20.8			28.5			30.2	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.9	18.9	12.6	29.7	7.4	17.4	9.1	33.2				
Change Period (Y+Rc), s	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3				
Max Green Setting (Gmax), s	4.5	32.2	9.0	25.7	7.3	29.4	12.3	22.4				
Max Q Clear Time (g_c+I1), s	3.5	6.9	8.6	21.8	4.7	7.3	5.9	14.0				
Green Ext Time (p_c), s	0.0	1.6	0.1	2.5	0.0	1.3	0.1	3.6				
Intersection Summary												
HCM 7th Control Delay, s/veh			24.9									
HCM 7th LOS			C									
Notes												
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 7th Signalized Intersection Summary
 12: Twin Oaks Valley Rd & San Marcos Blvd

Horizon Year + Project PM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↗	↖↗	↑↑		↖↗	↑↑	↗	↖↗	↑↑	
Traffic Volume (veh/h)	325	680	390	340	500	100	420	809	340	90	719	296
Future Volume (veh/h)	325	680	390	340	500	100	420	809	340	90	719	296
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	339	708	406	366	538	108	442	852	358	95	757	312
Peak Hour Factor	0.96	0.96	0.96	0.93	0.93	0.93	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	333	1158	605	230	868	173	230	1199	626	199	789	325
Arrive On Green	0.10	0.33	0.33	0.07	0.30	0.30	0.07	0.34	0.34	0.06	0.32	0.32
Sat Flow, veh/h	3456	3554	1534	3456	2932	586	3456	3554	1542	3456	2432	1001
Grp Volume(v), veh/h	339	708	406	366	325	321	442	852	358	95	553	516
Grp Sat Flow(s),veh/h/ln	1728	1777	1534	1728	1777	1740	1728	1777	1542	1728	1777	1656
Q Serve(g_s), s	13.0	22.6	29.5	9.0	21.3	21.5	9.0	28.2	24.3	3.6	41.2	41.3
Cycle Q Clear(g_c), s	13.0	22.6	29.5	9.0	21.3	21.5	9.0	28.2	24.3	3.6	41.2	41.3
Prop In Lane	1.00		1.00	1.00		0.34	1.00		1.00	1.00		0.60
Lane Grp Cap(c), veh/h	333	1158	605	230	526	515	230	1199	626	199	577	538
V/C Ratio(X)	1.02	0.61	0.67	1.59	0.62	0.62	1.92	0.71	0.57	0.48	0.96	0.96
Avail Cap(c_a), veh/h	333	1166	609	230	530	520	230	1199	626	205	579	540
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.76	0.76	0.76	0.83	0.83	0.83	0.38	0.38	0.38
Uniform Delay (d), s/veh	61.0	38.3	33.9	63.0	40.9	41.0	63.0	39.0	31.2	61.6	44.7	44.7
Incr Delay (d2), s/veh	54.2	2.4	5.8	280.1	4.1	4.3	426.5	1.7	1.0	0.7	14.4	15.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.1	10.0	11.6	12.8	9.7	9.6	17.5	12.2	8.9	1.6	19.8	18.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	115.2	40.7	39.7	343.1	45.0	45.3	489.5	40.6	32.3	62.3	59.1	60.0
LnGrp LOS	F	D	D	F	D	D	F	D	C	E	E	E
Approach Vol, veh/h		1453			1012			1652			1164	
Approach Delay, s/veh		57.8			152.9			158.9			59.8	
Approach LOS		E			F			F			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	51.4	16.0	51.6	20.0	47.4	14.3	53.3				
Change Period (Y+Rc), s	7.0	7.4	7.0	* 7.8	7.0	7.4	6.5	7.8				
Max Green Setting (Gmax), s	9.0	44.3	9.0	* 44	13.0	40.3	8.0	45.0				
Max Q Clear Time (g_c+I1), s	11.0	31.5	11.0	43.3	15.0	23.5	5.6	30.2				
Green Ext Time (p_c), s	0.0	4.9	0.0	0.5	0.0	3.3	0.0	5.9				

Intersection Summary												
HCM 7th Control Delay, s/veh											108.1	
HCM 7th LOS											F	

Notes
 * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 13: Twin Oaks Valley Rd & SR 78 WB Ramps

Horizon Year + Project PM
 12/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↔		↔		↑↑↑	↗		↑↑↑	↗
Traffic Volume (veh/h)	0	0	0	720	0	552	0	1207	600	0	1265	344
Future Volume (veh/h)	0	0	0	720	0	552	0	1207	600	0	1265	344
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	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
Work Zone On Approach				No			No			No		
Adj Sat Flow, veh/h/ln				1870	0	1870	0	1870	1870	0	1870	1870
Adj Flow Rate, veh/h				791	0	607	0	1437	714	0	1332	0
Peak Hour Factor				0.91	0.91	0.91	0.84	0.84	0.84	0.95	0.95	0.95
Percent Heavy Veh, %				2	0	2	0	2	2	0	2	2
Cap, veh/h				900	0	727	0	3387	1430	0	3387	
Arrive On Green				0.26	0.00	0.26	0.00	1.00	1.00	0.00	0.66	0.00
Sat Flow, veh/h				3456	0	2790	0	5274	1533	0	5274	1585
Grp Volume(v), veh/h				791	0	607	0	1437	714	0	1332	0
Grp Sat Flow(s),veh/h/ln				1728	0	1395	0	1702	1533	0	1702	1585
Q Serve(g_s), s				28.5	0.0	26.7	0.0	0.0	0.0	0.0	15.4	0.0
Cycle Q Clear(g_c), s				28.5	0.0	26.7	0.0	0.0	0.0	0.0	15.4	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				900	0	727	0	3387	1430	0	3387	
V/C Ratio(X)				0.88	0.00	0.84	0.00	0.42	0.50	0.00	0.39	
Avail Cap(c_a), veh/h				1579	0	1275	0	3387	1430	0	3387	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.14	0.14	0.00	0.10	0.00
Uniform Delay (d), s/veh				46.1	0.0	45.4	0.0	0.0	0.0	0.0	10.0	0.0
Incr Delay (d2), s/veh				1.2	0.0	1.0	0.0	0.1	0.2	0.0	0.0	0.0
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				12.4	0.0	9.3	0.0	0.0	0.1	0.0	5.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				47.3	0.0	46.4	0.0	0.1	0.2	0.0	10.0	0.0
LnGrp LOS				D		D		A	A		A	
Approach Vol, veh/h					1398			2151			1332	
Approach Delay, s/veh					46.9			0.1			10.0	
Approach LOS					D			A			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		91.5				91.5		38.5				
Change Period (Y+Rc), s		5.3				5.3		4.6				
Max Green Setting (Gmax), s		60.7				60.7		59.4				
Max Q Clear Time (g_c+I1), s		2.0				17.4		30.5				
Green Ext Time (p_c), s		13.4				7.0		3.3				

Intersection Summary		
HCM 7th Control Delay, s/veh		16.2
HCM 7th LOS		B

Notes
 Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 7th Signalized Intersection Summary
 14: Twin Oaks Valley Rd & SR 78 EB Ramps

Horizon Year + Project PM
 12/10/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	153	40	230	0	0	0	0	1824	960	418	1697	0
Future Volume (veh/h)	153	40	230	0	0	0	0	1824	960	418	1697	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98				1.00		0.98	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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	136	0	350				0	2643	829	435	1768	0
Peak Hour Factor	0.85	0.85	0.85				0.84	0.84	0.84	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	286	0	500				0	3302	913	492	3896	0
Arrive On Green	0.16	0.00	0.16				0.00	0.59	0.59	0.28	1.00	0.00
Sat Flow, veh/h	1781	0	3111				0	5611	1552	3456	5274	0
Grp Volume(v), veh/h	136	0	350				0	2643	829	435	1768	0
Grp Sat Flow(s),veh/h/ln	1781	0	1555				0	1870	1552	1728	1702	0
Q Serve(g_s), s	9.0	0.0	13.8				0.0	47.6	61.3	15.6	0.0	0.0
Cycle Q Clear(g_c), s	9.0	0.0	13.8				0.0	47.6	61.3	15.6	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	286	0	500				0	3302	913	492	3896	0
V/C Ratio(X)	0.47	0.00	0.70				0.00	0.80	0.91	0.89	0.45	0.00
Avail Cap(c_a), veh/h	526	0	919				0	3302	913	633	3896	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.82	0.82	0.00
Uniform Delay (d), s/veh	49.6	0.0	51.6				0.0	20.8	23.6	45.5	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.0	1.8				0.0	2.1	14.4	9.9	0.3	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.0	5.5				0.0	19.4	23.7	6.2	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	50.8	0.0	53.4				0.0	22.9	38.0	55.4	0.3	0.0
LnGrp LOS	D		D				C	D	E	A		
Approach Vol, veh/h		486						3472			2203	
Approach Delay, s/veh		52.6						26.5			11.2	
Approach LOS		D						C			B	
Timer - Assigned Phs	1	2		4			6					
Phs Duration (G+Y+Rc), s	22.7	81.8		25.5			104.5					
Change Period (Y+Rc), s	4.2	5.3		4.6			5.3					
Max Green Setting (Gmax), s	23.8	53.7		38.4			81.7					
Max Q Clear Time (g_c+I1), s	17.6	63.3		15.8			2.0					
Green Ext Time (p_c), s	0.8	0.0		1.8			21.3					
Intersection Summary												
HCM 7th Control Delay, s/veh			23.1									
HCM 7th LOS			C									
Notes												
User approved volume balancing among the lanes for turning movement.												



APPENDIX K
QUEUE ANALYSIS WORKSHEETS

Intersection: 6: Twin Oaks Valley Rd & Project Driveway

Movement	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	T	TR
Maximum Queue (ft)	50	74	63	74	96	120	160
Average Queue (ft)	15	43	27	16	26	52	67
95th Queue (ft)	42	66	60	55	71	114	145
Link Distance (ft)	629	629		2913	2913	1858	1858
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			150				
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 6: Twin Oaks Valley Rd & Project Driveway

Movement	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	T	TR
Maximum Queue (ft)	41	60	114	74	88	111	128
Average Queue (ft)	10	27	54	12	19	37	50
95th Queue (ft)	33	53	97	45	62	85	105
Link Distance (ft)	298	298		2913	2913	1858	1858
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			150				
Storage Blk Time (%)			0				
Queuing Penalty (veh)			0				

Intersection: 6: Twin Oaks Valley Rd & Project Driveway

Movement	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	T	TR
Maximum Queue (ft)	56	90	88	68	93	158	162
Average Queue (ft)	19	42	29	17	29	50	54
95th Queue (ft)	48	72	65	52	76	118	125
Link Distance (ft)	629	629		2913	2913	1858	1858
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			150				
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 6: Twin Oaks Valley Rd & Project Driveway

Movement	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	T	TR
Maximum Queue (ft)	35	70	115	79	101	98	109
Average Queue (ft)	11	31	53	14	27	35	41
95th Queue (ft)	34	56	100	50	75	80	90
Link Distance (ft)	298	298		2913	2913	1858	1858
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			150				
Storage Blk Time (%)			0				
Queuing Penalty (veh)			0				



APPENDIX L

TRANSIT SCHEDULE AND MAPS

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Escondido to Vista via Mission Rd. & S. Santa Fe Ave.

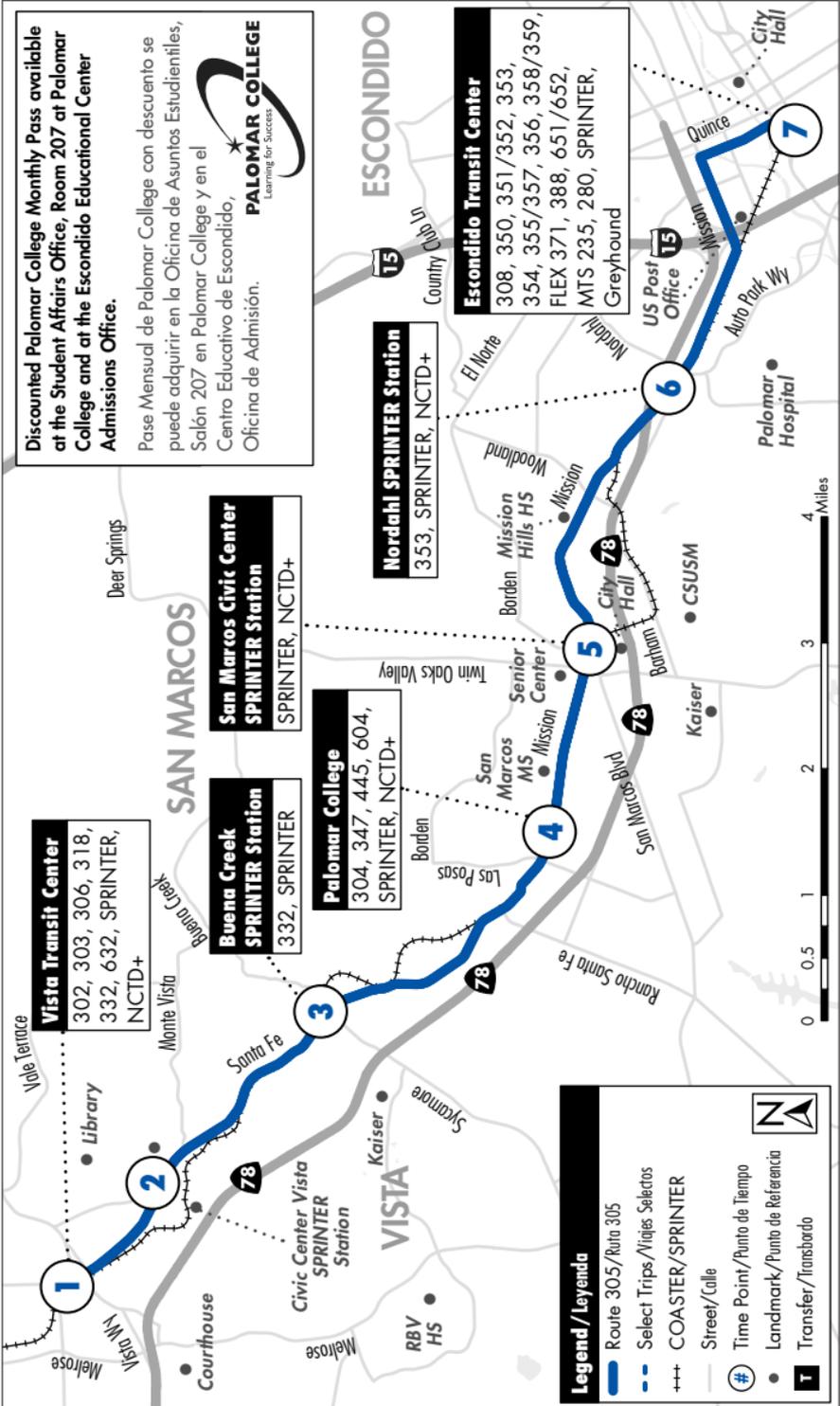
Escondido a Vista via Mission Rd. y S. Santa Fe Ave.

M-F • SA • SU
L-V • SÁ • DO

Destinations/Destinos

- Palomar College
- San Marcos Civic Center
- Mission Hills High School
- San Marcos Middle School

- Vista Transit Center
- Escondido Transit Center
- North Inland Live Well Center
- DMV



Monday - Friday
Eastbound to Escondido Transit Center
Lunes a Viernes • Dirección hacia el este al Centro de Tránsito Escondido

Vista Transit Center	S. Santa Fe & Civic Center Dr.	Buena Creek SPRINTER Station	Palomar College Transit Center	Mission Rd. & San Marcos Bl.	Mission Rd. & Auto Pkwy.	Escondido Transit Center
1	2	3	4	5	6	7
4:32a	4:36a	4:40a	4:49a	4:52a	4:58a	5:06a
5:02a	5:07a	5:12a	5:22a	5:26a	5:34a	5:42a
5:32a	5:37a	5:42a	5:53a	5:57a	6:05a	6:15a
6:02a	6:07a	6:13a	6:25a	6:30a	6:41a	6:51a
6:32a	6:37a	6:46a	6:59a	7:06a	7:18a	7:30a
7:02a	7:07a	7:16a	7:29a	7:36a	7:48a	8:00a
7:32a	7:38a	7:47a	8:00a	8:07a	8:19a	8:33a
8:02a	8:08a	8:16a	8:28a	8:34a	8:44a	8:56a
-	-	-	*8:42a	*8:48a	*8:57a	*9:09a
8:34a	8:39a	8:46a	8:58a	9:04a	9:13a	9:25a
9:04a	9:09a	9:16a	9:27a	9:32a	9:41a	9:53a
9:32a	9:37a	9:44a	9:54a	9:59a	10:08a	10:20a
10:02a	10:07a	10:14a	10:26a	10:31a	10:41a	10:53a
10:32a	10:37a	10:44a	10:56a	11:01a	11:11a	11:23a
11:02a	11:07a	11:14a	11:26a	11:31a	11:41a	11:53a
11:32a	11:37a	11:44a	11:56a	12:01p	12:11p	12:23p
12:02p	12:07p	12:14p	12:26p	12:31p	12:41p	12:53p
12:32p	12:37p	12:44p	12:56p	1:01p	1:11p	1:23p
1:02p	1:07p	1:14p	1:26p	1:31p	1:41p	1:53p
1:32p	1:37p	1:45p	1:57p	2:02p	2:12p	2:24p
2:02p	2:07p	2:15p	2:27p	2:33p	2:43p	2:57p
2:32p	2:38p	2:46p	2:58p	3:04p	3:15p	3:29p
3:02p	3:08p	3:16p	3:30p	3:36p	3:47p	4:01p
3:32p	3:38p	3:47p	4:01p	4:07p	4:18p	4:32p
4:02p	4:08p	4:18p	4:32p	4:38p	4:49p	5:03p
4:32p	4:38p	4:47p	5:01p	5:07p	5:17p	5:30p
5:02p	5:08p	5:17p	5:30p	5:36p	5:45p	5:58p
5:32p	5:38p	5:45p	5:58p	6:03p	6:12p	6:23p
6:02p	6:08p	6:15p	6:27p	6:32p	6:40p	6:51p
6:32p	6:37p	6:43p	6:55p	7:00p	7:08p	7:17p

* Operates Tuesdays only.
Opera solamente los Martes.



Highlighted text reflects updated times.
El texto resaltado refleja los horarios actualizados.

Please note, BREEZE "school tripper" bus service only runs while schools are in session and are subject to change based on bell times. NCTD will update trip planning applications and GoNCTD.com if this service changes.

Tenga en cuenta que el servicio de autobús "school tripper" de BREEZE solo opera mientras las escuelas se encuentren abiertas y está sujeto a cambios en función de los horarios de entrada y salida. NCTD actualizará las aplicaciones de planificación de viaje y GoNCTD.com si este servicio cambia.

Monday - Friday**Eastbound to Escondido Transit Center***Lunes a Viernes • Dirección hacia el este al Centro de Tránsito Escondido*

Vista Transit Center	S. Santa Fe & Civic Center Dr.	Buena Creek SPRINTER Station	Palomar College Transit Center	Mission Rd. & San Marcos Bl.	Mission Rd. & Auto Pkwy.	Escondido Transit Center
1	2	3	4	5	6	7
7:02p	7:07p	7:13p	7:24p	7:28p	7:36p	7:45p
7:32p	7:37p	7:43p	7:54p	7:58p	8:05p	8:14p
8:02p	8:07p	8:12p	8:22p	8:26p	8:33p	8:42p
8:32p	8:37p	8:42p	8:51p	8:55p	9:02p	9:10p
9:02p	9:07p	9:12p	9:20p	9:24p	9:31p	9:39p
9:32p	9:37p	9:42p	9:50p	9:54p	10:01p	10:09p
10:02p	10:07p	10:12p	10:20p	10:24p	10:31p	10:39p
11:12p	11:16p	11:21p	11:29p	11:32p	11:38p	11:46p

Monday - Friday
Westbound to Vista Transit Center*Lunes a Viernes • Dirección hacia el oeste al Centro de Tránsito Vista*

Escondido Transit Center	Mission Rd. & Auto Pkwy.	Mission Rd. & San Marcos Bl.	Palomar College Transit Center	Buena Creek SPRINTER Station	S. Santa Fe & Civic Center Dr.	Vista Transit Center
7	6	5	4	3	2	1
4:21a	4:28a	4:33a	4:38a	4:43a	4:47a	4:53a
4:50a	4:58a	5:03a	5:09a	5:15a	5:20a	5:26a
5:16a	5:24a	5:29a	5:35a	5:42a	5:47a	5:54a
5:44a	5:53a	5:59a	6:06a	6:14a	6:21a	6:29a
6:11a	6:20a	6:26a	6:33a	6:41a	6:48a	6:56a
6:39a	6:48a	6:55a	7:03a	7:12a	7:19a	7:27a
7:06a	7:15a	7:23a	7:31a	7:40a	7:47a	7:55a
7:36a	7:45a	7:54a	8:03a	8:13a	8:20a	8:29a
8:06a	8:15a	8:25a	8:34a	8:44a	8:51a	9:00a
8:38a	8:47a	8:54a	9:02a	9:11a	9:18a	9:27a
9:06a	9:15a	9:22a	9:30a	9:39a	9:46a	9:55a
9:36a	9:45a	9:52a	10:00a	10:08a	10:14a	10:23a
10:06a	10:15a	10:22a	10:30a	10:38a	10:44a	10:52a
10:36a	10:45a	10:52a	11:00a	11:08a	11:14a	11:21a
11:06a	11:15a	11:22a	11:30a	11:38a	11:45a	11:53a
11:34a	11:43a	11:50a	11:58a	12:06p	12:13p	12:21p
12:04p	12:13p	12:20p	12:28p	12:37p	12:44p	12:52p
12:34p	12:43p	12:51p	12:59p	1:08p	1:15p	1:23p
1:04p	1:13p	1:21p	1:29p	1:39p	1:46p	1:56p
-	*1:21p	*1:29p	*1:37p	*1:47p	*1:54p	*2:04p
1:34p	1:43p	1:51p	1:59p	2:09p	2:16p	2:26p
2:04p	2:13p	2:21p	2:29p	2:40p	2:48p	2:58p
-	**2:22p	**2:31p	**2:39p	**2:50p	**2:58p	**3:08p
2:34p	2:44p	2:53p	3:01p	3:12p	3:20p	3:30p
3:04p	3:14p	3:24p	3:34p	3:50p	3:58p	4:10p
3:34p	3:44p	3:57p	4:08p	4:24p	4:32p	4:44p
4:08p	4:18p	4:27p	4:37p	4:51p	4:59p	5:11p
4:38p	4:48p	4:57p	5:06p	5:19p	5:27p	5:39p
5:08p	5:18p	5:27p	5:35p	5:47p	5:55p	6:06p

* Operates Wednesdays only.
Opera solamente los Miércoles.

** Operates Monday, Tuesday, Thursday, and Friday.
Opera Lunes, Martes, Jueves y Viernes.

Please note, BREEZE "school tripper" bus service only runs while schools are in session and are subject to change based on bell times. NCTD will update trip planning applications and GoNCTD.com if this service changes.

Tenga en cuenta que el servicio de autobús "school tripper" de BREEZE solo opera mientras las escuelas se encuentren abiertas y está sujeto a cambios en función de los horarios de entrada y salida. NCTD actualizará las aplicaciones de planificación de viaje y GoNCTD.com si este servicio cambia.

Monday - Friday
Westbound to Vista Transit Center
Lunes a Viernes • Dirección hacia el oeste al Centro de Tránsito Vista

Escondido Transit Center	Mission Rd. & Auto Pkwy.	Mission Rd. & San Marcos Bl.	Palomar College Transit Center	Buena Creek SPRINTER Station	S. Santa Fe & Civic Center Dr.	Vista Transit Center
7	6	5	4	3	2	1
5:38p	5:47p	5:56p	6:03p	6:12p	6:19p	6:30p
6:08p	6:17p	6:24p	6:31p	6:40p	6:47p	6:57p
6:38p	6:46p	6:53p	7:00p	7:08p	7:15p	7:24p
7:08p	7:16p	7:23p	7:29p	7:36p	7:42p	7:51p
7:38p	7:46p	7:52p	7:58p	8:05p	8:11p	8:18p
8:08p	8:16p	8:22p	8:28p	8:35p	8:41p	8:48p
8:38p	8:46p	8:52p	8:58p	9:05p	9:10p	9:17p
9:14p	9:21p	9:27p	9:33p	9:40p	9:45p	9:52p
9:51p	9:58p	10:03p	10:09p	10:16p	10:21p	10:28p
10:30p	10:37p	10:42p	10:47p	10:53p	10:58p	11:05p

Saturday & Sunday
Eastbound to Escondido Transit Center
Sábado y Domingo • Dirección hacia el este al Centro de Tránsito Escondido

Vista Transit Center	S. Santa Fe & Civic Center Dr.	Buena Creek SPRINTER Station	Palomar College Transit Center	Mission Rd. & San Marcos Bl.	Mission Rd. & Auto Pkwy.	Escondido Transit Center
1	2	3	4	5	6	7
5:32a	5:38a	5:43a	5:51a	5:55a	6:03a	6:09a
6:02a	6:08a	6:13a	6:21a	6:25a	6:33a	6:39a
6:32a	6:38a	6:43a	6:51a	6:56a	7:04a	7:10a
7:02a	7:08a	7:13a	7:21a	7:26a	7:34a	7:41a
7:32a	7:38a	7:44a	7:54a	7:59a	8:07a	8:14a
8:02a	8:08a	8:14a	8:24a	8:29a	8:37a	8:45a
8:32a	8:38a	8:44a	8:54a	8:59a	9:07a	9:15a
9:02a	9:08a	9:14a	9:24a	9:29a	9:38a	9:47a
9:32a	9:39a	9:45a	9:55a	10:00a	10:09a	10:18a
10:02a	10:09a	10:15a	10:25a	10:30a	10:39a	10:48a
10:32a	10:39a	10:45a	10:55a	11:00a	11:10a	11:19a
11:02a	11:09a	11:15a	11:25a	11:30a	11:40a	11:49a
11:32a	11:39a	11:45a	11:55a	12:00p	12:10p	12:19p
12:02p	12:09p	12:15p	12:25p	12:30p	12:38p	12:47p
12:32p	12:39p	12:45p	12:55p	1:00p	1:08p	1:17p
1:02p	1:09p	1:15p	1:25p	1:30p	1:38p	1:47p
1:32p	1:39p	1:45p	1:55p	2:00p	2:08p	2:17p
2:02p	2:09p	2:15p	2:24p	2:30p	2:38p	2:47p
2:32p	2:39p	2:45p	2:54p	3:00p	3:08p	3:17p
3:02p	3:09p	3:15p	3:24p	3:30p	3:38p	3:47p
3:32p	3:39p	3:45p	3:54p	4:00p	4:08p	4:17p
4:02p	4:09p	4:15p	4:24p	4:30p	4:38p	4:47p
4:32p	4:39p	4:45p	4:54p	5:00p	5:08p	5:17p
5:02p	5:09p	5:15p	5:24p	5:30p	5:37p	5:46p
5:32p	5:39p	5:45p	5:54p	5:59p	6:06p	6:14p
6:02p	6:09p	6:15p	6:24p	6:29p	6:36p	6:44p
6:32p	6:39p	6:45p	6:54p	6:59p	7:06p	7:14p
7:02p	7:09p	7:14p	7:22p	7:27p	7:34p	7:42p
7:32p	7:39p	7:44p	7:52p	7:57p	8:04p	8:11p
8:02p	8:09p	8:14p	8:22p	8:27p	8:34p	8:41p
8:32p	8:38p	8:43p	8:51p	8:55p	9:02p	9:09p
9:02p	9:08p	9:13p	9:21p	9:25p	9:32p	9:39p
9:32p	9:38p	9:43p	9:51p	9:55p	10:02p	10:09p
10:02p	10:08p	10:13p	10:21p	10:25p	10:31p	10:37p
11:12p	11:18p	11:23p	11:31p	11:35p	11:41p	11:47p

Saturday
Westbound to Vista Transit Center
Sábado • Dirección hacia el oeste al Centro de Tránsito Vista

Escondido Transit Center	Mission Rd. & Auto Pkwy.	Mission Rd. & San Marcos Bl.	Palomar College Transit Center	Buena Creek SPRINTER Station	S. Santa Fe & Civic Center Dr.	Vista Transit Center
7	6	5	4	3	2	1
5:16a	5:24a	5:29a	5:34a	5:43a	5:49a	5:55a
5:46a	5:54a	5:59a	6:04a	6:13a	6:19a	6:25a
6:15a	6:23a	6:28a	6:33a	6:42a	6:48a	6:54a
6:44a	6:53a	6:59a	7:04a	7:14a	7:20a	7:26a
7:14a	7:24a	7:30a	7:35a	7:45a	7:51a	7:58a
7:44a	7:54a	8:00a	8:05a	8:15a	8:21a	8:28a
8:09a	8:19a	8:25a	8:30a	8:40a	8:47a	8:55a
8:38a	8:48a	8:55a	9:00a	9:11a	9:18a	9:26a
9:07a	9:17a	9:24a	9:29a	9:40a	9:47a	9:55a
9:37a	9:47a	9:54a	9:59a	10:10a	10:17a	10:25a
10:07a	10:17a	10:24a	10:29a	10:40a	10:47a	10:55a
10:37a	10:47a	10:54a	10:59a	11:10a	11:17a	11:25a
11:07a	11:17a	11:24a	11:29a	11:40a	11:47a	11:55a
11:37a	11:47a	11:54a	11:59a	12:10p	12:17p	12:25p
12:06p	12:16p	12:23p	12:28p	12:39p	12:46p	12:54p
12:36p	12:46p	12:53p	12:58p	1:09p	1:16p	1:24p
1:06p	1:16p	1:23p	1:28p	1:39p	1:46p	1:54p
1:36p	1:46p	1:53p	1:58p	2:09p	2:16p	2:24p
2:06p	2:16p	2:23p	2:28p	2:39p	2:46p	2:54p
2:36p	2:46p	2:53p	2:58p	3:09p	3:16p	3:24p
3:06p	3:16p	3:23p	3:28p	3:39p	3:46p	3:54p
3:36p	3:46p	3:53p	3:58p	4:09p	4:16p	4:24p
4:06p	4:16p	4:23p	4:28p	4:39p	4:46p	4:54p
4:36p	4:46p	4:53p	4:58p	5:09p	5:16p	5:24p
5:07p	5:17p	5:24p	5:29p	5:40p	5:47p	5:55p
5:38p	5:48p	5:55p	6:00p	6:11p	6:17p	6:24p
6:10p	6:19p	6:26p	6:31p	6:41p	6:47p	6:54p
6:41p	6:50p	6:56p	7:01p	7:11p	7:17p	7:24p
7:12p	7:21p	7:27p	7:32p	7:42p	7:48p	7:55p
7:42p	7:51p	7:57p	8:02p	8:12p	8:18p	8:24p
8:13p	8:22p	8:28p	8:33p	8:43p	8:49p	8:55p
8:44p	8:51p	8:57p	9:02p	9:12p	9:18p	9:24p
9:15p	9:22p	9:28p	9:32p	9:40p	9:46p	9:52p
10:33p	10:40p	10:46p	10:50p	10:58p	11:04p	11:09p

Sunday
Westbound to Vista Transit Center
Domingo • Dirección hacia el oeste al Centro de Tránsito Vista

Escondido Transit Center	Mission Rd. & Auto Pkwy.	Mission Rd. & San Marcos Bl.	Palamar College Transit Center	Buena Creek SPRINTER Station	S. Santa Fe & Civic Center Dr.	Vista Transit Center
7	6	5	4	3	2	1
5:16a	5:24a	5:29a	5:34a	5:43a	5:49a	5:55a
5:46a	5:54a	5:59a	6:04a	6:13a	6:19a	6:25a
6:15a	6:23a	6:28a	6:33a	6:42a	6:48a	6:54a
6:43a	6:52a	6:58a	7:03a	7:13a	7:19a	7:25a
7:11a	7:21a	7:27a	7:32a	7:42a	7:48a	7:55a
7:40a	7:50a	7:56a	8:01a	8:11a	8:17a	8:24a
8:09a	8:19a	8:25a	8:30a	8:40a	8:47a	8:55a
8:38a	8:48a	8:55a	9:00a	9:11a	9:18a	9:26a
9:07a	9:17a	9:24a	9:29a	9:40a	9:47a	9:55a
9:37a	9:47a	9:54a	9:59a	10:10a	10:17a	10:25a
10:07a	10:17a	10:24a	10:29a	10:40a	10:47a	10:55a
10:37a	10:47a	10:54a	10:59a	11:10a	11:17a	11:25a
11:07a	11:17a	11:24a	11:29a	11:40a	11:47a	11:55a
11:37a	11:47a	11:54a	11:59a	12:10p	12:17p	12:25p
12:06p	12:16p	12:23p	12:28p	12:39p	12:46p	12:54p
12:36p	12:46p	12:53p	12:58p	1:09p	1:16p	1:24p
1:06p	1:16p	1:23p	1:28p	1:39p	1:46p	1:54p
1:36p	1:46p	1:53p	1:58p	2:09p	2:16p	2:24p
2:06p	2:16p	2:23p	2:28p	2:39p	2:46p	2:54p
2:36p	2:46p	2:53p	2:58p	3:09p	3:16p	3:24p
3:06p	3:16p	3:23p	3:28p	3:39p	3:46p	3:54p
3:36p	3:46p	3:53p	3:58p	4:09p	4:16p	4:24p
4:06p	4:16p	4:23p	4:28p	4:39p	4:46p	4:54p
4:36p	4:46p	4:53p	4:58p	5:09p	5:16p	5:24p
5:07p	5:17p	5:24p	5:29p	5:40p	5:47p	5:55p
5:38p	5:48p	5:55p	6:00p	6:11p	6:17p	6:24p
6:10p	6:19p	6:26p	6:31p	6:41p	6:47p	6:54p
6:41p	6:50p	6:56p	7:01p	7:11p	7:17p	7:24p
7:12p	7:21p	7:27p	7:32p	7:42p	7:48p	7:55p
7:42p	7:51p	7:57p	8:02p	8:12p	8:18p	8:24p
8:13p	8:22p	8:28p	8:33p	8:43p	8:49p	8:55p
8:44p	8:51p	8:57p	9:02p	9:12p	9:18p	9:24p
9:15p	9:22p	9:28p	9:32p	9:40p	9:46p	9:52p
10:33p	10:40p	10:46p	10:50p	10:58p	11:04p	11:09p

SPRINTER SCHEDULE

Schedule subject to change / Los horarios están sujetos a cambios

EASTBOUND		OCEANSIDE TO ESCONDIDO																																		
STATIONS	READ DOWN	30 MIN FREQUENCY	MONDAY-SUNDAY (Half-shaded boxes indicate NO SATURDAY, SUNDAY, or HOLIDAY service)																																	
			Oceanside Transit Center	↓	:03 :33	4:03a	4:33a	5:03a	5:33a	6:03a	6:33a	7:03a	7:33a	8:03a	8:33a	9:03a	9:33a	10:03a	10:33a	11:03a	11:33a	12:03p	12:33p	1:03p	1:33p	2:03p	2:33p	3:03p	3:33p	4:03p	4:33p	5:03p	5:33p	6:03p	6:33p	7:03p
Coast Highway	↓	:05 :35	4:05a	4:35a	5:05a	5:35a	6:05a	6:35a	7:05a	7:35a	8:05a	8:35a	9:05a	9:35a	10:05a	10:35a	11:05a	11:35a	12:05p	12:35p	1:05p	1:35p	2:05p	2:35p	3:05p	3:35p	4:05p	4:35p	5:05p	5:35p	6:05p	6:35p	7:05p	7:35p	8:05p	8:35p
Crouch Street	↓	:07 :37	4:07a	4:37a	5:07a	5:37a	6:07a	6:37a	7:07a	7:37a	8:07a	8:37a	9:07a	9:37a	10:07a	10:37a	11:07a	11:37a	12:07p	12:37p	1:07p	1:37p	2:07p	2:37p	3:07p	3:37p	4:07p	4:37p	5:07p	5:37p	6:07p	6:37p	7:07p	7:37p	8:07p	8:37p
El Camino Real	↓	:11 :41	4:11a	4:41a	5:11a	5:41a	6:11a	6:41a	7:11a	7:41a	8:11a	8:41a	9:11a	9:41a	10:11a	10:41a	11:11a	11:41a	12:11p	12:41p	1:11p	1:41p	2:11p	2:41p	3:11p	3:41p	4:11p	4:41p	5:11p	5:41p	6:11p	6:41p	7:11p	7:41p	8:11p	8:41p
Rancho Del Oro	↓	:14 :44	4:14a	4:44a	5:14a	5:44a	6:14a	6:44a	7:14a	7:44a	8:14a	8:44a	9:14a	9:44a	10:14a	10:44a	11:14a	11:44a	12:14p	12:44p	1:14p	1:44p	2:14p	2:44p	3:14p	3:44p	4:14p	4:44p	5:14p	5:44p	6:14p	6:44p	7:14p	7:44p	8:14p	8:44p
College Boulevard	↓	:17 :47	4:17a	4:47a	5:17a	5:47a	6:17a	6:47a	7:17a	7:47a	8:17a	8:47a	9:17a	9:47a	10:17a	10:47a	11:17a	11:47a	12:17p	12:47p	1:17p	1:47p	2:17p	2:47p	3:17p	3:47p	4:17p	4:47p	5:17p	5:47p	6:17p	6:47p	7:17p	7:47p	8:17p	8:47p
Melrose Drive	↓	:22 :52	4:22a	4:52a	5:22a	5:52a	6:22a	6:52a	7:22a	7:52a	8:22a	8:52a	9:22a	9:52a	10:22a	10:52a	11:22a	11:52a	12:22p	12:52p	1:22p	1:52p	2:22p	2:52p	3:22p	3:52p	4:22p	4:52p	5:22p	5:52p	6:22p	6:52p	7:22p	7:52p	8:22p	8:52p
Vista Transit Center	↓	:26 :56	4:26a	4:56a	5:26a	5:56a	6:26a	6:56a	7:26a	7:56a	8:26a	8:56a	9:26a	9:56a	10:26a	10:56a	11:26a	11:56a	12:26p	12:56p	1:26p	1:56p	2:26p	2:56p	3:26p	3:56p	4:26p	4:56p	5:26p	5:56p	6:26p	6:56p	7:26p	7:56p	8:26p	8:56p
Civic Center-Vista	↓	:29 :59	4:29a	4:59a	5:29a	5:59a	6:29a	6:59a	7:29a	7:59a	8:29a	8:59a	9:29a	9:59a	10:29a	10:59a	11:29a	11:59a	12:29p	12:59p	1:29p	1:59p	2:29p	2:59p	3:29p	3:59p	4:29p	4:59p	5:29p	5:59p	6:29p	6:59p	7:29p	7:59p	8:29p	8:59p
Buena Creek	↓	:35 :05	4:35a	5:05a	5:35a	6:05a	6:35a	7:05a	7:35a	8:05a	8:35a	9:05a	9:35a	10:05a	10:35a	11:05a	11:35a	12:05p	12:35p	1:05p	1:35p	2:05p	2:35p	3:05p	3:35p	4:05p	4:35p	5:05p	5:35p	6:05p	6:35p	7:05p	7:35p	8:05p	8:35p	9:05p
Palomar College	↓	:40 :10	4:40a	5:10a	5:40a	6:10a	6:40a	7:10a	7:40a	8:10a	8:40a	9:10a	9:40a	10:10a	10:40a	11:10a	11:40a	12:10p	12:40p	1:10p	1:40p	2:10p	2:40p	3:10p	3:40p	4:10p	4:40p	5:10p	5:40p	6:10p	6:40p	7:10p	7:40p	8:10p	8:40p	9:10p
San Marcos Civic Center	↓	:43 :13	4:43a	5:13a	5:43a	6:13a	6:43a	7:13a	7:43a	8:13a	8:43a	9:13a	9:43a	10:13a	10:43a	11:13a	11:43a	12:13p	12:43p	1:13p	1:43p	2:13p	2:43p	3:13p	3:43p	4:13p	4:43p	5:13p	5:43p	6:13p	6:43p	7:13p	7:43p	8:13p	8:43p	9:13p
Cal State San Marcos	↓	:46 :16	4:46a	5:16a	5:46a	6:16a	6:46a	7:16a	7:46a	8:16a	8:46a	9:16a	9:46a	10:16a	10:46a	11:16a	11:46a	12:16p	12:46p	1:16p	1:46p	2:16p	2:46p	3:16p	3:46p	4:16p	4:46p	5:16p	5:46p	6:16p	6:46p	7:16p	7:46p	8:16p	8:46p	9:16p
Nordahl Road	↓	:51 :21	4:51a	5:21a	5:51a	6:21a	6:51a	7:21a	7:51a	8:21a	8:51a	9:21a	9:51a	10:21a	10:51a	11:21a	11:51a	12:21p	12:51p	1:21p	1:51p	2:21p	2:51p	3:21p	3:51p	4:21p	4:51p	5:21p	5:51p	6:21p	6:51p	7:21p	7:51p	8:21p	8:51p	9:21p
Escondido Transit Center	↓	:56 :26	4:56a	5:26a	5:56a	6:26a	6:56a	7:26a	7:56a	8:26a	8:56a	9:26a	9:56a	10:26a	10:56a	11:26a	11:56a	12:26p	12:56p	1:26p	1:56p	2:26p	2:56p	3:26p	3:56p	4:26p	4:56p	5:26p	5:56p	6:26p	6:56p	7:26p	7:56p	8:26p	8:56p	9:26p

EASTBOUND		EB				
FRIDAY NIGHT ONLY		SATURDAY NIGHT ONLY				
9:03p	9:33p	10:03p	10:33p	9:33p	10:33p	11:33p
9:05p	9:35p	10:05p	10:35p	9:35p	10:35p	11:35p
9:07p	9:37p	10:07p	10:37p	9:37p	10:37p	11:37p
9:11p	9:41p	10:11p	10:41p	9:41p	10:41p	11:41p
9:14p	9:44p	10:14p	10:44p	9:44p	10:44p	11:44p
9:17p	9:47p	10:17p	10:47p	9:47p	10:47p	11:47p
9:22p	9:52p	10:22p	10:52p	9:52p	10:52p	11:52p
9:26p	9:56p	10:26p	10:56p	9:56p	10:56p	11:56p
9:29p	9:59p	10:29p	10:59p	9:59p	10:59p	11:59p
9:35p	10:05p	10:35p	11:05p	10:05p	11:05p	12:05a
9:40p	10:10p	10:40p	11:10p	10:10p	11:10p	12:10a
9:43p	10:13p	10:43p	11:13p	10:13p	11:13p	12:13a
9:46p	10:16p	10:46p	11:16p	10:16p	11:16p	12:16a
9:51p	10:21p	10:51p	11:21p	10:21p	11:21p	12:21a
9:56p	10:26p	10:56p	11:26p	10:26p	11:26p	12:26a

WESTBOUND		ESCONDIDO TO OCEANSIDE																																		
STATIONS	READ DOWN	30 MIN FREQUENCY	MONDAY-SUNDAY (Half-shaded boxes indicate NO SATURDAY, SUNDAY, or HOLIDAY service)																																	
			Escondido Transit Center	↓	:03 :33	4:03a	4:33a	5:03a	5:33a	6:03a	6:33a	7:03a	7:33a	8:03a	8:33a	9:03a	9:33a	10:03a	10:33a	11:03a	11:33a	12:03p	12:33p	1:03p	1:33p	2:03p	2:33p	3:03p	3:33p	4:03p	4:33p	5:03p	5:33p	6:03p	6:33p	7:03p
Nordahl Road	↓	:06 :36	4:06a	4:36a	5:06a	5:36a	6:06a	6:36a	7:06a	7:36a	8:06a	8:36a	9:06a	9:36a	10:06a	10:36a	11:06a	11:36a	12:06p	12:36p	1:06p	1:36p	2:06p	2:36p	3:06p	3:36p	4:06p	4:36p	5:06p	5:36p	6:06p	6:36p	7:06p	7:36p	8:06p	8:36p
Cal State San Marcos	↓	:11 :41	4:11a	4:41a	5:11a	5:41a	6:11a	6:41a	7:11a	7:41a	8:11a	8:41a	9:11a	9:41a	10:11a	10:41a	11:11a	11:41a	12:11p	12:41p	1:11p	1:41p	2:11p	2:41p	3:11p	3:41p	4:11p	4:41p	5:11p	5:41p	6:11p	6:41p	7:11p	7:41p	8:11p	8:41p
San Marcos Civic Center	↓	:14 :44	4:14a	4:44a	5:14a	5:44a	6:14a	6:44a	7:14a	7:44a	8:14a	8:44a	9:14a	9:44a	10:14a	10:44a	11:14a	11:44a	12:14p	12:44p	1:14p	1:44p	2:14p	2:44p	3:14p	3:44p	4:14p	4:44p	5:14p	5:44p	6:14p	6:44p	7:14p	7:44p	8:14p	8:44p
Palomar College	↓	:17 :47	4:17a	4:47a	5:17a	5:47a	6:17a	6:47a	7:17a	7:47a	8:17a	8:47a	9:17a	9:47a	10:17a	10:47a	11:17a	11:47a	12:17p	12:47p	1:17p	1:47p	2:17p	2:47p	3:17p	3:47p	4:17p	4:47p	5:17p	5:47p	6:17p	6:47p	7:17p	7:47p	8:17p	8:47p
Buena Creek	↓	:22 :52	4:22a	4:52a	5:22a	5:52a	6:22a	6:52a	7:22a	7:52a	8:22a	8:52a	9:22a	9:52a	10:22a	10:52a	11:22a	11:52a	12:22p	12:52p	1:22p	1:52p	2:22p	2:52p	3:22p	3:52p	4:22p	4:52p	5:22p	5:52p	6:22p	6:52p	7:22p	7:52p	8:22p	8:52p
Civic Center-Vista	↓	:27 :57	4:27a	4:57a	5:27a	5:57a	6:27a	6:57a	7:27a	7:57a	8:27a	8:57a	9:27a	9:57a	10:27a	10:57a	11:27a	11:57a	12:27p	12:57p	1:27p	1:57p	2:27p	2:57p	3:27p	3:57p	4:27p	4:57p	5:27p	5:57p	6:27p	6:57p	7:27p	7:57p	8:27p	8:57p
Vista Transit Center	↓	:30 :00	4:30a	5:00a	5:30a	6:00a	6:30a	7:00a	7:30a	8:00a	8:30a	9:00a	9:30a	10:00a	10:30a	11:00a	11:30a	12:00p	12:30p	1:00p	1:30p	2:00p	2:30p	3:00p	3:30p	4:00p	4:30p	5:00p	5:30p	6:00p	6:30p	7:00p	7:30p	8:00p	8:30p	9:00p
Melrose Drive	↓	:35 :05	4:35a	5:05a	5:35a	6:05a	6:35a	7:05a	7:35a	8:05a	8:35a	9:05a	9:35a	10:05a	10:35a	11:05a	11:35a	12:05p	12:35p	1:05p	1:35p	2:05p	2:35p	3:05p	3:35p	4:05p	4:35p	5:05p	5:35p	6:05p	6:35p	7:05p	7:35p	8:05p	8:35p	9:05p
College Boulevard	↓	:40 :10	4:40a	5:10a	5:40a	6:10a	6:40a	7:10a	7:40a	8:10a	8:40a	9:10a	9:40a	10:10a	10:40a	11:10a	11:40a	12:10p	12:40p	1:10p	1:40p	2:10p	2:40p	3:10p	3:40p	4:10p	4:40p	5:10p	5:40p	6:10p	6:40p	7:10p	7:40p	8:10p	8:40p	9:10p
Rancho Del Oro	↓	:43 :13	4:43a	5:13a	5:43a	6:13a	6:43a	7:13a	7:43a	8:13a	8:43a	9:13a	9:43a	10:13a	10:43a	11:13a	11:43a	12:13p	12:43p	1:13p	1:43p	2:13p	2:43p	3:13p	3:43p	4:13p	4:43p	5:13p	5:43p	6:13p	6:43p	7:13p	7:43p	8:13p	8:43p	9:13p
El Camino Real	↓	:46 :16	4:46a	5:16a	5:46a	6:16a	6:46a	7:16a	7:46a	8:16a	8:46a	9:16a	9:46a	10:16a	10:46a	11:16a	11:46a	12:16p	12:46p	1:16p	1:46p	2:16p	2:46p	3:16p	3:46p	4:16p	4:46p	5:16p	5:46p	6:16p	6:46p	7:16p	7:46p	8:16p	8:46p	9:16p
Crouch Street	↓	:49 :19	4:49a	5:19a	5:49a	6:19a	6:49a	7:19a	7:49a	8:19a	8:49a	9:19a	9:49a	10:19a	10:49a	11:19a	11:49a	12:19p	12:49p	1:19p	1:49p	2:19p	2:49p	3:19p	3:49p	4:19p	4:49p	5:19								



APPENDIX M
POST-MITIGATION INTERSECTION ANALYSIS WORKSHEETS

HCM 7th Signalized Intersection Summary
 12: Twin Oaks Valley Rd & San Marcos Blvd

Opening Year + Project AM (Post-Mitigation)

01/26/2026



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	186	431	257	359	328	17	201	455	542	89	836	242
Future Volume (veh/h)	186	431	257	359	328	17	201	455	542	89	836	242
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	204	474	282	390	357	18	221	500	596	95	889	257
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.91	0.91	0.91	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	253	1105	576	357	1173	59	214	1186	678	187	870	251
Arrive On Green	0.07	0.31	0.31	0.10	0.34	0.34	0.06	0.33	0.33	0.05	0.32	0.32
Sat Flow, veh/h	3456	3554	1535	3456	3437	173	3456	3554	1540	3456	2700	779
Grp Volume(v), veh/h	204	474	282	390	184	191	221	500	596	95	584	562
Grp Sat Flow(s),veh/h/ln	1728	1777	1535	1728	1777	1833	1728	1777	1540	1728	1777	1703
Q Serve(g_s), s	8.4	15.4	20.5	15.0	11.0	11.1	9.0	15.8	48.4	3.9	46.7	46.7
Cycle Q Clear(g_c), s	8.4	15.4	20.5	15.0	11.0	11.1	9.0	15.8	48.4	3.9	46.7	46.7
Prop In Lane	1.00		1.00	1.00		0.09	1.00		1.00	1.00		0.46
Lane Grp Cap(c), veh/h	253	1105	576	357	606	625	214	1186	678	187	572	548
V/C Ratio(X)	0.81	0.43	0.49	1.09	0.30	0.31	1.03	0.42	0.88	0.51	1.02	1.02
Avail Cap(c_a), veh/h	334	1118	581	357	606	625	214	1186	678	198	572	548
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.80	0.80	0.80	0.93	0.93	0.93	0.60	0.60	0.60
Uniform Delay (d), s/veh	66.2	39.7	34.9	65.0	35.1	35.1	68.0	37.5	37.5	66.7	49.2	49.2
Incr Delay (d2), s/veh	10.3	1.2	3.0	69.4	1.0	1.0	67.4	0.2	12.0	1.3	34.6	36.0
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	4.0	6.8	8.0	9.9	4.9	5.1	5.9	6.8	20.8	1.7	25.5	24.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	76.4	40.9	37.9	134.4	36.1	36.1	135.4	37.7	49.4	68.0	83.7	85.2
LnGrp LOS	E	D	D	F	D	D	F	D	D	E	F	F
Approach Vol, veh/h		960			765			1317			1241	
Approach Delay, s/veh		47.6			86.2			59.4			83.2	
Approach LOS		D			F			E			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	22.0	52.5	16.0	54.5	17.6	56.9	14.3	56.2				
Change Period (Y+Rc), s	7.0	7.4	7.0	* 7.8	7.0	7.4	6.5	7.8				
Max Green Setting (Gmax), s	15.0	45.6	9.0	* 47	14.0	46.6	8.3	47.4				
Max Q Clear Time (g_c+I1), s	17.0	22.5	11.0	48.7	10.4	13.1	5.9	50.4				
Green Ext Time (p_c), s	0.0	3.9	0.0	0.0	0.2	2.0	0.0	0.0				

Intersection Summary

HCM 7th Control Delay, s/veh	68.4
HCM 7th LOS	E

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 12: Twin Oaks Valley Rd & San Marcos Blvd

Opening Year + Project PM (Post-Mitigation)

01/26/2026



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↖	↖↗	↑↑		↖↗	↑↑	↖	↖↗	↑↑	
Traffic Volume (veh/h)	286	599	339	316	438	92	365	754	310	80	665	259
Future Volume (veh/h)	286	599	339	316	438	92	365	754	310	80	665	259
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	298	624	353	340	471	99	384	794	326	84	700	273
Peak Hour Factor	0.96	0.96	0.96	0.93	0.93	0.93	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	343	1112	632	310	881	184	334	1231	676	184	741	289
Arrive On Green	0.10	0.31	0.31	0.09	0.30	0.30	0.10	0.35	0.35	0.05	0.30	0.30
Sat Flow, veh/h	3456	3554	1533	3456	2907	606	3456	3554	1543	3456	2474	965
Grp Volume(v), veh/h	298	624	353	340	287	283	384	794	326	84	503	470
Grp Sat Flow(s),veh/h/ln	1728	1777	1533	1728	1777	1736	1728	1777	1543	1728	1777	1663
Q Serve(g_s), s	12.3	21.2	25.6	13.0	19.4	19.7	14.0	27.3	21.9	3.4	40.1	40.1
Cycle Q Clear(g_c), s	12.3	21.2	25.6	13.0	19.4	19.7	14.0	27.3	21.9	3.4	40.1	40.1
Prop In Lane	1.00		1.00	1.00		0.35	1.00		1.00	1.00		0.58
Lane Grp Cap(c), veh/h	343	1112	632	310	539	526	334	1231	676	184	532	498
V/C Ratio(X)	0.87	0.56	0.56	1.10	0.53	0.54	1.15	0.65	0.48	0.46	0.94	0.94
Avail Cap(c_a), veh/h	357	1112	632	310	539	526	334	1231	676	191	539	504
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.81	0.81	0.81	0.86	0.86	0.86	0.64	0.64	0.64
Uniform Delay (d), s/veh	64.4	41.5	32.9	66.0	42.0	42.1	65.5	39.9	29.2	66.6	49.6	49.6
Incr Delay (d2), s/veh	19.3	2.1	3.5	74.9	3.0	3.2	93.6	1.0	0.5	1.1	18.7	19.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	9.5	9.9	8.9	8.8	8.8	10.4	11.8	8.0	1.5	20.1	18.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	83.6	43.6	36.4	140.9	45.0	45.3	159.1	40.9	29.7	67.7	68.3	69.2
LnGrp LOS	F	D	D	F	D	D	F	D	C	E	E	E
Approach Vol, veh/h		1275			910			1504			1057	
Approach Delay, s/veh		51.0			80.9			68.6			68.7	
Approach LOS		D			F			E			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.0	52.8	21.0	51.2	21.4	51.4	14.2	58.0				
Change Period (Y+Rc), s	7.0	7.4	7.0	* 7.8	7.0	7.4	6.5	7.8				
Max Green Setting (Gmax), s	13.0	45.3	14.0	* 44	15.0	43.3	8.0	50.0				
Max Q Clear Time (g_c+I1), s	15.0	27.6	16.0	42.1	14.3	21.7	5.4	29.3				
Green Ext Time (p_c), s	0.0	4.9	0.0	1.1	0.1	3.1	0.0	6.3				

Intersection Summary

HCM 7th Control Delay, s/veh	66.3
HCM 7th LOS	E

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
2: Twin Oaks Valley Rd & Buena Creek Rd

Horizon Year + Project AM (Post-Mitigation)

01/26/2026



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↖	↗		↖	↕	↗
Traffic Volume (veh/h)	470	0	356	5	5	0	176	464	5	5	1065	460
Future Volume (veh/h)	470	0	356	5	5	0	176	464	5	5	1065	460
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	505	0	383	10	10	0	187	494	5	5	1109	479
Peak Hour Factor	0.93	0.93	0.93	0.50	0.50	0.50	0.94	0.94	0.94	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	341	0	489	36	25	0	160	953	10	119	925	763
Arrive On Green	0.31	0.00	0.31	0.31	0.31	0.00	0.09	0.52	0.52	0.13	0.99	0.99
Sat Flow, veh/h	935	0	1560	0	80	0	1781	1848	19	1781	1870	1541
Grp Volume(v), veh/h	505	0	383	20	0	0	187	0	499	5	1109	479
Grp Sat Flow(s),veh/h/ln	935	0	1560	80	0	0	1781	0	1866	1781	1870	1541
Q Serve(g_s), s	0.0	0.0	33.5	0.0	0.0	0.0	13.5	0.0	26.5	0.4	74.2	1.3
Cycle Q Clear(g_c), s	47.0	0.0	33.5	47.0	0.0	0.0	13.5	0.0	26.5	0.4	74.2	1.3
Prop In Lane	1.00		1.00	0.50		0.00	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	341	0	489	61	0	0	160	0	963	119	925	763
V/C Ratio(X)	1.48	0.00	0.78	0.33	0.00	0.00	1.17	0.00	0.52	0.04	1.20	0.63
Avail Cap(c_a), veh/h	341	0	489	61	0	0	160	0	963	207	925	763
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.82	0.00	0.82	0.09	0.09	0.09
Uniform Delay (d), s/veh	54.8	0.0	46.9	42.5	0.0	0.0	68.3	0.0	24.0	60.8	0.8	0.4
Incr Delay (d2), s/veh	231.5	0.0	8.1	3.1	0.0	0.0	116.4	0.0	1.6	0.0	90.4	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	35.2	0.0	14.2	0.6	0.0	0.0	11.2	0.0	11.7	0.2	23.6	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	286.3	0.0	55.0	45.6	0.0	0.0	184.7	0.0	25.6	60.8	91.2	0.8
LnGrp LOS	F		E	D			F		C	E	F	A
Approach Vol, veh/h		888			20			686			1593	
Approach Delay, s/veh		186.5			45.6			69.0			63.9	
Approach LOS		F			D			E			E	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.8	84.3		52.1	19.0	81.1		52.1				
Change Period (Y+Rc), s	5.8	5.8		* 5.1	5.5	5.8		5.1				
Max Green Setting (Gmax), s	17.4	70.0		* 47	13.5	74.2		45.9				
Max Q Clear Time (g_c+I1), s	2.4	28.5		49.0	15.5	76.2		49.0				
Green Ext Time (p_c), s	0.0	3.1		0.0	0.0	0.0		0.0				

Intersection Summary

HCM 7th Control Delay, s/veh	99.1
HCM 7th LOS	F

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 12: Twin Oaks Valley Rd & San Marcos Blvd

Horizon Year + Project AM (Post-Mitigation)

01/26/2026



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	214	490	300	390	370	20	230	488	590	100	895	273
Future Volume (veh/h)	214	490	300	390	370	20	230	488	590	100	895	273
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	235	538	330	424	402	22	253	536	648	106	952	290
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.91	0.91	0.91	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	286	1105	576	357	1135	62	214	1184	677	188	858	260
Arrive On Green	0.08	0.31	0.31	0.10	0.33	0.33	0.06	0.33	0.33	0.05	0.32	0.32
Sat Flow, veh/h	3456	3554	1535	3456	3420	187	3456	3554	1540	3456	2665	808
Grp Volume(v), veh/h	235	538	330	424	208	216	253	536	648	106	633	609
Grp Sat Flow(s),veh/h/ln	1728	1777	1535	1728	1777	1830	1728	1777	1540	1728	1777	1697
Q Serve(g_s), s	9.7	17.8	24.9	15.0	12.9	13.0	9.0	17.2	48.3	4.3	46.7	46.7
Cycle Q Clear(g_c), s	9.7	17.8	24.9	15.0	12.9	13.0	9.0	17.2	48.3	4.3	46.7	46.7
Prop In Lane	1.00		1.00	1.00		0.10	1.00		1.00	1.00		0.48
Lane Grp Cap(c), veh/h	286	1105	576	357	590	607	214	1184	677	188	572	546
V/C Ratio(X)	0.82	0.49	0.57	1.19	0.35	0.36	1.18	0.45	0.96	0.56	1.11	1.11
Avail Cap(c_a), veh/h	381	1118	581	357	590	607	214	1184	677	210	572	546
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.72	0.72	0.72	0.90	0.90	0.90	0.42	0.42	0.42
Uniform Delay (d), s/veh	65.5	40.6	36.3	65.0	36.7	36.7	68.0	38.0	39.7	66.9	49.2	49.2
Incr Delay (d2), s/veh	10.3	1.5	4.1	102.6	1.2	1.2	115.5	0.2	22.8	1.2	59.0	62.5
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	4.6	7.9	9.8	11.6	5.7	5.9	7.3	7.4	25.7	1.9	29.4	28.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	75.7	42.1	40.4	167.6	37.9	37.9	183.5	38.2	62.5	68.0	108.2	111.7
LnGrp LOS	E	D	D	F	D	D	F	D	E	E	F	F
Approach Vol, veh/h		1103			848			1437			1348	
Approach Delay, s/veh		48.8			102.7			74.7			106.6	
Approach LOS		D			F			E			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	22.0	52.5	16.0	54.5	19.0	55.5	14.4	56.1				
Change Period (Y+Rc), s	7.0	7.4	7.0	* 7.8	7.0	7.4	6.5	7.8				
Max Green Setting (Gmax), s	15.0	45.6	9.0	* 47	16.0	44.6	8.8	46.9				
Max Q Clear Time (g_c+I1), s	17.0	26.9	11.0	48.7	11.7	15.0	6.3	50.3				
Green Ext Time (p_c), s	0.0	4.3	0.0	0.0	0.3	2.3	0.1	0.0				

Intersection Summary

HCM 7th Control Delay, s/veh	82.8
HCM 7th LOS	F

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
2: Twin Oaks Valley Rd & Buena Creek Rd

Horizon Year + Project PM (Post-Mitigation)

01/26/2026



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↔		↖	↗		↖	↕	↗
Traffic Volume (veh/h)	630	0	328	5	0	0	298	787	5	0	817	570
Future Volume (veh/h)	630	0	328	5	0	0	298	787	5	0	817	570
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.98	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	692	0	360	20	0	0	343	905	6	0	869	606
Peak Hour Factor	0.91	0.91	0.91	0.25	0.25	0.25	0.87	0.87	0.87	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	749	0	612	56	0	0	267	1453	10	1	1116	921
Arrive On Green	0.39	0.00	0.39	0.39	0.00	0.00	0.15	0.78	0.78	0.00	0.60	0.60
Sat Flow, veh/h	1781	0	1555	21	0	0	1781	1855	12	1781	1870	1544
Grp Volume(v), veh/h	692	0	360	20	0	0	343	0	911	0	869	606
Grp Sat Flow(s),veh/h/ln	1781	0	1555	21	0	0	1781	0	1868	1781	1870	1544
Q Serve(g_s), s	0.0	0.0	27.4	1.2	0.0	0.0	22.5	0.0	30.9	0.0	52.5	39.1
Cycle Q Clear(g_c), s	57.8	0.0	27.4	59.0	0.0	0.0	22.5	0.0	30.9	0.0	52.5	39.1
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	749	0	612	56	0	0	267	0	1463	1	1116	921
V/C Ratio(X)	0.92	0.00	0.59	0.36	0.00	0.00	1.28	0.00	0.62	0.00	0.78	0.66
Avail Cap(c_a), veh/h	749	0	612	56	0	0	267	0	1463	210	1116	921
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.09	0.00	0.09	0.00	0.39	0.39
Uniform Delay (d), s/veh	45.1	0.0	35.9	74.8	0.0	0.0	63.7	0.0	6.9	0.0	22.8	20.1
Incr Delay (d2), s/veh	17.2	0.0	1.5	3.8	0.0	0.0	130.4	0.0	0.2	0.0	2.2	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	28.9	0.0	10.7	0.8	0.0	0.0	19.7	0.0	9.8	0.0	22.2	13.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	62.3	0.0	37.4	78.6	0.0	0.0	194.1	0.0	7.1	0.0	25.0	21.5
LnGrp LOS	E		D	E			F		A		C	C
Approach Vol, veh/h		1052			20			1254			1475	
Approach Delay, s/veh		53.8			78.6			58.2			23.6	
Approach LOS		D			E			E			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	124.4		64.1	28.0	96.4		64.1				
Change Period (Y+Rc), s	5.8	5.8		* 5.1	5.5	5.8		5.1				
Max Green Setting (Gmax), s	17.7	57.7		* 59	22.5	53.2		57.9				
Max Q Clear Time (g_c+I1), s	0.0	32.9		61.0	24.5	54.5		59.8				
Green Ext Time (p_c), s	0.0	6.9		0.0	0.0	0.0		0.0				

Intersection Summary

HCM 7th Control Delay, s/veh	43.7
HCM 7th LOS	D

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary
 12: Twin Oaks Valley Rd & San Marcos Blvd

Horizon Year + Project PM (Post-Mitigation)

01/26/2026



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	325	680	390	340	500	100	420	809	340	90	719	296
Future Volume (veh/h)	325	680	390	340	500	100	420	809	340	90	719	296
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	339	708	406	366	538	108	442	852	358	95	757	312
Peak Hour Factor	0.96	0.96	0.96	0.93	0.93	0.93	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	381	1098	626	310	845	169	334	1242	681	187	738	304
Arrive On Green	0.11	0.31	0.31	0.09	0.29	0.29	0.10	0.35	0.35	0.05	0.30	0.30
Sat Flow, veh/h	3456	3554	1532	3456	2931	586	3456	3554	1543	3456	2431	1001
Grp Volume(v), veh/h	339	708	406	366	325	321	442	852	358	95	553	516
Grp Sat Flow(s),veh/h/ln	1728	1777	1532	1728	1777	1740	1728	1777	1543	1728	1777	1655
Q Serve(g_s), s	14.0	24.9	31.1	13.0	23.1	23.3	14.0	29.7	24.6	3.9	44.0	44.0
Cycle Q Clear(g_c), s	14.0	24.9	31.1	13.0	23.1	23.3	14.0	29.7	24.6	3.9	44.0	44.0
Prop In Lane	1.00		1.00	1.00		0.34	1.00		1.00	1.00		0.60
Lane Grp Cap(c), veh/h	381	1098	626	310	512	502	334	1242	681	187	539	502
V/C Ratio(X)	0.89	0.64	0.65	1.18	0.63	0.64	1.32	0.69	0.53	0.51	1.03	1.03
Avail Cap(c_a), veh/h	381	1110	632	310	518	508	334	1242	681	198	539	502
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.76	0.76	0.76	0.83	0.83	0.83	0.57	0.57	0.57
Uniform Delay (d), s/veh	63.6	43.2	34.9	66.0	44.9	45.0	65.5	40.4	29.7	66.7	50.5	50.5
Incr Delay (d2), s/veh	21.8	2.9	5.1	104.1	4.5	4.7	162.5	1.3	0.6	1.2	36.0	37.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.2	11.2	12.1	10.1	10.6	10.5	13.6	12.9	9.0	1.7	24.3	22.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	85.4	46.2	40.0	170.1	49.5	49.7	228.0	41.7	30.3	67.9	86.5	87.9
LnGrp LOS	F	D	D	F	D	D	F	D	C	E	F	F
Approach Vol, veh/h		1453			1012			1652			1164	
Approach Delay, s/veh		53.6			93.2			89.1			85.6	
Approach LOS		D			F			F			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.0	52.2	21.0	51.8	23.0	49.2	14.3	58.5				
Change Period (Y+Rc), s	7.0	7.4	7.0	* 7.8	7.0	7.4	6.5	7.8				
Max Green Setting (Gmax), s	13.0	45.3	14.0	* 44	16.0	42.3	8.3	49.7				
Max Q Clear Time (g_c+I1), s	15.0	33.1	16.0	46.0	16.0	25.3	5.9	31.7				
Green Ext Time (p_c), s	0.0	4.8	0.0	0.0	0.0	3.3	0.0	6.5				

Intersection Summary

HCM 7th Control Delay, s/veh	79.3
HCM 7th LOS	E

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



APPENDIX N
POST-MITIGATION ARTERIAL ANALYSIS WORKSHEETS

Arterial Level of Service: NB Twin Oaks Valley Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	14	35.0	42.1	0.1	8
	13	31.6	47.9	0.1	10
San Marcos Blvd	12	23.0	36.3	0.2	18
	10	15.6	33.0	0.2	24
Borden Rd	8	37.5	73.1	0.5	23
	7	5.1	15.4	0.1	31
	5	11.1	76.2	0.9	44
E. La Cienega Road	4	16.2	53.0	0.5	35
	18	5.6	24.8	0.2	35
	16	1.4	15.6	0.2	41
Olive Street	3	7.5	16.1	0.1	29
	2	14.8	24.3	0.1	19
Twin Oaks Valley Rd	1	143.2	161.1	0.2	4
Total		347.8	618.8	3.5	21

Arterial Level of Service: SB Twin Oaks Valley Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Twin Oaks Valley Rd	1	46.7	59.8	0.1	6
Buena Creek Rd	2	60.7	77.1	0.2	9
Olive Street	3	12.3	21.8	0.1	21
	16	4.6	14.4	0.1	33
	18	1.2	14.0	0.2	46
E. La Cienega Road	4	6.5	22.4	0.2	39
Del Roy Dr	5	12.2	48.7	0.5	38
Windy Wy	7	9.5	81.8	0.9	41
Borden Rd	8	52.0	62.2	0.1	8
Richmar Road	10	34.2	69.1	0.5	24
San Marcos Blvd	12	56.9	73.0	0.2	11
SR 78 WB Ramps	13	18.3	32.1	0.2	21
SR 78 EB Ramps	14	26.1	37.2	0.1	13
Total		341.2	613.6	3.6	21

Arterial Level of Service: NB Twin Oaks Valley Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	14	68.1	300.3	0.1	4
	13	86.7	102.4	0.1	5
San Marcos Blvd	12	52.9	66.5	0.2	10
	10	33.6	50.4	0.2	16
Borden Rd	8	35.3	70.2	0.5	24
	7	7.5	18.1	0.1	26
	5	14.7	81.1	0.9	41
E. La Cienega Road	4	14.2	49.9	0.5	37
	18	5.9	25.5	0.2	34
	16	2.4	16.7	0.2	38
Olive Street	3	19.4	29.6	0.1	16
	2	32.6	41.8	0.1	11
Twin Oaks Valley Rd	1	42.3	60.3	0.2	11
Total		415.6	912.9	3.5	19

Arterial Level of Service: SB Twin Oaks Valley Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Twin Oaks Valley Rd	1	28.5	42.2	0.1	9
Buena Creek Rd	2	102.3	117.6	0.2	6
Olive Street	3	6.9	15.4	0.1	30
	16	1.7	11.5	0.1	41
	18	0.6	13.3	0.2	48
E. La Cienega Road	4	3.6	19.5	0.2	45
Del Roy Dr	5	10.3	46.5	0.5	40
Windy Wy	7	8.7	77.5	0.9	43
Borden Rd	8	42.5	52.4	0.1	9
Richmar Road	10	43.4	75.3	0.5	22
San Marcos Blvd	12	62.4	79.5	0.2	10
SR 78 WB Ramps	13	23.8	36.5	0.2	18
SR 78 EB Ramps	14	14.1	24.9	0.1	20
Total		348.8	612.2	3.6	21

Arterial Level of Service: NB Twin Oaks Valley Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	14	33.3	40.1	0.1	8
	13	28.7	44.7	0.1	11
San Marcos Blvd	12	28.1	41.4	0.2	16
	10	16.7	34.5	0.2	23
Borden Rd	8	26.6	61.5	0.5	27
	7	6.6	17.2	0.1	28
Project Driveway	6	4.7	43.7	0.6	47
	5	10.0	36.0	0.4	36
E. La Cienega Road	4	13.1	49.8	0.5	37
	18	5.2	24.4	0.2	36
	16	2.0	16.2	0.2	39
Olive Street	3	6.2	14.9	0.1	32
Buena Creek Rd	2	16.1	25.6	0.1	18
Twin Oaks Valley Rd	1	75.9	93.4	0.2	7
Total		273.1	543.5	3.5	23

Arterial Level of Service: SB Twin Oaks Valley Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Twin Oaks Valley Rd	1	50.2	63.6	0.1	6
Buena Creek Rd	2	43.9	57.7	0.2	12
Olive Street	3	9.3	18.9	0.1	24
	16	3.0	12.8	0.1	37
	18	1.1	13.9	0.2	46
E. La Cienega Road	4	6.2	22.2	0.2	39
Del Roy Dr	5	15.0	51.3	0.5	36
Project Driveway	6	7.2	36.3	0.4	36
Windy Wy	7	7.9	52.3	0.6	39
Borden Rd	8	53.6	63.8	0.1	8
Richmar Road	10	33.3	68.5	0.5	25
San Marcos Blvd	12	71.3	87.2	0.2	9
SR 78 WB Ramps	13	20.3	33.9	0.2	20
SR 78 EB Ramps	14	26.0	37.1	0.1	13
Total		348.7	619.5	3.6	21

Arterial Level of Service: NB Twin Oaks Valley Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	14	52.6	352.7	0.1	5
	13	18.7	34.7	0.1	14
San Marcos Blvd	12	33.4	47.1	0.2	14
	10	34.7	51.7	0.2	15
Borden Rd	8	36.2	71.4	0.5	24
	7	5.0	15.4	0.1	31
Project Driveway	6	4.9	45.1	0.6	45
	5	9.7	35.7	0.4	37
E. La Cienega Road	4	12.6	48.6	0.5	38
	18	5.0	24.3	0.2	36
	16	2.6	16.7	0.2	38
Olive Street	3	17.3	27.4	0.1	18
Buena Creek Rd	2	31.2	40.5	0.1	11
Twin Oaks Valley Rd	1	44.9	63.3	0.2	11
Total		308.7	874.6	3.5	22

Arterial Level of Service: SB Twin Oaks Valley Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Twin Oaks Valley Rd	1	28.0	41.6	0.1	9
Buena Creek Rd	2	104.5	119.9	0.2	6
Olive Street	3	13.6	22.7	0.1	20
	16	2.5	12.3	0.1	38
	18	0.9	13.7	0.2	46
E. La Cienega Road	4	5.0	21.3	0.2	41
Del Roy Dr	5	14.0	50.3	0.5	37
Project Driveway	6	9.0	37.9	0.4	35
Windy Wy	7	9.6	52.4	0.6	39
Borden Rd	8	35.3	45.3	0.1	11
Richmar Road	10	46.2	79.7	0.5	21
San Marcos Blvd	12	80.1	97.0	0.2	8
SR 78 WB Ramps	13	20.2	33.4	0.2	20
SR 78 EB Ramps	14	14.0	25.0	0.1	19
Total		383.0	652.6	3.6	20



END OF APPENDICES