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November 24, 2021

Mr. Abe Bandegan
City of Encinitas
Development Services Department
505 South Vulcan Avenue
Encinitas, CA 92024

SUBJECT: LA COSTA AVENUE AND VULCAN AVENUE ANALYSIS, ENCINITAS, CA (RICK ENGINEERING COMPANY JOB NUMBER 19349-A)

Dear Mr. Bandegan:

The following study was prepared to evaluate the feasibility of intersection control and corridor improvements along La Costa Avenue between North Coast Highway 101 and Interstate 5 (I-5), and traffic calming improvements along Vulcan Avenue between La Costa Avenue and Encinitas Boulevard in the City of Encinitas. **Exhibit 1** following this letter illustrates the project vicinity map.

Introduction

The La Costa Avenue study corridor consists of the following intersections:

- La Costa Avenue / North Coast Highway 101 (Currently Signalized)
- La Costa Avenue / Vulcan Avenue (Currently All-Way-Stop Controlled)
- La Costa Avenue / Sheridan Road (Currently Two-Way-Stop Controlled)

The intersection control alternatives that were evaluated in this study are limited to the La Costa Avenue / Vulcan Avenue and La Costa Avenue / Sheridan Road intersections, in which the two intersections were analyzed with all-way-stop control, signalization, and as roundabouts. The two intersections were also analyzed without and with a potential center two-way left-turn lane between Vulcan Avenue and I-5. Although the La Costa Avenue / North Coast Highway 101 intersection was included in the analysis of the intersection control alternatives, there are no plans to change the existing intersection control (traffic signal).

Below is a list of the intersection control and roadway improvement alternatives along the La Costa Avenue study corridor that were evaluated for the study intersections:

- Existing Volumes/Intersection Controls
- Existing Volumes/Intersection Controls With Two-Way Left-Turn Lane
- Existing Volumes With All-Way-Stop Control: Without Two-Way Left-Turn Lane
- Existing Volumes With All-Way-Stop Control: With Two-Way Left-Turn Lane
- Existing Volumes With Traffic Signals: Without Two-Way Left-Turn Lane
- Existing Volumes With Traffic Signals: With Two-Way Left-Turn Lane
- Existing Volumes With Roundabouts: Without or With Two-Way Left-Turn Lane

Because the roundabouts would have a signal entry lane on the La Costa Avenue intersection approaches regardless of whether or not a two-way left-turn lane is constructed, the roundabouts alternative for the study intersections would have the same results either without or with a two-way left-turn lane.

Daily roadway segment operations were also evaluated for the following segments along La Costa Avenue:

- La Costa Avenue between North Coast Highway 101 and Vulcan Avenue
- La Costa Avenue between Vulcan Avenue and Sheridan Road
- La Costa Avenue between Sheridan Road and I-5 Southbound Ramps

The above-listed roadway segments were evaluated with the existing average daily traffic (ADT) volumes with the current lane configuration (one lane in each direction without left-turn lanes), and with a two-way left-turn lane between Vulcan Avenue and I-5. The segment of La Costa Avenue between North Coast Highway 101 and Vulcan Avenue was only evaluated with the current lane configuration.

This study also evaluated the potential need to implement additional traffic calming measures to the measures that are currently identified in the Vulcan Avenue Safety and Mobility Enhancements project, which includes narrowing the roadway, providing a pedestrian pathway and installation of three raised crosswalks and rectangular rapid flashing beacons (RRFBs) along Vulcan Avenue between La Costa Avenue and Encinitas Boulevard.

Analysis Methodology

Level of service (LOS) operations at the study intersections with the intersection control and roadway improvement alternatives were evaluated using the 6th Edition Highway Capacity Manual (HCM-6) methodology. The SYNCHRO 11 software program was utilized as an interface for the HCM-6 method for the analysis of the stop-controlled and signalized intersection alternatives. The SimTraffic application within SYNCHRO was utilized to evaluate the 95th percentile queue lengths for the stop-controlled and signalized intersection alternatives.

The SIDRA software program was used to evaluate the study intersections based on the HCM-6 methodology for the roundabout alternative, and the 95th percentile queue lengths for the roundabout alternative were also evaluated using SIDRA.

The SimTraffic application within the SYNCHRO 11 software program was also used to perform an arterial analysis of La Costa Avenue between North Coast Highway 101 and the I-5 Southbound Ramps for all intersection and roadway improvement alternatives including the roundabout alternative. The arterial analysis is based on the methodology in Chapter 16 of the 6th Edition Highway Capacity Manual (HCM-6). LOS is determined based on vehicular speed through a roadway corridor relative to its free-flow speed, and is calculated based on travel time and delay through the intersections along the corridor, including the intersections at either end of the corridor. The posted 35 mph speed limit on La Costa Avenue is used as the free-flow speed for the arterial analysis.

The roadway segment analysis for the La Costa Avenue study corridor was performed based on the existing daily traffic volume, the volume-to-capacity (v/c) ratios and the daily LOS capacity thresholds in the City's General Plan Circulation Element. The segment of La Costa Avenue between North Coast Highway 101 and the I-5 Southbound Ramps is classified as a four-lane Collector, but is currently built as a two-lane Local Roadway. Therefore, the La Costa Avenue study corridor is analyzed as a two-lane Local Roadway under Existing Conditions, and is analyzed as a two-lane Augmented Local Roadway with a two-way left-turn lane between Vulcan Avenue and I-5 Southbound Ramps.

Existing Roadway and Intersection Conditions

The following is a brief description of the roadways and intersections within the study area as identified in the *City of Encinitas Circulation Element* (November 28, 2018) where applicable:

La Costa Avenue is classified as a four-lane Collector in the *City of Encinitas Circulation Element* from North Coast Highway to the I-5 Southbound Ramps, but is currently built with the capacity of a two-lane Local Street. The pavement width of La Costa Avenue varies from 28 feet to 40 feet. The posted speed limit on the roadway is 35 miles per hour (mph). A buffered bike lane is provided on the north side of the roadway and a bike lane and pedestrian-only on-street path are provided on the south side of the roadway from Vulcan Avenue to the I-5 Southbound Ramps. Sidewalks are not provided and on-street parking is not permitted on either side of the roadway between North Coast Highway 101 and the I-5 Southbound Ramps.

Vulcan Avenue is classified as an Augmented Local Street (two lanes with left-turn lanes) in the *City of Encinitas Circulation Element* from La Costa Avenue to Encinitas Boulevard, is currently built as a two-lane Local Street. The pavement width of Vulcan Avenue varies from 24 feet to 40 feet. The posted speed limit on the roadway is 35 miles per hour (mph) between La Costa Avenue and Leucadia Boulevard and is 30 mph between Leucadia Boulevard and Encinitas Boulevard. On-street parking is permitted in designated locations where the roadway width can accommodate on-street parking. Short sections of sidewalk are provided in various locations along the east side of the roadway.

La Costa Avenue / North Coast Highway 101 is currently constructed as a signalized intersection. The northbound approach currently provides one dedicated left-turn lane, two through lanes, one dedicated right-turn lane, and a bike lane; The southbound approach currently provides one dedicated left-turn lane, two through lanes, one dedicated right-turn lane; the eastbound approach currently provides one shared left-thru lane and one dedicated right-turn lane; and the westbound approach currently provides one shared left-thru lane and one dedicated right-turn lane. There are crosswalks provided on the south leg and the east leg of the intersection.

La Costa Avenue / Vulcan Avenue is currently constructed as an all-way stop controlled intersection. The northbound approach currently provides one dedicated left-turn lane and one dedicated right-turn lane; The southbound approach is a residential driveway with one shared left-thru-right lane; the eastbound approach currently provides one shared left-thru-right lane; and the westbound approach currently provides one shared left-thru-right lane. There is a continental crosswalk provided on the south leg of the intersection. The north side of the roadway currently provides a buffered bike lane and the southside of the roadway currently provides a bike lane and a pedestrian-only on-street path.

La Costa Avenue / Sheridan Road is currently constructed as a one-way stop-controlled intersection. The northbound approach currently provides one shared left-thru-right lane; The southbound approach is offset by approximately 60 feet west and currently provides one shared left-thru-right lane; the eastbound approach currently provides one shared left-thru-right lane; and the westbound approach currently provides one shared left-thru-right lane. The north side of the roadway currently provides a buffered bike lane and the southside of the roadway currently provides a bike lane and a pedestrian-only on-street path.

La Costa Avenue / I-5 Southbound Ramps is currently constructed as a signalized intersection. The southbound approach currently provides one dedicated left-turn lane, one shared thru-right lane, and one dedicated right-turn lane; the eastbound approach currently provides two through lanes; and the westbound approach currently provides two left-turn lanes and two through lanes. There is a crosswalk provided on the south leg of the intersection.

Existing Traffic Volumes

Intersection turning movement counts were collected at the following three study intersections during the AM (7-9am) and PM (4-6pm) peak periods on Thursday, September 23, 2021:

- La Costa Avenue / North Coast Highway 101
- La Costa Avenue / Vulcan Avenue
- La Costa Avenue / Sheridan Road

Average daily traffic (ADT) counts were also collected over a 24-hour period along the following three study roadway segments on Thursday, September 23, 2021:

- La Costa Avenue between Coast Highway 101 and Vulcan Avenue
- La Costa Avenue between Vulcan Avenue and Sheridan Road
- La Costa Avenue between Sheridan Road and I-5

Although many people have returned to working outside of their homes in the last few months, it is likely that commuter traffic patterns have not returned to the pre-COVID traffic conditions prior to March 2020. As a result, the new traffic counts were compared against historical pre-COVID counts that were collected on May 16, 2019 at the following intersections and roadway segments:

2019 Turning Movement Counts
- La Costa Avenue / North Coast Highway 101
- La Costa Avenue / Vulcan Avenue
- La Costa Avenue / I-5 Southbound Ramp (no 2021 counts to compare against)

2019 ADT Counts
- La Costa Avenue between Vulcan Avenue and North Coast Highway 101
- La Costa Avenue between Vulcan Avenue and Seabreeze Court
- La Costa Avenue between Seabreeze Court and I-5 Southbound Ramps

The comparison between the 2019 and 2021 counts revealed that overall intersection volumes had increased 6% from 2019 to 2021, and overall roadway segment volumes had increased 7% from 2019 to 2021. However, the increase in the overall intersection volumes were limited to the PM peak hour, while AM peak hour volumes at the La Costa Avenue / North Coast Highway 101 and La Costa Avenue / Vulcan Avenue intersections had decreased from 2019 to 2021.

Turning movement volumes during the AM peak hour were adjusted at the La Costa Avenue / North Coast Highway 101 and La Costa Avenue / Vulcan Avenue intersections to provide an overall 6% growth from 2019 to 2021. AM peak hour link volumes on La Costa Avenue between Vulcan Avenue and Sheridan Road were also adjusted to reflect 6% growth on the through movement volumes on La Costa Avenue at the intersection with Sheridan Road. In addition, the 2019 turning movement counts at the La Costa Avenue / I-5 Southbound Ramps intersection were adjusted upward by 6% to be consistent with the other intersections.

The adjusted 2021 traffic volumes are illustrated in **Exhibit 2** following this letter. The 2019 and 2021 traffic counts, and the growth adjustment calculations are provided in **Appendix A**.

Intersection Control and Roadway Alternatives

As previously presented, the following intersection control alternatives were evaluated for the La Costa Avenue / Vulcan Avenue and La Costa Avenue / Sheridan Road intersections:

- Existing Intersection Controls
  - All-Way Stop Control at La Costa Avenue / Vulcan Avenue
  - Two-Way Stop Control at La Costa Avenue / Sheridan Road
- All-Way Stop Control at both intersections
  - La Costa Avenue / Vulcan Avenue intersection control same as existing
- Traffic Signals at both intersections
- Roundabouts at both intersections

In addition, each of the intersection control alternatives was evaluated with both the existing cross-section of the La Costa Avenue corridor and with a center two-way left-turn lane along La Costa Avenue between Vulcan Avenue and the I-5 Southbound Ramps.

The following exhibits, which are provided following this letter, illustrate the intersection control and roadway alternatives along the La Costa corridor as described above:

- **Exhibit 3**: Existing Intersection Controls along La Costa Avenue Corridor – Without and With Two-Way Left-Turn Lane
- **Exhibit 4**: All-Way Stop Control along La Costa Avenue Corridor – Without and With Two-Way Left-Turn Lane
- **Exhibit 5**: Traffic Signals along La Costa Avenue Corridor – Without and With Two-Way Left-Turn Lane
- **Exhibit 6**: Roundabouts along La Costa Avenue Corridor – Without and With Two-Way Left-Turn Lane

Intersection Level of Service Operations Analysis

Levels of service (LOS) were evaluated at the study intersections for the weekday AM and PM peak hours. The weekday AM intersection analysis evaluates LOS during the hour with the highest vehicular traffic between 7:00 AM and 9:00 AM. The weekday PM intersection analysis evaluates LOS during the hour with the highest vehicular traffic between 4:00 PM and 6:00 PM.

Intersection operations were analyzed with SYNCHRO 11 software (Trafficware) utilizing the methodologies outlined in the *Highway Capacity Manual 6th Edition (HCM 6)*. Synchro reports delays, which correspond to a particular LOS, to describe the overall operation of an intersection.

The three study intersections were evaluated with the existing intersection controls and with each of the intersection control alternatives, and also with both the existing cross-section and with a center two-way left-turn lane on La Costa Avenue between Vulcan Avenue and the I-5 Southbound Ramps.

The two-way left-turn lane scenario would include a westbound left-turn lane at the La Costa Avenue / Vulcan Avenue intersection, and both eastbound and westbound left-turn lanes at the La Costa Avenue / Sheridan Road intersection.

Table 1 displays the LOS analysis results for the study intersections under each intersection control alternative without and with a two-way left-turn lane on La Costa Avenue. **Appendix B** contains the intersection LOS worksheets.

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Table 1
Intersection LOS Operations With Intersection Control Alternatives
Without and With Two-Way Left-Turn Lane

Intersection	Intersection Control	Peak Hour	With Existing Cross-Section on La Costa Ave		With TWLTL on La Costa Ave	
			Delay[1]	LOS	Delay[1]	LOS
With Existing Intersection Controls						
La Costa Avenue / N. Coast Highway 101	Signal	AM	27.2	C	27.2	C
		PM	31.5	C	31.5	C
La Costa Avenue / Vulcan Avenue	AWSC	AM	**57.5**	**F**	**47.9**	**E**
		PM	**36.2**	**E**	31.4	D
La Costa Avenue / Sheridan Road	TWSC[2]	AM	**42.0**	**E**	**40.5**	**E**
		PM	27.6	D	27.2	D
With All-Way Stop Control at Both La Costa/Vulcan and La Costa/Sheridan						
La Costa Avenue / N. Coast Highway 101	Signal	AM	Same as with existing intersection controls			
		PM	Same as with existing intersection controls			
La Costa Avenue / Vulcan Avenue	AWSC	AM	Same as with existing intersection controls			
		PM	Same as with existing intersection controls			
La Costa Avenue / Sheridan Road	AWSC	AM	**54.5**	**F**	**63.1**	**F**
		PM	**50.4**	**F**	**57.4**	**F**
With Traffic Signals at Both La Costa/Vulcan and La Costa/Sheridan						
La Costa Avenue / N. Coast Highway 101	Signal	AM	31.4	C	32.6	C
		PM	37.8	D	37.9	D
La Costa Avenue / Vulcan Avenue	Signal	AM	9.1	A	20.3	C
		PM	9.4	A	22.4	C
La Costa Avenue / Sheridan Road	Signal	AM	9.4	A	15.6	B
		PM	10.0	A	16.1	B
With Roundabouts at Both La Costa/Vulcan and La Costa/Sheridan						
La Costa Avenue / N. Coast Highway 101	Signal	AM	Same as with existing intersection controls			
		PM	Same as with existing intersection controls			
La Costa Avenue / Vulcan Avenue	Roundabout	AM	10.7	B	-	-
		PM	8.2	A	-	-
La Costa Avenue / Sheridan Road	Roundabout[3]	AM	8.5	A	-	-
		PM	8.1	A	-	-

FOOTNOTES:
Deficient LOS and delay indicated in **bold**.
AWSC = All-Way Stop Control; TWSC = Two-Way Stop Control
[1]Delay is measured in seconds per vehicle.
[2]Delay and LOS being reported for the TWSC control type are taken from the movement with the worst delay.
[3]Because the roundabouts would have a single entry lane on the La Costa Avenue intersection approaches regardless of whether or not a two-way left-turn lane was constructed, the intersection operations analysis results are anticipated to be the same and therefore were only shown once in Table 1.

As shown in Table 1, the La Costa Avenue / Vulcan Avenue intersection currently operates at LOS F during the AM peak hour and operates at LOS E during the PM peak hour. The La Costa Avenue / Sheridan Road intersection currently operates at LOS E during the AM peak hour.

If a two-way left-turn lane was constructed along the La Costa Avenue study corridor, intersection operations at the La Costa Avenue / Vulcan Avenue intersection are anticipated to improve to LOS E during the AM peak hour and are anticipated to improve to LOS D during the PM peak hour. At the La Costa Avenue / Sheridan Road intersection, AM peak hour operations are anticipated to remain at LOS E if a two-way left-turn lane was constructed.

If all-way stop control was implemented at the La Costa Avenue / Sheridan Road intersection, operations are anticipated to worsen to LOS F during both the AM and PM peak hours. If a two-way left-turn lane was constructed along the La Costa Avenue study corridor, the La Costa Avenue / Sheridan Road intersection is anticipated to also operate at LOS F during the AM and PM peak hours with all-way stop control.

If traffic signals were installed at the La Costa Avenue / Vulcan Avenue and La Costa Avenue / Sheridan Road intersections based on the existing lane configuration on La Costa Avenue, both intersections are anticipated to operate at LOS A during both the AM and PM peak hours, assuming permitted left-turn phasing on the La Costa Avenue approaches at both intersections. If a two-way left-turn lane was constructed along the La Costa Avenue study corridor, the La Costa Avenue / Vulcan Avenue intersection is anticipated to operate at LOS C during the AM and PM peak hours due to the longer cycle length needed to provide a protected left-turn phase for the dedicated westbound left-turn lane that would be provided at the intersection. The La Costa Avenue / Sheridan Road intersection is anticipated to operate at LOS B during both the AM and PM peak hours if a two-way left-turn lane was constructed along La Costa Avenue.

If single-lane roundabouts were constructed at the La Costa Avenue / Vulcan Avenue and La Costa Avenue / Sheridan Road intersections, the La Costa Avenue / Vulcan Avenue intersection is anticipated to operate at LOS B or better during the AM and PM peak hours, and the La Costa Avenue / Sheridan Road intersection is anticipated to operate at LOS A during the AM and PM peak hours. Because the roundabouts would have a single entry lane on the La Costa Avenue intersection approaches regardless of whether or not a two-way left-turn lane is constructed, the intersection analysis results are anticipated to be the same and therefore were only shown once in Table 1.

Table 1 shows that the La Costa Avenue / North Coast Highway 101 intersection currently operates at LOS C during both the AM and PM peak hours. Operations are anticipated to remain the same at the La Costa Avenue / North Coast Highway 101 intersection under the other intersection control alternatives except for the traffic signal alternative for the La Costa Avenue / Vulcan Avenue and La Costa Avenue / Sheridan Road intersections.

If a traffic signal was installed at the La Costa Avenue / Vulcan Avenue intersection, it was assumed in the operations analysis that the traffic signal would be coordinated with the existing traffic signal at the La Costa Avenue / North Coast Highway 101 intersection due to the close spacing between the two intersections (approximately 475 feet). Specifically, it was assumed that the southbound left-turn phase at the La Costa Avenue / North Coast Highway 101 intersection would be coordinated with the eastbound through phase at the La Costa Avenue / Vulcan Avenue intersection to reduce the instances of eastbound queues spilling back over the bridge and impacting signal operations from the southbound left-turn lane at the La Costa Avenue / North Coast Highway 101 intersection.

As previously discussed, the La Costa Avenue / Vulcan Avenue intersection is anticipated to operate at LOS A during the peak hours without a dedicated westbound left-turn lane, and is anticipated to operate at LOS C with a dedicated westbound left-turn lane. This is because permitted left-turn phasing was assumed for the westbound left-turn movement and because a half-cycle length of 60 seconds was used for the La Costa Avenue / Vulcan Avenue intersection, whereas a cycle length of 120 seconds was used for the La Costa Avenue / North Coast Highway 101 intersection. If a dedicated westbound left-turn lane was constructed at the La Costa Avenue / Vulcan Avenue intersection , it was assumed that protected left-turn phasing would be implemented, which would require the full 120 cycle length for signal coordination with the La Costa Avenue / North Coast Highway 101 intersection, and the longer cycle length is anticipated to result in a longer delay despite the increase in lane capacity at the intersection.

Table 1 also shows that if a traffic signal was installed at the La Costa Avenue / Vulcan Avenue intersection, average delay at the La Costa Avenue / North Coast Highway 101 intersection is anticipated to increase to LOS D operations during the PM peak hour as a result of the signal coordination with the La Costa Avenue / Vulcan Avenue intersection.

Intersection Queuing Analysis

A queuing analysis was performed for the three study intersections with the existing intersection controls and with each of the intersection control alternatives, and also with both the existing cross-section and with a center two-way left-turn lane on La Costa Avenue between Vulcan Avenue and the I-5 Southbound Ramps.

The SimTraffic application within the SYNCHRO 11 software program was used to conduct the queuing analysis at the study intersections except for the roundabout alternative. The SIDRA software program was used to evaluate the La Costa Avenue / Vulcan Avenue and La Costa Avenue / Sheridan Road intersections for the roundabout alternative. The queuing analysis results are based on the 95th percentile queue lengths in feet for each approach or turning movement. The SimTrafffic/SYNCHRO software program assumes a queue length of 25 feet per vehicle.

The results of the queuing analysis with the existing cross-section on La Costa Avenue are shown in **Table 2**. The SimTraffic and SIDRA queuing worksheets are provided in **Appendix C.**

Table 2 shows the following results for each of the intersection control alternatives without a two-way left-turn lane on La Costa Avenue between Vulcan Avenue and I-5:

- The 95th percentile queue lengths in the westbound right-turn lane at the signalized La Costa Avenue / North Coast Highway 101 intersection currently exceed the available storage length during both the AM and PM peak hours.
- The 95th percentile queue length in the eastbound shared through/right-turn lane at the all-way stop controlled La Costa Avenue / Vulcan Avenue intersection currently extends nearly the entire stacking distance between Vulcan Avenue and North Coast Highway 101 (450 feet) during the AM peak hour.
- If all-way stop control is implemented at the La Costa Avenue / Sheridan Road intersection, the 95th percentile queue lengths in the eastbound and westbound through lanes are anticipated to increase considerably since these movements are currently uncontrolled, but the queue lengths are not anticipated to exceed 8-9 vehicles during the AM and PM peak hours.
- If a traffic signal was installed at the La Costa Avenue / Vulcan Avenue intersection, the 95th percentile queue length in the eastbound shared through/right-turn lane is anticipated to decrease by 5-6 vehicles during the AM peak hour, but the 95th percentile queue length in the westbound shared left-turn/through lane is anticipated to increase by 3-4 vehicles during the AM peak hour. During the PM peak hour, the 95th percentile queue length in the eastbound shared through/right-turn lane is anticipated to decrease by 4-5 vehicles, and the 95th percentile queue length in the westbound shared left-turn/through lane is anticipated to increase by 3-4 vehicles.

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Table 2
Intersection Queue Lengths With Intersection Control Alternatives
Without Two-Way Left-Turn Lane

Intersection	Intersection Control	Lane/ Movement	No. of Lanes / Storage Length (feet)	AM Peak Hour		PM Peak Hour	
				Volume	95% Queue Length (feet)	Volume	95% Queue Length (feet)
With Existing Intersection Controls							
La Costa Avenue / N. Coast Highway 101	Signal	WB Left/Through	1 / 475'[1]	335	194'	237	262'
		WB Right	1 / 110'	79	**165'**	274	**157'**
		SB Left	1 / 245'	359	241'	262	159'
La Costa Avenue / Vulcan Avenue	AWSC	EB Through/Right	1 / 450'[2]	609	425'	440	230'
		WB Left/Through	1 / NA	610	333'	580	203'
La Costa Avenue / Sheridan Road	TWSC	EB Left/Through/Right	1 / NA	601	4'	556	1'
		WB Left/Through/Right	1 / NA	666	80'	609	80'
With All-Way Stop Control at Both La Costa/Vulcan and La Costa/Sheridan							
La Costa Avenue / N. Coast Highway 101	Signal	Queues same as with existing intersection controls					
La Costa Avenue / Vulcan Avenue	AWSC	Queues same as with existing intersection controls					
La Costa Avenue / Sheridan Road	AWSC	EB Left/Through/Right	1 / NA	601	66'	556	79'
		WB Left/Through/Right	1 / NA	666	244'	609	221'
With Traffic Signals at Both La Costa/Vulcan and La Costa/Sheridan							
La Costa Avenue / N. Coast Highway 101	Signal	WB Left/Through	1 / 475'[1]	335	288'	237	311'
		WB Right	1 / 110'	79	**121'**	274	**121'**
		SB Left	1 / 245'	359	**296'**	262	**300'**
La Costa Avenue / Vulcan Avenue	Signal	EB Through/Right	1 / 450'[2]	609	277'	440	113'
		WB Left/Through	1 / NA	610	426'	580	301'
La Costa Avenue / Sheridan Road	Signal	EB Left/Through/Right	1 / NA	601	43'	556	116'
		WB Left/Through/Right	1 / NA	666	297'	609	120'
With Roundabouts at Both La Costa/Vulcan and La Costa/Sheridan							
La Costa Avenue / N. Coast Highway 101	Signal	Queues same as with existing intersection controls					
La Costa Avenue / Vulcan Avenue	Roundabout	EB Through/Right	1 / 450'[2]	609	219'	440	75'
		WB Left/Through	1 / NA	610	119'	580	89'
La Costa Avenue / Sheridan Road	Roundabout	EB Left/Through/Right	1 / NA	601	113'	556	93'
		WB Left/Through/Right	1 / NA	666	112'	609	113'

NOTE: Queuing analysis conducted using SimTraffic application of Synchro 11 software program for TWSC, AWSC and signal alternatives. The SIDRA software program was used to conduct the queuing analysis for the roundabout alternative.

Queue length exceeding existing storage length indicated in **bold**.

NA = Not Applicable

AWSC = All-Way Stop Control; TWSC = Two-Way Stop Control

[1]Stacking distance between Vulcan Avenue and North Coast Highway 101 in the westbound direction.

[2]Stacking distance between North Coast Highway 101 and Vulcan Avenue in the eastbound direction.

- If a traffic signal was installed at the La Costa Avenue / Vulcan Avenue intersection, the 95th percentile queue length is anticipated to exceed the existing storage length of the southbound left-turn lane at the La Costa Avenue / North Coast Highway 101 intersection by 2-3 vehicles during both the AM and PM peak hours as a result of signal coordination with the La Costa Avenue / Vulcan Avenue intersection.
- If a traffic signal was installed at the La Costa Avenue / Sheridan Road intersection, the 95th percentile queue lengths are anticipated to range from 2 vehicles in the eastbound shared left-turn/through/right-turn lane to 12 vehicles in the westbound shared left-turn/through/right-turn lane during the AM peak hour. During the PM peak hour, the 95th percentile queue lengths in both the eastbound and westbound shared left-turn/through/right-turn lanes are not anticipated to exceed 5 vehicles.
- If a roundabout was installed at the La Costa Avenue / Vulcan Avenue intersection, the 95th percentile queue length in the eastbound shared through/right-turn lane is not anticipated to exceed 8-9 vehicles in length during the AM peak hour, and is not anticipated to exceed 3 vehicles during the PM peak hour. The 95th percentile queue length in the westbound shared left-turn/through lane is not anticipated to exceed 3-4 vehicles during the AM and PM peak hours.
- If a roundabout was installed at the La Costa Avenue / Sheridan Road intersection, the 95th percentile queue lengths in the eastbound and westbound through lanes are not anticipated to exceed 5-6 vehicles during the AM and PM peak hours.

Table 3 presents the queuing analysis results with a center two-way left-turn lane on La Costa Avenue. The SimTraffic and SIDRA queuing worksheets are provided in Appendix C**.**

Table 3 shows the following results for each of the intersection control alternatives if a two-way left-turn lane was constructed on La Costa Avenue between Vulcan Avenue and I-5:

- If a two-way left-turn lane was constructed on La Costa Avenue with the existing intersection controls, the 95th percentile queue length in the eastbound shared through/right-turn lane at the current all-way stop controlled La Costa Avenue / Vulcan Avenue intersection is anticipated to decrease by 6 vehicles during the AM peak hour, and the 95th percentile queue length in the westbound through lane is anticipated to decrease by 10 vehicles during the AM peak hour. The 95th percentile queue lengths during the PM peak hour are anticipated to decrease by 2 vehicles in both the eastbound and westbound through lanes of the La Costa Avenue / Vulcan Avenue intersection if a two-way left-turn lane was constructed.
- If all-way stop control was implemented at the La Costa Avenue / Sheridan Road intersection and if a two-way left-turn lane was constructed on La Costa Avenue, the 95th percentile queue lengths in the eastbound and westbound through lanes are not anticipated to exceed 8-9 vehicles in length during the AM and PM peak hours.
- If a traffic signal was installed at the La Costa Avenue / Vulcan Avenue intersection and if a two-way left-turn lane was constructed on La Costa Avenue, the 95th percentile queue length in the eastbound shared through/right-turn lane is anticipated to decrease by 5-6 vehicles during the AM peak hour, and is anticipated to decrease by 2-3 vehicles during the PM peak hour. The 95th percentile queue length of the westbound through lane of the La Costa Avenue / Vulcan Avenue intersection is anticipated to increase by 8-9 vehicles during the AM peak hour, and is anticipated to increase by 4-5 vehicles during the PM peak hour.
- If a traffic signal was installed at the La Costa Avenue / Vulcan Avenue intersection and if a two-way left-turn lane was constructed on La Costa Avenue, the 95th percentile queue length in the westbound shared left-turn/through lane at the La Costa Avenue / North Coast Highway 101 intersection is anticipated to exceed the available stacking distance between North Coast Highway 101 and Vulcan Avenue by 1-2 vehicles during the AM peak hour.

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Table 3
Intersection Queue Lengths With Intersection Control Alternatives
With Two-Way Left-Turn Lane

Intersection	Intersection Control	Lane/ Movement	No. of Lanes / Storage Length (feet)	AM Peak Hour		PM Peak Hour	
				Volume	95% Queue Length (feet)	Volume	95% Queue Length (feet)
With Existing Intersection Controls - With TWLTL							
La Costa Avenue / N. Coast Highway 101	Signal	Queues same as with existing intersection controls					
La Costa Avenue / Vulcan Avenue	AWSC	EB Through/Right	1 / 450'[2]	609	272'	440	198'
		WB Left	1 /NA[3]	240	78'	111	95'
		WB Through	1 / NA	370	84'	469	148'
La Costa Avenue / Sheridan Road	TWSC	EB Left	1 /NA[3]	3	0'	6	0'
		WB Left	1 /NA[3]	43	45'	42	30'
With All-Way Stop Control at Both La Costa/Vulcan and La Costa/Sheridan - With TWLTL							
La Costa Avenue / N. Coast Highway 101	Signal	Queues same as with existing intersection controls					
La Costa Avenue / Vulcan Avenue	AWSC	Queues same as with existing intersection controls					
La Costa Avenue / Sheridan Road	AWSC	EB Left	1 /NA[3]	3	0'	6	0'
		EB Through/Right	1 / NA	598	50'	550	51'
		WB Left	1 /NA[3]	43	93'	42	81'
		WB Through/Right	1 / NA	623	289'	567	216'
With Traffic Signals at Both La Costa/Vulcan and La Costa/Sheridan - With TWLTL							
La Costa Avenue / N. Coast Highway 101	Signal	WB Left/Through	1 / 475'[1]	335	**506'**	237	303'
		WB Right	1 / 110'	79	**168'**	274	**161'**
		SB Left	1 / 245'	359	**310'**	262	**309'**
La Costa Avenue / Vulcan Avenue	Signal	EB Through/Right	1 / 450'[2]	609	281'	440	159'
		WB Left	1 /NA[3]	240	130'	111	138'
		WB Through	1 / NA	370	550'	469	314'
La Costa Avenue / Sheridan Road	Signal	EB Left	1 /NA[3]	3	0'	6	0'
		EB Through/Right	1 / NA	598	157'	550	134'
		WB Left	1 /NA[3]	43	56'	42	39'
		WB Through/Right	1 / NA	623	256'	567	201'

NOTE: Queuing analysis conducted using SimTraffic application of Synchro 11 software program.

Queue length exceeding existing storage length indicated in **bold**.

NA = Not Applicable

AWSC = All-Way Stop Control; TWSC = Two-Way Stop Control

[1]Stacking distance between Vulcan Avenue and North Coast Highway 101 in the westbound direction.

[2]Stacking distance between North Coast Highway 101 and Vulcan Avenue in the eastbound direction.

[3]Left-turn movement would be provided within two-way left-turn lane.

[4]Because the roundabouts would have a single entry lane on the La Costa Avenue intersection approaches regardless of whether or not a two-way left-turn lane was constructed, the queuing analysis results are anticipated to be the same and therefore were only shown in Table 2.

- If a traffic signal was installed at the La Costa Avenue / Vulcan Avenue intersection and if a two-way left-turn lane was constructed on La Costa Avenue, the 95th percentile queue length is anticipated to exceed the existing storage length of the southbound left-turn lane at the La Costa Avenue / North Coast Highway 101 intersection by 2-3 vehicles during both the AM and PM peak hours as a result of signal coordination with the La Costa Avenue / Vulcan Avenue intersection.
- If a traffic signal was installed at the La Costa Avenue / Sheridan Road intersection and if a two-way left-turn lane was constructed on La Costa Avenue, the 95th percentile queue lengths in the eastbound and westbound through lanes are not anticipated to exceed 10 vehicles during the AM and PM peak hours.

Because the roundabouts would have a single entry lane on the La Costa Avenue intersection approaches regardless of whether or not a two-way left-turn lane was constructed, the queuing analysis results are anticipated to be the same and therefore were only shown in Table 2.

Arterial Corridor Analysis

An arterial analysis was performed for the La Costa Avenue corridor between North Coast Highway 101 and the I-5 Southbound Ramps during the AM and PM peak hours with the existing intersection controls and with each of the traffic control alternatives, and also with both the existing cross-section and with a center two-way left-turn lane on La Costa Avenue between Vulcan Avenue and the I-5 Southbound Ramps.

The SimTraffic application within the SYNCHRO 11 software program was used to conduct the arterial analysis for all traffic control and improvement alternatives, based on the methodology in Chapter 16 of the 6th Edition Highway Capacity Manual (HCM-6). The posted speed limit of 35 mph is used as the free-flow speed along the La Costa Avenue study corridor. Below are the LOS thresholds used in the arterial analysis based on a free-flow speed of 35 mph, per Exhibit 16-3 in Chapter 16 of the 6th Edition Highway Capacity Manual (HCM-6):

- LOS A = 29 mph or higher
- LOS B = 24 to 28 mph
- LOS C = 19 to 23 mph
- LOS D = 15 to 18 mph
- LOS E = 12 to 14 mph
- LOS F = 11 mph or lower

The results of the arterial analysis for all intersection control and roadway alternatives are shown in **Table 4**. The SimTraffic analysis worksheets are provided in **Appendix D.**

As shown in Table 4, the existing arterial operations along the La Costa Avenue corridor are at LOS D or better in both directions during the AM peak hour, but operations are at LOS E during the PM peak hour in the eastbound direction. If a two-way left-turn lane was constructed along the La Costa Avenue corridor, arterial operations with the existing intersection controls are anticipated to improve to LOS C in both directions during the AM peak hour, and are anticipated to improve to LOS D or better in both directions during the PM peak hour.

If all-way stop control was implemented at the La Costa Avenue / Sheridan Road intersection, arterial operations are anticipated to remain at LOS D or better in both directions during the AM peak hour, and are anticipated to remain at LOS E in the eastbound direction during the PM peak hour. If a two-way left-turn lane was constructed along the La Costa Avenue corridor, arterial operations with all-way stop control at both intersections are anticipated to improve to LOS C in both directions during the AM peak hour, and are anticipated to remain at LOS E in the eastbound direction during the PM peak hour.

Table 4
Arterial Corridor Operations With Intersection Control Alternatives
Without and With Two-Way Left-Turn Lane

Arterial Corridor	Intersection Control Alternative	Direction	With Existing Cross-Section on La Costa Ave				With TWLTL on La Costa Ave			
			AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
			Speed (mph)	LOS[1]	Speed (mph)	LOS[1]	Speed (mph)	LOS[1]	Speed (mph)	LOS[1]
La Costa Avenue from N. Coast Highway 101 to I-5 Southbound Ramps	With Existing Intersection Controls	EB	16	D	**14**	**E**	22	C	17	D
		WB	19	C	26	B	22	C	27	B
	With All-Way Stop Control at Both La Costa/Vulcan and La Costa/Sheridan	EB	17	D	**13**	**E**	20	C	**14**	**E**
		WB	22	C	23	C	20	C	24	B
	With Traffic Signals at Both La Costa/Vulcan and La Costa/Sheridan	EB	**14**	**E**	17	D	**11**	**E**	**12**	**E**
		WB	15	D	22	C	16	D	26	B
	With Roundabouts at Both La Costa/Vulcan and La Costa/Sheridan[2]	EB	20	C	**13**	**E**	-	-	-	-
		WB	24	B	24	B	-	-	-	-

Note: Arterial analysis conducted using the SimTraffic application of the Synchro 11 software program.
Deficient LOS indicated in **bold**.
[1]LOS is based on criteria shown in Exhibit 16-3, Chapter 16 of the Highway Capacity Manual 6th Edition (HCM-6), and is based on a free-flow speed of 35 miles per hour (mph) on La Costa Avenue.
[2]Because the roundabouts would have a single entry lane on the La Costa Avenue intersection approaches regardless of whether or not a two-way left-turn lane was constructed, the arterial operations analysis results are anticipated to be the same and therefore were only shown once in Table 4.

If traffic signals were installed at the La Costa Avenue / Vulcan Avenue and La Costa Avenue / Sheridan Road intersections, arterial operations are anticipated to worsen to LOS E in the eastbound direction and are anticipated to worsen to LOS D in the westbound direction during the AM peak hour, either without or with a two-way left-turn lane on La Costa Avenue. During the PM peak hour, arterial operations are anticipated to improve to LOS D in the eastbound direction and are anticipated to worsen to LOS C in the westbound direction without a two-way left-turn lane. If a two-way left-turn lane was constructed along the La Costa Avenue corridor, arterial operations with traffic signals during the PM peak hour are anticipated to remain at LOS E in the eastbound direction and are anticipated to remain at LOS B in the westbound direction.

If roundabouts were installed at the La Costa Avenue / Vulcan Avenue and La Costa Avenue / Sheridan Road intersections, arterial operations are anticipated to improve to LOS C or better in both directions during the AM peak hour, but are anticipated to remain at LOS E in the eastbound direction during the PM peak hour. Because the roundabouts would have a single entry lane on the La Costa Avenue intersection approaches regardless of whether or not a two-way left-turn lane was constructed, the arterial operations analysis results are anticipated to be the same and therefore were only shown once in Table 4.

Roadway Segment Analysis

A roadway segment analysis for the La Costa Avenue study corridor was performed based on the existing daily traffic volume, volume-to-capacity (v/c) ratios and the daily LOS capacity thresholds in the City's General Plan Circulation Element. As previously discussed, La Costa Avenue is classified as a four-lane Collector in the City's General Plan Circulation Element, but is currently built with the daily capacity of a two-lane Local Roadway.

The roadway segment analysis was conducted with both the existing cross-section of La Costa Avenue (one lane in each direction of travel) and with a center two-way left-turn lane, which would improve the La Costa Avenue study corridor to a two-lane Augmented Local Roadway.

Table 5 below summarizes the roadway segment capacity analysis results for the La Costa Avenue study corridor based on existing conditions and with a two-way left-turn lane between Vulcan Avenue and I-5 Southbound Ramps.

As shown in Table 5, the segment of La Costa Avenue between North Coast Highway 101 and Vulcan Avenue currently operates at LOS D, and the two segments of La Costa Avenue between Vulcan Avenue and the I-5 Southbound Ramps currently operate at LOS F.

If a two-way left-turn lane was constructed along La Costa Avenue between Vulcan Avenue and the I-5 Southbound Ramps, daily operations on the two segments of La Costa Avenue between Vulcan Avenue and the I-5 Southbound Ramps are anticipated to improve to LOS D or better.

Table 5
Roadway Segment Operations
Without and With Two-Way Left-Turn Lane

	Roadway Segment	Roadway Classification	Daily Capacity [a]	VOLUME	V/C [b]	LOS
With Existing Cross-Section on La Costa Avenue Corridor						
1	La Costa Avenue, N Coast Highway 101 to Vulcan Avenue	2-Lane Local Roadway	14,000	12,508	0.893	D
2	La Costa Avenue, Vulcan Avenue to Sheridan Road	2-Lane Local Roadway	14,000	**14,642**	**1.046**	**F**
3	La Costa Avenue, Sheridan Road to I-5 Southbound Ramps	2-Lane Local Roadway	14,000	**16,482**	**1.177**	**F**
With Two-Way Left-Turn Lane on La Costa Avenue Corridor						
1	La Costa Avenue, N Coast Highway 101 to Vulcan Avenue	2-Lane Local Roadway	14,000	12,508	0.893	D
2	La Costa Avenue, Vulcan Avenue to Sheridan Road	2-Lane Local Roadway Augmented	20,000	14,642	0.732	C
3	La Costa Avenue, Sheridan Road to I-5 Southbound Ramps	2-Lane Local Roadway Augmented	20,000	16,482	0.824	D

FOOTNOTES:

a. Roadway volume capacity and classification based on City of Encinitas Circulation Element (November 28, 2018)

b. Volume to Capacity ratio.

Roadway Widening Feasibility Assessment

The feasibility of widening La Costa Avenue to provide a two-way left-turn lane was also evaluated. La Costa Avenue between Vulcan Avenue and the I-5 Southbound Ramps is currently configured with one 10-foot travel lane in each direction, a 5-foot Class II bike lane with a 3-foot buffer on the north side, and a 6-foot Class II bike lane and a 6-foot pedestrian pathway on the south side, with a total pavement width of 40 feet.

If La Costa Avenue was widened to provide a two-way left-turn lane, it was assumed that each travel lane and the two-way left-turn lane would have a standard lane width of 12 feet, that 6-foot Class II bike lanes with 2-foot buffers would be provided in each direction, and there would be a total pavement width of 52 feet. It was also assumed that any new pedestrian facility would be constructed outside of the roadway, whether a sidewalk or pathway. **Exhibit 7** illustrates the curb-to-curb cross-section of La Costa Avenue with a two-way left-turn lane as described above.

The City's Right-of-Way (ROW) boundary along each side of La Costa Avenue was reviewed, and it was determined that the most challenging areas to widen the roadway would be at the La Costa Avenue / Vulcan Avenue and the La Costa Avenue / Sheridan Road intersections. The biggest challenges at the La Costa Avenue / Vulcan Avenue intersection include grade differences immediately to the north and south of the roadway, having to reconfigure a private driveway on the north side of the roadway, and having to transition from a 52-foot width at Vulcan Avenue to the existing 28-foot width at the bridge located approximately 200 feet west of Vulcan Avenue. The biggest challenges at the La Costa Avenue / Sheridan Road intersection include limited ROW with private properties adjacent to the roadway on the north side of La Costa Avenue, and the close proximity of greenhouse buildings to the roadway on the south side of La Costa Avenue.

Exhibit 8 shows a conceptual layout of the La Costa Avenue / Vulcan Avenue intersection with the two-way left-turn lane transitioning to a dedicated westbound left-turn lane, and how the widened roadway would transition back to the existing width between Vulcan Avenue and the bridge over the rail line. As shown, the widening of La Costa Avenue through the intersection falls within the City's ROW, but the feasibility would need to be explored further as there may be environmental constraints along the north side of the roadway and the potential need for retaining walls on both sides of the roadway.

Exhibit 9 shows a conceptual layout of the La Costa Avenue / Sheridan Road intersection with a two-way left-turn lane transitioning to dedicated left-turn lanes on the eastbound and westbound approaches. Although most of the widening could occur entirely within the City's ROW, the ROW boundary is close to the edge of the existing roadway on the north side of La Costa Avenue west of Sheridan Road, and a couple feet of additional ROW may potentially need to be taken to widen the roadway. The close proximity of the greenhouse buildings to the edge of roadway on the south side of La Costa Avenue limits how much widening could occur on the south side. A potential pedestrian facility would need to abut the greenhouse buildings at the southwest corner of the intersection.

A detailed assessment of the physical and environmental constraints along the corridor such as slopes adjacent to the roadway, adjacent wetlands, and locations and configurations of driveways, utilities and landscaping within the City's ROW may reveal greater challenges than what was evaluated in this conceptual study. However, based on this initial assessment of the La Costa Avenue corridor, it appears that widening the roadway within the City's ROW boundary is feasible.

Feasibility Assessment of Intersection Control Alternatives

The feasibility of implementing all-way stop control or installing traffic signals or roundabouts at the La Costa Avenue / Vulcan Avenue and La Costa Avenue / Sheridan Road intersections was also evaluated. The feasibility of all-way stop control and installation of traffic signals was evaluated based on warrants in the *California Manual on Uniform Traffic Control Devices* (CA MUTCD 2014 Edition, Revision 6, March 30, 2021), and the feasibility of constructing roundabouts at the two intersections was evaluated based on preparing conceptual layouts per design vehicle standards.

All-Way Stop Control Feasibility Assessment (La Costa Avenue / Sheridan Road Intersection)

Criteria C1 and C2 (Minimum Volumes) of the Multi-Way Stop Applications in Section 2B.07 of the California Manual on Uniform Traffic Control Devices (CA MUTCD 2014 Edition, Revision 6, March 30, 2021) was reviewed to determine if installation of all-way stop control may be warranted at the La Costa Avenue / Sheridan Road intersection. Below are the specific Minimum Volumes criteria per Section 2B.07 of the CA MUTCD:

- Criterion C1: The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day.
- Criterion C2: The combined vehicular, pedestrian and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 vehicles per hour for the same 8 hours, with an average delay of at least 30 seconds per vehicle during the highest hour.

The 24-hour daily traffic counts that were collected on La Costa Avenue, which are provided in Appendix A, show that the combined hourly volumes approaching Sheridan Road from the eastbound and westbound directions exceed 300 vehicles per hour for a consecutive 16 hours between 6:00 AM and 10:00 PM. Therefore, Criterion C1 would be met for the major street volumes at the La Costa Avenue / Sheridan Road intersection.

Daily traffic counts over a 24-hour period were not collected on Sheridan Road, so 8 hours of hourly counts are not available for the minor street approaches of the La Costa Avenue / Sheridan Road intersection. However, the turning movement counts that were collected at the intersection during the AM and PM peak periods provide a total of 4 hours of counts on the northbound and southbound minor street approaches, which are shown in the matrix below:

Hour	Sheridan Road NB Approach		Sheridan Road SB Approach		Total Combined Approach Volumes on Sheridan Road		
	Vehicles	Peds/Bikes	Vehicles	Peds/Bikes	Vehicles	Peds/Bikes	Total
7:00 - 8:00 AM	74	3	23	0	97	3	**100**
8:00 - 9:00 AM	58	5	16	2	74	7	**81**
4:00 - 5:00 PM	83	3	18	0	101	3	**104**
5:00 - 6:00 PM	51	2	6	0	57	2	**59**

As shown, the combined northbound and southbound minor street approach volumes at the La Costa Avenue / Sheridan Road intersection, including pedestrians and bicycles, are less than 200 vehicles per hour during the AM and PM peak period, which are when the highest vehicular volumes typically occur on a weekday. Because the combined minor street approach volumes do not exceed the Criterion C2 threshold (200 or more vehicles per hour) during the highest peak hours of the day, it can be presumed that the combined minor street approach volumes would not meet Criterion C2 if at least 8 hours of traffic counts were available for the minor street approaches.

There are other criteria in Section 2B.07 of the CA MUTCD that could be evaluated to determine if all-way stop control should be considered at the La Costa Avenue / Sheridan Road intersection. However, the intersection operations analysis results previously shown in Table 1 had shown that level of service is anticipated to worsen from LOS D/E based on the minor street approach delay to LOS F based on overall average delay during the peak hours if all-way stop control was implemented at the La Costa Avenue / Sheridan Road intersection, either without or with a two-way left-turn lane on La Costa Avenue. Because all-way stop control is anticipated to result in LOS F operations at the intersection during the peak hours, and because the minor street approach volumes do not meet the minimum volume thresholds per the CA MUTCD, all-way stop control is not recommended at the La Costa Avenue / Sheridan Road intersection.

Signalization Feasibility Assessment

To determine the feasibility of installing traffic signals at the La Costa Avenue / Vulcan Avenue and La Costa Avenue / Sheridan Road intersections, the Four-Hour Vehicular Volume Warrant (Warrant 2) and the Peak Hour Warrant (Warrant 3) from Chapter 4C (Traffic Control Signal Needs Studies) of the CA-MUTCD were analyzed to determine if installation of a traffic signal is justified at one or both intersections.

Table 6 below summarizes the results of the signal warrants analysis for the La Costa Avenue / Vulcan Avenue and La Costa Avenue / Sheridan Road intersections. The signal warrants analysis worksheets are provided in **Appendix E**.

Table 6
Signal Warrant Analysis

Intersection	Warrant Satisfied?
Four-Hour Vehicular Volume (Warrant 2)	
La Costa Avenue / Vulcan Avenue	NO
La Costa Avenue / Sheridan Road	NO
Peak Hour Volume (Warrant 3)	
La Costa Avenue / Vulcan Avenue	**YES**
La Costa Avenue / Sheridan Road	NO

YES = warrant satisfied
NO = warrant not satisfied
N/A = Not Applicable

As shown in Table 6, the Four-Hour Vehicular Volume Warrant (Warrant 2) was not satisfied for either intersection using the four hours of turning movement count data collected during the AM and PM peak periods. Table 6 also shows that the Peak Hour Warrant (Warrant 3) was satisfied at the La Costa Avenue / Vulcan Avenue intersection, but was not satisfied at the La Costa Avenue / Sheridan Road intersection.

The results of the intersection operations analysis show that if a traffic signal was installed at the La Costa Avenue / Vulcan Avenue intersection, the intersection is anticipated to operate at LOS A during both the AM and PM peak hours based on the existing lane configuration on La Costa Avenue. If a dedicated westbound left-turn lane was constructed at the La Costa Avenue / Vulcan Avenue intersection, the intersection is anticipated to operate at LOS C during both the AM and PM peak hours. The La Costa Avenue / Vulcan Avenue is anticipated to experience a longer average delay with the construction of a westbound left-turn lane due to the need for a longer cycle length assuming protected left-turn phasing would be implemented.

Based on the results of the signal warrants analysis, installation of a traffic signal is not recommended at the La Costa Avenue / Sheridan Road intersection because the signal warrants that were analyzed were not satisfied. Installation of a traffic signal at the La Costa Avenue / Vulcan Avenue intersection is recommended to be considered as a feasible intersection control to improve operations at the intersection either without or with a two-way left-turn lane on La Costa Avenue.

Roundabout Feasibility Assessment

The feasibility of constructing roundabouts at the La Costa Avenue / Vulcan Avenue and La Costa Avenue / Sheridan Road intersections was evaluated by preparing conceptual layouts at the two intersections and determining what the potential ROW impacts would be to construct the roundabouts.

The conceptual layouts were prepared for a single-lane roundabout at each intersection using the California Legal Design Vehicle (65-foot truck) to determine the size and configuration of the roundabout. **Exhibits 10 and 11** illustrate the conceptual layouts for a single-lane roundabout at the La Costa Avenue / Vulcan Avenue and La Costa Avenue / Sheridan Road intersections, respectively.

Exhibit 10 shows that a single-lane roundabout at the La Costa Avenue / Vulcan Avenue intersection would need a minimum 105-foot inscribed diameter to accommodate the California Legal Design Vehicle (65-foot truck). As shown, additional ROW would be needed on all sides of the intersection, and particularly the southeast corner to avoid impacting the single-family residence located at the southwest corner of the intersection. Exhibit 10 also shows that the private residential driveway located on the north side of the intersection would need to be realigned in order to have access to the roundabout, which would require taking additional ROW on the north side of La Costa Avenue.

Exhibit 11 shows that a single-lane roundabout at the La Costa Avenue / Sheridan Road intersection would also need a minimum 105-foot inscribed diameter to accommodate the California Legal Design Vehicle (65-foot truck). The conceptual layout in Exhibit 11 shows the additional ROW that would be needed in order for the roundabout to accommodate both the north and south legs of the intersection, which are currently offset by approximately 60 feet. Exhibit 11 also shows that additional ROW would need to be taken at all four corners of the intersection to construct a single-lane roundabout. Constructing a single-lane roundabout would require removing the existing greenhouse building at the southwest corner of the intersection, and would require removing a single-family residence at the northeast corner of the intersection.

Due to the greater ROW impacts associated with constructing single-lane roundabouts to accommodate the California Legal Design Vehicle (65-foot truck), conceptual layouts were also prepared for a mini-roundabout at each intersection using the AASHTO SU-30 Design Vehicle (30-foot truck). **Exhibits 12 and 13** illustrate the conceptual layouts for a mini-roundabout at the La Costa Avenue / Vulcan Avenue and La Costa Avenue / Sheridan Road intersections, respectively.

Exhibit 12 shows that a mini-roundabout at the La Costa Avenue / Vulcan Avenue intersection would need a minimum 75-foot inscribed diameter to accommodate the AASHTO SU-30 Design Vehicle (30-foot truck). As shown, the additional ROW needed to construct a mini-roundabout with a 75-foot inscribed diameter is significantly less than the additional ROW needed to construct a single-lane roundabout with a 105-foot inscribed diameter as previously shown in Exhibit 10. The private residential driveway on the north side of the intersection would not need to be realigned to access a mini-roundabout, and only minor modification of the driveway would be needed. A mini-roundabout would be constructed with a roll-over curb so that larger vehicles may driveway over the curb of the roundabout to proceed through the intersection.

The mini-roundabout option shown in Exhibit 12 for the La Costa Avenue / Vulcan Avenue intersection does not include raised splitter islands for pedestrian refuge. Additional analysis will be needed to be conducted to provide pedestrian refuge for a mini-roundabout at this intersection.

Exhibit 13 shows that a mini-roundabout at the La Costa Avenue / Sheridan Road intersection would also need a minimum 75-foot inscribed diameter to accommodate the AASHTO SU-30 Design Vehicle (30-foot truck). As shown, additional ROW would still need to be taken, but a mini-roundabout could be constructed without needing to remove any buildings near the intersection. However, the proposed ROW line would intrude through the greenhouse building at the southwest corner of the intersection.

A mini-roundabout at the La Costa Avenue / Sheridan Road intersection would not include the north leg of Sheridan Road due to the 60-foot offset between the north and south legs. Eastbound vehicles entering the roundabout would still have left-turn access to the north leg of Sheridan Road by performing a U-turn maneuver through the roundabout. However, left-turn access from southbound Sheridan Road onto eastbound La Costa Avenue may not be allowed with the configuration shown in Exhibit 13. Modifications to the design shown in Exhibit 13 could be made so that a short refuge lane could be provided to allow entry into the roundabout, which would require a wider roadway on the west leg and shifting the roundabout a short distance to the east.

The mini-roundabout option shown in Exhibit 13 for the La Costa Avenue / Sheridan Road intersection does not include raised splitter islands for pedestrian refuge. Additional analysis will be needed to be conducted to provide pedestrian refuge for a mini-roundabout at this intersection

Vulcan Avenue Traffic Calming Assessment

The purpose of the traffic calming assessment for Vulcan Avenue is to determine if additional traffic calming measures should be considered in addition to the planned improvements included in the Vulcan Avenue Safety and Mobility Enhancements Project. The Vulcan Avenue Safety and Mobility Enhancements Project was approved by Encinitas City Council on August 25, 2021 to mitigate the potential impacts of cut-through traffic on Vulcan Avenue once the approved Leucadia Streetscape Project along North Coast Highway 101 is completed. The Leucadia Streetscape Project will reduce most of North Coast Highway 101 between Encinitas Boulevard and La Costa Avenue to one travel lane in each direction and will include construction of four roundabouts along the corridor.

The Vulcan Avenue Safety and Mobility Enhancements Project is considered an interim project because it is anticipated that the alignment and cross-section of Vulcan Avenue may change once the railroad double tracking improvements, the Coastal Rail extension, and potential storm drain improvements are completed. The Vulcan Avenue Safety and Mobility Enhancements Project consists of the following improvements:

- Reducing the width of the travel lanes to 10 feet in each direction.
- Shifting the travel lanes to the west side of the roadway.
- Painting a pedestrian pathway along the east side of the roadway.
- Adding “Sharrow” and “30 MPH” speed limit markings on the travel lanes.
- Adding raised crosswalks across Vulcan Avenue with Rectangular Rapid Flashing Beacons (RRFBs) at the Vulcan Avenue intersections with Andrew Avenue, Sanford Street, and Orpheus Avenue.

A copy of the Vulcan Avenue Safety and Mobility Enhancements Project plans are provided in **Appendix F. Exhibit 14** shows the locations of the three raised crosswalks and RRFBs that are planned to be constructed with the Vulcan Avenue Safety and Mobility Enhancements Project.

The distances between the planned raised crosswalks/RRFBs and also between the raised crosswalks/RRFBs and signalized or all-way-stop controlled intersections along the Vulcan Avenue corridor were measured to determine if additional raised crosswalks and/or RRFBs should be considered. The signalized and all-way stop controlled intersections along the Vulcan Avenue corridor are at La Costa Avenue (all-way stop), Leucadia Boulevard (traffic signal), Union Street (all-way stop), and at Encinitas Boulevard (traffic signal).

The spacing (in miles) between the planned raised crosswalks/RRFBs along Vulcan Avenue from La Costa Avenue to Encinitas Boulevard is summarized below:

Vulcan Avenue Segment	**Distance (Miles)**
• La Costa Avenue to Raised Crosswalk at Andrew Avenue:	0.18
• Andrew Avenue to Raised Crosswalk at Sanford Street:	0.52
• Sanford Street to Leucadia Boulevard:	0.66
• Leucadia Boulevard to Union Street:	0.49
• Union Street to Raised Crosswalk at Orpheus Avenue:	0.26
• Orpheus Avenue to Encinitas Boulevard:	0.45

As shown above, two of the segments between raised crosswalks or between raised crosswalks and controlled intersections exceed one half-mile in length. The planned raised crosswalks/RRFBs would serve a dual purpose of calming traffic and enhancing pedestrian mobility and safety; however, their effectiveness at calming traffic may be diminished along the segments where spacing exceeds one half-mile.

The segments of Vulcan Avenue between Andrew Avenue and Sanford Street, and between Sanford Street and Leucadia Boulevard, were evaluated to determine potential locations of additional raised crosswalks and RRFBs to reduce the distances between the currently planned raised crosswalks/RRFBs or between the planned raised crosswalks/RRFBs and controlled intersections. Based on this evaluation, two potential locations for additional raised crosswalks and RRFBs were identified and are discussed below:

Vulcan Avenue Segment #1: Andrew Avenue to Sanford Street (0.52 mile)
Due to the close proximity to Grandview Street (on the west side of North Coast Highway 101) where one of the major beach access points in Leucadia is provided, and where an existing raised crosswalk and RRFB is provided for crossing North Coast Highway 101 at Grandview Street, it is recommended that a raised crosswalk with an RRFB be considered across Vulcan Avenue at the intersection with Coral Cove Way on either the north or south side of the intersection. Existing sidewalks are located at both the northeast and southeast corners of the Vulcan Avenue / Coral Cove Way intersection, which enhances the suitability of a raised crosswalk and RRFB at this intersection. Installation of a raised crosswalk and RRFB at this location would reduce the spacing between the planned raised crosswalks/RRFBs to 0.30 mile from Andrew Avenue to Coral Cove Way, and 0.22 mile from Coral Cove Way to Sanford Street.

Vulcan Avenue Segment #2: Sanford Street to Leucadia Boulevard (0.66 mile)
The ideal location for an additional raised crosswalk with RRFB along this segment of Vulcan Avenue is near the intersection with East Glaucus Street, which is located approximately midway between Sanford Street and Leucadia Boulevard. A raised crosswalk and RRFB at East Glaucus Street would be in close proximity to NCTD bus transit stops along North Coast Highway 101 and would be located only 300 feet south of an existing raised crosswalk and RRFB across North Coast Highway 101 at Phoebe Street. The north side of East Glaucus Street would be a preferable location for a raised crosswalk with RRFB across Vulcan Avenue due to a fire hydrant and a private driveway located at the southeast corner of the intersection. Installation of a raised crosswalk and RRFB at this location would reduce the spacing between

the planned raised crosswalks/RRFBs and/or major intersections to 0.36 mile from Sanford Street to East Glaucus Street, and 0.30 mile from East Glaucus Street to Leucadia Boulevard.

One or both sides of Vulcan Avenue are currently lacking sidewalks at the locations of both the planned and recommended additional raised crosswalks/RRFBs. Raised crosswalks with RRFBs are required to be ADA accessible and would need to provide pedestrian ramps with truncated domes on each side of the roadway. Therefore, new sidewalks would also need to be constructed on both sides of Vulcan Avenue at the locations of the planned and recommended additional raised crosswalks/RRFBs in order to provide the required ADA accessible pedestrian ramps.

Exhibit 15 illustrates the two additional raised crosswalks/RRFBs that are recommended along the Vulcan Avenue corridor between La Costa Avenue and Encinitas Boulevard.

Conclusions/Recommendations

The results of the intersection operations analysis with the studied intersection control alternatives show that the lowest intersection delays at the La Costa Avenue / Vulcan Avenue and La Costa Avenue / Sheridan Road intersections are anticipated to occur with either construction of single-lane (or mini) roundabouts or with installation of traffic signals without a two-way left-turn lane on La Costa Avenue. If a two-way left-turn lane was constructed on La Costa Avenue, it is anticipated that traffic flow in the through lanes at the two intersections would improve due to the reduced conflicts with left-turning traffic, but it is also anticipated that longer overall delays would occur as a result of providing protected left-turn phasing for the eastbound/westbound left-turn movements on La Costa Avenue.

The results of the queuing analysis showed that the shortest queue lengths during the peak hours at the La Costa Avenue / Vulcan Avenue and La Costa Avenue / Sheridan Road intersections are anticipated to occur with construction of roundabouts at both intersections. If a traffic signal was installed at the La Costa Avenue / Vulcan Avenue, queue lengths during peak hours are anticipated to be shorter without a dedicated westbound left-turn lane at the intersection because signal coordination with the La Costa Avenue / North Coast Highway 101 intersection would allow for a half-cycle length that is anticipated to reduce both delay and queuing.

The results of the arterial analysis showed that the highest vehicular speeds and LOS D or better operations during peak hours in both directions of travel along La Costa Avenue are anticipated to occur if a two-way left-turn lane was constructed on La Costa Avenue between Vulcan Avenue and I-5, with the existing traffic controls at the La Costa Avenue / Vulcan Avenue and La Costa Avenue / Sheridan Road intersections.

The results of the roadway segment analysis showed that the existing daily LOS F operations on La Costa Avenue between Vulcan Avenue and the I-5 Southbound Ramps are anticipated to improve to LOS D or better if a two-way left-turn lane was constructed along La Costa Avenue.

The results of the feasibility assessment for widening La Costa Avenue from Vulcan Avenue to I-5 to provide a two-way left-turn lane showed that widening La Costa Avenue could largely be accommodated within the City's ROW along the corridor. Although some challenges do exist near the La Costa Avenue / Vulcan Avenue and La Costa Avenue / Sheridan Road intersections, it appears that along the overall corridor, widening La Costa Avenue to construct a two-way left-turn lane should be feasible.

The results of the feasibility assessment for the intersection control alternatives show that neither all-way stop control nor installation of a traffic signal are warranted at the La Costa Avenue / Sheridan Road intersection, while installation of a traffic signal is warranted at the La Costa Avenue / Vulcan Avenue intersection. Construction of a single-lane roundabout to accommodate the California Legal Design Vehicle

(65-foot truck) would be difficult at both the La Costa Avenue / Vulcan Avenue and La Costa Avenue / Sheridan Road intersections and additional ROW would need to be acquired, which may require removing a single-family residence and a greenhouse building at two of the corners of the La Costa Avenue / Sheridan Road intersection. Construction of a mini-roundabout to accommodate the AASHTO SU-30 Design Vehicle (30-foot truck) is anticipated to be a more feasible roundabout option at both intersections and is anticipated to require significantly less acquisition of additional ROW.

Table 7 provides a "pro-con" comparison of the intersection control alternatives at the La Costa Avenue / Vulcan Avenue and La Costa Avenue / Sheridan Road intersections based on the findings described above, either without or with a two-way left-turn lane along La Costa Avenue. Based on the results of the analysis and the comparison shown in Table 7, it appears that either installing a traffic signal or constructing a mini-roundabout should be considered at the La Costa Avenue / Vulcan Avenue intersection, and either maintaining the existing intersection control (two-way stop control) or constructing a mini-roundabout should be considered at the La Costa Avenue / Sheridan Road intersection.

The results of the traffic calming assessment for Vulcan Avenue showed that two additional raised crosswalks with RRFBs should be considered along Vulcan Avenue between Andrew Avenue and Leucadia Boulevard to provide more effective traffic calming along the Vulcan Avenue corridor for when the Leucadia Streetscape project is completed along North Coast Highway 101.

If you have any questions regarding the results of this analysis, please contact me or David Mizell directly at (619) 291-0707.

Sincerely,

RICK ENGINEERING COMPANY

David Mizell, AICP
Associate Traffic Planner

Brian Stephenson, PE, PTOE
Associate Principal

Table 7
Intersection Control Alternatives Comparison

Intersection Control Alternative	Intersection			
	La Costa Ave/Vulcan Ave		La Costa Ave/Sheridan Road	
	Pro	Con	Pro	Con
Without Two-Way Left-Turn Lane				
With Existing Intersection Control	No potential impacts to adjacent property owners.	Intersection currently operates at LOS E/F with existing AWSC.	No potential impacts to adjacent property owners. Minimal delay for uncontrolled east-west through traffic.	Intersection currently operates at LOS E during AM peak hour based on minor street worst movement delay.
With All-Way Stop Control	Same as with existing intersection control.	Same as with existing intersection control.	Delay anticipated to be reduced for the minor street approaches.	Average intersection delay anticipated to worsen to LOS F during both peak hours due to major street vehicles having to stop. AWSC is not warranted based on traffic volumes.
With Traffic Signals	Significant reduction in delay anticipated during both peak hours.	Queuing anticipated to increase in the westbound shared left-turn/through lane during both peak hours.	Significant reduction in delay anticipated during both peak hours.	Queuing in the eastbound/westbound through lanes anticipated to increase during both peak hours. Installation of traffic signal not warranted based on traffic volumes.
With Roundabouts	Significant reduction in delay anticipated during both peak hours.	Cost to construct full size roundabout may be significant, would require ROW acquisition and realigning private driveway.	Significant reduction in delay anticipated during both peak hours.	Cost to construct full size roundabout may be significant, may require ROW acquisition and removing existing buildings adjacent to intersection.
With Full-Size Single-Lane Roundabouts	Significant reduction in delay anticipated during both peak hours. Feasibility to constructed anticipated to be much higher and may fall entirely within City's ROW.	Larger trucks would need to drive over curb to proceed through mini-roundabout, may not slow traffic as effectively as full size roundabout.	Significant reduction in delay anticipated during both peak hours. Feasibility to construct anticipated to be much higher and acquisition of ROW anticipated to be greatly reduced.	Larger trucks would need to drive over curb to proceed through mini-roundabout, may not slow traffic as effectively as full size roundabout. Acquisition of ROW still anticipated on 3 sides of intersection.
With Two-Way Left-Turn Lane				
With Existing Intersection Control	Intersection delay and queuing anticipated to be reduced during both peak hours.	Intersection anticipated to operate at LOS E during AM peak hour.	Anticipated improvement in traffic flow for eastbound and westbound through lanes with reduced conflicts with left turn traffic.	Intersection anticipated to continue operating at LOS E during AM peak hour.
With All-Way Stop Control	Same as with existing intersection control.	Same as with existing intersection control.	Reduced conflicts with left turn traffic.	Average intersection delay anticipated to worsen to LOS F during both peak hours due to major street vehicles having to stop. AWSC is not warranted based on traffic volumes.
With Traffic Signals	Significant reduction in delay anticipated during both peak hours. Reduced left turn conflicts with through traffic.	Widening to provide a westbound left turn lane may require additional ROW and there may be environment constraints to widening on north side of roadway.	Significant reduction in delay anticipated during both peak hours.	Queuing in the eastbound/westbound through lanes anticipated to increase during both peak hours. Installation of traffic signal not warranted based on traffic volumes.
With Full-Size Single-Lane Roundabouts	Significant reduction in delay anticipated during both peak hours.	Cost to construct full size roundabout may be significant, would require ROW acquisition and realigning private driveway.	Significant reduction in delay anticipated during both peak hours.	Cost to construct full size roundabout may be significant, may require ROW acquisition and removing existing buildings adjacent to intersection.
With Mini-Roundabouts	Significant reduction in delay anticipated during both peak hours. Feasibility to constructed anticipated to be much higher and may fall entirely within City's ROW.	Larger trucks would need to drive over curb to proceed through mini-roundabout, may not slow traffic as effectively as full size roundabout.	Significant reduction in delay anticipated during both peak hours. Feasibility to construct anticipated to be much higher and acquisition of ROW anticipated to be greatly reduced.	Larger trucks would need to drive over curb to proceed through mini-roundabout, may not slow traffic as effectively as full size roundabout. Acquisition of ROW still anticipated on 3 sides of intersection.

RICK ENGINEERING COMPANY

EXHIBIT 1

VICINITY MAP

LA COSTA AVENUE CORRIDOR ANALYSIS

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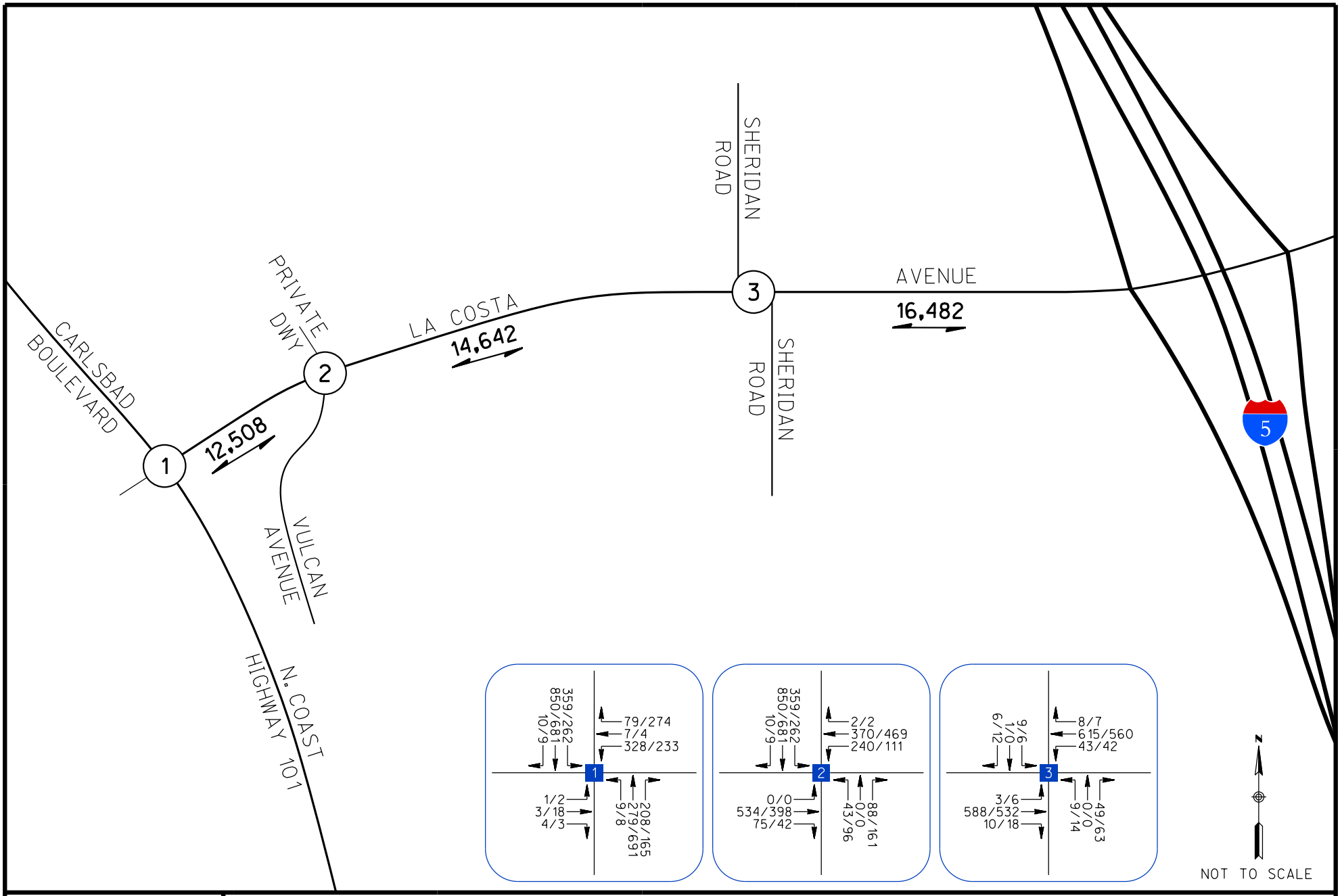

RICK ENGINEERING COMPANY

EXHIBIT 2

EXISTING TRAFFIC VOLUMES

LA COSTA AVENUE CORRIDOR ANALYSIS

LEGEND

AM/PM=PEAK HOUR VOLUMES

X,XXX =TWO-WAY ADT

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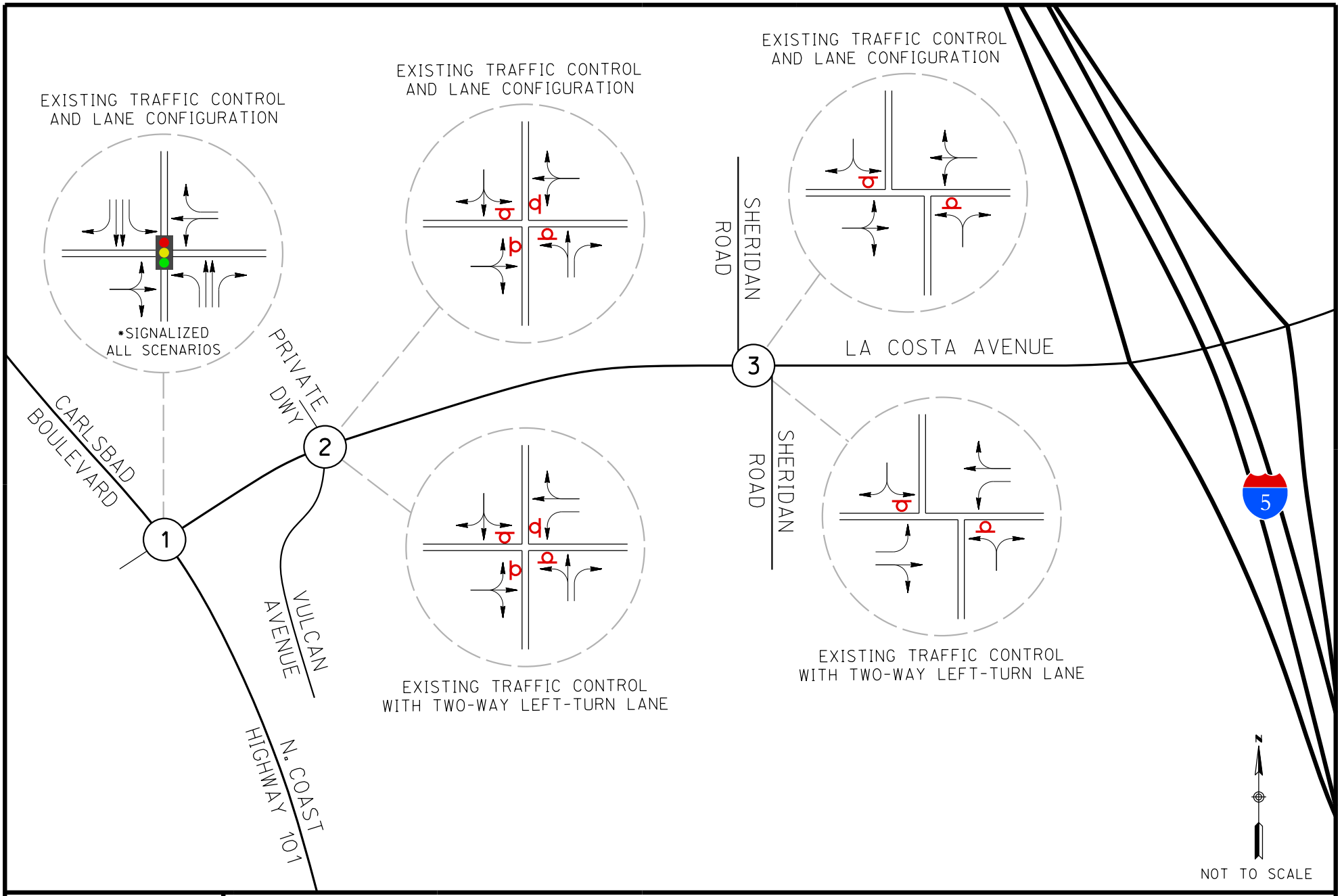

RICK ENGINEERING COMPANY

EXHIBIT 3

EXISTING TRAFFIC CONTROLS ALONG LA COSTA AVENUE CORRIDOR WITHOUT AND WITH TWO-WAY LEFT-TURN LANE

LA COSTA AVENUE CORRIDOR ANALYSIS

LEGEND

- q =STOP SIGN
- =TRAFFIC SIGNAL
- =TURN MOVEMENTS

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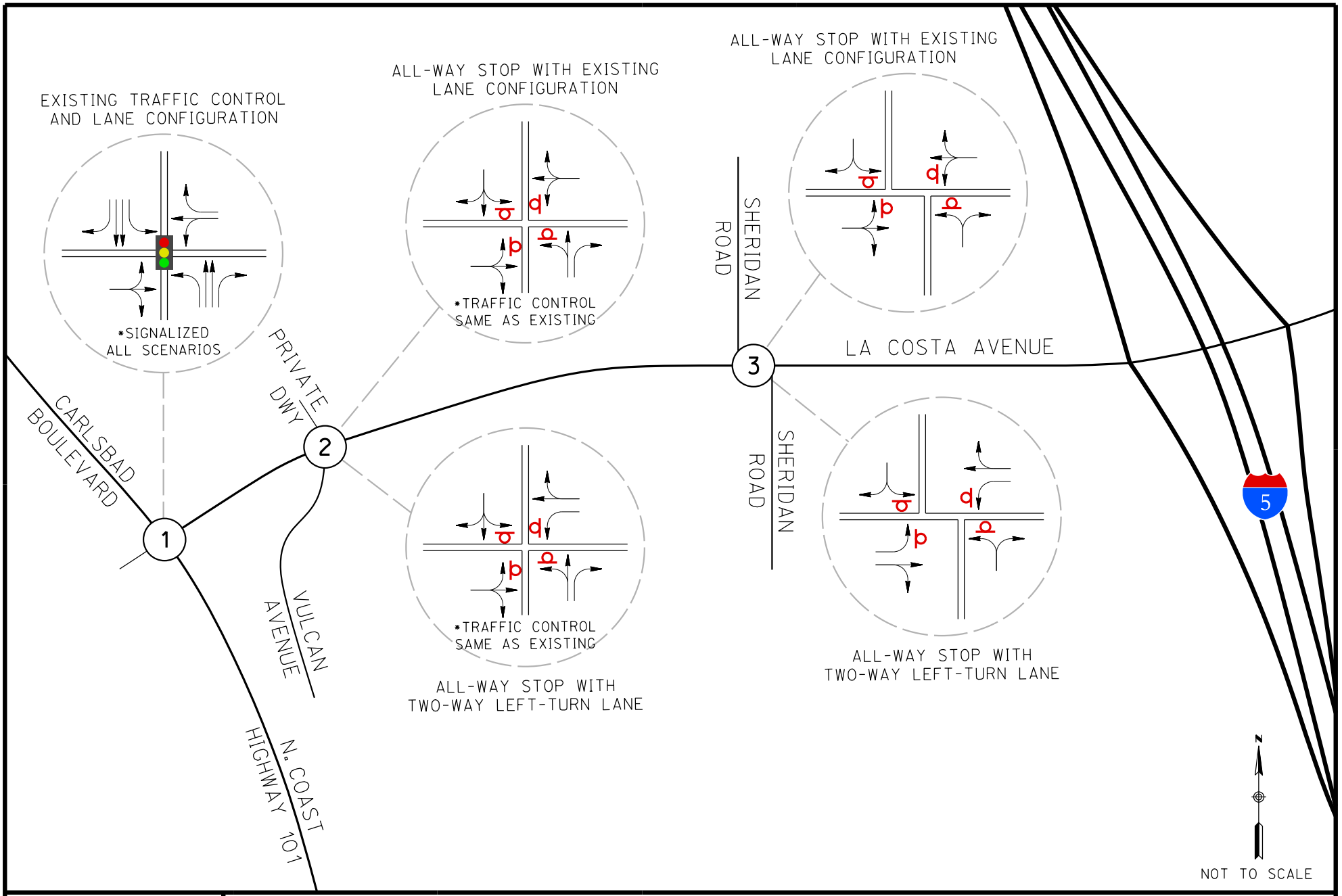

RICK ENGINEERING COMPANY

EXHIBIT 4

ALL-WAY STOP CONTROL ALONG LA COSTA AVENUE CORRIDOR
WITHOUT AND WITH TWO-WAY LEFT-TURN LANE

LA COSTA AVENUE CORRIDOR ANALYSIS

LEGEND
q =STOP SIGN
=TRAFFIC SIGNAL
=TURN MOVEMENTS

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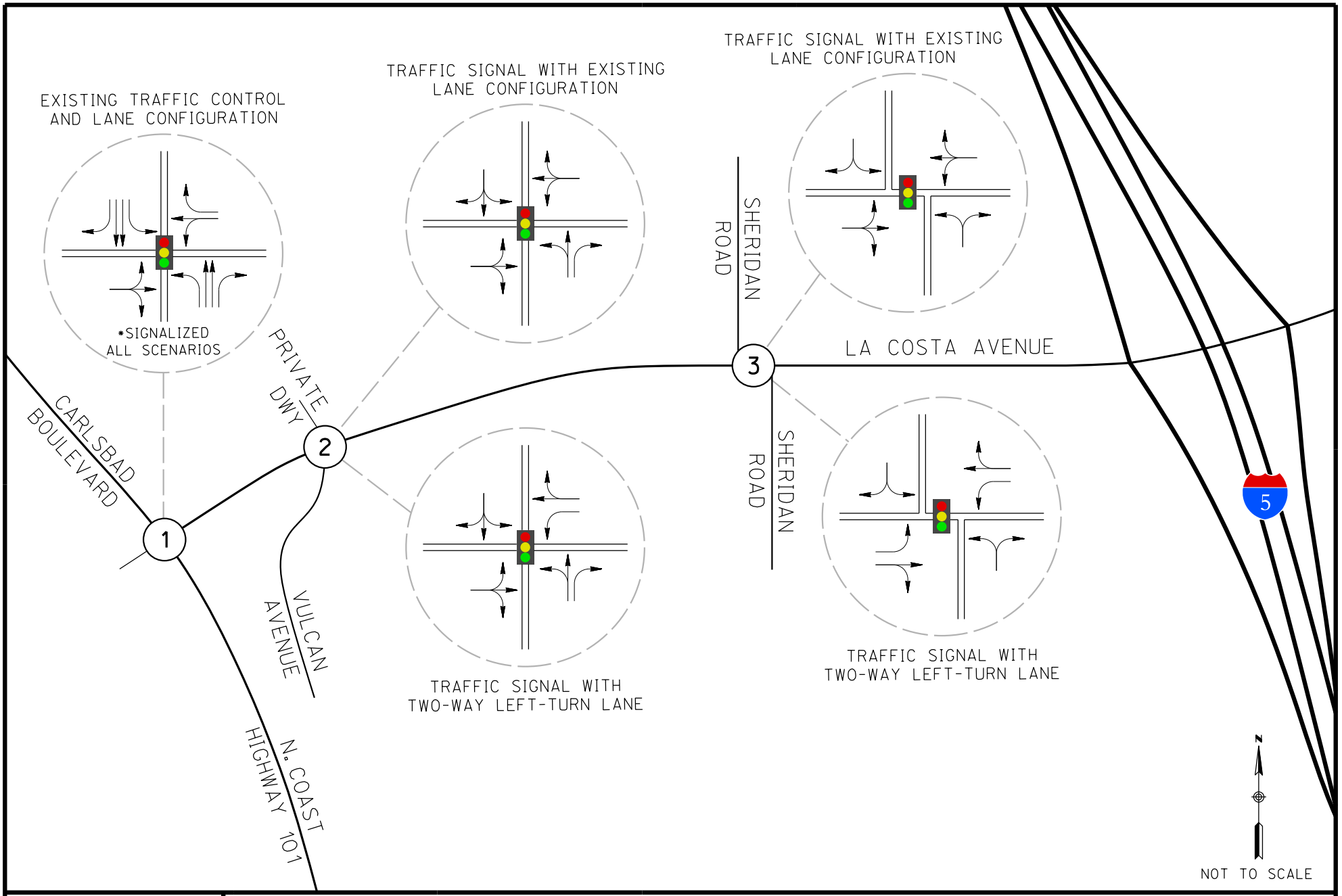

RICK ENGINEERING COMPANY™

EXHIBIT 5

TRAFFIC SIGNALS ALONG LA COSTA AVENUE CORRIDOR
WITHOUT AND WITH TWO-WAY LEFT-TURN LANE

LA COSTA AVENUE CORRIDOR ANALYSIS

LEGEND
=TRAFFIC SIGNAL
=TURN MOVEMENTS

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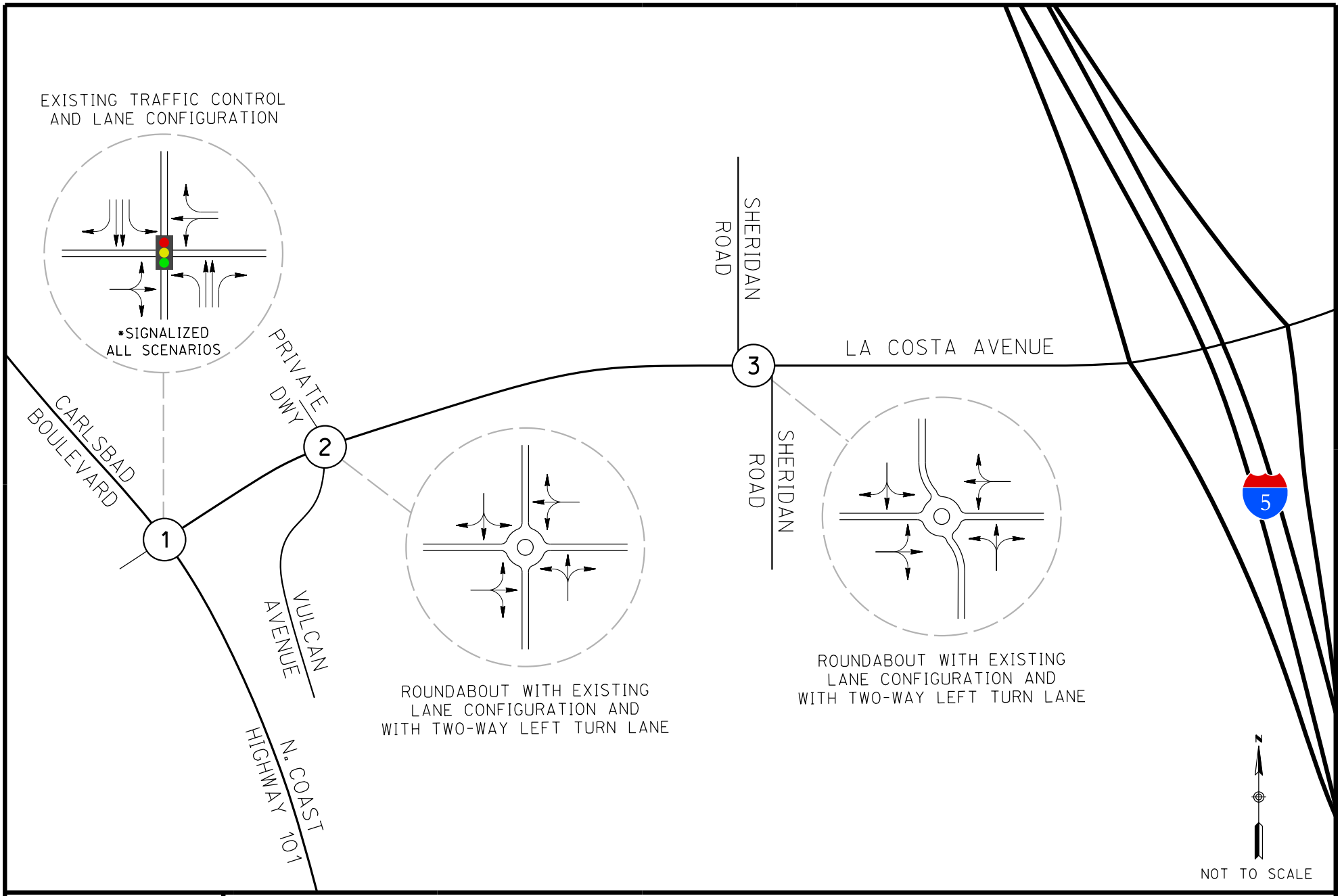

RICK ENGINEERING COMPANY

EXHIBIT 6

ROUNDABOUTS ALONG LA COSTA AVENUE CORRIDOR
WITHOUT AND WITH TWO-WAY LEFT-TURN LANE

LA COSTA AVENUE CORRIDOR ANALYSIS

LEGEND
=ROUNDABOUT
=TRAFFIC SIGNAL
=TURN MOVEMENTS

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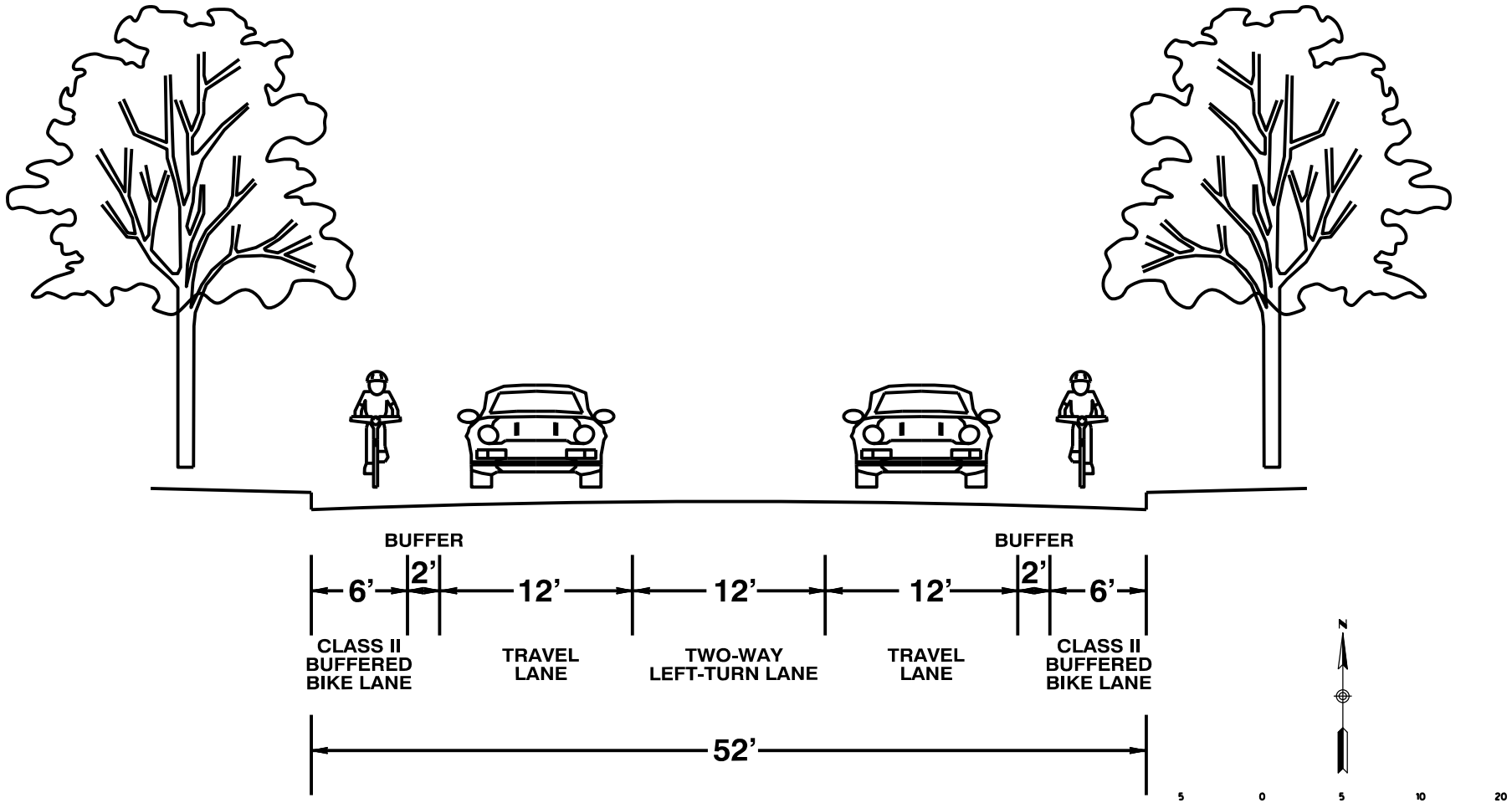

RICK™ ENGINEERING COMPANY

EXHIBIT 7

CONCEPTUAL CROSS SECTION - LA COSTA AVENUE WITH A TWO-WAY LEFT-TURN LANE

LA COSTA AVENUE CORRIDOR ANALYSIS

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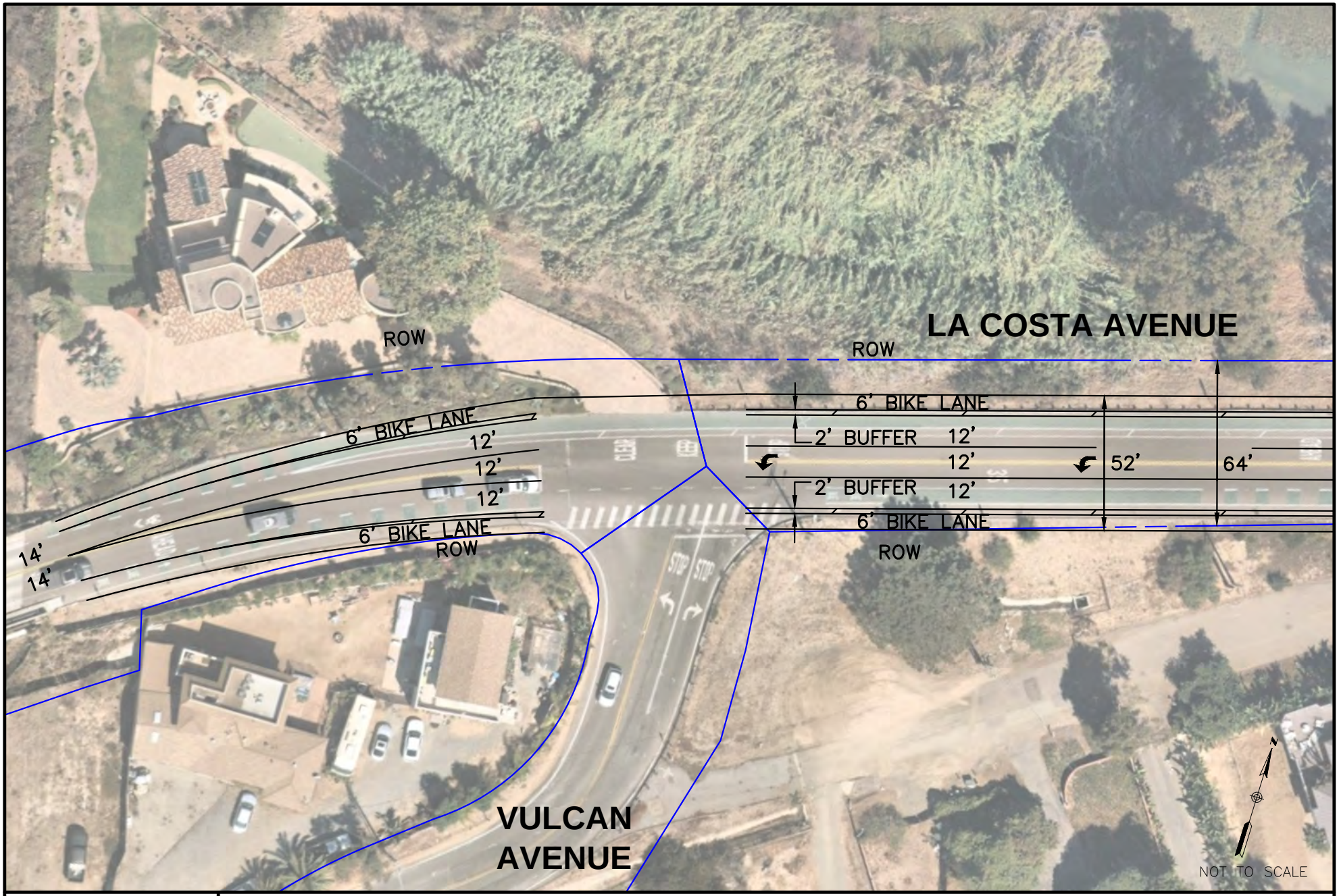
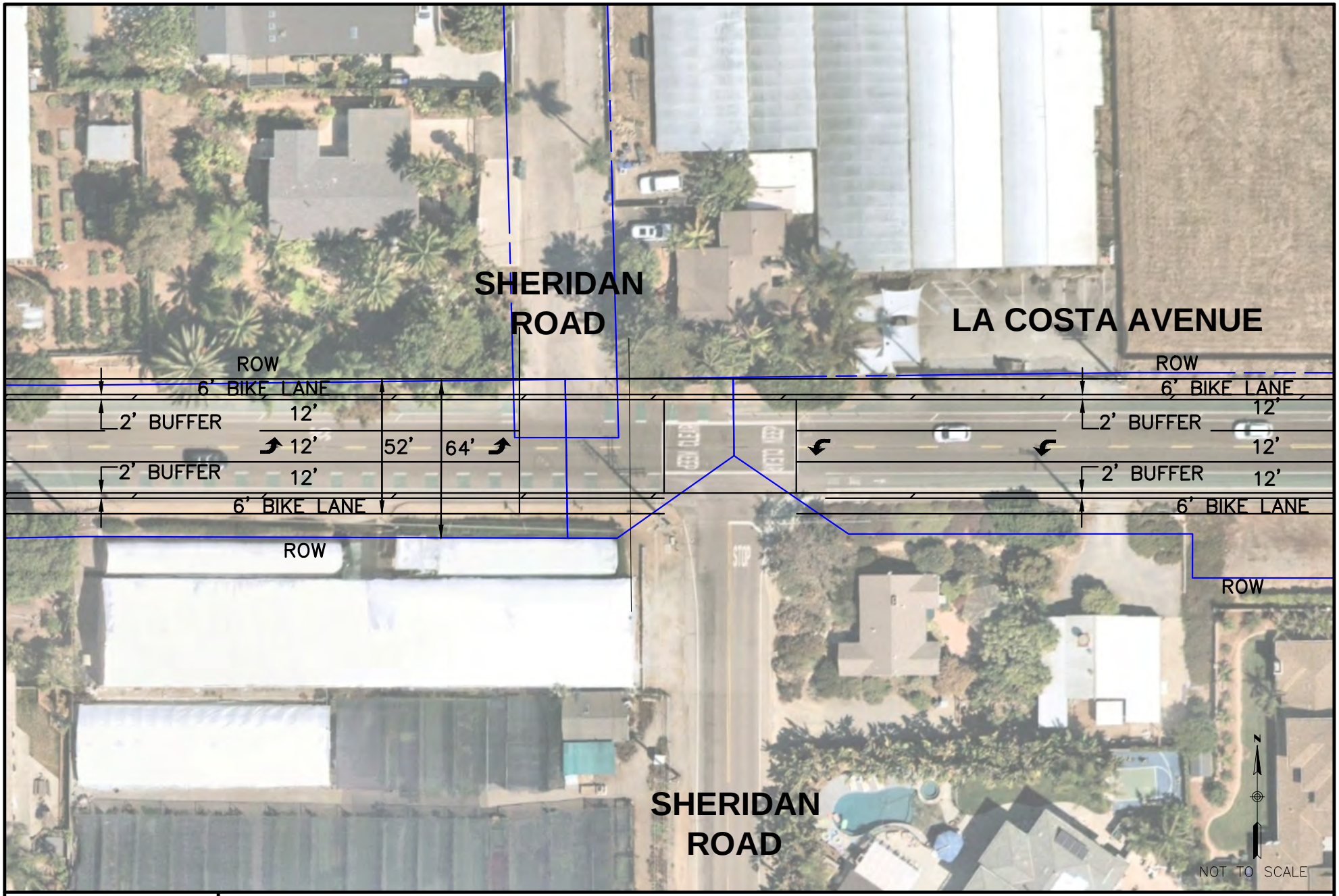


RICK ENGINEERING COMPANY

EXHIBIT 8

CONCEPTUAL STRIPING DESIGN - LA COSTA AVENUE AND VULCAN AVENUE INTERSECTION WITH A TWO-WAY LEFT-TURN LANE ON LA COSTA AVENUE

LA COSTA AVENUE CORRIDOR ANALYSIS

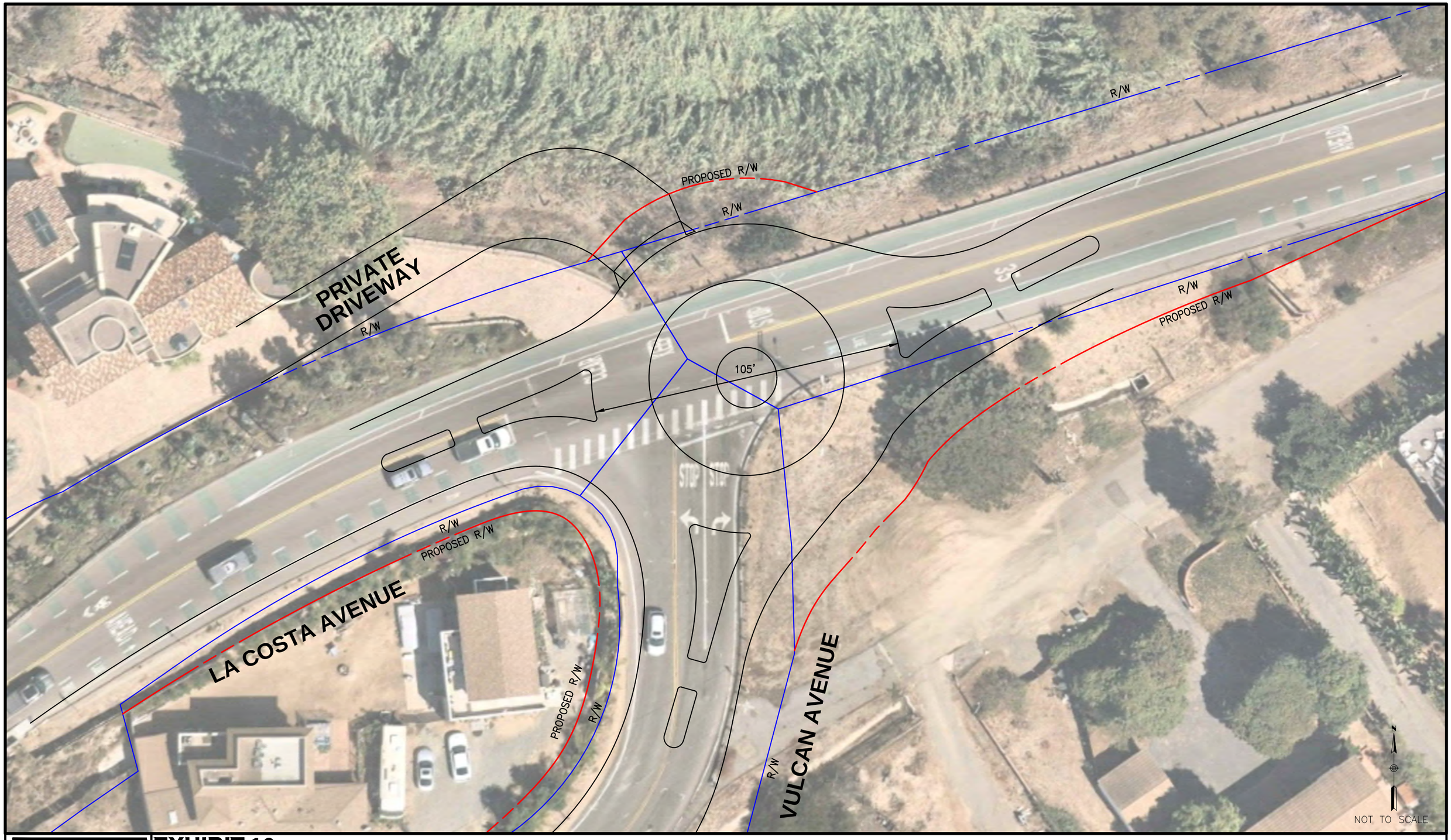


RICK ENGINEERING COMPANY

EXHIBIT 9

CONCEPTUAL STRIPING DESIGN - LA COSTA AVENUE AND SHERIDAN ROAD WITH A TWO-WAY LEFT-TURN LANE ON LA COSTA AVENUE

LA COSTA AVENUE CORRIDOR ANALYSIS

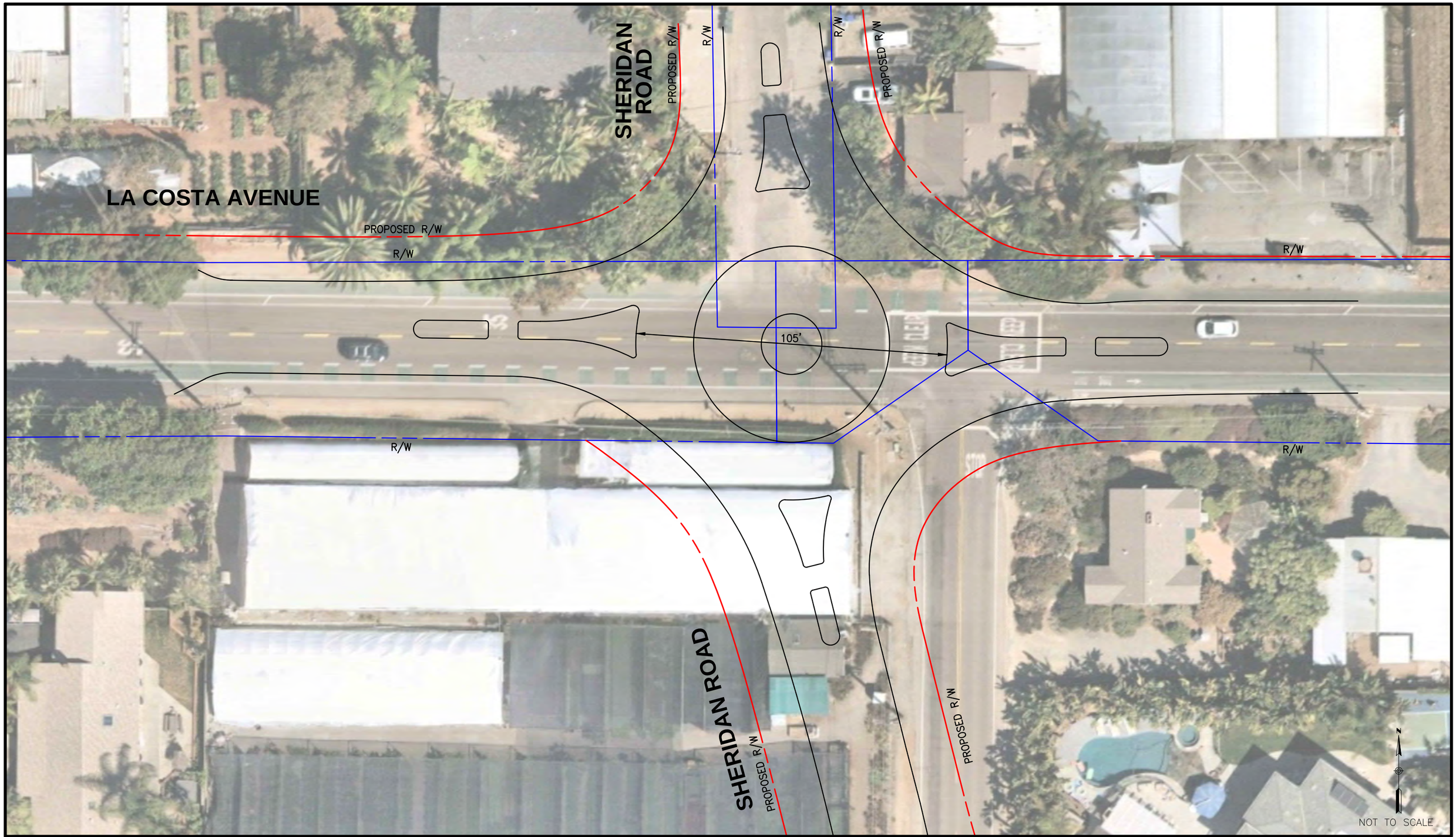


RICK ENGINEERING COMPANY

EXHIBIT 10

LA COSTA AVENUE/ VULCAN AVENUE ROUNDABOUT OPTION 1 (105' INSCRIBED DIAMETER)
DESIGN VEHICLES: AASHTO BUS-40 & CA LEGAL

LA COSTA AVENUE CORRIDOR ANALYSIS



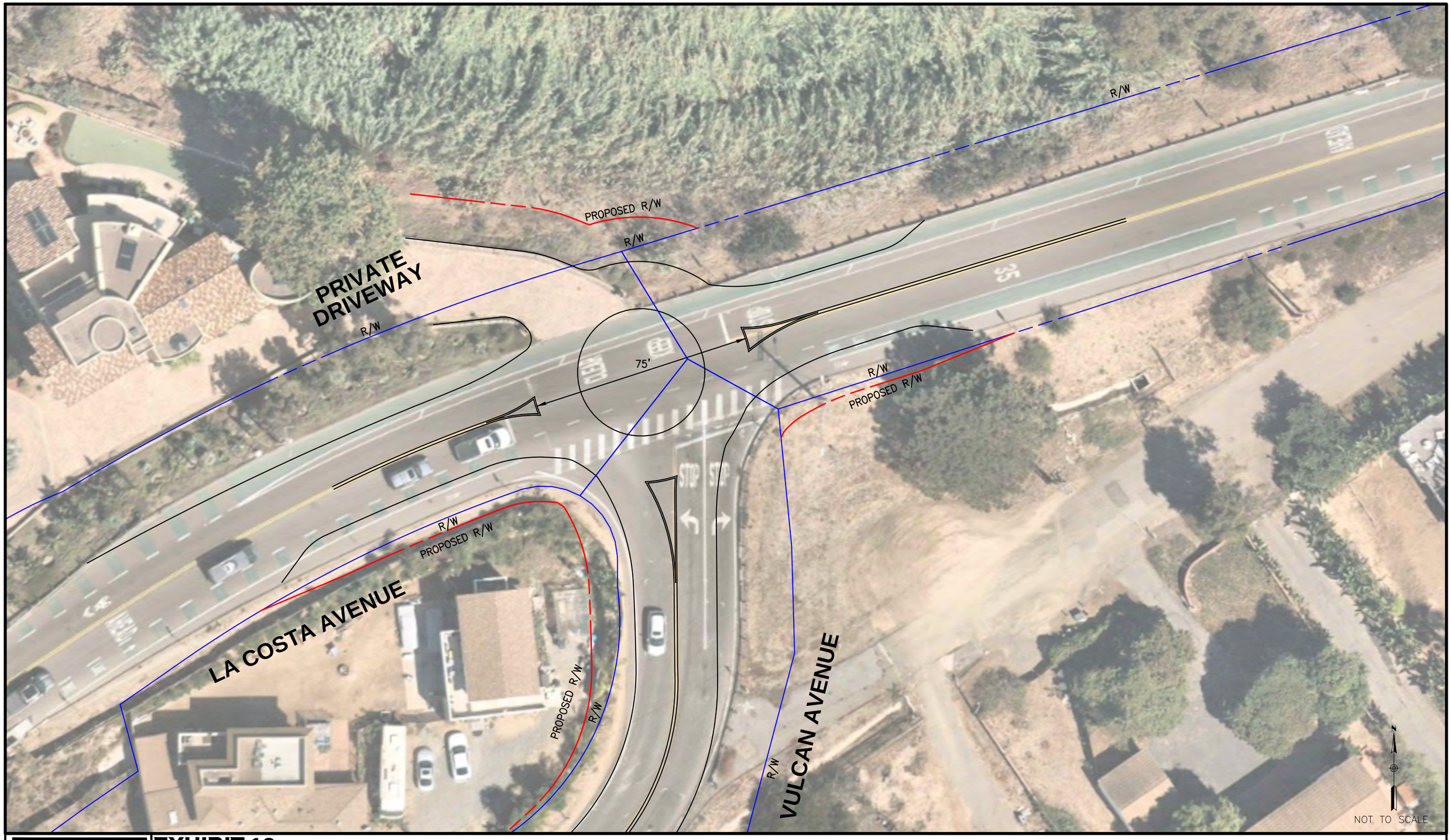
RICK ENGINEERING COMPANY

EXHIBIT 11

LA COSTA AVENUE/SHERIDAN ROAD ROUNDABOUT OPTION 1 (105' INSCRIBED DIAMETER)

DESIGN VEHICLES: AASHTO BUS-40 & CA LEGAL

LA COSTA AVENUE CORRIDOR ANALYSIS



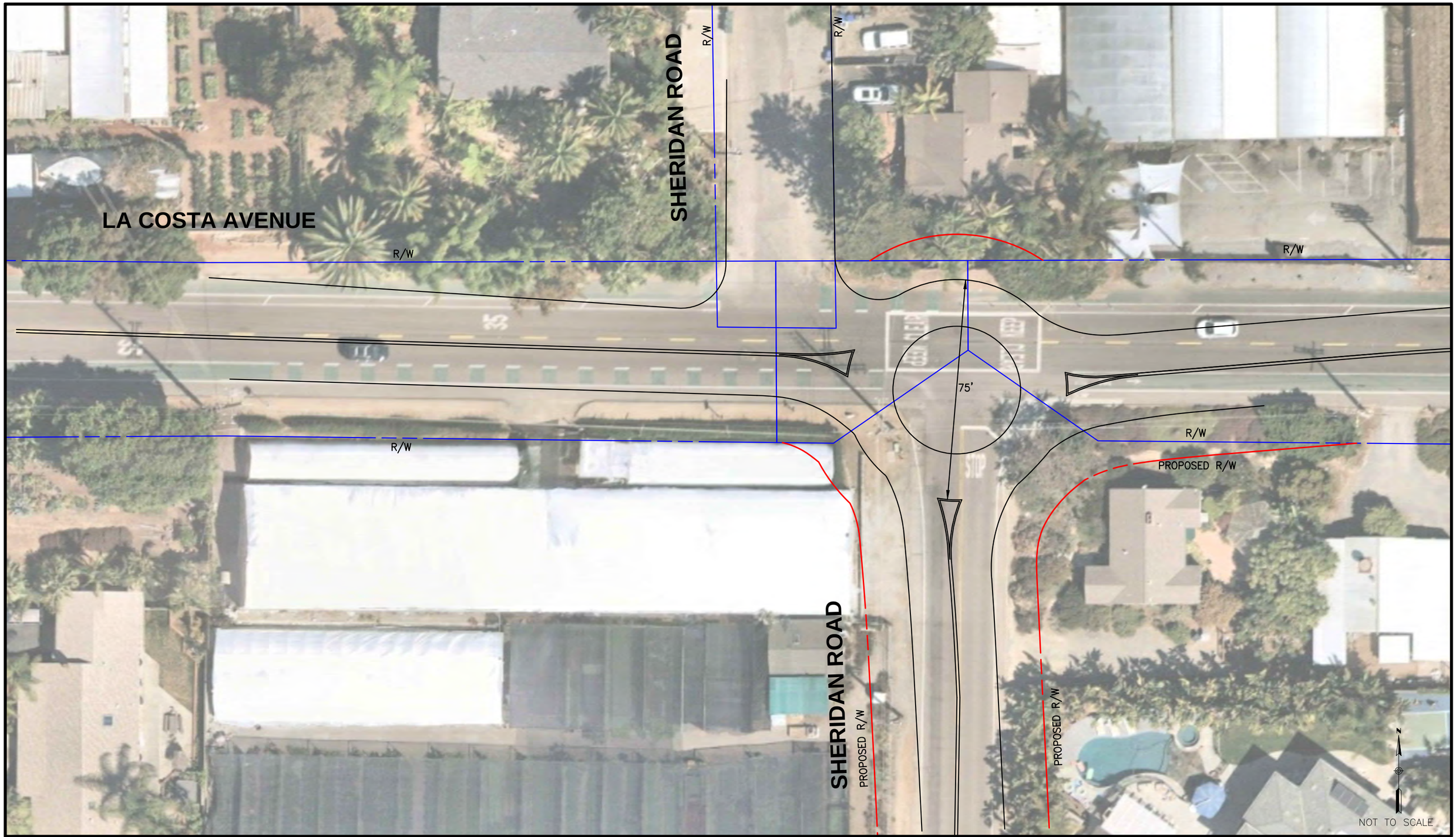
RICK ENGINEERING COMPANY

EXHIBIT 12

LA COSTA AVENUE/ VULCAN AVENUE MINI-ROUNDABOUT OPTION 2 (75' INSCRIBED DIAMETER)

DESIGN VEHICLES: AASHTO SU-30

LA COSTA AVENUE CORRIDOR ANALYSIS



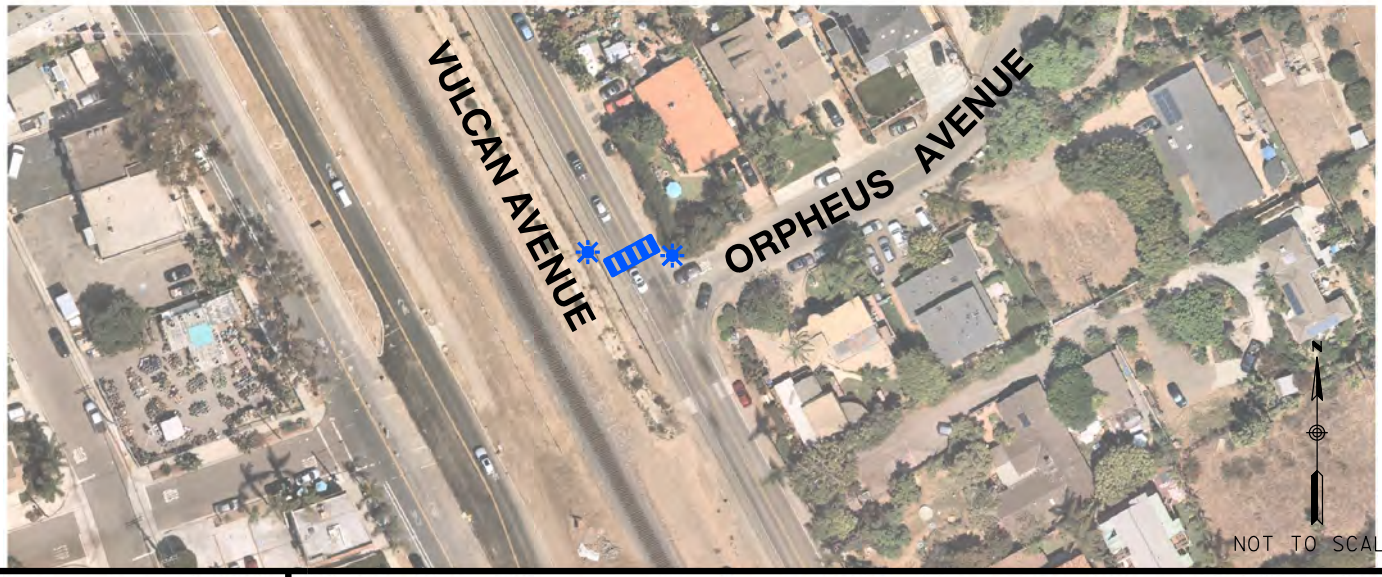
RICK ENGINEERING COMPANY

EXHIBIT 13

LA COSTA AVENUE/SHERIDAN ROAD MINI-ROUNDABOUT OPTION 2 (75' INSCRIBED DIAMETER)

DESIGN VEHICLES: AASHTO SU-30

LA COSTA AVENUE CORRIDOR ANALYSIS



RICK ENGINEERING COMPANY

EXHIBIT 14

VULCAN AVENUE - PLANNED RAISED CROSSWALKS WITH RECTANGULAR RAPID FLASHING BEACONS

LA COSTA AVENUE CORRIDOR ANALYSIS

LEGEND

- =PLANNED RECTANGULAR RAPID FLASHING BEACON
- =PLANNED RAISED CROSSWALK

RICK ENGINEERING COMPANY

EXHIBIT 15

VULCAN AVENUE - PROPOSED ADDITIONAL RAISED CROSSWALKS WITH RECTANGULAR RAPID FLASHING BEACON
LA COSTA AVENUE CORRIDOR ANALYSIS

LEGEND

- =PROPOSED RECTANGULAR RAPID FLASHING BEACON
- =PROPOSED RAISED CROSSWALK

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APPENDIX A

NEW/HISTORICAL TRAFFIC COUNTS
GROWTH ADJUSTMENT CALCULATIONS

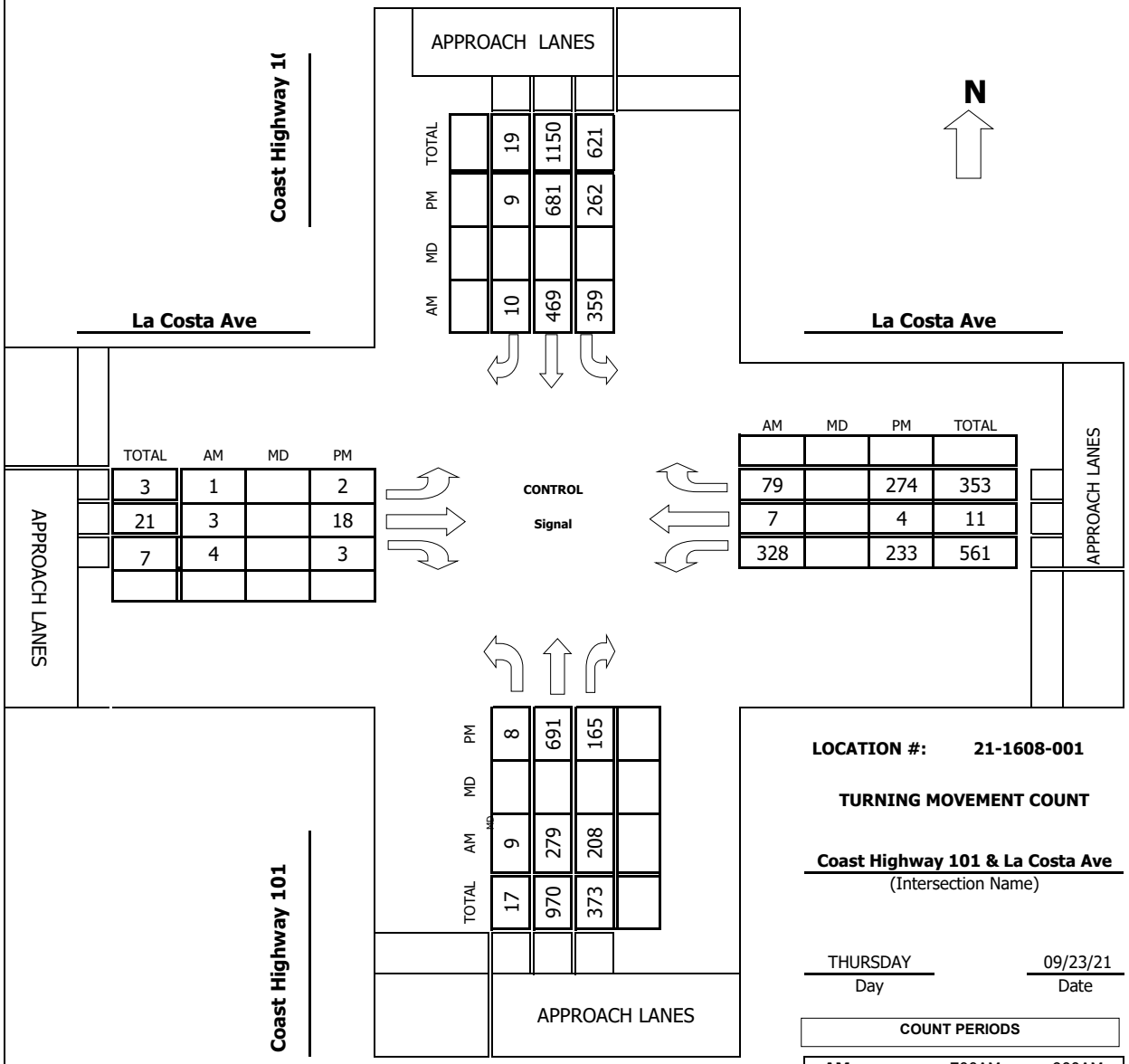
2021 TRAFFIC COUNTS

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 21-1608-001

TMC SUMMARY OF Coast Highway 101 & La Costa Ave



LOCATION #: 21-1608-001

TURNING MOVEMENT COUNT

Coast Highway 101 & La Costa Ave
(Intersection Name)

THURSDAY (Day) 09/23/21 (Date)

COUNT PERIODS			
AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 800 AM

NOON PEAK HOUR

PM PEAK HOUR 400 PM

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Coast Highway 101	DATE:	09/23/21	LOCATION:	Encinitas
E-W STREET:	La Costa Ave	DAY:	THURSDAY	PROJECT#	21-1608-001

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	1	1	2	1	0	1	0	0.5	0.5	1	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	1	74	28	43	108	1	0	1	2	43	1	13	315
7:15 AM	4	78	24	52	125	2	0	1	1	35	5	16	343
7:30 AM	1	80	28	59	141	1	0	1	3	52	2	19	387
7:45 AM	2	87	42	77	134	3	0	0	2	75	4	17	443
8:00 AM	3	74	50	101	131	3	0	2	0	64	1	21	450
8:15 AM	1	78	43	77	122	3	1	0	1	78	1	20	425
8:30 AM	4	56	48	83	124	3	0	1	3	76	4	20	422
8:45 AM	1	71	67	98	92	1	0	0	0	110	1	18	459
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	17	598	330	590	977	17	1	6	12	533	19	144	3244
Approach %	1.80	63.28	34.92	37.25	61.68	1.07	5.26	31.58	63.16	76.58	2.73	20.69	
App/Depart	945	/	743	1584	/	1522	19	/	926	696	/	53	

AM Peak Hr Begins at: 800 AM

PEAK													
Volumes	9	279	208	359	469	10	1	3	4	328	7	79	1756
Approach %	1.81	56.25	41.94	42.84	55.97	1.19	12.50	37.50	50.00	79.23	1.69	19.08	
PEAK HR. FACTOR:		0.892			0.891			0.500			0.802		0.956

CONTROL:	Signal
COMMENT 1:	
GPS:	33.082555, -117.308824

Intersection Turning Movement

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Coast Highway 101 0	DATE:	09/23/21	LOCATION:	Encinitas
E-W STREET:	La Costa Ave	DAY:	THURSDAY	PROJECT#	21-1608-001

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	1	1	2	1	0	1	0	0.5	0.5	1	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	0	151	31	65	275	4	1	8	0	45	0	72	652
4:15 PM	5	178	43	58	186	3	0	4	0	72	1	68	618
4:30 PM	3	172	38	95	114	1	0	2	1	61	3	65	555
4:45 PM	0	190	53	44	106	1	1	4	2	55	0	69	525
5:00 PM	6	155	46	49	83	0	3	4	1	87	2	56	492
5:15 PM	3	187	32	67	98	1	0	1	2	97	1	47	536
5:30 PM	2	147	39	90	104	2	0	4	0	89	1	48	526
5:45 PM	1	146	36	67	89	0	0	2	3	87	1	48	480
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	20	1326	318	535	1055	12	5	29	9	593	9	473	4384
Approach %	1.20	79.69	19.11	33.40	65.86	0.75	11.63	67.44	20.93	55.16	0.84	44.00	
App/Depart	1664	/	1804	1602	/	1657	43	/	882	1075	/	41	

PM Peak Hr Begins at: 400 PM

PEAK													
Volumes	8	691	165	262	681	9	2	18	3	233	4	274	2350
Approach %	0.93	79.98	19.10	27.52	71.53	0.95	8.70	78.26	13.04	45.60	0.78	53.62	

PEAK HR. FACTOR:	0.889	0.692	0.639	0.906	0.901

CONTROL:	Signal
COMMENT 1:	0
GPS:	33.082555, -117.308824

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

Pedestrian & Bicycle Study

N-S STREET: Coast Highway 101
E-W STREET: La Costa Ave

Date: 09/23/21
Day: THURSDAY

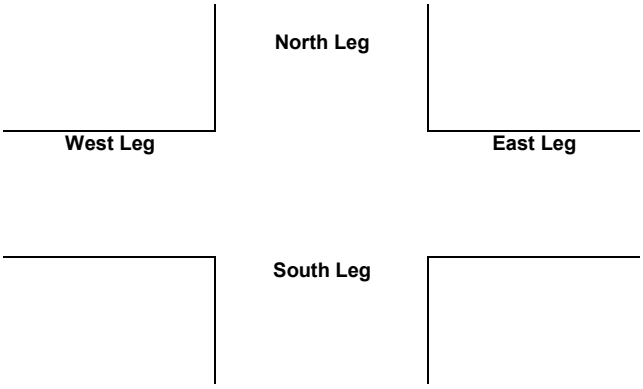
City: Encinitas
Project #: 21-1608-001

	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	0	0	1
7:15 AM	0	1	0	2
7:30 AM	0	1	0	1
7:45 AM	0	0	1	1
8:00 AM	0	0	1	1
8:15 AM	0	1	0	2
8:30 AM	0	1	0	3
8:45 AM	0	0	1	0
TOTAL	**0**	**4**	**3**	**11**

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	0	0	1
7:15 AM	0	0	0	1
7:30 AM	0	0	0	0
7:45 AM	0	0	0	2
8:00 AM	0	0	0	1
8:15 AM	0	0	1	0
8:30 AM	0	0	0	3
8:45 AM	0	0	2	1
TOTAL	**0**	**0**	**3**	**9**

	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	1
4:15 PM	0	0	2	1
4:30 PM	0	0	1	1
4:45 PM	0	2	0	1
5:00 PM	0	0	1	1
5:15 PM	0	4	0	2
5:30 PM	3	0	1	0
5:45 PM	0	4	0	3
TOTAL	**3**	**10**	**5**	**10**

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	8
4:15 PM	0	0	1	5
4:30 PM	0	0	0	4
4:45 PM	0	0	1	4
5:00 PM	0	0	2	4
5:15 PM	0	0	0	4
5:30 PM	0	0	1	3
5:45 PM	0	0	0	2
TOTAL	**0**	**0**	**5**	**34**

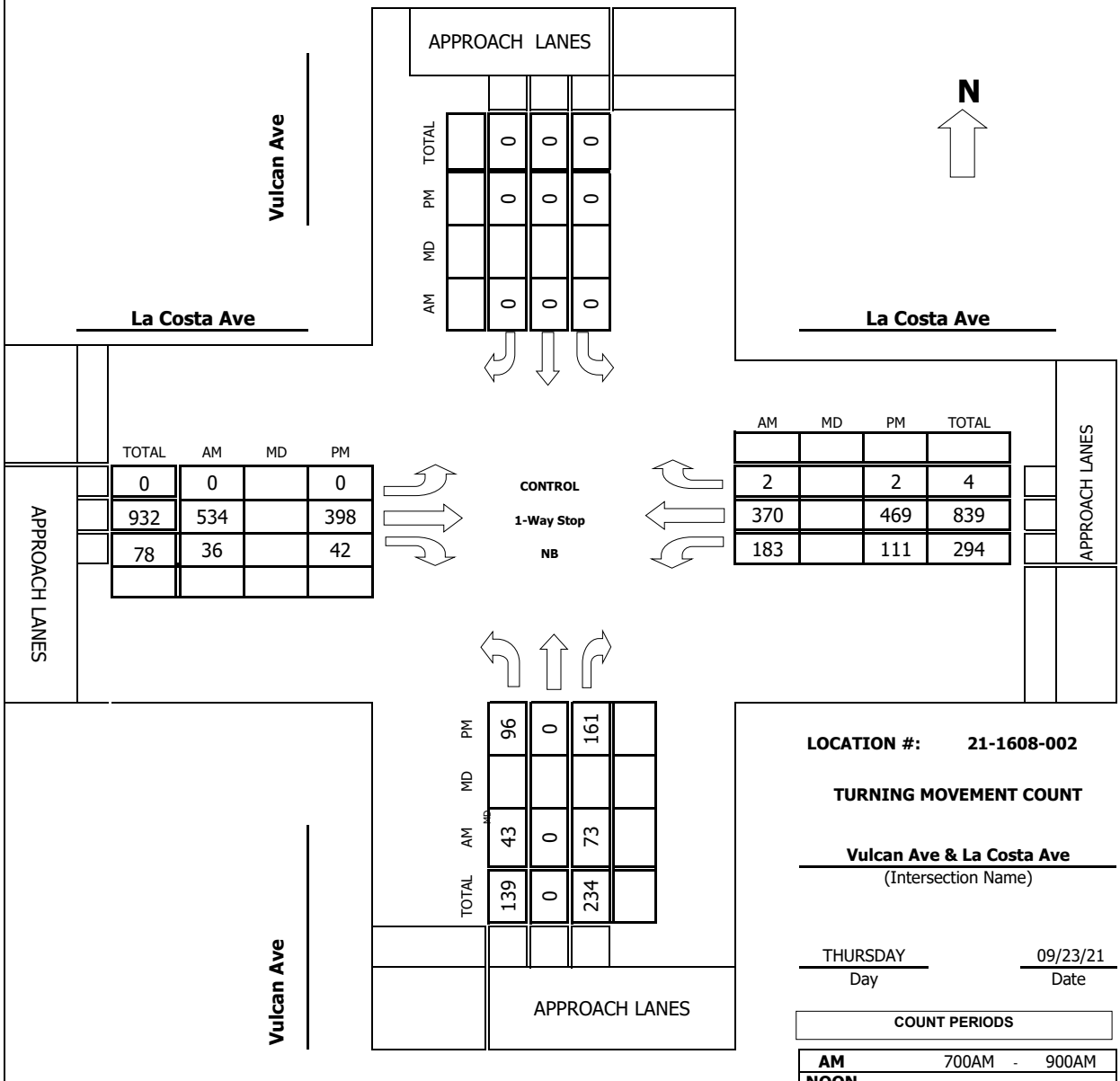


Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 21-1608-002

TMC SUMMARY OF Vulcan Ave & La Costa Ave



LOCATION #: 21-1608-002

TURNING MOVEMENT COUNT

Vulcan Ave & La Costa Ave
(Intersection Name)

THURSDAY (Day) 09/23/21 (Date)

COUNT PERIODS			
AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 800 AM

NOON PEAK HOUR

PM PEAK HOUR 500 PM

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Vulcan Ave	DATE:	09/23/21	LOCATION:	Encinitas
E-W STREET:	La Costa Ave	DAY:	THURSDAY	PROJECT#	21-1608-002

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	0	1	0	1	0	0	1	0	0	1	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	13	0	11	0	0	0	0	64	8	30	45	0	171
7:15 AM	15	0	13	1	0	0	0	68	9	33	41	0	180
7:30 AM	14	0	18	0	0	0	0	77	11	43	59	0	222
7:45 AM	10	0	17	0	0	0	0	108	10	41	86	0	272
8:00 AM	11	0	17	0	0	0	0	146	7	54	75	1	311
8:15 AM	13	0	19	0	0	0	0	106	14	59	86	1	298
8:30 AM	13	0	18	0	0	0	0	122	10	41	87	0	291
8:45 AM	6	0	19	0	0	0	0	160	5	29	122	0	341
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	95	0	132	1	0	0	0	851	74	330	601	2	2086
Approach %	41.85	0.00	58.15	100.00	0.00	0.00	0.00	92.00	8.00	35.37	64.42	0.21	
App/Depart	227	/	2	1	/	404	925	/	984	933	/	696	

AM Peak Hr Begins at: 800 AM

PEAK													
Volumes	43	0	73	0	0	0	0	534	36	183	370	2	1241
Approach %	37.07	0.00	62.93	####	####	####	0.00	93.68	6.32	32.97	66.67	0.36	
PEAK HR. FACTOR:	0.906			0.000			0.864			0.919			0.910

CONTROL:	1-Way Stop (NB)
COMMENT 1:	North leg is a driveway
GPS:	33.083369, -117.307198

Intersection Turning Movement

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Vulcan Ave 0	DATE:	09/23/21	LOCATION:	Encinitas
E-W STREET:	La Costa Ave	DAY:	THURSDAY	PROJECT#	21-1608-002

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	0	1	0	1	0	0	1	0	0	1	0	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	20	1	59	0	0	0	0	91	12	25	97	1	306
4:15 PM	28	1	52	0	0	0	0	95	10	32	113	0	331
4:30 PM	34	0	48	0	0	0	0	116	18	25	96	0	337
4:45 PM	17	2	37	0	0	0	1	87	14	34	108	0	300
5:00 PM	24	0	35	0	0	0	0	93	7	27	121	1	308
5:15 PM	31	0	42	0	0	0	0	86	14	32	115	0	320
5:30 PM	20	0	43	0	0	0	0	123	11	28	118	0	343
5:45 PM	21	0	41	0	0	0	0	96	10	24	115	1	308
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	195	4	357	0	0	0	1	787	96	227	883	3	2553
Approach %	35.07	0.72	64.21	####	####	####	0.11	89.03	10.86	20.40	79.34	0.27	
App/Depart	556	/	8	0	/	323	884	/	1144	1113	/	1078	

PM Peak Hr Begins at: 500 PM

PEAK													
Volumes	96	0	161	0	0	0	0	398	42	111	469	2	1279
Approach %	37.35	0.00	62.65	####	####	####	0.00	90.45	9.55	19.07	80.58	0.34	
PEAK HR. FACTOR:	0.880			0.000			0.821			0.977			0.932

CONTROL:	1-Way Stop (NB)
COMMENT 1:	North leg is a driveway
GPS:	33.083369, -117.307198

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

Pedestrian & Bicycle Study

N-S STREET: Vulcan Ave
E-W STREET: La Costa Ave

Date: 09/23/21
Day: THURSDAY

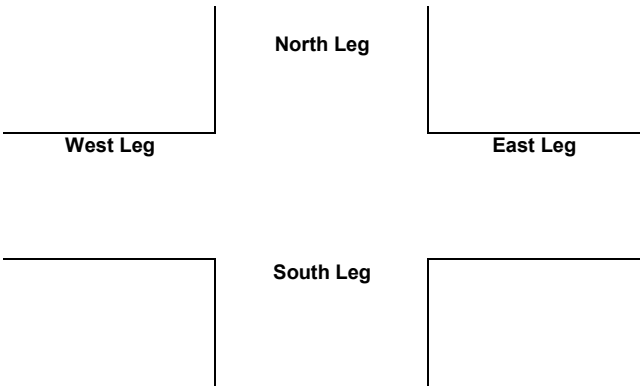
City: Encinitas
Project #: 21-1608-002

	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	0	0	0
7:15 AM	0	1	0	0
7:30 AM	0	0	0	1
7:45 AM	0	1	0	0
8:00 AM	0	0	1	0
8:15 AM	0	0	0	0
8:30 AM	0	2	0	0
8:45 AM	0	1	0	0
TOTAL	**0**	**5**	**1**	**1**

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	0	0	0
7:15 AM	1	1	0	0
7:30 AM	0	0	0	0
7:45 AM	1	1	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	1	1	0	0
8:45 AM	0	0	0	0
TOTAL	**3**	**3**	**0**	**0**

	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	0	0	0	1
4:30 PM	0	0	1	0
4:45 PM	0	2	0	0
5:00 PM	0	0	0	0
5:15 PM	0	3	0	1
5:30 PM	0	2	2	0
5:45 PM	0	4	0	0
TOTAL	**0**	**11**	**3**	**2**

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	2	1	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	1	2	0	0
5:00 PM	1	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	1	0	0
5:45 PM	1	0	0	0
TOTAL	**5**	**4**	**0**	**0**

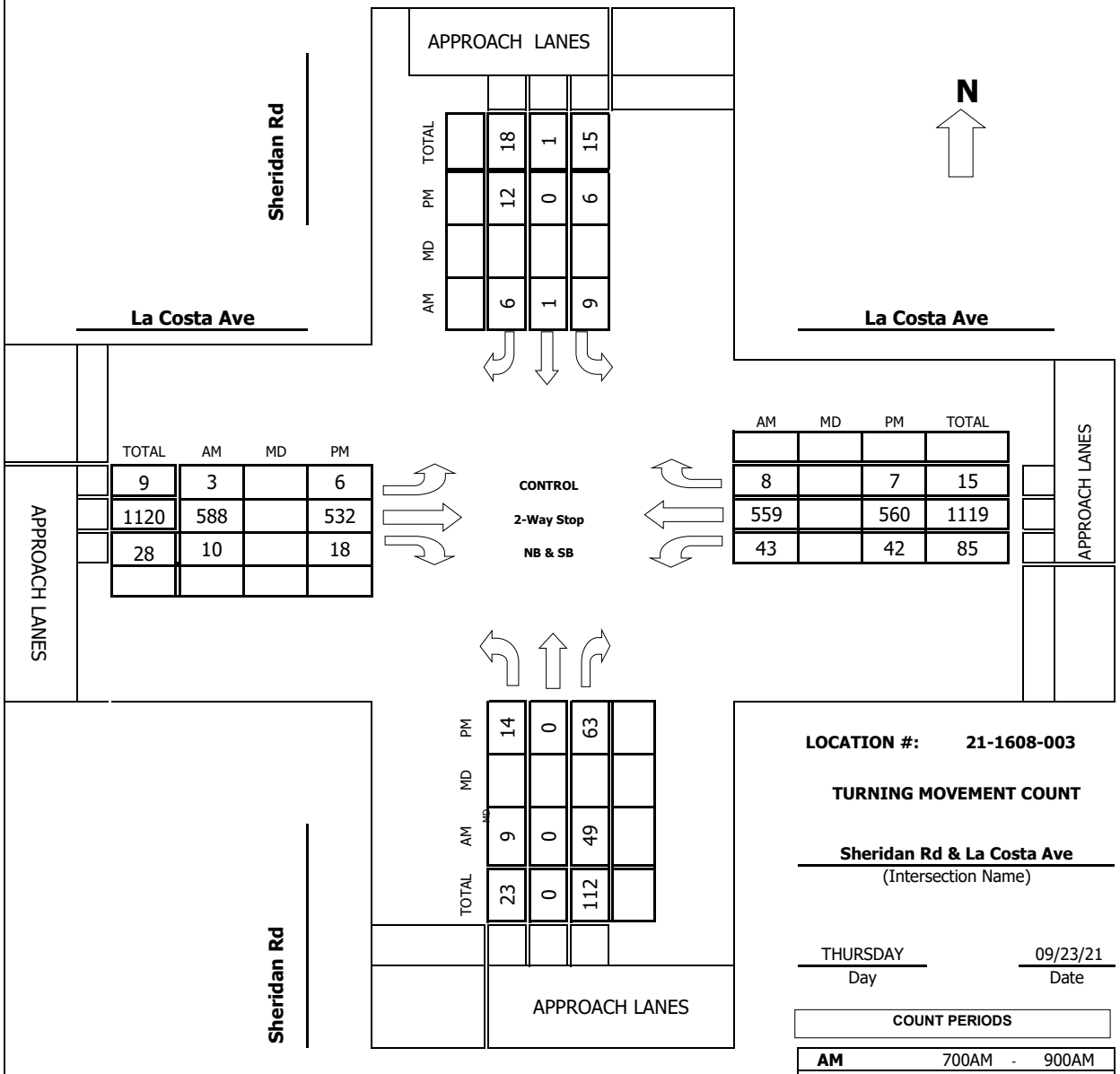


Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 21-1608-003

TMC SUMMARY OF Sheridan Rd & La Costa Ave



LOCATION #: 21-1608-003

TURNING MOVEMENT COUNT

Sheridan Rd & La Costa Ave
(Intersection Name)

THURSDAY (Day) 09/23/21 (Date)

COUNT PERIODS

AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 800 AM

NOON PEAK HOUR

PM PEAK HOUR 415 PM

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Sheridan Rd	DATE:	09/23/21	LOCATION:	Encinitas
E-W STREET:	La Costa Ave	DAY:	THURSDAY	PROJECT#	21-1608-003

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	1	0	0	1	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	3	0	10	1	0	0	1	71	1	8	76	1	172
7:15 AM	1	0	14	1	0	0	0	85	1	13	74	1	190
7:30 AM	2	0	23	8	0	1	0	92	2	6	103	0	237
7:45 AM	3	0	18	11	0	1	4	123	3	11	122	4	300
8:00 AM	0	0	12	5	0	2	1	160	3	10	131	2	326
8:15 AM	3	0	10	0	0	2	0	125	1	14	143	1	299
8:30 AM	5	0	13	2	0	1	1	134	3	11	133	4	307
8:45 AM	1	0	14	2	1	1	1	169	3	8	152	1	353
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	18	0	114	30	1	8	8	959	17	81	934	14	2184
Approach %	13.64	0.00	86.36	76.92	2.56	20.51	0.81	97.46	1.73	7.87	90.77	1.36	
App/Depart	132	/	22	39	/	99	984	/	1103	1029	/	960	

AM Peak Hr Begins at: 800 AM

PEAK													
Volumes	9	0	49	9	1	6	3	588	10	43	559	8	1285
Approach %	15.52	0.00	84.48	56.25	6.25	37.50	0.50	97.84	1.66	7.05	91.64	1.31	
PEAK HR. FACTOR:	0.806			0.571			0.868			0.947			0.910

CONTROL:	2-Way Stop (NB & SB)
COMMENT 1:	
GPS:	33.084029, -117.302898

Intersection Turning Movement

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Sheridan Rd 0	DATE:	09/23/21	LOCATION:	Encinitas
E-W STREET:	La Costa Ave	DAY:	THURSDAY	PROJECT#	21-1608-003

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	1	0	0	1	0	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	5	4	10	1	2	0	0	145	2	5	108	2	284
4:15 PM	2	0	16	0	0	7	1	143	4	8	126	1	308
4:30 PM	3	0	26	2	0	4	1	150	5	6	133	3	333
4:45 PM	4	0	13	2	0	0	0	120	6	10	146	1	302
5:00 PM	5	0	8	2	0	1	4	119	3	18	155	2	317
5:15 PM	1	0	11	0	0	0	9	116	6	10	151	1	305
5:30 PM	2	1	13	0	0	1	0	158	5	10	143	1	334
5:45 PM	1	0	9	1	0	1	0	143	2	8	128	2	295
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	23	5	106	8	2	14	15	1094	33	75	1090	13	2478
Approach %	17.16	3.73	79.10	33.33	8.33	58.33	1.31	95.80	2.89	6.37	92.53	1.10	
App/Depart	134	/	33	24	/	110	1142	/	1208	1178	/	1127	

PM Peak Hr Begins at: 415 PM

PEAK													
Volumes	14	0	63	6	0	12	6	532	18	42	560	7	1260
Approach %	18.18	0.00	81.82	33.33	0.00	66.67	1.08	95.68	3.24	6.90	91.95	1.15	
PEAK HR. FACTOR:		0.664			0.643			0.891			0.870		0.946

CONTROL:	2-Way Stop (NB & SB)
COMMENT 1:	0
GPS:	33.084029, -117.302898

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

Pedestrian & Bicycle Study

N-S STREET: Sheridan Rd
E-W STREET: La Costa Ave

Date: 09/23/21
Day: THURSDAY

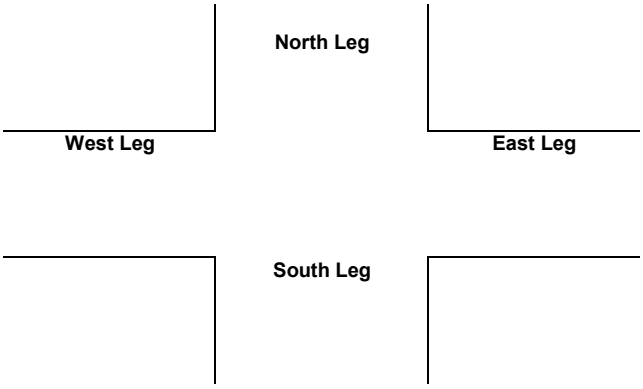
City: Encinitas
Project #: 21-1608-003

	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	0	0	0
7:15 AM	0	2	1	0
7:30 AM	0	0	0	0
7:45 AM	1	3	2	0
8:00 AM	0	0	3	0
8:15 AM	0	0	0	1
8:30 AM	0	2	0	0
8:45 AM	0	3	2	1
TOTAL	**1**	**10**	**8**	**2**

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	3	3	0	0
7:15 AM	1	2	0	0
7:30 AM	0	0	0	0
7:45 AM	0	1	0	0
8:00 AM	0	1	0	0
8:15 AM	2	1	0	0
8:30 AM	2	2	0	0
8:45 AM	0	1	0	0
TOTAL	**8**	**11**	**0**	**0**

	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	1	0
4:15 PM	0	0	1	0
4:30 PM	0	0	0	0
4:45 PM	0	0	1	0
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	1	2	0
5:45 PM	0	1	0	0
TOTAL	**0**	**2**	**5**	**0**

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	2	2	0	0
4:30 PM	5	3	0	0
4:45 PM	1	1	0	0
5:00 PM	1	1	0	0
5:15 PM	1	0	0	0
5:30 PM	0	1	0	0
5:45 PM	0	0	0	0
TOTAL	**10**	**8**	**0**	**0**



Prepared by: Field Data Services of Arizona/Veracity Traffic Group (520) 316-6745

Volumes for: Thursday, September 23, 2021 City: Encinitas Project #: 21-1608-004

Location: La Costa Ave btwn Coast Highway 101 & Vulcan Ave

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			12		3			12:00			74		132		
00:15			3		10			12:15			87		137		
00:30			1		9			12:30			80		130		
00:45			6	22	7	29	51	12:45			88	329	99	498	827
01:00			9		4			13:00			89		112		
01:15			1		7			13:15			94		115		
01:30			6		3			13:30			102		106		
01:45			3	19	6	20	39	13:45			91	376	98	431	807
02:00			4		8			14:00			94		98		
02:15			3		3			14:15			103		87		
02:30			1		4			14:30			120		110		
02:45			0	8	4	19	27	14:45			92	409	116	411	820
03:00			1		1			15:00			79		124		
03:15			0		0			15:15			108		102		
03:30			2		3			15:30			95		95		
03:45			4	7	5	9	16	15:45			117	399	108	429	828
04:00			2		3			16:00			103		116		
04:15			7		6			16:15			104		142		
04:30			5		5			16:30			137		130		
04:45			4	18	7	21	39	16:45			100	444	122	510	954
05:00			12		12			17:00			101		141		
05:15			12		7			17:15			101		155		
05:30			34		9			17:30			142		137		
05:45			24	82	40	68	150	17:45			101	445	135	568	1013
06:00			30		26			18:00			110		120		
06:15			41		31			18:15			95		111		
06:30			53		40			18:30			94		107		
06:45			50	174	55	152	326	18:45			75	374	64	402	776
07:00			74		61			19:00			88		74		
07:15			80		55			19:15			80		80		
07:30			90		78			19:30			72		52		
07:45			120	364	97	291	655	19:45			76	316	57	263	579
08:00			157		87			20:00			65		46		
08:15			122		99			20:15			60		39		
08:30			129		99			20:30			55		29		
08:45			169	577	132	417	994	20:45			65	245	48	162	407
09:00			116		95			21:00			69		46		
09:15			96		97			21:15			64		62		
09:30			113		93			21:30			49		59		
09:45			107	432	90	375	807	21:45			42	224	40	207	431
10:00			114		105			22:00			36		36		
10:15			120		83			22:15			32		33		
10:30			102		100			22:30			38		29		
10:45			99	435	108	396	831	22:45			21	127	17	115	242
11:00			90		91			23:00			21		21		
11:15			98		105			23:15			17		17		
11:30			87		104			23:30			8		11		
11:45			74	349	120	420	769	23:45			10	56	15	64	120
Total Vol.			2487		2217		**4704**				3744		4060		**7804**

GPS Coordinates: 33.083076, -117.307934

Daily Totals

NB	SB	EB	WB	Combined
		6231	6277	**12508**

	AM			PM		
Split %	52.9%	47.1%	**37.6%**	48.0%	52.0%	**62.4%**
Peak Hour	08:00	11:45	**08:00**	15:45	17:00	**17:00**
Volume	577	519	**994**	461	568	**1013**
P.H.F.	0.85	0.95	**0.83**	0.84	0.92	**0.91**

Prepared by: Field Data Services of Arizona/Veracity Traffic Group (520) 316-6745

Volumes for: Thursday, September 23, 2021 City: Encinitas Project #: 21-1608-005

Location: La Costa Ave btwn Vulcan Ave & Sheridan Rd

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			12		9			12:00			98		128		
00:15			11		13			12:15			87		122		
00:30			10		11			12:30			74		121		
00:45			7	40	10	43	83	12:45			78	337	104	475	812
01:00			4		14			13:00			80		108		
01:15			8		8			13:15			89		89		
01:30			5		5			13:30			99		99		
01:45			9	26	9	36	62	13:45			90	358	90	386	744
02:00			6		6			14:00			103		98		
02:15			3		3			14:15			111		87		
02:30			2		2			14:30			108		74		
02:45			5	16	5	16	32	14:45			101	423	116	375	798
03:00			2		2			15:00			108		103		
03:15			1		1			15:15			106		111		
03:30			4		4			15:30			123		108		
03:45			1	8	1	8	16	15:45			146	483	126	448	931
04:00			5		2			16:00			155		123		
04:15			8		1			16:15			146		141		
04:30			5		3			16:30			163		128		
04:45			9	27	2	8	35	16:45			130	594	143	535	1129
05:00			19		5			17:00			128		150		
05:15			20		8			17:15			129		150		
05:30			24		9			17:30			160		143		
05:45			41	104	11	33	137	17:45			137	554	139	582	1136
06:00			45		20			18:00			114		131		
06:15			40		24			18:15			108		117		
06:30			45		41			18:30			99		78		
06:45			85	215	50	135	350	18:45			90	411	80	406	817
07:00			89		69			19:00			98		85		
07:15			99		74			19:15			87		86		
07:30			90		99			19:30			74		60		
07:45			136	414	128	370	784	19:45			75	334	65	296	630
08:00			158		133			20:00			50		58		
08:15			146		141			20:15			59		54		
08:30			166		126			20:30			60		74		
08:45			176	646	143	543	1189	20:45			65	234	78	264	498
09:00			155		116			21:00			58		80		
09:15			128		125			21:15			52		87		
09:30			122		107			21:30			43		74		
09:45			131	536	99	447	983	21:45			39	192	45	286	478
10:00			108		90			22:00			30		50		
10:15			128		85			22:15			32		54		
10:30			111		106			22:30			28		42		
10:45			107	454	88	369	823	22:45			24	114	21	167	281
11:00			85		106			23:00			21		19		
11:15			89		101			23:15			19		16		
11:30			99		108			23:30			16		13		
11:45			90	363	122	437	800	23:45			13	69	13	61	130
Total Vol.			2849		2445		**5294**				4103		4281		**8384**

GPS Coordinates: 33.083883, -117.305273

Daily Totals

NB	SB	EB	WB	Combined
		6952	6726	**13678**

	AM			PM		
Split %	53.8%	46.2%	**38.7%**	48.9%	51.1%	**61.3%**
Peak Hour	08:00	08:00	**08:00**	15:45	16:45	**17:00**
Volume	646	543	**1189**	610	586	**1136**
P.H.F.	0.92	0.95	**0.93**	0.94	0.98	**0.94**

Prepared by: Field Data Services of Arizona/Veracity Traffic Group (520) 316-6745

Volumes for: Thursday, September 23, 2021 City: Encinitas Project #: 21-1608-006

Location: La Costa Ave btwn Sheridan Rd & I-5

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			9		7			12:00			131		158		
00:15			3		13			12:15			154		157		
00:30			2		12			12:30			119		152		
00:45			8	22	8	40	62	12:45			143	547	125	592	1139
01:00			10		7			13:00			137		152		
01:15			2		9			13:15			144		120		
01:30			10		6			13:30			139		115		
01:45			3	25	8	30	55	13:45			150	570	119	506	1076
02:00			3		9			14:00			145		121		
02:15			2		3			14:15			142		123		
02:30			4		8			14:30			154		160		
02:45			4	13	5	25	38	14:45			152	593	139	543	1136
03:00			2		1			15:00			148		142		
03:15			0		1			15:15			153		136		
03:30			4		5			15:30			138		139		
03:45			6	12	8	15	27	15:45			140	579	122	539	1118
04:00			4		5			16:00			163		120		
04:15			5		5			16:15			166		136		
04:30			10		10			16:30			178		143		
04:45			11	30	7	27	57	16:45			140	647	152	551	1198
05:00			17		14			17:00			133		171		
05:15			30		16			17:15			136		165		
05:30			46		18			17:30			169		155		
05:45			35	128	43	91	219	17:45			152	590	140	631	1221
06:00			50		40			18:00			132		157		
06:15			72		54			18:15			141		146		
06:30			89		70			18:30			120		123		
06:45			99	310	86	250	560	18:45			98	491	112	538	1029
07:00			89		87			19:00			108		105		
07:15			99		89			19:15			100		102		
07:30			128		111			19:30			88		77		
07:45			149	465	141	428	893	19:45			77	373	87	371	744
08:00			169		152			20:00			60		71		
08:15			138		161			20:15			60		64		
08:30			151		150			20:30			61		43		
08:45			181	639	163	626	1265	20:45			45	226	67	245	471
09:00			187		136			21:00			54		65		
09:15			174		127			21:15			62		77		
09:30			146		116			21:30			47		73		
09:45			163	670	119	498	1168	21:45			45	208	59	274	482
10:00			139		118			22:00			34		51		
10:15			146		100			22:15			31		38		
10:30			129		108			22:30			31		36		
10:45			152	566	126	452	1018	22:45			22	118	26	151	269
11:00			137		116			23:00			21		29		
11:15			147		127			23:15			13		25		
11:30			142		122			23:30			10		16		
11:45			145	571	155	520	1091	23:45			11	55	21	91	146
Total Vol.			3451		3002		**6453**				4997		5032		**10029**

GPS Coordinates: 33.084055, -117.300986

Daily Totals

NB	SB	EB	WB	Combined
		8448	8034	**16482**

	AM			PM		
Split %	53.5%	46.5%	**39.2%**	49.8%	50.2%	**60.8%**
Peak Hour	08:30	08:00	**08:30**	15:45	16:45	**16:45**
Volume	693	626	**1269**	647	643	**1221**
P.H.F.	0.93	0.96	**0.92**	0.91	0.94	**0.94**

2019 TRAFFIC COUNTS

Prepared by National Data & Surveying Services

I-5 SB Ramps & La Costa Ave

Peak Hour Turning Movement Count

ID: 19-04220-001
City: Encinitas

Day: Thursday
Date: 05/16/2019

PEAK HOURS	COUNT PERIODS
07:30 AM - 08:30 AM	07:00 AM - 09:00 AM
NONE	NONE
05:00 PM - 06:00 PM	04:00 PM - 06:00 PM

I-5 SB Ramps — SOUTHBOUND

AM	287	4	508	0	0	AM
NOON	0	0	0	0	0	NOON
PM	163	1	451	0	0	PM
	1	0.5	1.5	0		

EASTBOUND — La Costa Ave

AM	NOON	PM	
734	0	647	⇦
0	0	0	0
0	0	0	0
617	0	507	2
67	0	67	0
AM	NOON	PM	

WESTBOUND — La Costa Ave

PM	NOON	AM	
0	0	0	0
484	0	447	2
738	0	655	2
0	0	2	0
958	0	1127	⇨
PM	NOON	AM	

CONTROL

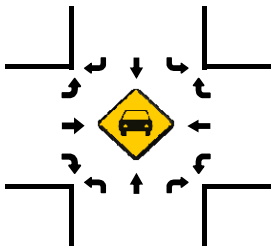
Signalized

TEV	2587	0	2411
	AM	NOON	PM
PHF	0.92		0.93

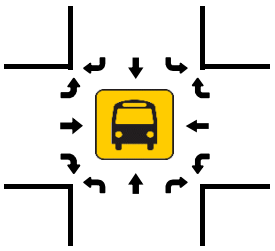
I-5 SB Ramps — NORTHBOUND

	0	0	0	0		
PM	806	0	0	0	0	PM
NOON	0	0	0	0	0	NOON
AM	726	0	0	0	0	AM

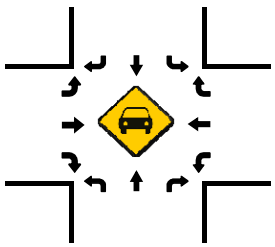
Total Vehicles (AM)



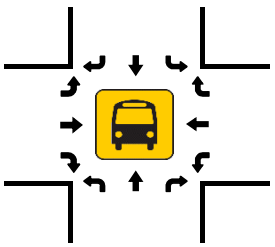
Total Vehicles (AM)



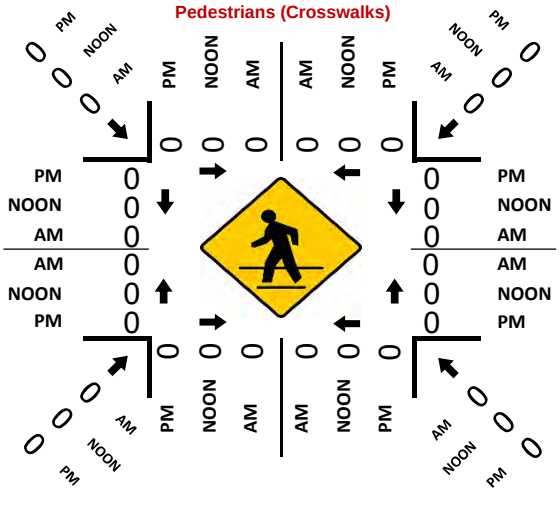
Total Vehicles (NOON)



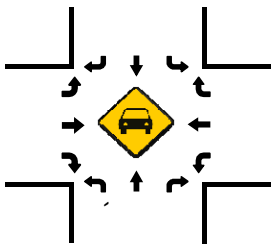
Total Vehicles (NOON)



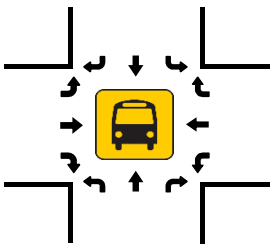
Pedestrians (Crosswalks)



Total Vehicles (PM)



Total Vehicles (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: I-5 SB Ramps & La Costa Ave
City: Encinitas
Control: Signalized

Project ID: 19-04220-001
Date: 5/16/2019

Total

NS/EW Streets:	I-5 SB Ramps				I-5 SB Ramps				La Costa Ave				La Costa Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1.5	0.5	1	0	0	2	0	0	2	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	0	0	0	62	8	48	0	0	113	25	0	160	69	0	0	485
7:15 AM	0	0	0	0	72	3	61	0	0	162	20	0	156	89	0	0	563
7:30 AM	0	0	0	0	101	3	67	0	0	163	18	0	188	85	0	1	626
7:45 AM	0	0	0	0	142	0	65	0	0	170	18	0	168	137	0	0	700
8:00 AM	0	0	0	0	130	0	78	0	0	145	17	0	170	124	0	1	665
8:15 AM	0	0	0	0	135	1	77	0	0	139	14	0	129	101	0	0	596
8:30 AM	0	0	0	0	146	1	59	0	0	120	18	0	106	83	0	0	533
8:45 AM	0	0	0	0	137	1	57	0	0	142	16	0	77	96	0	0	526
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	925	17	512	0	0	1154	146	0	1154	784	0	2	4694
APPROACH %'s :					63.62%	1.17%	35.21%	0.00%	0.00%	88.77%	11.23%	0.00%	59.48%	40.41%	0.00%	0.10%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	508	4	287	0	0	617	67	0	655	447	0	2	2587
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.894	0.333	0.920	0.000	0.000	0.907	0.931	0.000	0.871	0.816	0.000	0.500	0.924
					0.938				0.910				0.905				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1.5	0.5	1	0	0	2	0	0	2	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	102	1	32	0	0	118	20	0	156	101	0	0	530
4:15 PM	0	0	0	0	111	0	34	0	0	108	20	0	162	121	0	0	556
4:30 PM	0	0	0	0	120	0	36	0	0	131	26	0	186	127	0	0	626
4:45 PM	0	0	0	0	101	1	39	0	0	112	30	0	162	114	0	0	559
5:00 PM	0	0	0	0	110	1	47	0	0	119	14	0	184	105	0	0	580
5:15 PM	0	0	0	0	113	0	39	0	0	134	19	0	195	120	0	0	620
5:30 PM	0	0	0	0	119	0	42	0	0	148	19	0	190	129	0	0	647
5:45 PM	0	0	0	0	109	0	35	0	0	106	15	0	169	130	0	0	564
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	885	3	304	0	0	976	163	0	1404	947	0	0	4682
APPROACH %'s :					74.24%	0.25%	25.50%	0.00%	0.00%	85.69%	14.31%	0.00%	59.72%	40.28%	0.00%	0.00%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	451	1	163	0	0	507	67	0	738	484	0	0	2411
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.947	0.250	0.867	0.000	0.000	0.856	0.882	0.000	0.946	0.931	0.000	0.000	0.932
					0.955				0.859				0.958				

Prepared by National Data & Surveying Services

N Coast Hwy 101 & La Costa Ave

Peak Hour Turning Movement Count

ID: 19-04220-003
City: Encinitas

Day: Thursday
Date: 05/16/2019

PEAK HOURS

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

COUNT PERIODS

AM: 07:00 AM - 09:00 AM
NOON: NONE
PM: 04:00 PM - 06:00 PM

N Coast Hwy 101 — SOUTHBOUND

AM	0	1040	243	6	285	AM
NOON	0	0	0	0	0	NOON
PM	0	372	183	21	754	PM

La Costa Ave — EASTBOUND

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

WESTBOUND — La Costa Ave

PM	NOON	AM	
220	0	71	1
0	0	0	1
281	0	248	0
0	0	0	0
402	0	444	
PM	NOON	AM	

N Coast Hwy 101 — NORTHBOUND

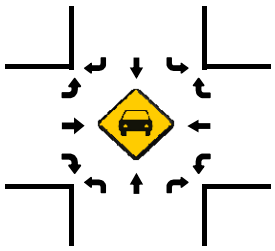
PM	653	0	0	513	219	PM
NOON	0	0	0	0	0	NOON
AM	1288	0	0	208	201	AM

	0	2	1	0
	0	0	2	1

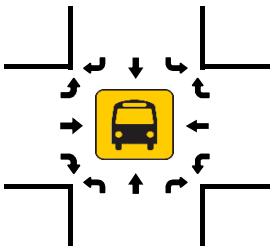
CONTROL: Signalized

TEV	2017	0	1809
	AM	NOON	PM
PHF	0.97		0.90

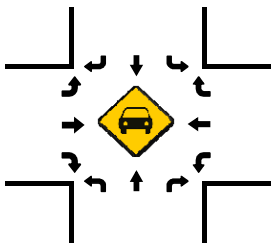
Total Vehicles (AM)



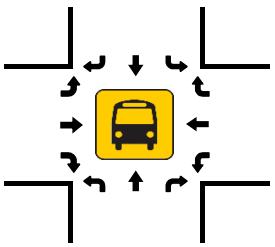
Total Vehicles (AM)



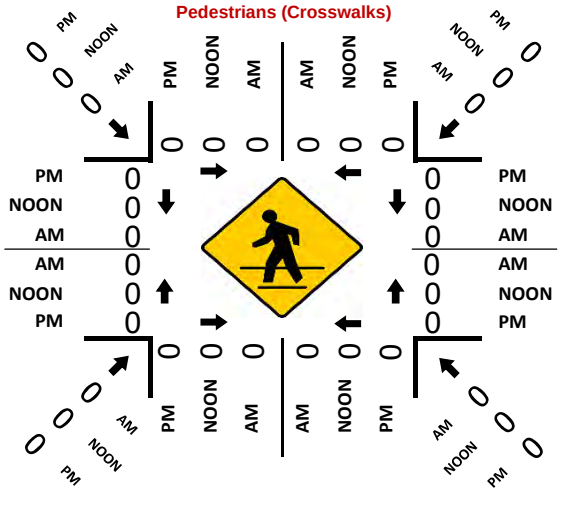
Total Vehicles (NOON)



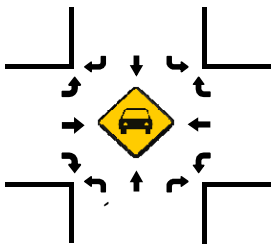
Total Vehicles (NOON)



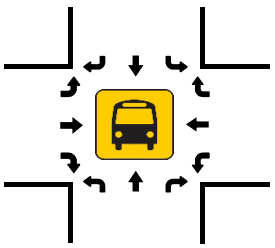
Pedestrians (Crosswalks)



Total Vehicles (PM)



Total Vehicles (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: N Coast Hwy 101 & La Costa Ave
City: Encinitas
Control: Signalized

Project ID: 19-04220-003
Date: 5/16/2019

Total

NS/EW Streets:	N Coast Hwy 101				N Coast Hwy 101				La Costa Ave				La Costa Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	1	0	1	2	0	0	0	0	0	0	0	1	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	47	48	0	61	270	0	2	0	0	0	0	50	0	17	0	495
7:15 AM	0	48	45	0	52	272	0	1	0	0	0	0	61	0	23	0	502
7:30 AM	0	58	63	0	61	251	0	1	0	0	0	0	74	0	12	0	520
7:45 AM	0	55	45	0	69	247	0	2	0	0	0	0	63	0	19	0	500
8:00 AM	0	61	54	0	53	228	0	4	0	0	0	0	69	0	25	0	494
8:15 AM	0	63	53	0	42	231	0	5	0	0	0	0	79	0	28	0	501
8:30 AM	0	67	38	0	45	224	0	2	0	0	0	0	55	0	26	0	457
8:45 AM	0	88	60	0	60	148	0	6	0	0	0	0	68	0	26	0	456
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	487	406	0	443	1871	0	23	0	0	0	0	519	0	176	0	3925
APPROACH %'s :	0.00%	54.54%	45.46%	0.00%	18.96%	80.06%	0.00%	0.98%					74.68%	0.00%	25.32%	0.00%	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	0	208	201	0	243	1040	0	6	0	0	0	0	248	0	71	0	2017
PEAK HR FACTOR :	0.000	0.897	0.798	0.000	0.880	0.956	0.000	0.750	0.000	0.000	0.000	0.000	0.838	0.000	0.772	0.000	0.970
		0.845				0.968								0.927			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	1	0	1	2	0	0	0	0	0	0	0	1	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	123	53	0	44	77	0	7	0	0	0	0	57	0	47	0	408
4:15 PM	0	128	49	0	44	84	0	6	0	0	0	0	65	0	40	0	416
4:30 PM	0	142	54	0	35	97	0	4	0	0	0	0	60	0	62	0	454
4:45 PM	0	116	43	0	40	100	0	6	0	0	0	0	59	0	44	0	408
5:00 PM	0	129	49	0	34	73	0	6	0	0	0	0	61	0	53	0	405
5:15 PM	0	147	62	0	53	106	0	2	0	0	0	0	72	0	63	0	505
5:30 PM	0	118	60	0	54	96	0	5	0	0	0	0	65	0	56	0	454
5:45 PM	0	119	48	0	42	97	0	8	0	0	0	0	83	0	48	0	445
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1022	418	0	346	730	0	44	0	0	0	0	522	0	413	0	3495
APPROACH %'s :	0.00%	70.97%	29.03%	0.00%	30.89%	65.18%	0.00%	3.93%					55.83%	0.00%	44.17%	0.00%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	0	513	219	0	183	372	0	21	0	0	0	0	281	0	220	0	1809
PEAK HR FACTOR :	0.000	0.872	0.883	0.000	0.847	0.877	0.000	0.656	0.000	0.000	0.000	0.000	0.846	0.000	0.873	0.000	0.896
		0.876				0.894								0.928			

Prepared by National Data & Surveying Services

Vulcan Ave & La Costa Ave

Peak Hour Turning Movement Count

ID: 19-04220-004
City: Encinitas

Day: Thursday
Date: 05/16/2019

PEAK HOURS	COUNT PERIODS
07:30 AM - 08:30 AM	07:00 AM - 09:00 AM
NONE	NONE
05:00 PM - 06:00 PM	04:00 PM - 06:00 PM

Vulcan Ave — SOUTHBOUND

AM	0	1	0	0	1	AM
NOON	0	0	0	0	0	NOON
PM	0	0	1	0	0	PM

EASTBOUND — La Costa Ave

AM	NOON	PM	
382	0	499	⇦
0	0	0	↶ 0
0	0	0	↱ 0
361	0	343	→ 1
82	0	56	↴ 0
AM	NOON	PM	

WESTBOUND — La Costa Ave

PM	NOON	AM	
0	0	1	↰ 0
441	0	349	← 1
123	0	261	↰ 0
0	0	0	↰ 0
496	0	544	⇨
PM	NOON	AM	

CONTROL

1-Way Stop (NB)

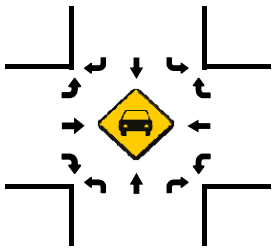
TEV	1271	0	1174
	AM	NOON	PM
PHF	0.96		0.90

Vulcan Ave — NORTHBOUND

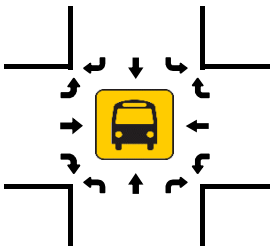
PM	179	0	58	0	152	PM
NOON	0	0	0	0	0	NOON
AM	344	0	33	0	183	AM

0 0 0 0 — 0 1 0 1

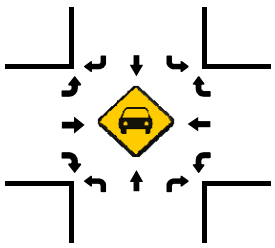
Total Vehicles (AM)



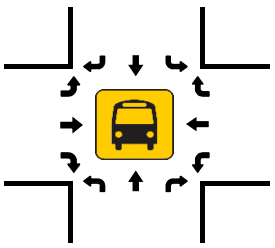
Total Vehicles (AM)



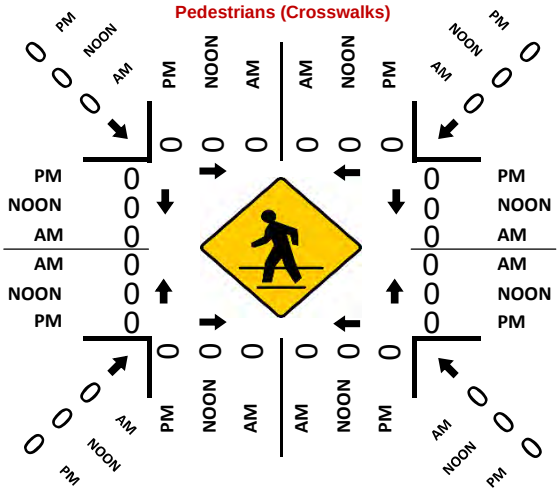
Total Vehicles (NOON)



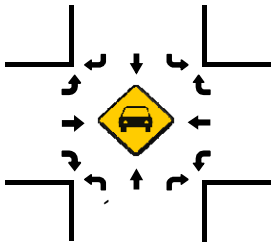
Total Vehicles (NOON)



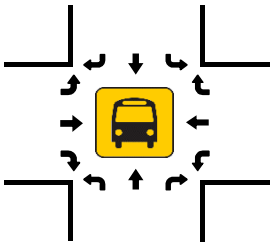
Pedestrians (Crosswalks)



Total Vehicles (PM)



Total Vehicles (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Vulcan Ave & La Costa Ave
City: Encinitas
Control: 1-Way Stop (NB)

Project ID: 19-04220-004
Date: 5/16/2019

Total

NS/EW Streets:	Vulcan Ave				Vulcan Ave				La Costa Ave				La Costa Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	10	0	43	0	0	0	0	0	0	84	22	0	38	58	0	0	255
7:15 AM	10	0	50	0	0	0	0	0	0	75	19	0	45	74	0	1	274
7:30 AM	4	0	55	0	0	0	0	0	0	109	18	0	51	83	0	0	320
7:45 AM	6	0	51	0	0	1	0	0	0	86	26	0	75	85	0	0	330
8:00 AM	7	0	40	0	0	0	0	0	0	85	21	0	71	95	0	0	319
8:15 AM	16	0	37	0	0	0	0	0	0	81	17	0	64	86	1	0	302
8:30 AM	4	0	38	0	0	0	0	0	0	65	19	0	54	73	0	0	253
8:45 AM	7	0	49	0	0	0	0	0	0	97	25	0	38	87	0	0	303
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	64	0	363	0	0	1	0	0	0	682	167	0	436	641	1	1	2356
APPROACH %'s :	14.99%	0.00%	85.01%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	80.33%	19.67%	0.00%	40.41%	59.41%	0.09%	0.09%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	33	0	183	0	0	1	0	0	0	361	82	0	261	349	1	0	1271
PEAK HR FACTOR :	0.516	0.000	0.832	0.000	0.000	0.250	0.000	0.000	0.000	0.828	0.788	0.000	0.870	0.918	0.250	0.000	0.963
	0.915				0.250				0.872				0.920				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	19	0	28	0	0	0	0	0	0	84	16	0	25	90	1	0	263
4:15 PM	10	0	40	0	0	0	0	0	0	71	20	0	26	95	0	0	262
4:30 PM	17	0	39	0	0	0	0	0	0	75	15	0	26	107	0	0	279
4:45 PM	10	0	44	0	0	0	0	0	0	67	13	0	34	99	0	0	267
5:00 PM	13	0	35	0	0	0	0	0	0	69	15	0	34	94	0	0	260
5:15 PM	18	0	38	0	1	0	0	0	0	103	15	0	31	121	0	0	327
5:30 PM	15	0	41	0	0	0	0	0	0	99	13	0	27	106	0	0	301
5:45 PM	12	0	38	0	0	0	0	0	0	72	13	0	31	120	0	0	286
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	114	0	303	0	1	0	0	0	0	640	120	0	234	832	1	0	2245
APPROACH %'s :	27.34%	0.00%	72.66%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	84.21%	15.79%	0.00%	21.93%	77.98%	0.09%	0.00%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	58	0	152	0	1	0	0	0	0	343	56	0	123	441	0	0	1174
PEAK HR FACTOR :	0.806	0.000	0.927	0.000	0.250	0.000	0.000	0.000	0.000	0.833	0.933	0.000	0.904	0.911	0.000	0.000	0.898
	0.938				0.250				0.845				0.928				

Prepared by NDS/ATD

VOLUME

La Costa Ave Bet. Seabreeze Ct & I-5 SB Ramps

Day: Thursday
Date: 5/16/2019

City: Encinitas
Project #: CA19_4221_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	7,732	7,629	15,361

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			8		10		18		12:00			105		111		216	
00:15			4		8		12		12:15			119		99		218	
00:30			3		5		8		12:30			96		111		207	
00:45			2	17	4	27	6	44	12:45			119	439	108	429	227	868
01:00			5		4		9		13:00			94		107		201	
01:15			2		2		4		13:15			140		122		262	
01:30			2		3		5		13:30			122		99		221	
01:45			1	10	1	10	2	20	13:45			111	467	122	450	233	917
02:00			3		2		5		14:00			136		112		248	
02:15			3		4		7		14:15			129		96		225	
02:30			4		2		6		14:30			151		139		290	
02:45			2	12	1	9	3	21	14:45			128	544	148	495	276	1039
03:00			3		0		3		15:00			156		133		289	
03:15			3		2		5		15:15			125		133		258	
03:30			3		2		5		15:30			154		122		276	
03:45			2	11	1	5	3	16	15:45			127	562	138	526	265	1088
04:00			8		3		11		16:00			135		135		270	
04:15			5		5		10		16:15			133		156		289	
04:30			9		2		11		16:30			151		162		313	
04:45			17	39	7	17	24	56	16:45			144	563	142	595	286	1158
05:00			22		10		32		17:00			134		154		288	
05:15			22		16		38		17:15			156		163		319	
05:30			38		26		64		17:30			140		170		310	
05:45			39	121	27	79	66	200	17:45			125	555	168	655	293	1210
06:00			46		43		89		18:00			121		140		261	
06:15			59		62		121		18:15			125		139		264	
06:30			83		62		145		18:30			91		133		224	
06:45			112	300	90	257	202	557	18:45			86	423	117	529	203	952
07:00			136		117		253		19:00			101		88		189	
07:15			177		148		325		19:15			110		90		200	
07:30			180		154		334		19:30			86		96		182	
07:45			174	667	201	620	375	1287	19:45			97	394	78	352	175	746
08:00			152		202		354		20:00			70		62		132	
08:15			157		178		335		20:15			67		64		131	
08:30			132		162		294		20:30			64		73		137	
08:45			162	603	154	696	316	1299	20:45			51	252	42	241	93	493
09:00			187		131		318		21:00			45		59		104	
09:15			136		116		252		21:15			44		51		95	
09:30			150		111		261		21:30			30		51		81	
09:45			95	568	106	464	201	1032	21:45			34	153	44	205	78	358
10:00			99		96		195		22:00			36		32		68	
10:15			111		107		218		22:15			25		20		45	
10:30			102		92		194		22:30			19		27		46	
10:45			106	418	85	380	191	798	22:45			23	103	23	102	46	205
11:00			119		85		204		23:00			17		23		40	
11:15			118		90		208		23:15			16		14		30	
11:30			101		129		230		23:30			10		14		24	
11:45			122	460	118	422	240	882	23:45			8	51	13	64	21	115
TOTALS				3226		2986		**6212**	**TOTALS**				4506		4643		**9149**
SPLIT %				51.9%		48.1%		**40.4%**	**SPLIT %**				49.3%		50.7%		**59.6%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	7,732	7,629	15,361

AM Peak Hour			07:15	07:45	**07:30**	**PM Peak Hour**			16:30	17:00	**17:00**
AM Pk Volume			683	743	**1398**	**PM Pk Volume**			585	655	**1210**
Pk Hr Factor			0.949	0.920	**0.932**	**Pk Hr Factor**			0.938	0.963	**0.948**
7 - 9 Volume	0	0	1270	1316	**2586**	**4 - 6 Volume**	0	0	1118	1250	**2368**
7 - 9 Peak Hour			07:15	07:45	**07:30**	**4 - 6 Peak Hour**			16:30	17:00	**17:00**
7 - 9 Pk Volume	0	0	683	743	**1398**	**4 - 6 Pk Volume**	0	0	585	655	**1210**
Pk Hr Factor	0.000	0.000	0.949	0.920	**0.932**	**Pk Hr Factor**	0.000	0.000	0.938	0.963	**0.948**

Prepared by NDS/ATD

VOLUME

La Costa Ave Bet. Seabreeze Ct & N Vulcan Ave

Day: Thursday
Date: 5/16/2019

City: Encinitas
Project #: CA19_4221_002

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	7,023	7,010	14,033

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			7		10		17		12:00			91		99		190	
00:15			4		9		13		12:15			113		95		208	
00:30			4		5		9		12:30			86		97		183	
00:45			1	16	4	28	5	44	12:45			102	392	101	392	203	784
01:00			5		3		8		13:00			90		98		188	
01:15			2		2		4		13:15			130		121		251	
01:30			1		3		4		13:30			114		89		203	
01:45			1	9	1	9	2	18	13:45			96	430	113	421	209	851
02:00			2		2		4		14:00			121		99		220	
02:15			2		3		5		14:15			115		93		208	
02:30			3		2		5		14:30			132		120		252	
02:45			3	10	1	8	4	18	14:45			125	493	129	441	254	934
03:00			2		0		2		15:00			137		119		256	
03:15			3		2		5		15:15			102		126		228	
03:30			3		2		5		15:30			146		119		265	
03:45			1	9	1	5	2	14	15:45			114	499	128	492	242	991
04:00			7		3		10		16:00			141		127		268	
04:15			7		6		13		16:15			118		150		268	
04:30			8		2		10		16:30			131		120		251	
04:45			12	34	6	17	18	51	16:45			126	516	150	547	276	1063
05:00			24		11		35		17:00			147		151		298	
05:15			19		15		34		17:15			141		160		301	
05:30			35		26		61		17:30			106		150		256	
05:45			34	112	27	79	61	191	17:45			106	500	149	610	255	1110
06:00			40		43		83		18:00			124		129		253	
06:15			48		61		109		18:15			118		120		238	
06:30			70		66		136		18:30			85		120		205	
06:45			107	265	83	253	190	518	18:45			84	411	106	475	190	886
07:00			125		118		243		19:00			93		88		181	
07:15			120		124		244		19:15			107		85		192	
07:30			124		155		279		19:30			88		93		181	
07:45			117	486	182	579	299	1065	19:45			89	377	69	335	158	712
08:00			120		182		302		20:00			68		47		115	
08:15			165		150		315		20:15			61		55		116	
08:30			167		155		322		20:30			57		63		120	
08:45			168	620	151	638	319	1258	20:45			47	233	40	205	87	438
09:00			178		118		296		21:00			42		49		91	
09:15			123		111		234		21:15			44		41		85	
09:30			142		101		243		21:30			29		46		75	
09:45			79	522	104	434	183	956	21:45			31	146	35	171	66	317
10:00			91		79		170		22:00			33		30		63	
10:15			88		100		188		22:15			27		18		45	
10:30			92		82		174		22:30			19		23		42	
10:45			95	366	72	333	167	699	22:45			23	102	18	89	41	191
11:00			106		82		188		23:00			16		20		36	
11:15			108		88		196		23:15			17		12		29	
11:30			97		119		216		23:30			10		13		23	
11:45			114	425	102	391	216	816	23:45			7	50	13	58	20	108
TOTALS				2874		2774		**5648**	**TOTALS**				4149		4236		**8385**
SPLIT %				50.9%		49.1%		**40.2%**	**SPLIT %**				49.5%		50.5%		**59.8%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	7,023	7,010	14,033

AM Peak Hour			08:15	07:30	**08:00**	**PM Peak Hour**			16:30	16:45	**16:45**
AM Pk Volume			678	669	**1258**	**PM Pk Volume**			545	611	**1131**
Pk Hr Factor			0.952	0.919	**0.977**	**Pk Hr Factor**			0.927	0.955	**0.939**
7 - 9 Volume	0	0	1106	1217	**2323**	**4 - 6 Volume**	0	0	1016	1157	**2173**
7 - 9 Peak Hour			08:00	07:30	**08:00**	**4 - 6 Peak Hour**			16:30	16:45	**16:45**
7 - 9 Pk Volume	0	0	620	669	**1258**	**4 - 6 Pk Volume**	0	0	545	611	**1131**
Pk Hr Factor	0.000	0.000	0.923	0.919	**0.977**	**Pk Hr Factor**	0.000	0.000	0.927	0.955	**0.939**

Prepared by NDS/ATD

VOLUME

La Costa Ave Bet. N Vulcan Ave & N Coast Hwy 101

Day: Thursday
Date: 5/16/2019

City: Encinitas
Project #: CA19_4221_003

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	5,396	5,070	10,466

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			7		4		11		12:00			78		76		154	
00:15			2		4		6		12:15			85		66		151	
00:30			3		3		6		12:30			81		68		149	
00:45			1	13	2	13	3	26	12:45			87	331	80	290	167	621
01:00			5		1		6		13:00			75		69		144	
01:15			2		1		3		13:15			87		87		174	
01:30			1		0		1		13:30			95		59		154	
01:45			1	9	0	2	1	11	13:45			95	352	101	316	196	668
02:00			2		1		3		14:00			94		81		175	
02:15			2		2		4		14:15			77		82		159	
02:30			3		1		4		14:30			96		104		200	
02:45			3	10	1	5	4	15	14:45			81	348	104	371	185	719
03:00			1		0		1		15:00			96		94		190	
03:15			2		1		3		15:15			106		100		206	
03:30			0		1		1		15:30			108		91		199	
03:45			1	4	1	3	2	7	15:45			111	421	103	388	214	809
04:00			5		2		7		16:00			97		107		204	
04:15			5		4		9		16:15			92		106		198	
04:30			10		2		12		16:30			91		120		211	
04:45			5	25	3	11	8	36	16:45			81	361	113	446	194	807
05:00			16		7		23		17:00			83		105		188	
05:15			14		10		24		17:15			113		133		246	
05:30			17		17		34		17:30			114		127		241	
05:45			21	68	21	55	42	123	17:45			88	398	129	494	217	892
06:00			32		32		64		18:00			88		101		189	
06:15			33		49		82		18:15			77		98		175	
06:30			46		43		89		18:30			87		90		177	
06:45			90	201	49	173	139	374	18:45			80	332	70	359	150	691
07:00			108		73		181		19:00			73		63		136	
07:15			91		80		171		19:15			61		66		127	
07:30			129		84		213		19:30			72		63		135	
07:45			118	446	102	339	220	785	19:45			63	269	41	233	104	502
08:00			106		97		203		20:00			56		38		94	
08:15			94		103		197		20:15			42		37		79	
08:30			90		81		171		20:30			30		45		75	
08:45			124	414	101	382	225	796	20:45			24	152	24	144	48	296
09:00			120		93		213		21:00			38		35		73	
09:15			88		91		179		21:15			26		23		49	
09:30			81		73		154		21:30			21		24		45	
09:45			66	355	71	328	137	683	21:45			18	103	12	94	30	197
10:00			78		59		137		22:00			24		13		37	
10:15			86		77		163		22:15			15		9		24	
10:30			72		61		133		22:30			19		12		31	
10:45			84	320	48	245	132	565	22:45			13	71	13	47	26	118
11:00			77		60		137		23:00			22		11		33	
11:15			92		70		162		23:15			12		8		20	
11:30			85		88		173		23:30			7		5		12	
11:45			93	347	81	299	174	646	23:45			5	46	9	33	14	79
TOTALS				2212		1855		**4067**	**TOTALS**				3184		3215		**6399**
SPLIT %				54.4%		45.6%		**38.9%**	**SPLIT %**				49.8%		50.2%		**61.1%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	5,396	5,070	10,466

AM Peak Hour			07:30	07:30	**07:30**	**PM Peak Hour**			15:15	17:00	**17:15**
AM Pk Volume			447	386	**833**	**PM Pk Volume**			422	494	**893**
Pk Hr Factor			0.866	0.937	**0.947**	**Pk Hr Factor**			0.950	0.929	**0.908**
7 - 9 Volume	0	0	860	721	**1581**	**4 - 6 Volume**	0	0	759	940	**1699**
7 - 9 Peak Hour			07:30	07:30	**07:30**	**4 - 6 Peak Hour**			17:00	17:00	**17:00**
7 - 9 Pk Volume	0	0	447	386	**833**	**4 - 6 Pk Volume**	0	0	398	494	**892**
Pk Hr Factor	0.000	0.000	0.866	0.937	**0.947**	**Pk Hr Factor**	0.000	0.000	0.873	0.929	**0.907**

GROWTH ADJUSTMENT CALCULATIONS

Peak Hour		NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR			
AM	**2019**	0	208	201	243	1046	0	0	0	0	248	0	71	**2017**	La Costa and N Coast Hwy 101	
AM	**2021**	9	279	208	359	469	10	1	3	4	328	7	79	**1756**	La Costa and N Coast Hwy 101	
	Change	9	71	7	116	-577	10	1	3	4	80	7	8	**-261**		
	% Change		34%	3%	48%	-55%					32%		11%	**-13%**		
	Adjustment:					850										
	Revised 2021	**9**	**279**	**208**	**359**	**850**	**10**	**1**	**3**	**4**	**328**	**7**	**79**	2137		
	Revised Change													**120**		
	Revised % Change													**6%**		

2019	**6271**
2021	**6626**
Change	**355**
%Growth	**1.06**

Peak Hour		NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR			
PM	**2019**	0	513	219	204	372	0	0	0	0	281	0	220	**1809**	La Costa and N Coast Hwy 101	
PM	**2021**	8	691	165	262	681	9	2	18	3	233	4	274	**2350**	La Costa and N Coast Hwy 101	NO CHANGE
	Change	8	178	-54	58	309	9	2	18	3	-48	4	54	**541**		
	% Change		35%	-25%	28%	83%					-17%		25%	**30%**		

Peak Hour																
AM	**2019**	33	0	183	0	1	0	0	361	82	261	349	1	**1271**	La Costa and Vulcan	
AM	**2021**	43	0	73	0	0	0	0	534	36	183	370	2	**1241**	La Costa and Vulcan	
	Change	10	0	-110	0	-1	0	0	173	-46	-78	21	1	**-30**		
	% Change	30%		-60%		-100%			48%	-56%	-30%	6%	100%	**-2%**		
	Adjustment:			88						75	240					
	Revised 2021	**43**	**0**	**88**	**0**	**0**	**0**	**0**	**534**	**75**	**240**	**370**	**2**	1352		
	Revised Change													**81**		
	Revised % Change													**6%**		

Peak Hour																
PM	**2019**	58	0	152	1	0	0	0	343	56	123	441	0	**1174**	La Costa and Vulcan	
PM	**2021**	96	0	161	0	0	0	0	398	42	111	469	2	**1279**	La Costa and Vulcan	NO CHANGE
	Change	38	0	9	-1	0	0	0	55	-14	-12	28	2	**105**		
	% Change	66%		6%	-100%				16%	-25%	-10%	6%		**9%**		

Peak Hour																
AM	**2019 Link**								544			611		**1155**	La Costa and Sheridan	
AM	**2021 Link**								601			574		**1175**	La Costa and Sheridan	
	Change	0	0	0	0	0	0	0	57	0	0	-37	0	**20**		
	% Change								10%			-6%		**2%**		
	Full 2021	9	0	49	9	1	6	3	588	10	43	559	8	**1285**		
	Adjustment:											1.10				
	Revised 2021	**9**	**0**	**49**	**9**	**1**	**6**	**3**	**588**	**10**	**43**	**615**	**8**	1341		
	Revised Change													**56**		
	Revised % Change													**4%**		

Peak Hour																
PM	**2019 Link**								496			564		**1060**	La Costa and Sheridan	
PM	**2021 Link**								556			586		**1142**	La Costa and Sheridan	
	Change	0	0	0	0	0	0	0	60	0	0	22	0	**82**		
	% Change								12%			4%		**8%**		
	Full 2021	**14**	**0**	**63**	**6**	**0**	**12**	**6**	**532**	**18**	**42**	**560**	**7**	1260	NO CHANGE	

Peak Hour																
AM	**2019**				508	4	287		617	67	657	447			La Costa and I-5 SB Ramps	
	Adjustment:				1.06	1.06	1.06		1.06	1.06	1.06	1.06				
AM	**2021**	**0**	**0**	**0**	**537**	**4**	**303**	**0**	**652**	**71**	**694**	**472**	**0**		La Costa and I-5 SB Ramps	
	Change															

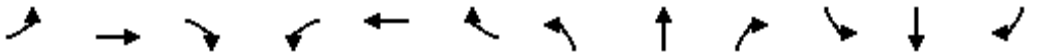
Peak Hour																
PM	**2019**				451	1	163		507	67	738	484			La Costa and I-5 SB Ramps	
	Adjustment:				1.06	1.06	1.06		1.06	1.06	1.06	1.06				
PM	**2021**	**0**	**0**	**0**	**477**	**1**	**172**	**0**	**536**	**71**	**780**	**511**	**0**		La Costa and I-5 SB Ramps	

Segment	2019 ADT	2021 ADT	Change	% Change	Adjustment	Revised 2021 ADT
La Costa, Hwy 101 to Vulcan	10,466	12,508	**2,042**	**20%**		**12,508**
La Costa, Vulcan to Sheridan	14,033	13,678	**-355**	**-3%**	1.07	**14,642**
La Costa, Sheridan to I-5	15,361	16,482	**1,121**	**7%**		**16,482**
Overall	**39,860**	**42,668**	**2,808**	**7%**		

APPENDIX B

HCM INTERSECTION LOS ANALYSIS WORKSHEETS

WITH EXISTING TRAFFIC CONTROLS
WITH EXISTING LA COSTA AVENUE CROSS-SECTION



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	3	4	328	7	79	9	279	208	359	850	10
Future Volume (veh/h)	1	3	4	328	7	79	9	279	208	359	850	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.97	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	2	6	8	410	9	99	10	313	234	403	955	11
Peak Hour Factor	0.50	0.50	0.50	0.80	0.80	0.80	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	10	31	35	488	11	444	27	643	721	448	1484	635
Arrive On Green	0.02	0.02	0.02	0.28	0.28	0.28	0.01	0.18	0.18	0.25	0.42	0.42
Sat Flow, veh/h	462	1385	1559	1745	38	1585	1781	3554	1531	1781	3554	1520
Grp Volume(v), veh/h	8	0	8	419	0	99	10	313	234	403	955	11
Grp Sat Flow(s),veh/h/ln	1847	0	1559	1783	0	1585	1781	1777	1531	1781	1777	1520
Q Serve(g_s), s	0.4	0.0	0.4	18.3	0.0	4.0	0.5	6.6	8.1	18.1	17.7	0.4
Cycle Q Clear(g_c), s	0.4	0.0	0.4	18.3	0.0	4.0	0.5	6.6	8.1	18.1	17.7	0.4
Prop In Lane	0.25		1.00	0.98		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	41	0	35	499	0	444	27	643	721	448	1484	635
V/C Ratio(X)	0.19	0.00	0.23	0.84	0.00	0.22	0.38	0.49	0.32	0.90	0.64	0.02
Avail Cap(c_a), veh/h	134	0	113	882	0	784	129	1261	987	572	2144	917
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	39.8	0.0	39.8	28.1	0.0	22.9	40.4	30.5	14.2	30.0	19.2	14.2
Incr Delay (d2), s/veh	2.3	0.0	3.3	3.9	0.0	0.3	8.6	0.6	0.3	14.7	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.2	7.9	0.0	1.5	0.3	2.6	4.2	8.8	6.4	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.0	0.0	43.1	32.0	0.0	23.2	49.0	31.0	14.5	44.7	19.7	14.2
LnGrp LOS	D	A	D	C	A	C	D	C	B	D	B	B
Approach Vol, veh/h		16			518			557			1369	
Approach Delay, s/veh		42.6			30.3			24.4			27.0	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	25.4	21.4		8.2	5.8	41.0		27.8				
Change Period (Y+Rc), s	4.6	6.4		6.4	4.6	6.4		4.6				
Max Green Setting (Gmax), s	26.6	29.4		6.0	6.0	50.0		41.0				
Max Q Clear Time (g_c+I1), s	20.1	10.1		2.4	2.5	19.7		20.3				
Green Ext Time (p_c), s	0.7	2.4		0.0	0.0	6.8		2.9				

Intersection Summary	
HCM 6th Ctrl Delay	27.2
HCM 6th LOS	C

Notes

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

Intersection	
Intersection Delay, s/veh	57.5
Intersection LOS	F

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	534	75	240	370	43	88
Future Vol, veh/h	534	75	240	370	43	88
Peak Hour Factor	0.86	0.86	0.92	0.92	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	621	87	261	402	47	97
Number of Lanes	1	0	0	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	1
HCM Control Delay	69.8	54.4	11.6
HCM LOS	F	F	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1
Vol Left, %	100%	0%	0%	39%
Vol Thru, %	0%	0%	88%	61%
Vol Right, %	0%	100%	12%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	43	88	609	610
LT Vol	43	0	0	240
Through Vol	0	0	534	370
RT Vol	0	88	75	0
Lane Flow Rate	47	97	708	663
Geometry Grp	7	7	2	2
Degree of Util (X)	0.105	0.186	1.046	0.983
Departure Headway (Hd)	8.329	7.092	5.319	5.543
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	433	509	687	656
Service Time	6.029	4.792	3.328	3.543
HCM Lane V/C Ratio	0.109	0.191	1.031	1.011
HCM Control Delay	12	11.4	69.8	54.4
HCM Lane LOS	B	B	F	F
HCM 95th-tile Q	0.3	0.7	18.3	14.8

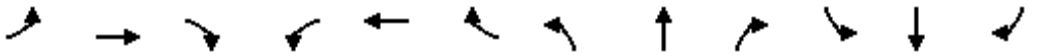
Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	588	10	43	615	8	9	0	49	9	1	6
Future Vol, veh/h	3	588	10	43	615	8	9	0	49	9	1	6
Conflicting Peds, #/hr	1	0	10	10	0	1	2	0	8	8	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	95	95	95	81	81	81	57	57	57
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	676	11	45	647	8	11	0	60	16	2	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	656	0	0	697	0	0	1448	1444	700	1468	1445	654
Stage 1	-	-	-	-	-	-	698	698	-	742	742	-
Stage 2	-	-	-	-	-	-	750	746	-	726	703	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	931	-	-	899	-	-	109	132	439	106	132	467
Stage 1	-	-	-	-	-	-	431	442	-	408	422	-
Stage 2	-	-	-	-	-	-	403	421	-	416	440	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	930	-	-	890	-	-	97	119	432	84	119	466
Mov Cap-2 Maneuver	-	-	-	-	-	-	97	119	-	84	119	-
Stage 1	-	-	-	-	-	-	425	435	-	406	388	-
Stage 2	-	-	-	-	-	-	360	387	-	353	433	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.6	22.1	42
HCM LOS			C	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	281	930	-	-	890	-	-	125
HCM Lane V/C Ratio	0.255	0.004	-	-	0.051	-	-	0.225
HCM Control Delay (s)	22.1	8.9	0	-	9.3	0	-	42
HCM Lane LOS	C	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	1	0	-	-	0.2	-	-	0.8



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	18	3	233	4	274	8	691	165	262	681	9
Future Volume (veh/h)	2	18	3	233	4	274	8	691	165	262	681	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		1.00	1.00		0.96	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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	28	5	256	4	301	9	776	185	380	987	13
Peak Hour Factor	0.64	0.64	0.64	0.91	0.91	0.91	0.89	0.89	0.89	0.69	0.69	0.69
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	7	65	58	401	6	362	24	953	772	417	1737	732
Arrive On Green	0.04	0.04	0.04	0.23	0.23	0.23	0.01	0.27	0.27	0.23	0.49	0.49
Sat Flow, veh/h	180	1681	1509	1755	27	1585	1781	3554	1528	1781	3554	1497
Grp Volume(v), veh/h	31	0	5	260	0	301	9	776	185	380	987	13
Grp Sat Flow(s),veh/h/ln	1861	0	1509	1783	0	1585	1781	1777	1528	1781	1777	1497
Q Serve(g_s), s	1.6	0.0	0.3	12.6	0.0	17.3	0.5	19.5	6.6	19.8	18.7	0.4
Cycle Q Clear(g_c), s	1.6	0.0	0.3	12.6	0.0	17.3	0.5	19.5	6.6	19.8	18.7	0.4
Prop In Lane	0.10		1.00	0.98		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	72	0	58	407	0	362	24	953	772	417	1737	732
V/C Ratio(X)	0.43	0.00	0.09	0.64	0.00	0.83	0.38	0.81	0.24	0.91	0.57	0.02
Avail Cap(c_a), veh/h	117	0	95	766	0	681	112	1099	835	495	1863	785
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	44.8	0.0	44.2	33.2	0.0	35.1	46.7	32.7	13.7	35.6	17.2	12.6
Incr Delay (d2), s/veh	4.0	0.0	0.6	1.7	0.0	5.0	9.6	4.2	0.2	19.1	0.4	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	0.8	0.0	0.1	5.5	0.0	6.9	0.3	8.3	3.3	10.2	6.8	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.9	0.0	44.9	34.9	0.0	40.0	56.3	36.9	13.9	54.7	17.6	12.6
LnGrp LOS	D	A	D	C	A	D	E	D	B	D	B	B
Approach Vol, veh/h		36			561			970			1380	
Approach Delay, s/veh		48.3			37.7			32.7			27.8	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	26.9	32.0		10.1	5.9	53.0		26.4				
Change Period (Y+Rc), s	4.6	6.4		6.4	4.6	6.4		4.6				
Max Green Setting (Gmax), s	26.5	29.5		6.0	6.0	50.0		41.0				
Max Q Clear Time (g_c+I1), s	21.8	21.5		3.6	2.5	20.7		19.3				
Green Ext Time (p_c), s	0.5	3.3		0.0	0.0	7.1		2.5				

Intersection Summary		
HCM 6th Ctrl Delay		31.5
HCM 6th LOS		C

Notes

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

Intersection	
Intersection Delay, s/veh	36.2
Intersection LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	398	42	111	469	96	161
Future Vol, veh/h	398	42	111	469	96	161
Peak Hour Factor	0.82	0.82	0.98	0.98	0.88	0.88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	485	51	113	479	109	183
Number of Lanes	1	0	0	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	1
HCM Control Delay	34.6	49.1	13.1
HCM LOS	D	E	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1
Vol Left, %	100%	0%	0%	19%
Vol Thru, %	0%	0%	90%	81%
Vol Right, %	0%	100%	10%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	96	161	440	580
LT Vol	96	0	0	111
Through Vol	0	0	398	469
RT Vol	0	161	42	0
Lane Flow Rate	109	183	537	592
Geometry Grp	7	7	2	2
Degree of Util (X)	0.241	0.341	0.861	0.951
Departure Headway (Hd)	7.95	6.717	5.778	5.783
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	449	531	622	621
Service Time	5.745	4.511	3.857	3.859
HCM Lane V/C Ratio	0.243	0.345	0.863	0.953
HCM Control Delay	13.3	13	34.6	49.1
HCM Lane LOS	B	B	D	E
HCM 95th-tile Q	0.9	1.5	9.7	13

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	532	18	42	560	7	14	0	63	6	0	12
Future Vol, veh/h	6	532	18	42	560	7	14	0	63	6	0	12
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	5	5	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	87	87	87	66	66	66	64	64	64
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	598	20	48	644	8	21	0	95	9	0	19

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	652	0	0	620	0	0	1378	1372	615	1419	1378	648
Stage 1	-	-	-	-	-	-	624	624	-	744	744	-
Stage 2	-	-	-	-	-	-	754	748	-	675	634	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	935	-	-	960	-	-	122	146	491	114	145	470
Stage 1	-	-	-	-	-	-	473	478	-	407	421	-
Stage 2	-	-	-	-	-	-	401	420	-	444	473	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	935	-	-	958	-	-	109	133	488	85	132	470
Mov Cap-2 Maneuver	-	-	-	-	-	-	109	133	-	85	132	-
Stage 1	-	-	-	-	-	-	467	472	-	403	388	-
Stage 2	-	-	-	-	-	-	355	387	-	352	467	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.6	24.5	27.6
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	299	935	-	-	958	-	-	187
HCM Lane V/C Ratio	0.39	0.007	-	-	0.05	-	-	0.15
HCM Control Delay (s)	24.5	8.9	0	-	9	0	-	27.6
HCM Lane LOS	C	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	1.8	0	-	-	0.2	-	-	0.5

WITH EXISTING TRAFFIC CONTROLS
WITH TWLTL ON LA COSTA AVENUE

Intersection	
Intersection Delay, s/veh	47.9
Intersection LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	534	75	240	370	43	88
Future Vol, veh/h	534	75	240	370	43	88
Peak Hour Factor	0.86	0.86	0.92	0.92	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	621	87	261	402	47	97
Number of Lanes	1	0	1	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	84.7	16.6	11.4
HCM LOS	F	C	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	100%	0%
Vol Thru, %	0%	0%	88%	0%	100%
Vol Right, %	0%	100%	12%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	43	88	609	240	370
LT Vol	43	0	0	240	0
Through Vol	0	0	534	0	370
RT Vol	0	88	75	0	0
Lane Flow Rate	47	97	708	261	402
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.105	0.181	1.09	0.449	0.636
Departure Headway (Hd)	8.202	6.967	5.542	6.375	5.867
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	439	518	659	569	619
Service Time	5.902	4.667	3.542	4.075	3.567
HCM Lane V/C Ratio	0.107	0.187	1.074	0.459	0.649
HCM Control Delay	11.9	11.2	84.7	14.2	18.2
HCM Lane LOS	B	B	F	B	C
HCM 95th-tile Q	0.3	0.7	20.4	2.3	4.5

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	588	10	43	615	8	9	0	49	9	1	6
Future Vol, veh/h	3	588	10	43	615	8	9	0	49	9	1	6
Conflicting Peds, #/hr	1	0	10	10	0	1	2	0	8	8	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	95	95	95	81	81	81	57	57	57
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	676	11	45	647	8	11	0	60	16	2	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	656	0	0	697	0	0	1448	1444	700	1468	1445	654
Stage 1	-	-	-	-	-	-	698	698	-	742	742	-
Stage 2	-	-	-	-	-	-	750	746	-	726	703	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	931	-	-	899	-	-	109	132	439	106	132	467
Stage 1	-	-	-	-	-	-	431	442	-	408	422	-
Stage 2	-	-	-	-	-	-	403	421	-	416	440	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	930	-	-	890	-	-	100	124	432	87	124	466
Mov Cap-2 Maneuver	-	-	-	-	-	-	100	124	-	87	124	-
Stage 1	-	-	-	-	-	-	425	436	-	406	400	-
Stage 2	-	-	-	-	-	-	372	399	-	354	434	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.6	21.8	40.5
HCM LOS			C	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	285	930	-	-	890	-	-	129
HCM Lane V/C Ratio	0.251	0.004	-	-	0.051	-	-	0.218
HCM Control Delay (s)	21.8	8.9	-	-	9.3	-	-	40.5
HCM Lane LOS	C	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	1	0	-	-	0.2	-	-	0.8

Intersection	
Intersection Delay, s/veh	31.4
Intersection LOS	D

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	398	42	111	469	96	161
Future Vol, veh/h	398	42	111	469	96	161
Peak Hour Factor	0.82	0.82	0.98	0.98	0.88	0.88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	485	51	113	479	109	183
Number of Lanes	1	0	1	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	43.5	29.4	13.1
HCM LOS	E	D	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	100%	0%
Vol Thru, %	0%	0%	90%	0%	100%
Vol Right, %	0%	100%	10%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	96	161	440	111	469
LT Vol	96	0	0	111	0
Through Vol	0	0	398	0	469
RT Vol	0	161	42	0	0
Lane Flow Rate	109	183	537	113	479
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.241	0.342	0.912	0.214	0.838
Departure Headway (Hd)	7.967	6.736	6.119	6.812	6.303
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	448	531	590	524	574
Service Time	5.749	4.516	4.183	4.582	4.072
HCM Lane V/C Ratio	0.243	0.345	0.91	0.216	0.834
HCM Control Delay	13.3	13	43.5	11.4	33.7
HCM Lane LOS	B	B	E	B	D
HCM 95th-tile Q	0.9	1.5	11.3	0.8	8.8

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	532	18	42	560	7	14	0	63	6	0	12
Future Vol, veh/h	6	532	18	42	560	7	14	0	63	6	0	12
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	5	5	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	87	87	87	66	66	66	64	64	64
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	598	20	48	644	8	21	0	95	9	0	19

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	652	0	0	620	0	0	1378	1372	615	1419	1378	648
Stage 1	-	-	-	-	-	-	624	624	-	744	744	-
Stage 2	-	-	-	-	-	-	754	748	-	675	634	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	935	-	-	960	-	-	122	146	491	114	145	470
Stage 1	-	-	-	-	-	-	473	478	-	407	421	-
Stage 2	-	-	-	-	-	-	401	420	-	444	473	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	935	-	-	958	-	-	112	137	488	87	136	470
Mov Cap-2 Maneuver	-	-	-	-	-	-	112	137	-	87	136	-
Stage 1	-	-	-	-	-	-	469	474	-	404	400	-
Stage 2	-	-	-	-	-	-	366	399	-	353	469	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.6	24.1	27.2
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	303	935	-	-	958	-	-	190
HCM Lane V/C Ratio	0.385	0.007	-	-	0.05	-	-	0.148
HCM Control Delay (s)	24.1	8.9	-	-	9	-	-	27.2
HCM Lane LOS	C	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	1.7	0	-	-	0.2	-	-	0.5

WITH ALL-WAY STOP CONTROL
WITH EXISTING LA COSTA AVENUE CROSS-SECTION

Intersection	
Intersection Delay, s/veh	54.5
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	588	10	43	615	8	9	0	49	9	1	6
Future Vol, veh/h	3	588	10	43	615	8	9	0	49	9	1	6
Peak Hour Factor	0.87	0.87	0.87	0.95	0.95	0.95	0.81	0.81	0.81	0.57	0.57	0.57
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	676	11	45	647	8	11	0	60	16	2	11
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	55.7	59.5	10.9	10.9
HCM LOS	F	F	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	16%	0%	6%	56%
Vol Thru, %	0%	98%	92%	6%
Vol Right, %	84%	2%	1%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	58	601	666	16
LT Vol	9	3	43	9
Through Vol	0	588	615	1
RT Vol	49	10	8	6
Lane Flow Rate	72	691	701	28
Geometry Grp	1	1	1	1
Degree of Util (X)	0.134	0.996	1.011	0.057
Departure Headway (Hd)	6.759	5.189	5.19	7.329
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	528	698	701	486
Service Time	4.834	3.228	3.229	5.416
HCM Lane V/C Ratio	0.136	0.99	1	0.058
HCM Control Delay	10.9	55.7	59.5	10.9
HCM Lane LOS	B	F	F	B
HCM 95th-tile Q	0.5	15.9	16.6	0.2

Intersection	
Intersection Delay, s/veh	50.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	532	18	42	560	7	14	0	63	6	0	12
Future Vol, veh/h	6	532	18	42	560	7	14	0	63	6	0	12
Peak Hour Factor	0.89	0.89	0.89	0.87	0.87	0.87	0.66	0.66	0.66	0.64	0.64	0.64
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	598	20	48	644	8	21	0	95	9	0	19
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	41.8	66.2	11.6	10.7
HCM LOS	E	F	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	18%	1%	7%	33%
Vol Thru, %	0%	96%	92%	0%
Vol Right, %	82%	3%	1%	67%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	77	556	609	18
LT Vol	14	6	42	6
Through Vol	0	532	560	0
RT Vol	63	18	7	12
Lane Flow Rate	117	625	700	28
Geometry Grp	1	1	1	1
Degree of Util (X)	0.214	0.924	1.033	0.055
Departure Headway (Hd)	6.786	5.429	5.315	7.324
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	532	675	686	492
Service Time	4.786	3.429	3.349	5.324
HCM Lane V/C Ratio	0.22	0.926	1.02	0.057
HCM Control Delay	11.6	41.8	66.2	10.7
HCM Lane LOS	B	E	F	B
HCM 95th-tile Q	0.8	12.3	17.6	0.2

WITH ALL-WAY STOP CONTROL
WITH TWLTL ON LA COSTA AVENUE

Intersection	
Intersection Delay, s/veh	47.9
Intersection LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	534	75	240	370	43	88
Future Vol, veh/h	534	75	240	370	43	88
Peak Hour Factor	0.86	0.86	0.92	0.92	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	621	87	261	402	47	97
Number of Lanes	1	0	1	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	84.7	16.6	11.4
HCM LOS	F	C	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	100%	0%
Vol Thru, %	0%	0%	88%	0%	100%
Vol Right, %	0%	100%	12%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	43	88	609	240	370
LT Vol	43	0	0	240	0
Through Vol	0	0	534	0	370
RT Vol	0	88	75	0	0
Lane Flow Rate	47	97	708	261	402
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.105	0.181	1.09	0.449	0.636
Departure Headway (Hd)	8.202	6.967	5.542	6.375	5.867
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	439	518	659	569	619
Service Time	5.902	4.667	3.542	4.075	3.567
HCM Lane V/C Ratio	0.107	0.187	1.074	0.459	0.649
HCM Control Delay	11.9	11.2	84.7	14.2	18.2
HCM Lane LOS	B	B	F	B	C
HCM 95th-tile Q	0.3	0.7	20.4	2.3	4.5

Intersection	
Intersection Delay, s/veh	63.1
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	588	10	43	615	8	9	0	49	9	1	6
Future Vol, veh/h	3	588	10	43	615	8	9	0	49	9	1	6
Peak Hour Factor	0.87	0.87	0.87	0.95	0.95	0.95	0.81	0.81	0.81	0.57	0.57	0.57
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	676	11	45	647	8	11	0	60	16	2	11
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	79.7	54.2	10.9	10.9
HCM LOS	F	F	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	16%	100%	0%	100%	0%	56%
Vol Thru, %	0%	0%	98%	0%	99%	6%
Vol Right, %	84%	0%	2%	0%	1%	38%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	58	3	598	43	623	16
LT Vol	9	3	0	43	0	9
Through Vol	0	0	588	0	615	1
RT Vol	49	0	10	0	8	6
Lane Flow Rate	72	3	687	45	656	28
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.132	0.006	1.075	0.075	0.995	0.056
Departure Headway (Hd)	6.903	6.147	5.63	6.131	5.616	7.491
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	523	586	653	588	649	481
Service Time	4.903	3.847	3.33	3.831	3.316	5.491
HCM Lane V/C Ratio	0.138	0.005	1.052	0.077	1.011	0.058
HCM Control Delay	10.9	8.9	80.1	9.3	57.3	10.9
HCM Lane LOS	B	A	F	A	F	B
HCM 95th-tile Q	0.5	0	19.3	0.2	15.3	0.2

Intersection	
Intersection Delay, s/veh	31.4
Intersection LOS	D

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	398	42	111	469	96	161
Future Vol, veh/h	398	42	111	469	96	161
Peak Hour Factor	0.82	0.82	0.98	0.98	0.88	0.88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	485	51	113	479	109	183
Number of Lanes	1	0	1	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	43.5	29.4	13.1
HCM LOS	E	D	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	100%	0%
Vol Thru, %	0%	0%	90%	0%	100%
Vol Right, %	0%	100%	10%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	96	161	440	111	469
LT Vol	96	0	0	111	0
Through Vol	0	0	398	0	469
RT Vol	0	161	42	0	0
Lane Flow Rate	109	183	537	113	479
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.241	0.342	0.912	0.214	0.838
Departure Headway (Hd)	7.967	6.736	6.119	6.812	6.303
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	448	531	590	524	574
Service Time	5.749	4.516	4.183	4.582	4.072
HCM Lane V/C Ratio	0.243	0.345	0.91	0.216	0.834
HCM Control Delay	13.3	13	43.5	11.4	33.7
HCM Lane LOS	B	B	E	B	D
HCM 95th-tile Q	0.9	1.5	11.3	0.8	8.8

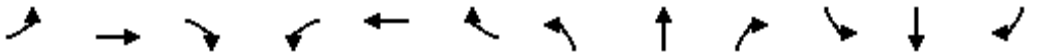
Intersection	
Intersection Delay, s/veh	57.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	532	18	42	560	7	14	0	63	6	0	12
Future Vol, veh/h	6	532	18	42	560	7	14	0	63	6	0	12
Peak Hour Factor	0.89	0.89	0.89	0.87	0.87	0.87	0.66	0.66	0.66	0.64	0.64	0.64
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	598	20	48	644	8	21	0	95	9	0	19
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	57.1	67.2	11.8	10.9
HCM LOS	F	F	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	18%	100%	0%	100%	0%	33%
Vol Thru, %	0%	0%	97%	0%	99%	0%
Vol Right, %	82%	0%	3%	0%	1%	67%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	77	6	550	42	567	18
LT Vol	14	6	0	42	0	6
Through Vol	0	0	532	0	560	0
RT Vol	63	0	18	0	7	12
Lane Flow Rate	117	7	618	48	652	28
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.216	0.012	0.99	0.084	1.044	0.056
Departure Headway (Hd)	6.871	6.416	5.885	6.282	5.766	7.433
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	526	561	618	572	632	485
Service Time	4.871	4.116	3.585	4.008	3.492	5.433
HCM Lane V/C Ratio	0.222	0.012	1	0.084	1.032	0.058
HCM Control Delay	11.8	9.2	57.6	9.6	71.5	10.9
HCM Lane LOS	B	A	F	A	F	B
HCM 95th-tile Q	0.8	0	14.7	0.3	17.4	0.2

WITH TRAFFIC SIGNALS
WITH EXISTING LA COSTA AVENUE CROSS-SECTION



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	3	4	328	7	79	9	279	208	359	850	10
Future Volume (veh/h)	1	3	4	328	7	79	9	279	208	359	850	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.96	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	2	6	8	410	9	99	10	313	234	403	955	11
Peak Hour Factor	0.50	0.50	0.50	0.80	0.80	0.80	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	10	29	32	458	10	416	25	572	662	664	1846	793
Arrive On Green	0.02	0.02	0.02	0.26	0.26	0.26	0.01	0.16	0.16	0.37	0.52	0.52
Sat Flow, veh/h	462	1385	1547	1745	38	1585	1781	3554	1528	1781	3554	1527
Grp Volume(v), veh/h	8	0	8	419	0	99	10	313	234	403	955	11
Grp Sat Flow(s),veh/h/ln	1847	0	1547	1783	0	1585	1781	1777	1528	1781	1777	1527
Q Serve(g_s), s	0.5	0.0	0.6	27.2	0.0	5.9	0.7	9.7	12.5	22.0	21.2	0.4
Cycle Q Clear(g_c), s	0.5	0.0	0.6	27.2	0.0	5.9	0.7	9.7	12.5	22.0	21.2	0.4
Prop In Lane	0.25		1.00	0.98		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	38	0	32	468	0	416	25	572	662	664	1846	793
V/C Ratio(X)	0.21	0.00	0.25	0.90	0.00	0.24	0.40	0.55	0.35	0.61	0.52	0.01
Avail Cap(c_a), veh/h	92	0	77	609	0	542	89	859	785	664	1846	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	0.00	1.00	0.41	0.00	0.41	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.8	0.0	57.8	42.7	0.0	34.8	58.6	46.3	23.6	30.5	18.9	14.0
Incr Delay (d2), s/veh	2.7	0.0	4.0	6.1	0.0	0.1	9.8	0.8	0.3	1.6	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	0.3	0.0	0.3	12.6	0.0	2.3	0.4	4.2	6.7	9.2	8.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.5	0.0	61.9	48.8	0.0	34.9	68.4	47.1	23.9	32.1	19.2	14.0
LnGrp LOS	E	A	E	D	A	C	E	D	C	C	B	B
Approach Vol, veh/h		16			518			557			1369	
Approach Delay, s/veh		61.2			46.2			37.7			23.0	
Approach LOS		E			D			D			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	49.3	25.7		8.9	6.3	68.7		36.1				
Change Period (Y+Rc), s	4.6	6.4		6.4	4.6	6.4		4.6				
Max Green Setting (Gmax), s	22.0	29.0		6.0	6.0	45.0		41.0				
Max Q Clear Time (g_c+I1), s	24.0	14.5		2.6	2.7	23.2		29.2				
Green Ext Time (p_c), s	0.0	2.2		0.0	0.0	6.2		2.3				

Intersection Summary			
HCM 6th Ctrl Delay		31.4	
HCM 6th LOS		C	

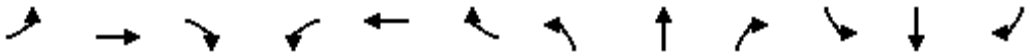
Notes

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

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	534	75	240	370	43	88
Future Volume (veh/h)	534	75	240	370	43	88
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	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	621	87	261	402	47	97
Peak Hour Factor	0.86	0.86	0.92	0.92	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1204	169	358	518	158	141
Arrive On Green	0.75	0.75	0.75	0.75	0.09	0.09
Sat Flow, veh/h	1599	224	364	688	1781	1585
Grp Volume(v), veh/h	0	708	663	0	47	97
Grp Sat Flow(s),veh/h/ln	0	1823	1052	0	1781	1585
Q Serve(g_s), s	0.0	9.4	20.4	0.0	1.5	3.6
Cycle Q Clear(g_c), s	0.0	9.4	29.9	0.0	1.5	3.6
Prop In Lane		0.12	0.39		1.00	1.00
Lane Grp Cap(c), veh/h	0	1372	875	0	158	141
V/C Ratio(X)	0.00	0.52	0.76	0.00	0.30	0.69
Avail Cap(c_a), veh/h	0	1372	875	0	564	502
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.88	0.83	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	3.0	6.4	0.0	25.6	26.5
Incr Delay (d2), s/veh	0.0	1.2	3.2	0.0	1.0	5.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.6	2.6	0.0	0.6	1.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	4.2	9.6	0.0	26.6	32.4
LnGrp LOS	A	A	A	A	C	C
Approach Vol, veh/h	708			663	144	
Approach Delay, s/veh	4.2			9.6	30.5	
Approach LOS	A			A	C	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		50.2		9.8		50.2
Change Period (Y+Rc), s		5.0		4.5		5.0
Max Green Setting (Gmax), s		31.5		19.0		31.5
Max Q Clear Time (g_c+I1), s		11.4		5.6		31.9
Green Ext Time (p_c), s		4.9		0.3		0.0

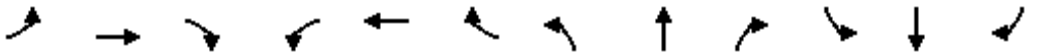
Intersection Summary		
HCM 6th Ctrl Delay		9.1
HCM 6th LOS		A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	588	10	43	615	8	9	0	49	9	1	6
Future Volume (veh/h)	3	588	10	43	615	8	9	0	49	9	1	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		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	3	676	11	45	647	8	11	0	60	16	2	11
Peak Hour Factor	0.87	0.87	0.87	0.95	0.95	0.95	0.81	0.81	0.81	0.57	0.57	0.57
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	95	906	15	129	852	10	21	0	116	50	6	35
Arrive On Green	0.49	0.49	0.49	0.49	0.49	0.49	0.09	0.00	0.09	0.05	0.05	0.05
Sat Flow, veh/h	2	1830	30	59	1721	21	243	0	1327	930	116	639
Grp Volume(v), veh/h	690	0	0	700	0	0	71	0	0	29	0	0
Grp Sat Flow(s),veh/h/ln	1861	0	0	1801	0	0	1570	0	0	1685	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.3	0.0	0.0	1.7	0.0	0.0	0.6	0.0	0.0
Cycle Q Clear(g_c), s	11.4	0.0	0.0	11.7	0.0	0.0	1.7	0.0	0.0	0.6	0.0	0.0
Prop In Lane	0.00		0.02	0.06		0.01	0.15		0.85	0.55		0.38
Lane Grp Cap(c), veh/h	1015	0	0	991	0	0	137	0	0	91	0	0
V/C Ratio(X)	0.68	0.00	0.00	0.71	0.00	0.00	0.52	0.00	0.00	0.32	0.00	0.00
Avail Cap(c_a), veh/h	1927	0	0	1830	0	0	775	0	0	832	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.8	0.0	0.0	7.9	0.0	0.0	16.8	0.0	0.0	17.5	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.9	0.0	0.0	3.0	0.0	0.0	2.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.0	0.0	2.8	0.0	0.0	0.6	0.0	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.6	0.0	0.0	8.8	0.0	0.0	19.8	0.0	0.0	19.5	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	B	A	A	B	A	A
Approach Vol, veh/h		690			700			71			29	
Approach Delay, s/veh		8.6			8.8			19.8			19.5	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		24.0		7.9		24.0		6.6				
Change Period (Y+Rc), s		5.0		4.5		5.0		4.5				
Max Green Setting (Gmax), s		38.0		19.0		38.0		19.0				
Max Q Clear Time (g_c+I1), s		13.4		3.7		13.7		2.6				
Green Ext Time (p_c), s		5.0		0.3		5.3		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			9.4									
HCM 6th LOS			A									



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	18	3	233	4	274	8	691	165	262	681	9
Future Volume (veh/h)	2	18	3	233	4	274	8	691	165	262	681	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		1.00	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	3	28	5	256	4	301	9	776	185	380	987	13
Peak Hour Factor	0.64	0.64	0.64	0.91	0.91	0.91	0.89	0.89	0.89	0.69	0.69	0.69
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	6	59	52	385	6	348	23	844	710	579	1952	826
Arrive On Green	0.03	0.03	0.03	0.22	0.22	0.22	0.01	0.24	0.24	0.32	0.55	0.55
Sat Flow, veh/h	180	1681	1490	1755	27	1585	1781	3554	1525	1781	3554	1503
Grp Volume(v), veh/h	31	0	5	260	0	301	9	776	185	380	987	13
Grp Sat Flow(s),veh/h/ln	1861	0	1490	1783	0	1585	1781	1777	1525	1781	1777	1503
Q Serve(g_s), s	2.0	0.0	0.4	16.0	0.0	22.0	0.6	25.6	9.0	22.0	20.8	0.5
Cycle Q Clear(g_c), s	2.0	0.0	0.4	16.0	0.0	22.0	0.6	25.6	9.0	22.0	20.8	0.5
Prop In Lane	0.10		1.00	0.98		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	65	0	52	391	0	348	23	844	710	579	1952	826
V/C Ratio(X)	0.48	0.00	0.10	0.66	0.00	0.87	0.39	0.92	0.26	0.66	0.51	0.02
Avail Cap(c_a), veh/h	93	0	74	609	0	542	89	859	716	579	1952	826
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	0.83	0.00	0.83	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.8	0.0	56.1	42.8	0.0	45.1	58.8	44.6	20.1	34.8	16.9	12.3
Incr Delay (d2), s/veh	5.3	0.0	0.8	1.6	0.0	7.5	10.4	14.7	0.2	2.7	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	1.0	0.0	0.2	7.1	0.0	9.2	0.3	12.5	4.6	9.5	7.7	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.2	0.0	56.9	44.4	0.0	52.6	69.1	59.3	20.3	37.5	17.1	12.3
LnGrp LOS	E	A	E	D	A	D	E	E	C	D	B	B
Approach Vol, veh/h		36			561			970			1380	
Approach Delay, s/veh		61.4			48.8			52.0			22.7	
Approach LOS		E			D			D			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	43.6	34.9		10.6	6.2	72.3		30.9				
Change Period (Y+Rc), s	4.6	6.4		6.4	4.6	6.4		4.6				
Max Green Setting (Gmax), s	22.0	29.0		6.0	6.0	45.0		41.0				
Max Q Clear Time (g_c+I1), s	24.0	27.6		4.0	2.6	22.8		24.0				
Green Ext Time (p_c), s	0.0	0.8		0.0	0.0	6.5		2.4				

Intersection Summary			
HCM 6th Ctrl Delay		37.8	
HCM 6th LOS		D	

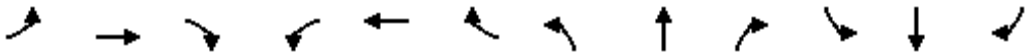
Notes

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

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	398	42	111	469	96	161
Future Volume (veh/h)	398	42	111	469	96	161
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.97	1.00		1.00	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	485	51	113	479	109	183
Peak Hour Factor	0.82	0.82	0.98	0.98	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1141	120	232	941	274	243
Arrive On Green	0.69	0.69	0.69	0.69	0.15	0.15
Sat Flow, veh/h	1658	174	233	1367	1781	1585
Grp Volume(v), veh/h	0	536	592	0	109	183
Grp Sat Flow(s),veh/h/ln	0	1833	1600	0	1781	1585
Q Serve(g_s), s	0.0	7.7	0.4	0.0	3.3	6.6
Cycle Q Clear(g_c), s	0.0	7.7	8.8	0.0	3.3	6.6
Prop In Lane		0.10	0.19		1.00	1.00
Lane Grp Cap(c), veh/h	0	1261	1173	0	274	243
V/C Ratio(X)	0.00	0.43	0.50	0.00	0.40	0.75
Avail Cap(c_a), veh/h	0	1261	1173	0	564	502
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.87	0.78	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	4.1	4.3	0.0	22.9	24.3
Incr Delay (d2), s/veh	0.0	0.9	0.3	0.0	0.9	4.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.9	1.9	0.0	1.3	2.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	5.0	4.5	0.0	23.8	28.9
LnGrp LOS	A	A	A	A	C	C
Approach Vol, veh/h	536			592	292	
Approach Delay, s/veh	5.0			4.5	27.0	
Approach LOS	A			A	C	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		46.3		13.7		46.3
Change Period (Y+Rc), s		5.0		4.5		5.0
Max Green Setting (Gmax), s		31.5		19.0		31.5
Max Q Clear Time (g_c+I1), s		9.7		8.6		10.8
Green Ext Time (p_c), s		3.4		0.7		4.3

Intersection Summary	
HCM 6th Ctrl Delay	9.4
HCM 6th LOS	A

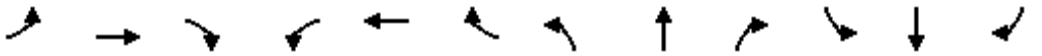


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	532	18	42	560	7	14	0	63	6	0	12
Future Volume (veh/h)	6	532	18	42	560	7	14	0	63	6	0	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	7	598	20	48	644	8	21	0	95	9	0	19
Peak Hour Factor	0.89	0.89	0.89	0.87	0.87	0.87	0.66	0.66	0.66	0.64	0.64	0.64
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	94	882	29	129	843	10	31	0	139	24	0	50
Arrive On Green	0.49	0.49	0.49	0.49	0.49	0.49	0.11	0.00	0.11	0.05	0.00	0.05
Sat Flow, veh/h	5	1786	59	64	1707	20	288	0	1303	521	0	1099
Grp Volume(v), veh/h	625	0	0	700	0	0	116	0	0	28	0	0
Grp Sat Flow(s),veh/h/ln	1850	0	0	1791	0	0	1590	0	0	1620	0	0
Q Serve(g_s), s	0.0	0.0	0.0	2.2	0.0	0.0	2.8	0.0	0.0	0.7	0.0	0.0
Cycle Q Clear(g_c), s	10.2	0.0	0.0	12.3	0.0	0.0	2.8	0.0	0.0	0.7	0.0	0.0
Prop In Lane	0.01		0.03	0.07		0.01	0.18		0.82	0.32		0.68
Lane Grp Cap(c), veh/h	1006	0	0	982	0	0	170	0	0	74	0	0
V/C Ratio(X)	0.62	0.00	0.00	0.71	0.00	0.00	0.68	0.00	0.00	0.38	0.00	0.00
Avail Cap(c_a), veh/h	1856	0	0	1777	0	0	762	0	0	777	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.6	0.0	0.0	8.1	0.0	0.0	17.1	0.0	0.0	18.4	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.0	1.0	0.0	0.0	4.8	0.0	0.0	3.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	0.0	3.0	0.0	0.0	1.1	0.0	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.3	0.0	0.0	9.1	0.0	0.0	21.8	0.0	0.0	21.5	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	A	C	A	A
Approach Vol, veh/h		625			700			116			28	
Approach Delay, s/veh		8.3			9.1			21.8			21.5	
Approach LOS		A			A			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		24.6		8.7		24.6		6.3				
Change Period (Y+Rc), s		5.0		4.5		5.0		4.5				
Max Green Setting (Gmax), s		38.0		19.0		38.0		19.0				
Max Q Clear Time (g_c+I1), s		12.2		4.8		14.3		2.7				
Green Ext Time (p_c), s		4.4		0.5		5.3		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			10.0									
HCM 6th LOS			A									

WITH TRAFFIC SIGNALS
WITH TWLTL ON LA COSTA AVENUE



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	3	4	328	7	79	9	279	208	359	850	10
Future Volume (veh/h)	1	3	4	328	7	79	9	279	208	359	850	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.96	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	2	6	8	410	9	99	10	313	234	403	955	11
Peak Hour Factor	0.50	0.50	0.50	0.80	0.80	0.80	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	10	29	32	458	10	416	25	572	662	664	1846	793
Arrive On Green	0.02	0.02	0.02	0.26	0.26	0.26	0.01	0.16	0.16	0.37	0.52	0.52
Sat Flow, veh/h	462	1385	1547	1745	38	1585	1781	3554	1528	1781	3554	1527
Grp Volume(v), veh/h	8	0	8	419	0	99	10	313	234	403	955	11
Grp Sat Flow(s),veh/h/ln	1847	0	1547	1783	0	1585	1781	1777	1528	1781	1777	1527
Q Serve(g_s), s	0.5	0.0	0.6	27.2	0.0	5.9	0.7	9.7	12.5	22.0	21.2	0.4
Cycle Q Clear(g_c), s	0.5	0.0	0.6	27.2	0.0	5.9	0.7	9.7	12.5	22.0	21.2	0.4
Prop In Lane	0.25		1.00	0.98		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	38	0	32	468	0	416	25	572	662	664	1846	793
V/C Ratio(X)	0.21	0.00	0.25	0.90	0.00	0.24	0.40	0.55	0.35	0.61	0.52	0.01
Avail Cap(c_a), veh/h	92	0	77	609	0	542	89	859	785	664	1846	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	0.00	1.00	0.97	0.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.8	0.0	57.8	42.7	0.0	34.8	58.6	46.3	23.6	30.5	18.9	14.0
Incr Delay (d2), s/veh	2.7	0.0	4.0	12.9	0.0	0.3	9.8	0.8	0.3	1.6	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	0.3	0.0	0.3	13.4	0.0	2.3	0.4	4.2	6.7	9.2	8.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.5	0.0	61.9	55.5	0.0	35.1	68.4	47.1	23.9	32.1	19.2	14.0
LnGrp LOS	E	A	E	E	A	D	E	D	C	C	B	B
Approach Vol, veh/h		16			518			557			1369	
Approach Delay, s/veh		61.2			51.6			37.7			23.0	
Approach LOS		E			D			D			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	49.3	25.7		8.9	6.3	68.7		36.1				
Change Period (Y+Rc), s	4.6	6.4		6.4	4.6	6.4		4.6				
Max Green Setting (Gmax), s	22.0	29.0		6.0	6.0	45.0		41.0				
Max Q Clear Time (g_c+I1), s	24.0	14.5		2.6	2.7	23.2		29.2				
Green Ext Time (p_c), s	0.0	2.2		0.0	0.0	6.2		2.3				

Intersection Summary			
HCM 6th Ctrl Delay		32.6	
HCM 6th LOS		C	

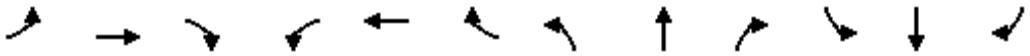
Notes

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

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	534	75	240	370	43	88
Future Volume (veh/h)	534	75	240	370	43	88
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.97	1.00		1.00	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	621	87	261	402	47	97
Peak Hour Factor	0.86	0.86	0.92	0.92	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1025	144	292	1576	139	124
Arrive On Green	0.85	0.85	0.16	0.84	0.08	0.08
Sat Flow, veh/h	1599	224	1781	1870	1781	1585
Grp Volume(v), veh/h	0	708	261	402	47	97
Grp Sat Flow(s),veh/h/ln	0	1823	1781	1870	1781	1585
Q Serve(g_s), s	0.0	14.2	17.2	5.2	3.0	7.2
Cycle Q Clear(g_c), s	0.0	14.2	17.2	5.2	3.0	7.2
Prop In Lane		0.12	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	0	1169	292	1576	139	124
V/C Ratio(X)	0.00	0.61	0.89	0.26	0.34	0.78
Avail Cap(c_a), veh/h	0	1169	408	1576	284	252
HCM Platoon Ratio	1.33	1.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.88	0.87	0.87	1.00	1.00
Uniform Delay (d), s/veh	0.0	4.2	49.1	1.9	52.4	54.3
Incr Delay (d2), s/veh	0.0	2.1	14.8	0.1	1.4	10.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.7	8.8	1.1	1.4	3.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	6.3	64.0	2.0	53.8	64.5
LnGrp LOS	A	A	E	A	D	E
Approach Vol, veh/h	708			663	144	
Approach Delay, s/veh	6.3			26.4	61.0	
Approach LOS	A			C	E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	24.2	81.9		13.9		106.1
Change Period (Y+Rc), s	4.5	5.0		4.5		5.0
Max Green Setting (Gmax), s	27.5	59.4		19.1		91.4
Max Q Clear Time (g_c+I1), s	19.2	16.2		9.2		7.2
Green Ext Time (p_c), s	0.5	5.8		0.3		2.7

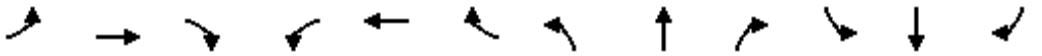
Intersection Summary	
HCM 6th Ctrl Delay	20.3
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	588	10	43	615	8	9	0	49	9	1	6
Future Volume (veh/h)	3	588	10	43	615	8	9	0	49	9	1	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		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	3	676	11	45	647	8	11	0	60	16	2	11
Peak Hour Factor	0.87	0.87	0.87	0.95	0.95	0.95	0.81	0.81	0.81	0.57	0.57	0.57
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	7	804	13	83	887	11	20	0	107	49	6	33
Arrive On Green	0.00	0.44	0.44	0.05	0.48	0.48	0.08	0.00	0.08	0.05	0.05	0.05
Sat Flow, veh/h	1781	1834	30	1781	1842	23	241	0	1317	926	116	637
Grp Volume(v), veh/h	3	0	687	45	0	655	71	0	0	29	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1864	1781	0	1865	1558	0	0	1679	0	0
Q Serve(g_s), s	0.1	0.0	15.9	1.2	0.0	13.6	2.1	0.0	0.0	0.8	0.0	0.0
Cycle Q Clear(g_c), s	0.1	0.0	15.9	1.2	0.0	13.6	2.1	0.0	0.0	0.8	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.01	0.15		0.85	0.55		0.38
Lane Grp Cap(c), veh/h	7	0	817	83	0	898	126	0	0	88	0	0
V/C Ratio(X)	0.41	0.00	0.84	0.54	0.00	0.73	0.56	0.00	0.00	0.33	0.00	0.00
Avail Cap(c_a), veh/h	183	0	1094	183	0	1095	610	0	0	657	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	24.1	0.0	12.1	22.6	0.0	10.1	21.5	0.0	0.0	22.2	0.0	0.0
Incr Delay (d2), s/veh	33.3	0.0	4.6	5.3	0.0	2.0	3.9	0.0	0.0	2.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	5.9	0.6	0.0	4.4	0.9	0.0	0.0	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.4	0.0	16.7	27.9	0.0	12.0	25.4	0.0	0.0	24.3	0.0	0.0
LnGrp LOS	E	A	B	C	A	B	C	A	A	C	A	A
Approach Vol, veh/h		690			700			71			29	
Approach Delay, s/veh		16.8			13.1			25.4			24.3	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.8	26.3		8.4	4.7	28.4		7.0				
Change Period (Y+Rc), s	4.5	5.0		4.5	4.5	5.0		4.5				
Max Green Setting (Gmax), s	5.0	28.5		19.0	5.0	28.5		19.0				
Max Q Clear Time (g_c+I1), s	3.2	17.9		4.1	2.1	15.6		2.8				
Green Ext Time (p_c), s	0.0	3.4		0.3	0.0	3.5		0.1				

Intersection Summary			
HCM 6th Ctrl Delay		15.6	
HCM 6th LOS		B	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	18	3	233	4	274	8	691	165	262	681	9
Future Volume (veh/h)	2	18	3	233	4	274	8	691	165	262	681	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		1.00	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	3	28	5	256	4	301	9	776	185	380	987	13
Peak Hour Factor	0.64	0.64	0.64	0.91	0.91	0.91	0.89	0.89	0.89	0.69	0.69	0.69
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	6	59	52	385	6	348	23	844	710	579	1952	826
Arrive On Green	0.03	0.03	0.03	0.22	0.22	0.22	0.01	0.24	0.24	0.32	0.55	0.55
Sat Flow, veh/h	180	1681	1490	1755	27	1585	1781	3554	1525	1781	3554	1503
Grp Volume(v), veh/h	31	0	5	260	0	301	9	776	185	380	987	13
Grp Sat Flow(s),veh/h/ln	1861	0	1490	1783	0	1585	1781	1777	1525	1781	1777	1503
Q Serve(g_s), s	2.0	0.0	0.4	16.0	0.0	22.0	0.6	25.6	9.0	22.0	20.8	0.5
Cycle Q Clear(g_c), s	2.0	0.0	0.4	16.0	0.0	22.0	0.6	25.6	9.0	22.0	20.8	0.5
Prop In Lane	0.10		1.00	0.98		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	65	0	52	391	0	348	23	844	710	579	1952	826
V/C Ratio(X)	0.48	0.00	0.10	0.66	0.00	0.87	0.39	0.92	0.26	0.66	0.51	0.02
Avail Cap(c_a), veh/h	93	0	74	609	0	542	89	859	716	579	1952	826
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	0.94	0.00	0.94	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.8	0.0	56.1	42.8	0.0	45.1	58.8	44.6	20.1	34.8	16.9	12.3
Incr Delay (d2), s/veh	5.3	0.0	0.8	1.8	0.0	8.3	10.4	14.7	0.2	2.7	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	1.0	0.0	0.2	7.2	0.0	9.3	0.3	12.5	4.6	9.5	7.7	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.2	0.0	56.9	44.6	0.0	53.5	69.1	59.3	20.3	37.5	17.1	12.3
LnGrp LOS	E	A	E	D	A	D	E	E	C	D	B	B
Approach Vol, veh/h		36			561			970			1380	
Approach Delay, s/veh		61.4			49.4			52.0			22.7	
Approach LOS		E			D			D			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	43.6	34.9		10.6	6.2	72.3		30.9				
Change Period (Y+Rc), s	4.6	6.4		6.4	4.6	6.4		4.6				
Max Green Setting (Gmax), s	22.0	29.0		6.0	6.0	45.0		41.0				
Max Q Clear Time (g_c+I1), s	24.0	27.6		4.0	2.6	22.8		24.0				
Green Ext Time (p_c), s	0.0	0.8		0.0	0.0	6.5		2.4				

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

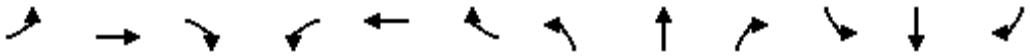
Notes

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

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	398	42	111	469	96	161
Future Volume (veh/h)	398	42	111	469	96	161
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.97	1.00		1.00	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	485	51	113	479	109	183
Peak Hour Factor	0.82	0.82	0.98	0.98	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1112	117	140	1471	239	213
Arrive On Green	0.67	0.67	0.08	0.79	0.13	0.13
Sat Flow, veh/h	1658	174	1781	1870	1781	1585
Grp Volume(v), veh/h	0	536	113	479	109	183
Grp Sat Flow(s),veh/h/ln	0	1833	1781	1870	1781	1585
Q Serve(g_s), s	0.0	16.4	7.5	8.8	6.8	13.6
Cycle Q Clear(g_c), s	0.0	16.4	7.5	8.8	6.8	13.6
Prop In Lane		0.10	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	0	1228	140	1471	239	213
V/C Ratio(X)	0.00	0.44	0.81	0.33	0.46	0.86
Avail Cap(c_a), veh/h	0	1228	289	1471	349	310
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.87	0.84	0.84	1.00	1.00
Uniform Delay (d), s/veh	0.0	9.2	54.4	3.7	47.9	50.8
Incr Delay (d2), s/veh	0.0	1.0	8.8	0.1	1.4	14.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	6.3	3.7	2.6	3.1	6.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	10.2	63.2	3.8	49.2	65.7
LnGrp LOS	A	B	E	A	D	E
Approach Vol, veh/h	536			592	292	
Approach Delay, s/veh	10.2			15.1	59.6	
Approach LOS	B			B	E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	13.9	85.4		20.6		99.4
Change Period (Y+Rc), s	4.5	5.0		4.5		5.0
Max Green Setting (Gmax), s	19.5	63.0		23.5		87.0
Max Q Clear Time (g_c+I1), s	9.5	18.4		15.6		10.8
Green Ext Time (p_c), s	0.2	3.9		0.6		3.3

Intersection Summary	
HCM 6th Ctrl Delay	22.4
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	532	18	42	560	7	14	0	63	6	0	12
Future Volume (veh/h)	6	532	18	42	560	7	14	0	63	6	0	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	7	598	20	48	644	8	21	0	95	9	0	19
Peak Hour Factor	0.89	0.89	0.89	0.87	0.87	0.87	0.66	0.66	0.66	0.64	0.64	0.64
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	17	732	24	88	824	10	31	0	138	23	0	49
Arrive On Green	0.01	0.41	0.41	0.05	0.45	0.45	0.11	0.00	0.11	0.04	0.00	0.04
Sat Flow, veh/h	1781	1797	60	1781	1843	23	287	0	1298	519	0	1096
Grp Volume(v), veh/h	7	0	618	48	0	652	116	0	0	28	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1857	1781	0	1865	1585	0	0	1616	0	0
Q Serve(g_s), s	0.2	0.0	13.9	1.2	0.0	14.0	3.3	0.0	0.0	0.8	0.0	0.0
Cycle Q Clear(g_c), s	0.2	0.0	13.9	1.2	0.0	14.0	3.3	0.0	0.0	0.8	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.01	0.18		0.82	0.32		0.68
Lane Grp Cap(c), veh/h	17	0	756	88	0	834	169	0	0	72	0	0
V/C Ratio(X)	0.42	0.00	0.82	0.54	0.00	0.78	0.69	0.00	0.00	0.39	0.00	0.00
Avail Cap(c_a), veh/h	189	0	1122	189	0	1127	639	0	0	651	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	23.2	0.0	12.4	21.9	0.0	11.1	20.3	0.0	0.0	21.9	0.0	0.0
Incr Delay (d2), s/veh	16.2	0.0	3.0	5.1	0.0	2.5	4.9	0.0	0.0	3.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	4.9	0.6	0.0	4.7	1.4	0.0	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.5	0.0	15.5	27.0	0.0	13.6	25.2	0.0	0.0	25.3	0.0	0.0
LnGrp LOS	D	A	B	C	A	B	C	A	A	C	A	A
Approach Vol, veh/h		625			700			116			28	
Approach Delay, s/veh		15.7			14.5			25.2			25.3	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.8	24.2		6.6	4.9	26.1		9.5				
Change Period (Y+Rc), s	4.5	5.0		4.5	4.5	5.0		4.5				
Max Green Setting (Gmax), s	5.0	28.5		19.0	5.0	28.5		19.0				
Max Q Clear Time (g_c+I1), s	3.2	15.9		2.8	2.2	16.0		5.3				
Green Ext Time (p_c), s	0.0	3.3		0.1	0.0	3.5		0.5				

Intersection Summary			
HCM 6th Ctrl Delay		16.1	
HCM 6th LOS		B	

WITH ROUNDABOUTS
(WITHOUT OR WITH TWLTL ON LA COSTA AVENUE)

DELAY (CONTROL)

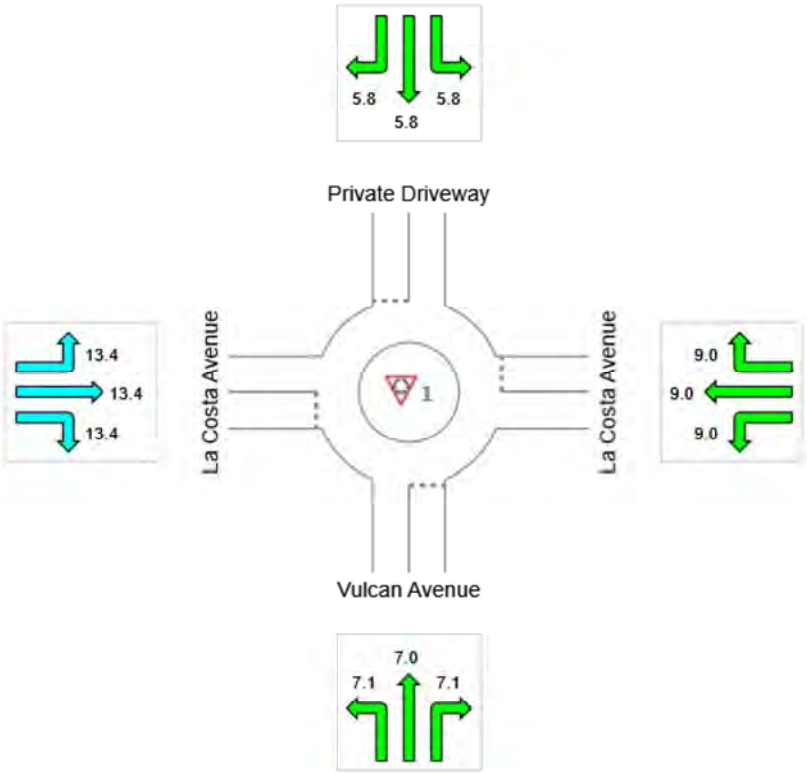
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 1 [LaCosta-Vulcan AM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	7.1	9.0	5.8	13.4	10.7
LOS	A	A	A	B	B



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: Same as Sign Control
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

DELAY (CONTROL)

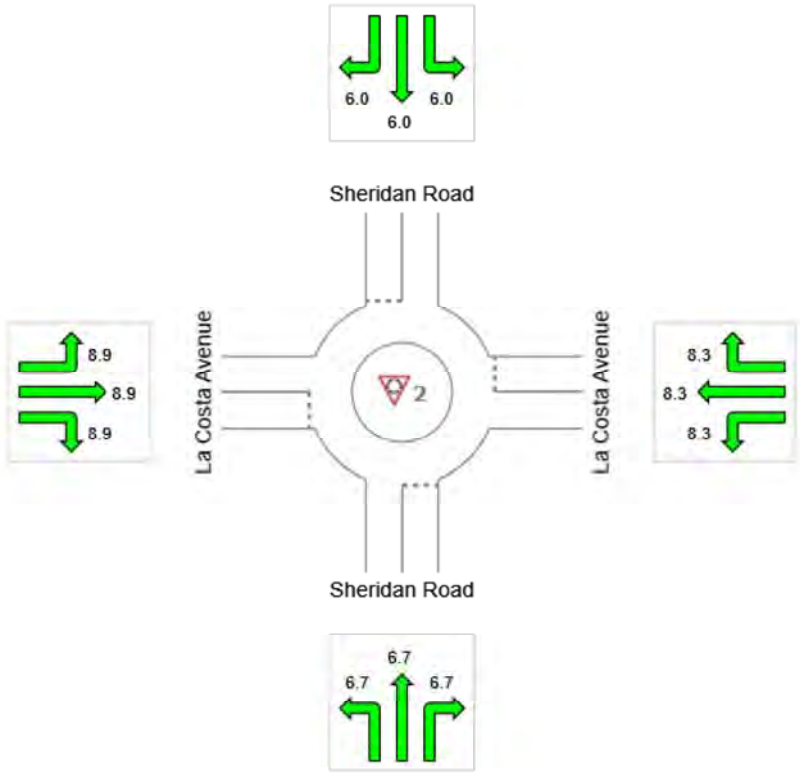
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 2 [LaCosta-Sheridan AM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	6.7	8.3	6.0	8.9	8.5
LOS	A	A	A	A	A



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: Same as Sign Control
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

DELAY (CONTROL)

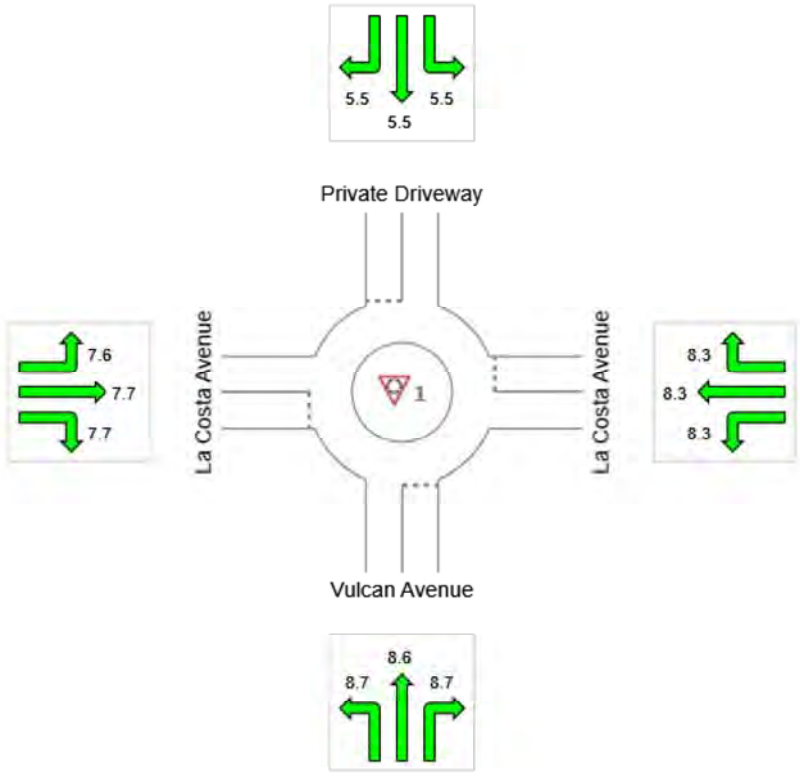
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 1 [LaCosta-Vulcan PM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	8.7	8.3	5.5	7.7	8.2
LOS	A	A	A	A	A



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: Same as Sign Control
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

DELAY (CONTROL)

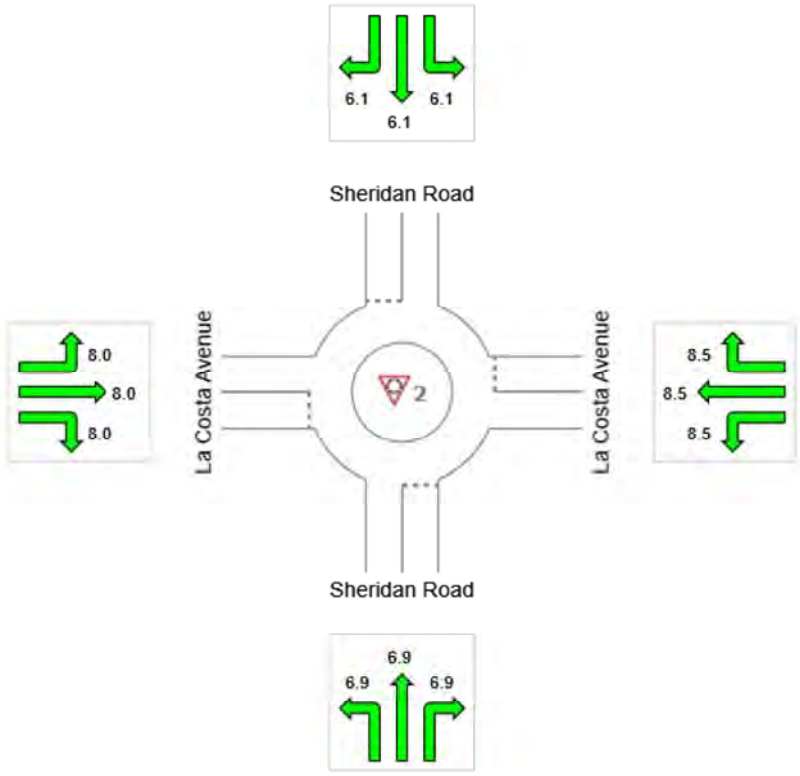
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 2 [LaCosta-Sheridan PM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	6.9	8.5	6.1	8.0	8.1
LOS	A	A	A	A	A



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: Same as Sign Control
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

APPENDIX C

SIMTRAFFIC AND SIDRA QUEUING ANALYSIS WORKSHEETS

WITH EXISTING TRAFFIC CONTROLS
WITH EXISTING LA COSTA AVENUE CROSS-SECTION

Intersection: 1: Coast Highway 101 & La Costa Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	24	19	203	135	90	157	259	139	252	223	170	21
Average Queue (ft)	5	5	128	71	13	102	76	60	182	126	105	2
95th Queue (ft)	18	18	194	165	51	160	189	133	241	187	169	13
Link Distance (ft)	227	227	476			878	878			927	927	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)				110	65			115	245			120
Storage Blk Time (%)			14	0		31	2	2	1		5	
Queuing Penalty (veh)			11	0		3	4	2	4		1	

Intersection: 2: Vulcan Avenue & La Costa Avenue

Movement	EB	WB	NB	NB
Directions Served	TR	LT	L	R
Maximum Queue (ft)	437	343	30	72
Average Queue (ft)	253	181	19	35
95th Queue (ft)	425	333	41	62
Link Distance (ft)	476	1286		642
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			75	
Storage Blk Time (%)				0
Queuing Penalty (veh)				0

Intersection: 3: Sheridan Road & La Costa Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	8	86	54	31
Average Queue (ft)	1	25	33	8
95th Queue (ft)	4	80	47	30
Link Distance (ft)	1286	812	1333	780
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 25

Intersection: 1: Coast Highway 101 & La Costa Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	44	17	272	135	47	375	336	140	253	165	159	24
Average Queue (ft)	11	1	128	87	12	228	172	81	159	110	86	2
95th Queue (ft)	37	8	262	157	36	343	303	161	247	159	142	11
Link Distance (ft)	226	226	476			895	895			831	831	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)				110	65			115	245			120
Storage Blk Time (%)			12	0	0	51	15	0	1		3	
Queuing Penalty (veh)			32	1	0	4	24	0	2		0	

Intersection: 2: Vulcan Avenue & La Costa Avenue

Movement	EB	WB	NB	NB
Directions Served	TR	LT	L	R
Maximum Queue (ft)	278	246	52	96
Average Queue (ft)	127	133	34	49
95th Queue (ft)	230	203	49	83
Link Distance (ft)	476	1287		642
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			75	
Storage Blk Time (%)				1
Queuing Penalty (veh)				1

Intersection: 3: Sheridan Road & La Costa Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	3	106	54	54
Average Queue (ft)	0	23	41	15
95th Queue (ft)	1	80	59	44
Link Distance (ft)	1287	812	1268	764
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 64

WITH EXISTING TRAFFIC CONTROLS
WITH TWLTL ON LA COSTA AVENUE

Intersection: 2: Vulcan Avenue & La Costa Avenue

Movement	EB	WB	WB	NB	NB
Directions Served	TR	L	T	L	R
Maximum Queue (ft)	263	92	95	27	70
Average Queue (ft)	183	50	63	15	31
95th Queue (ft)	272	78	84	36	59
Link Distance (ft)	476		1286		636
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		100		75	
Storage Blk Time (%)		0	0		0
Queuing Penalty (veh)		0	0		0

Intersection: 3: Sheridan Road & La Costa Avenue

Movement	WB	WB	NB	SB
Directions Served	L	TR	LTR	LTR
Maximum Queue (ft)	58	46	80	30
Average Queue (ft)	15	9	36	6
95th Queue (ft)	45	38	64	25
Link Distance (ft)		812	1328	772
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	50			
Storage Blk Time (%)	0	0		
Queuing Penalty (veh)	3	0		

Zone Summary

Zone wide Queuing Penalty: 3

Intersection: 2: Vulcan Avenue & La Costa Avenue

Movement	EB	WB	WB	NB	NB
Directions Served	TR	L	T	L	R
Maximum Queue (ft)	200	124	160	50	74
Average Queue (ft)	130	56	104	32	45
95th Queue (ft)	198	95	148	48	70
Link Distance (ft)	476		1286		636
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		100		75	
Storage Blk Time (%)			5		0
Queuing Penalty (veh)			6		0

Intersection: 3: Sheridan Road & La Costa Avenue

Movement	WB	WB	NB	SB
Directions Served	L	TR	LTR	LTR
Maximum Queue (ft)	26	21	78	50
Average Queue (ft)	10	1	40	13
95th Queue (ft)	30	10	71	43
Link Distance (ft)		812	1262	756
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	50			
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 6

WITH ALL-WAY STOP CONTROL
WITH EXISTING LA COSTA AVENUE CROSS-SECTION

Intersection: 3: Sheridan Road & La Costa Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	85	267	55	31
Average Queue (ft)	29	138	32	14
95th Queue (ft)	66	244	63	39
Link Distance (ft)	1286	812	1333	780
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Sheridan Road & La Costa Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	82	266	83	31
Average Queue (ft)	41	119	38	14
95th Queue (ft)	79	221	62	39
Link Distance (ft)	1287	812	1268	764
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

WITH ALL-WAY STOP CONTROL
WITH TWLTL ON LA COSTA AVENUE

Intersection: 3: Sheridan Road & La Costa Avenue

Movement	EB	WB	WB	NB	SB
Directions Served	TR	L	TR	LTR	LTR
Maximum Queue (ft)	64	74	367	52	31
Average Queue (ft)	19	44	131	32	16
95th Queue (ft)	50	93	289	57	42
Link Distance (ft)	1286		812	1328	772
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		50			
Storage Blk Time (%)	1	0	32		
Queuing Penalty (veh)	0	1	14		

Intersection: 3: Sheridan Road & La Costa Avenue

Movement	EB	WB	WB	NB	SB
Directions Served	TR	L	TR	LTR	LTR
Maximum Queue (ft)	54	74	278	68	30
Average Queue (ft)	23	34	107	38	6
95th Queue (ft)	51	81	216	57	26
Link Distance (ft)	1286		812	1262	756
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		50			
Storage Blk Time (%)	1		26		
Queuing Penalty (veh)	0		11		

WITH TRAFFIC SIGNALS
WITH EXISTING LA COSTA AVENUE CROSS-SECTION

Intersection: 1: Coast Highway 101 & La Costa Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T
Maximum Queue (ft)	24	18	264	135	46	154	127	54	269	594	584
Average Queue (ft)	7	7	190	38	9	117	56	36	194	238	200
95th Queue (ft)	23	22	288	121	40	157	122	56	296	541	530
Link Distance (ft)	227	227	476			878	878			927	927
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)				110	65			115	245		
Storage Blk Time (%)			30		0	41	0		6		6
Queuing Penalty (veh)			24		0	4	1		25		1

Intersection: 2: Vulcan Avenue & La Costa Avenue

Movement	EB	WB	NB	NB
Directions Served	TR	LT	L	R
Maximum Queue (ft)	288	375	29	51
Average Queue (ft)	140	242	11	36
95th Queue (ft)	277	426	34	56
Link Distance (ft)	476	1286		642
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			75	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Sheridan Road & La Costa Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	50	261	54	28
Average Queue (ft)	11	148	29	6
95th Queue (ft)	43	297	57	24
Link Distance (ft)	1286	812	1333	780
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 53

Intersection: 1: Coast Highway 101 & La Costa Avenue

Movement	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	24	328	125	88	278	258	140	267	329	203	136
Average Queue (ft)	5	146	54	29	242	203	74	212	217	152	27
95th Queue (ft)	20	311	121	82	290	281	161	300	359	215	117
Link Distance (ft)	226	476			895	895			831	831	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)			110	65			115	245			120
Storage Blk Time (%)		13	0		61	23	0	8		9	0
Queuing Penalty (veh)		35	0		5	38	1	27		1	0

Intersection: 2: Vulcan Avenue & La Costa Avenue

Movement	EB	WB	NB	NB
Directions Served	TR	LT	L	R
Maximum Queue (ft)	110	328	51	76
Average Queue (ft)	66	151	27	48
95th Queue (ft)	113	301	54	77
Link Distance (ft)	476	1296		641
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			75	
Storage Blk Time (%)				0
Queuing Penalty (veh)				0

Intersection: 3: Sheridan Road & La Costa Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	110	90	72	30
Average Queue (ft)	46	65	39	6
95th Queue (ft)	116	120	66	26
Link Distance (ft)	1296	812	1268	761
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 108

WITH TRAFFIC SIGNALS
WITH TWLTL ON LA COSTA AVENUE

Intersection: 1: Coast Highway 101 & La Costa Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	22	18	482	135	89	264	179	139	269	548	441	23
Average Queue (ft)	2	1	299	70	14	128	79	57	195	243	207	3
95th Queue (ft)	12	9	506	168	51	226	180	118	310	495	414	14
Link Distance (ft)	227	227	476			878	878			927	927	
Upstream Blk Time (%)			1									
Queuing Penalty (veh)			3									
Storage Bay Dist (ft)				110	65			115	245			120
Storage Blk Time (%)			32	0		40	3	0	11	5	11	
Queuing Penalty (veh)			25	0		4	6	0	46	16	1	

Intersection: 2: Vulcan Avenue & La Costa Avenue

Movement	EB	WB	WB	NB	NB
Directions Served	TR	L	T	L	R
Maximum Queue (ft)	441	124	494	66	75
Average Queue (ft)	110	119	259	38	37
95th Queue (ft)	281	130	550	68	61
Link Distance (ft)	476		1286		636
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		100		75	
Storage Blk Time (%)		36		1	0
Queuing Penalty (veh)		134		1	0

Intersection: 3: Sheridan Road & La Costa Avenue

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	0	152	62	357	54	31
Average Queue (ft)	0	58	27	94	35	12
95th Queue (ft)	0	157	56	256	50	37
Link Distance (ft)		1286		812	1328	772
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	50		50			
Storage Blk Time (%)		4	2	9		
Queuing Penalty (veh)		0	12	4		

Zone Summary

Zone wide Queuing Penalty: 253

Intersection: 1: Coast Highway 101 & La Costa Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	65	17	388	135	28	343	319	140	270	424	300	25
Average Queue (ft)	17	2	169	113	9	264	242	113	218	199	124	2
95th Queue (ft)	52	11	303	161	29	340	326	194	309	413	249	12
Link Distance (ft)	226	226	476			895	895			831	831	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)				110	65			115	245			120
Storage Blk Time (%)			13	0		67	32	0	14	2	10	
Queuing Penalty (veh)			35	0		5	53	1	48	4	1	

Intersection: 2: Vulcan Avenue & La Costa Avenue

Movement	EB	WB	WB	NB	NB
Directions Served	TR	L	T	L	R
Maximum Queue (ft)	196	124	455	99	210
Average Queue (ft)	85	99	127	79	111
95th Queue (ft)	159	138	314	128	214
Link Distance (ft)	476		1286		636
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		100		75	
Storage Blk Time (%)		18	2	26	5
Queuing Penalty (veh)		82	2	42	5

Intersection: 3: Sheridan Road & La Costa Avenue

Movement	EB	WB	WB	NB	SB
Directions Served	TR	L	TR	LTR	LTR
Maximum Queue (ft)	128	43	325	74	52
Average Queue (ft)	56	19	79	39	16
95th Queue (ft)	134	39	201	60	44
Link Distance (ft)	1286		812	1262	756
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		50			
Storage Blk Time (%)	5	1	6		
Queuing Penalty (veh)	0	4	2		

Zone Summary

Zone wide Queuing Penalty: 286

WITH ROUNDABOUTS
(WITHOUT OR WITH TWLTL ON LA COSTA AVENUE)

QUEUE DISTANCE (%ILE)

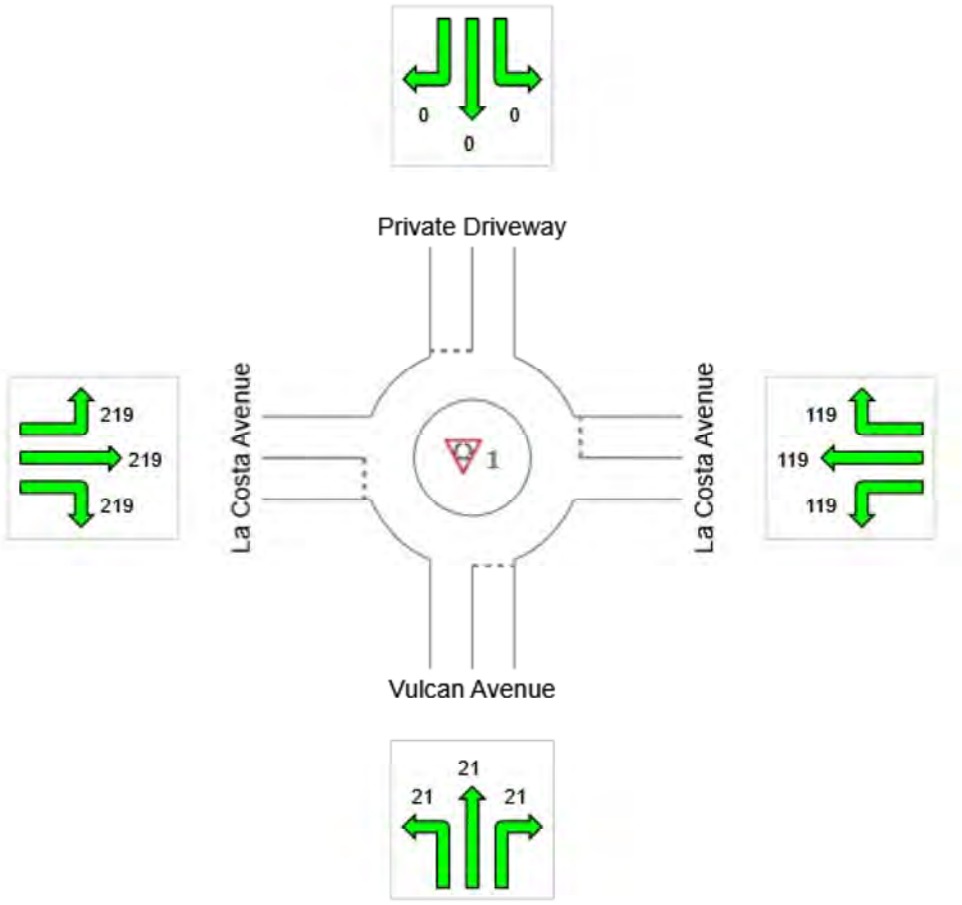
Largest 95% Back of Queue Distance for any lane used by vehicle movement (feet)

Site: 1 [LaCosta-Vulcan AM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Vehicle Queue (%ile)	21	119	0	219	219



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

QUEUE DISTANCE (%ILE)

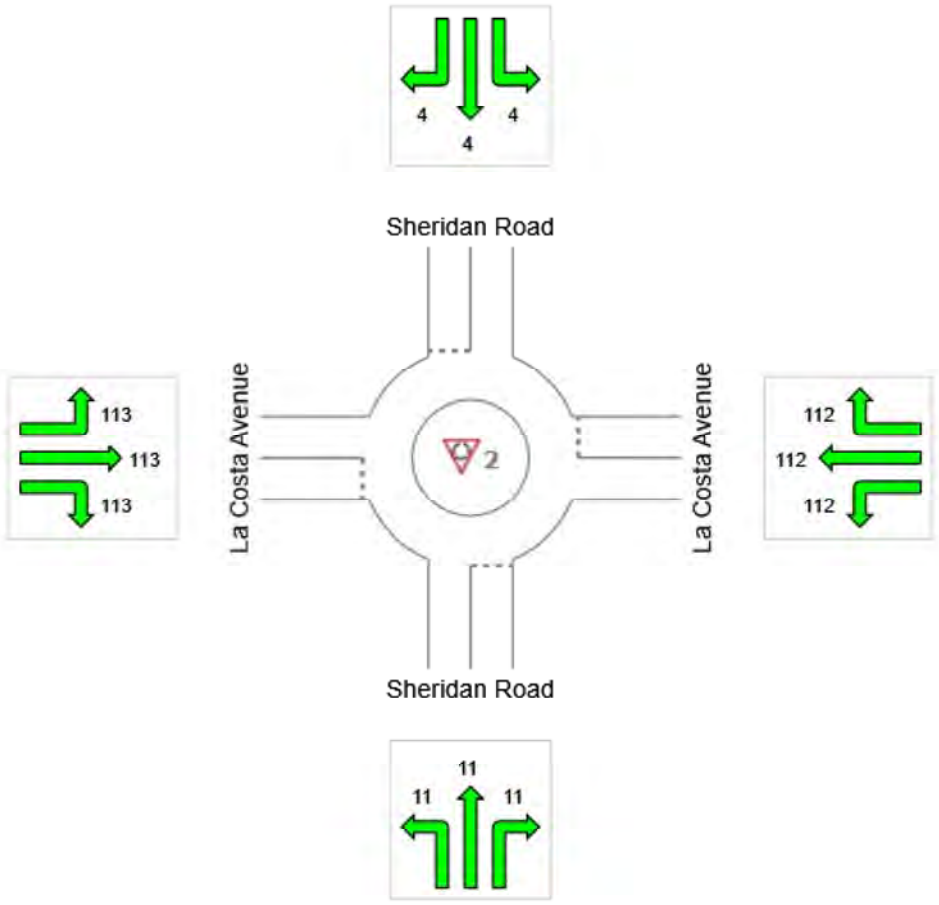
Largest 95% Back of Queue Distance for any lane used by vehicle movement (feet)

Site: 2 [LaCosta-Sheridan AM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Vehicle Queue (%ile)	11	112	4	113	113



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

QUEUE DISTANCE (%ILE)

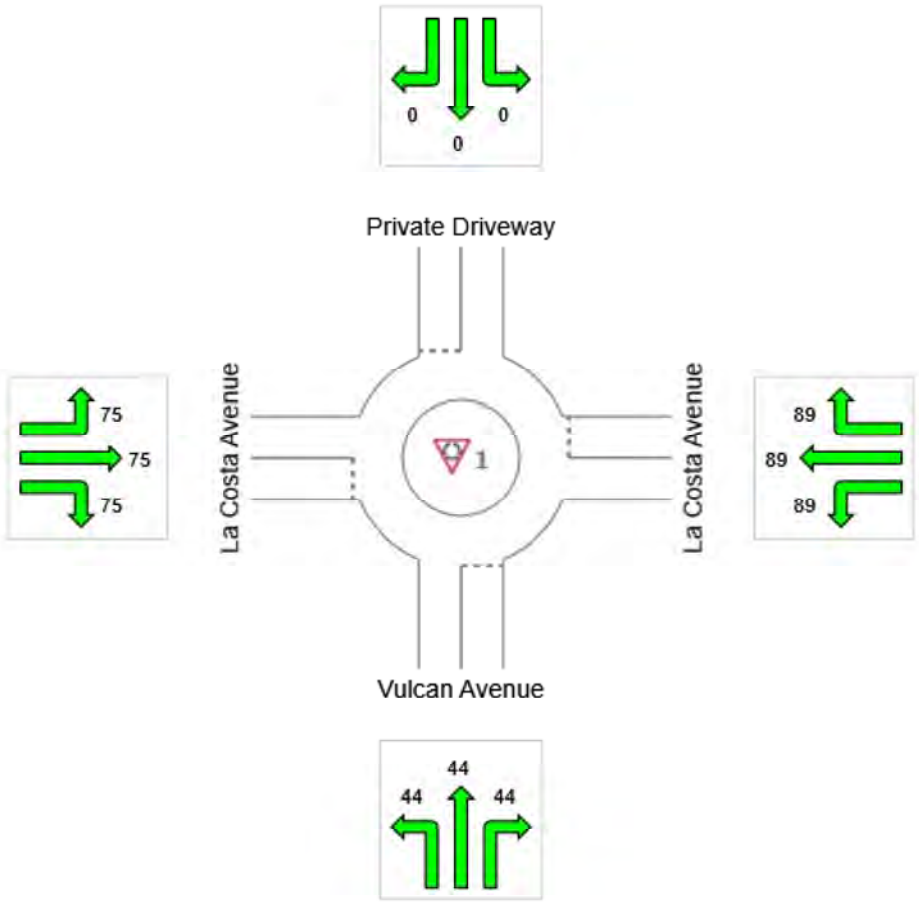
Largest 95% Back of Queue Distance for any lane used by vehicle movement (feet)

Site: 1 [LaCosta-Vulcan PM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Vehicle Queue (%ile)	44	89	0	75	89



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

QUEUE DISTANCE (%ILE)

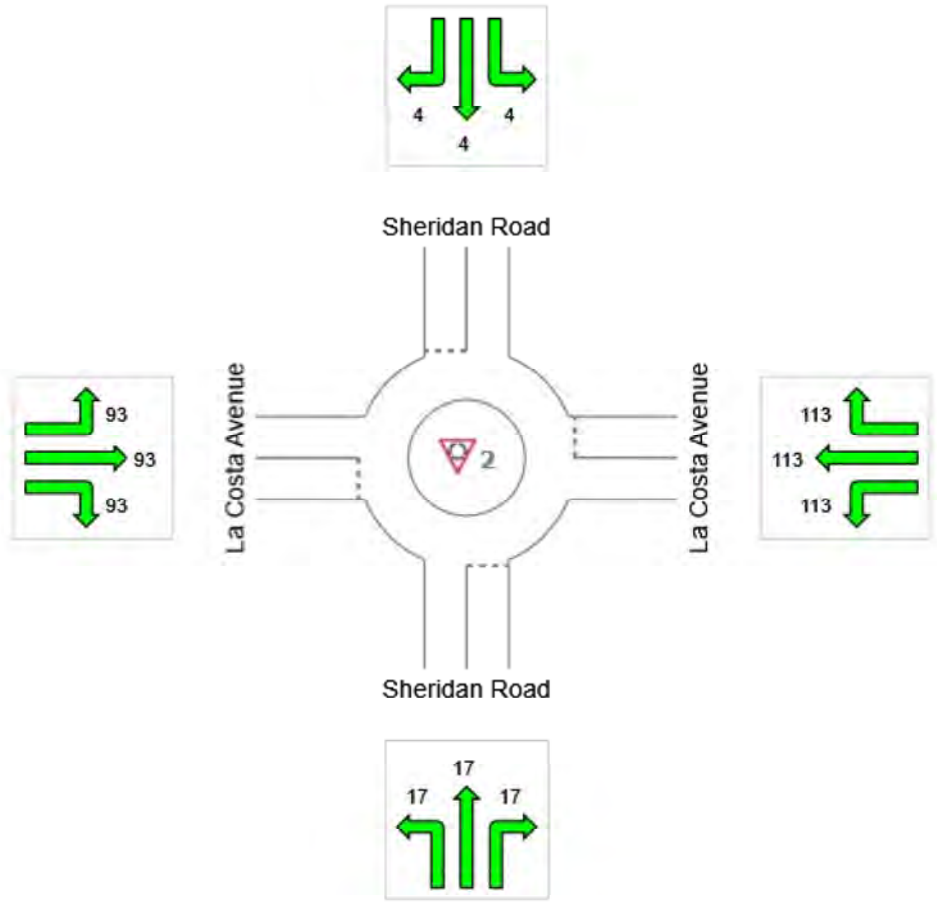
Largest 95% Back of Queue Distance for any lane used by vehicle movement (feet)

Site: 2 [LaCosta-Sheridan PM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Vehicle Queue (%ile)	17	113	4	93	113



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

APPENDIX D

SIMTRAFFIC ARTERIAL ANALYSIS WORKSHEETS

WITH EXISTING TRAFFIC CONTROLS
WITH EXISTING LA COSTA AVENUE CROSS-SECTION

Arterial Level of Service: EB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Coast Highway 101	1	39.9	44.5	0.1	4
Vulcan Avenue	2	15.4	21.1	0.1	19
Sheridan Road	3	4.0	30.3	0.3	31
	7	1.4	18.1	0.2	32
I-5 SB Ramps	4	24.8	31.0	0.1	8
Total		85.5	145.1	0.6	16

Arterial Level of Service: WB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
I-5 SB Ramps	4	8.7	30.1	0.2	25
	7	2.8	9.5	0.1	26
Sheridan Road	3	2.2	17.6	0.2	33
Vulcan Avenue	2	20.7	46.4	0.3	20
Coast Highway 101	1	40.6	52.8	0.1	7
Total		75.0	156.3	0.8	19

Arterial Level of Service: EB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Coast Highway 101	1	61.7	66.3	0.1	3
Vulcan Avenue	2	14.6	23.0	0.1	16
Sheridan Road	3	4.2	30.7	0.3	31
	7	1.3	17.7	0.2	33
I-5 SB Ramps	4	27.1	33.6	0.1	7
Total		108.9	171.4	0.6	14

Arterial Level of Service: WB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
I-5 SB Ramps	4	8.8	23.2	0.1	22
	7	2.2	8.9	0.1	27
Sheridan Road	3	1.8	17.7	0.2	33
Vulcan Avenue	2	16.8	42.9	0.3	22
Coast Highway 101	1	3.9	9.7	0.1	38
Total		33.6	102.3	0.7	26

WITH EXISTING TRAFFIC CONTROLS
WITH TWLTL ON LA COSTA AVENUE

Arterial Level of Service: EB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Coast Highway 101	1	-	-	0.1	-
Vulcan Avenue	2	20.1	25.5	0.1	15
Sheridan Road	3	3.8	29.5	0.3	32
	7	1.2	17.7	0.2	33
I-5 SB Ramps	4	25.9	32.2	0.1	8
Total		51.1	104.9	0.6	22

Arterial Level of Service: WB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
I-5 SB Ramps	4	9.0	30.0	0.2	25
	7	2.7	9.4	0.1	26
Sheridan Road	3	1.5	17.4	0.2	33
Vulcan Avenue	2	10.1	35.4	0.3	27
Coast Highway 101	1	27.9	39.1	0.1	10
Total		51.1	131.3	0.8	22

Arterial Level of Service: EB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Coast Highway 101	1	33.7	38.4	0.1	5
Vulcan Avenue	2	11.1	20.7	0.1	18
Sheridan Road	3	4.1	30.6	0.3	31
	7	1.3	17.7	0.2	33
I-5 SB Ramps	4	24.3	30.8	0.1	8
Total		74.6	138.2	0.6	17

Arterial Level of Service: WB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
I-5 SB Ramps	4	8.2	22.4	0.1	23
	7	2.1	8.7	0.1	28
Sheridan Road	3	1.6	17.8	0.2	33
Vulcan Avenue	2	14.3	39.9	0.3	24
Coast Highway 101	1	4.5	10.1	0.1	37
Total		30.6	98.9	0.7	27

WITH ALL-WAY STOP CONTROL
WITH EXISTING LA COSTA AVENUE CROSS-SECTION

Arterial Level of Service: EB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Coast Highway 101	1	12.3	17.6	0.1	11
Vulcan Avenue	2	16.7	24.7	0.1	18
Sheridan Road	3	14.3	40.8	0.3	23
	7	2.9	22.4	0.2	26
I-5 SB Ramps	4	25.5	32.3	0.1	8
Total		71.7	137.8	0.6	17

Arterial Level of Service: WB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
I-5 SB Ramps	4	8.2	29.4	0.2	26
	7	2.2	10.0	0.1	24
Sheridan Road	3	14.1	30.1	0.2	19
Vulcan Avenue	2	17.1	42.5	0.3	22
Coast Highway 101	1	11.5	21.3	0.1	18
Total		53.1	133.3	0.8	22

Arterial Level of Service: EB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Coast Highway 101	1	56.6	61.3	0.1	3
Vulcan Avenue	2	17.5	28.0	0.1	13
Sheridan Road	3	15.1	41.6	0.3	23
	7	3.9	20.5	0.2	28
I-5 SB Ramps	4	27.8	34.3	0.1	7
Total		120.9	185.7	0.6	13

Arterial Level of Service: WB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
I-5 SB Ramps	4	8.1	22.2	0.1	23
	7	2.3	9.1	0.1	27
Sheridan Road	3	14.1	30.0	0.2	19
Vulcan Avenue	2	15.5	41.1	0.3	23
Coast Highway 101	1	5.9	11.2	0.1	33
Total		46.0	113.5	0.7	23

WITH ALL-WAY STOP CONTROL
WITH TWLTL ON LA COSTA AVENUE

Arterial Level of Service: EB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Coast Highway 101	1	-	-	0.1	-
Vulcan Avenue	2	19.4	27.3	0.1	16
Sheridan Road	3	14.0	40.1	0.3	23
	7	3.7	20.3	0.2	29
I-5 SB Ramps	4	25.3	31.6	0.1	8
Total		62.5	119.3	0.6	20

Arterial Level of Service: WB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
I-5 SB Ramps	4	7.2	28.5	0.2	27
	7	2.8	9.5	0.1	26
Sheridan Road	3	14.9	30.5	0.2	19
Vulcan Avenue	2	12.5	38.0	0.3	25
Coast Highway 101	1	27.3	37.5	0.1	10
Total		64.8	143.9	0.8	20

Arterial Level of Service: EB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Coast Highway 101	1	54.7	59.3	0.1	3
Vulcan Avenue	2	9.5	17.1	0.1	22
Sheridan Road	3	14.5	41.1	0.3	23
	7	3.9	20.3	0.2	29
I-5 SB Ramps	4	26.5	33.2	0.1	7
Total		109.1	170.9	0.6	14

Arterial Level of Service: WB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
I-5 SB Ramps	4	8.4	22.6	0.1	22
	7	2.2	9.0	0.1	27
Sheridan Road	3	12.4	28.7	0.2	20
Vulcan Avenue	2	13.2	39.1	0.3	24
Coast Highway 101	1	5.5	11.6	0.1	32
Total		41.7	111.1	0.7	24

WITH TRAFFIC SIGNALS
WITH EXISTING LA COSTA AVENUE CROSS-SECTION

Arterial Level of Service: EB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Coast Highway 101	1	65.2	70.0	0.1	3
Vulcan Avenue	2	5.4	12.1	0.1	33
Sheridan Road	3	6.2	30.9	0.3	30
	7	1.9	20.8	0.2	28
I-5 SB Ramps	4	23.9	30.0	0.1	8
Total		102.6	163.7	0.6	14

Arterial Level of Service: WB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
I-5 SB Ramps	4	8.6	29.1	0.2	26
	7	2.1	9.7	0.1	25
Sheridan Road	3	10.2	25.9	0.2	22
Vulcan Avenue	2	30.2	55.9	0.3	17
Coast Highway 101	1	66.5	78.3	0.1	5
Total		117.6	198.9	0.8	15

Arterial Level of Service: EB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Coast Highway 101	1	31.5	36.3	0.1	5
Vulcan Avenue	2	1.7	2.7	0.1	140
Sheridan Road	3	9.3	35.4	0.3	27
	7	2.6	21.8	0.2	27
I-5 SB Ramps	4	33.6	40.1	0.1	6
Total		78.7	136.3	0.6	17

Arterial Level of Service: WB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
I-5 SB Ramps	4	9.7	23.6	0.1	21
	7	1.9	9.8	0.1	25
Sheridan Road	3	4.5	20.7	0.2	28
Vulcan Avenue	2	17.3	44.3	0.3	21
Coast Highway 101	1	14.1	20.5	0.1	18
Total		47.4	118.9	0.7	22

WITH TRAFFIC SIGNALS
WITH TWLTL ON LA COSTA AVENUE

Arterial Level of Service: EB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Coast Highway 101	1	102.5	107.3	0.1	2
Vulcan Avenue	2	8.7	15.9	0.1	28
Sheridan Road	3	8.5	34.0	0.3	28
	7	3.4	19.8	0.2	29
I-5 SB Ramps	4	25.6	31.8	0.1	8
Total		148.7	208.9	0.6	11

Arterial Level of Service: WB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
I-5 SB Ramps	4	9.6	31.2	0.2	24
	7	2.9	9.6	0.1	25
Sheridan Road	3	5.9	21.8	0.2	27
Vulcan Avenue	2	15.2	41.0	0.3	23
Coast Highway 101	1	72.8	82.0	0.1	5
Total		106.4	185.6	0.8	16

Arterial Level of Service: EB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Coast Highway 101	1	61.5	66.3	0.1	3
Vulcan Avenue	2	25.1	36.7	0.1	10
Sheridan Road	3	9.5	36.6	0.3	26
	7	3.7	20.3	0.2	29
I-5 SB Ramps	4	27.5	34.1	0.1	7
Total		127.3	194.1	0.6	12

Arterial Level of Service: WB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
I-5 SB Ramps	4	9.6	23.9	0.1	21
	7	2.9	9.7	0.1	25
Sheridan Road	3	5.7	22.0	0.2	26
Vulcan Avenue	2	8.5	34.7	0.3	27
Coast Highway 101	1	3.8	9.5	0.1	39
Total		30.5	99.8	0.7	26

WITH ROUNDABOUTS
(WITHOUT OR WITH TWLTL ON LA COSTA AVENUE)

Arterial Level of Service: EB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Coast Highway 101	1	12.7	18.0	0.1	11
Vulcan Avenue	2	4.8	9.6	0.1	41
Sheridan Avenue	3	6.9	36.8	0.3	26
	7	1.2	23.4	0.2	25
I-5 SB Ramps	4	24.1	30.6	0.1	8
Total		49.7	118.5	0.6	20

Arterial Level of Service: WB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
I-5 SB Ramps	4	8.6	29.7	0.2	26
	7	2.3	10.1	0.1	24
Sheridan Avenue	3	5.9	21.5	0.2	27
Vulcan Avenue	2	5.9	35.0	0.3	27
Coast Highway 101	1	12.3	26.6	0.1	14
Total		35.0	122.8	0.8	24

Arterial Level of Service: EB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Coast Highway 101	1	65.1	70.0	0.1	3
Vulcan Avenue	2	6.9	18.1	0.1	21
Sheridan Avenue	3	8.0	37.6	0.3	25
	7	1.1	23.3	0.2	25
I-5 SB Ramps	4	24.6	31.2	0.1	8
Total		105.7	180.3	0.6	13

Arterial Level of Service: WB La Costa Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
I-5 SB Ramps	4	8.8	23.0	0.1	22
	7	2.1	9.9	0.1	24
Sheridan Avenue	3	5.8	21.5	0.2	27
Vulcan Avenue	2	6.8	36.7	0.3	26
Coast Highway 101	1	7.8	17.5	0.1	21
Total		31.4	108.6	0.7	24

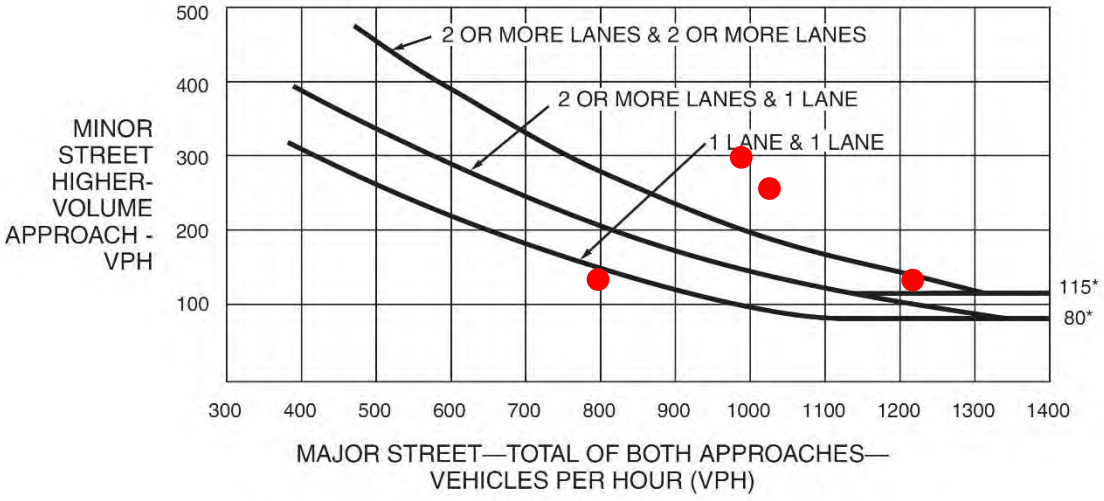
APPENDIX E

SIGNAL WARRANT ANALYSIS WORKSHEETS

LA COSTA AVENUE / VULCAN AVENUE

La Costa Avenue / Vulcan Avenue Intersection

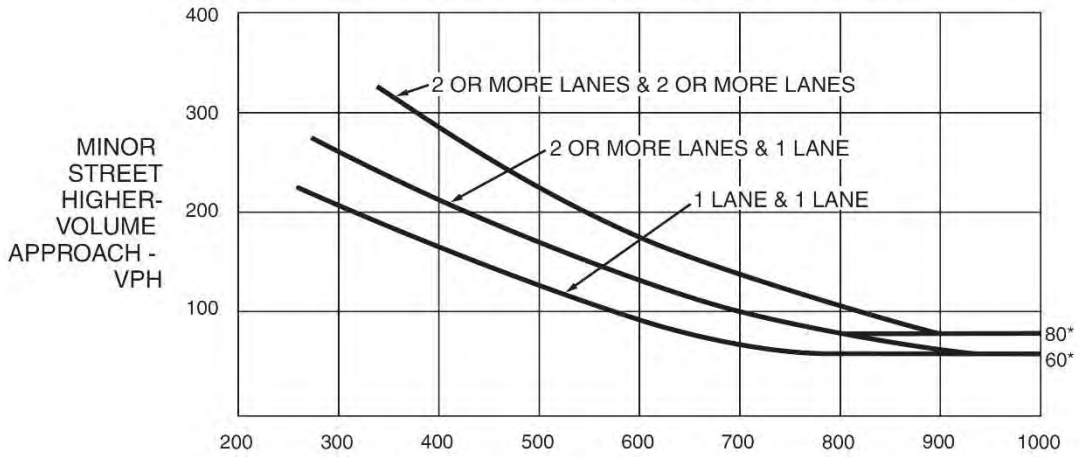
Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

RICK ENGINEERING COMPANY

SIGNAL WARRANT ANALYSIS

Minor Street:	Vulcan Avenue	**Number of Lanes on minor street:**	1
Major Street	La Costa Avenue	**Number of Lanes on major street:**	1
Scenario:	Existing AM Peak Hour	**Total Number of Vehicles Entering:**	1352
		Number of Approaches:	3
		Intersection total delay (seconds):	57.5
		Minor St approach total delay (veh-hr):	2.1

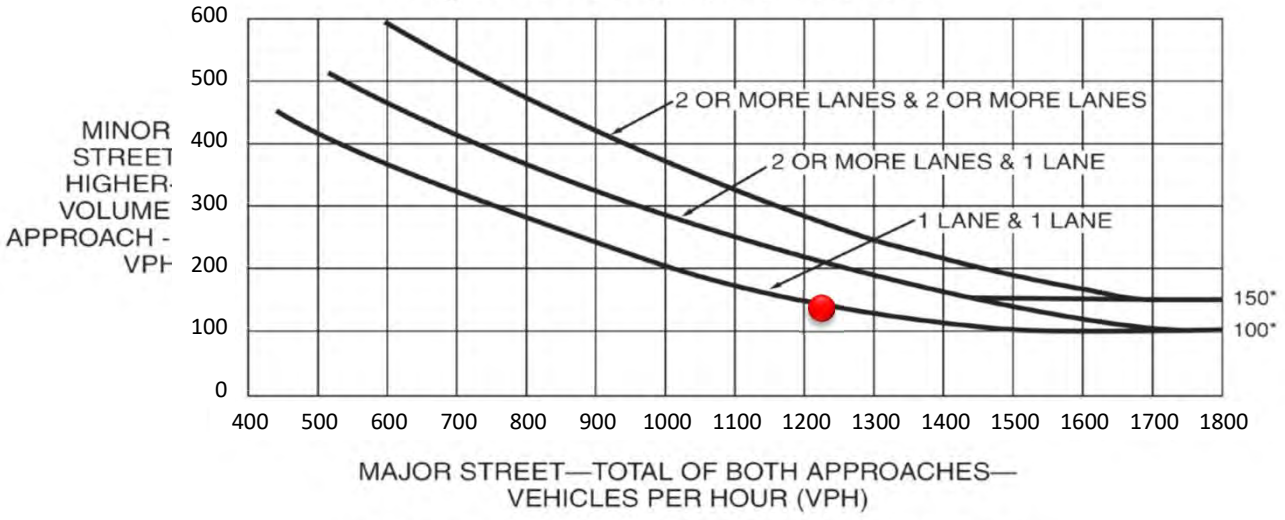
Part A

		Criteria Met?
1	Minor St approach total stopped time delay	NO
2	Volume on the same minor street approach (one directional only)	YES
3	Total volume entering the intersection during the peak hour	YES

Part B

Volume on Major St (Σ of both Approaches)	Volumes on Minor St (higher approach)
1221	131

Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Does the Intersection Meet Peak Hour Signal Warrants?:	
PART A	**NO**
PART B	**YES**

RICK ENGINEERING COMPANY

SIGNAL WARRANT ANALYSIS

Minor Street:	Vulcan Avenue	**Number of Lanes on minor street:**	1
Major Street	La Costa Avenue	**Number of Lanes on major street:**	1
Scenario:	Existing PM Peak Hour	**Total Number of Vehicles Entering:**	1279
		Number of Approaches:	3
		Intersection total delay (seconds):	36.2
		Minor St approach total delay (veh-hr):	2.6

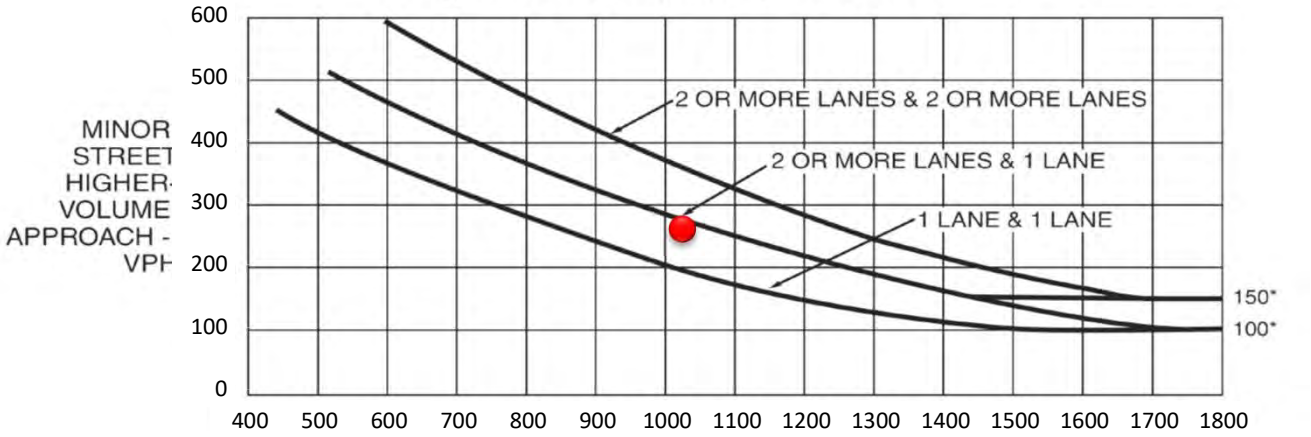
Part A

		Criteria Met?
1	Minor St approach total stopped time delay	NO
2	Volume on the same minor street approach (one directional only)	YES
3	Total volume entering the intersection during the peak hour	YES

Part B

Volume on Major St (Σ of both Approaches)	Volumes on Minor St (higher approach)
1022	257

Figure 4C-3. Warrant 3, Peak Hour



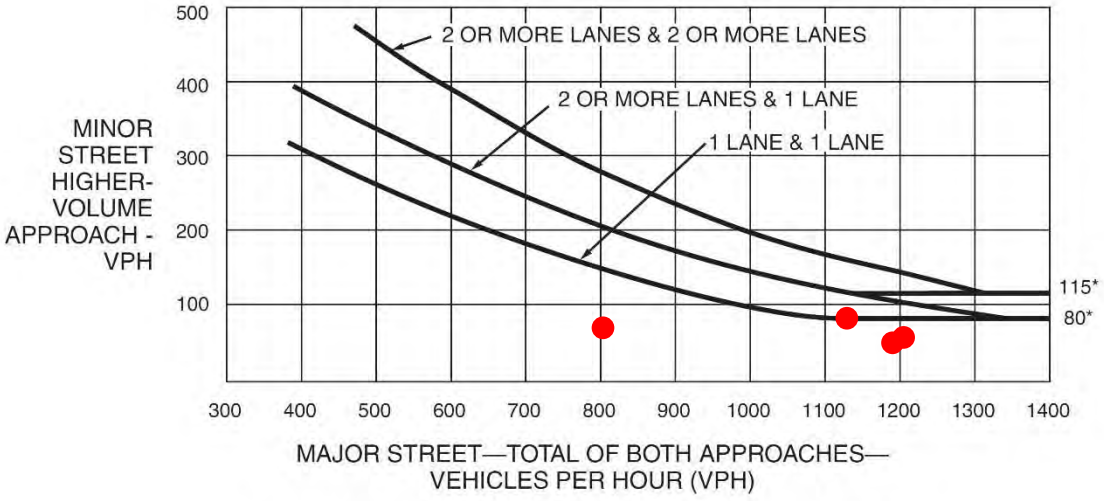
*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Does the Intersection Meet Peak Hour Signal Warrants?:	
PART A	**NO**
PART B	**YES**

LA COSTA AVENUE / SHERIDAN ROAD

La Costa Avenue / Sheridan Road Intersection

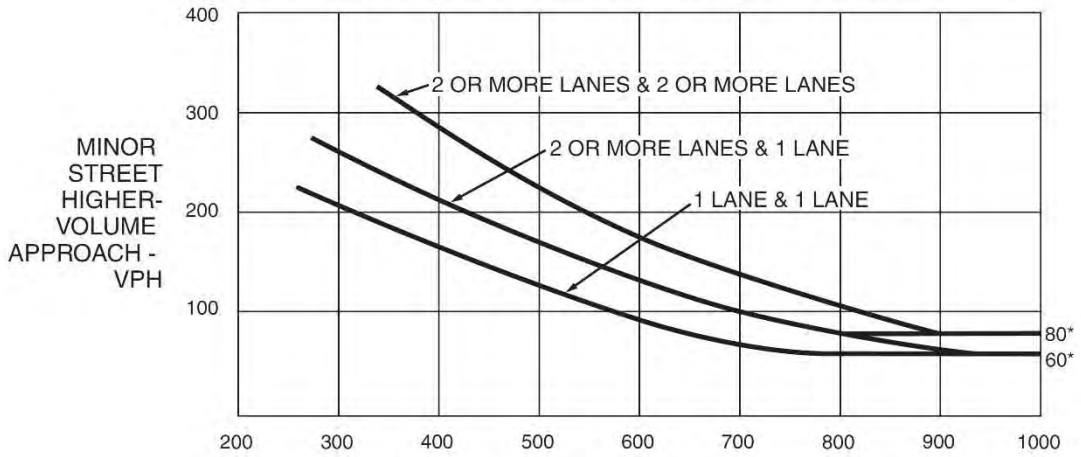
Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

RICK ENGINEERING COMPANY

SIGNAL WARRANT ANALYSIS

Minor Street:	Sheridan Road	**Number of Lanes on minor street:**	1
Major Street	La Costa Avenue	**Number of Lanes on major street:**	1
Scenario:	Existing AM Peak Hour	**Total Number of Vehicles Entering:**	1341
		Number of Approaches:	4
		Intersection total delay (seconds):	42.0
		Minor St approach total delay (veh-hr):	0.7

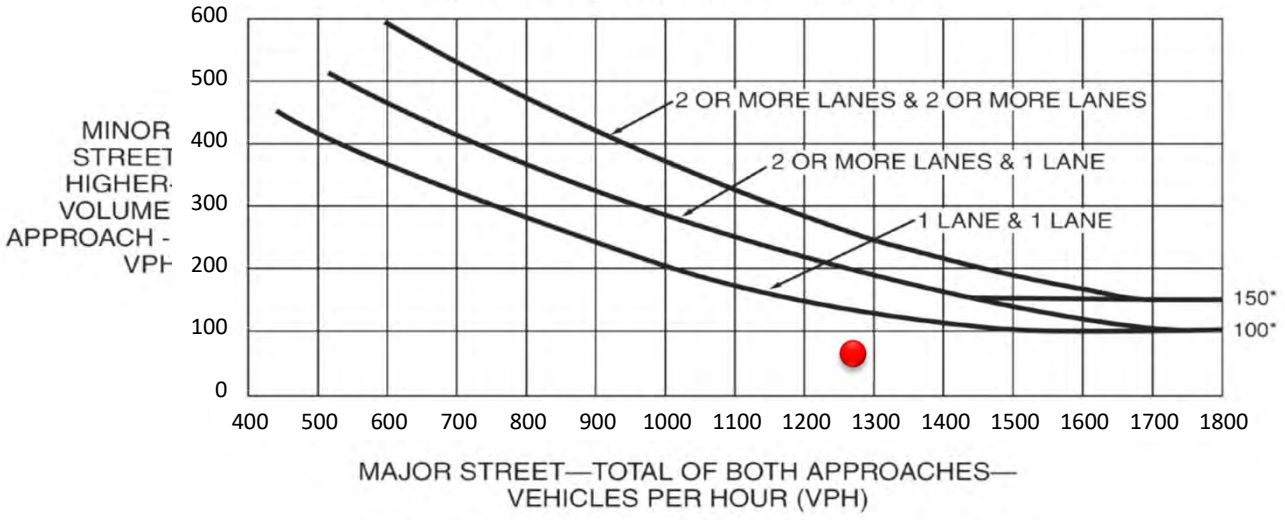
Part A

		Criteria Met?
1	Minor St approach total stopped time delay	NO
2	Volume on the same minor street approach (one directional only)	NO
3	Total volume entering the intersection during the peak hour	YES

Part B

Volume on Major St (Σ of both Approaches)	Volumes on Minor St (higher approach)
1267	58

Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Does the Intersection Meet Peak Hour Signal Warrants?:	
PART A	**NO**
PART B	**NO**

RICK ENGINEERING COMPANY

SIGNAL WARRANT ANALYSIS

Minor Street:	Sheridan Road	**Number of Lanes on minor street:**	1
Major Street	La Costa Avenue	**Number of Lanes on major street:**	1
Scenario:	Existing PM Peak Hour	**Total Number of Vehicles Entering:**	1260
		Number of Approaches:	4
		Intersection total delay (seconds):	27.6
		Minor St approach total delay (veh-hr):	0.6

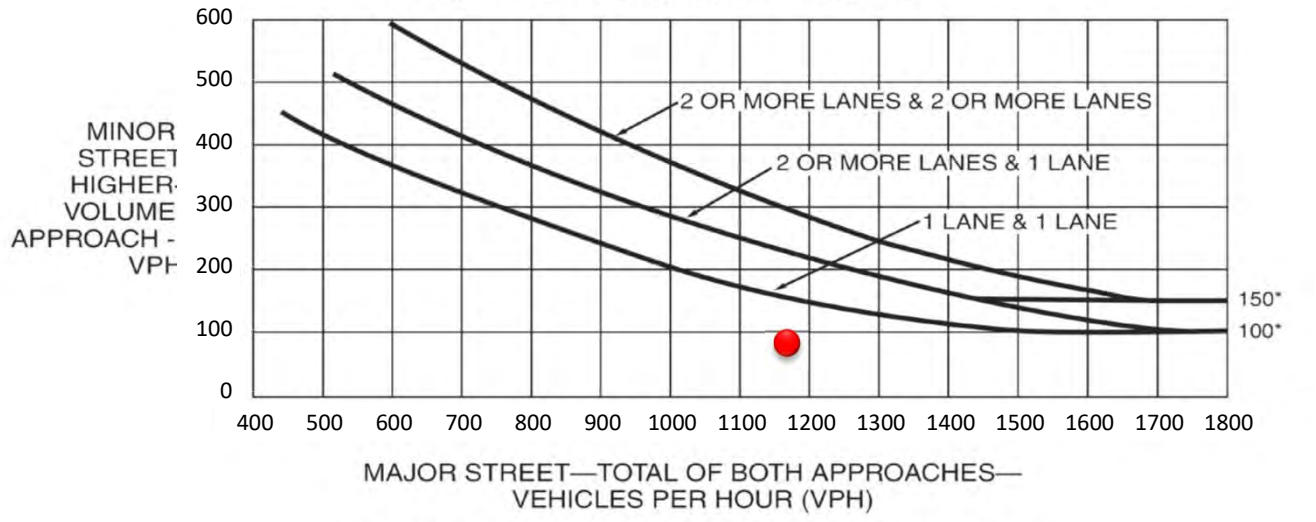
Part A

		Criteria Met?
1	Minor St approach total stopped time delay	NO
2	Volume on the same minor street approach (one directional only)	YES
3	Total volume entering the intersection during the peak hour	YES

Part B

Volume on Major St (Σ of both Approaches)	Volumes on Minor St (higher approach)
1165	77

Figure 4C-3. Warrant 3, Peak Hour

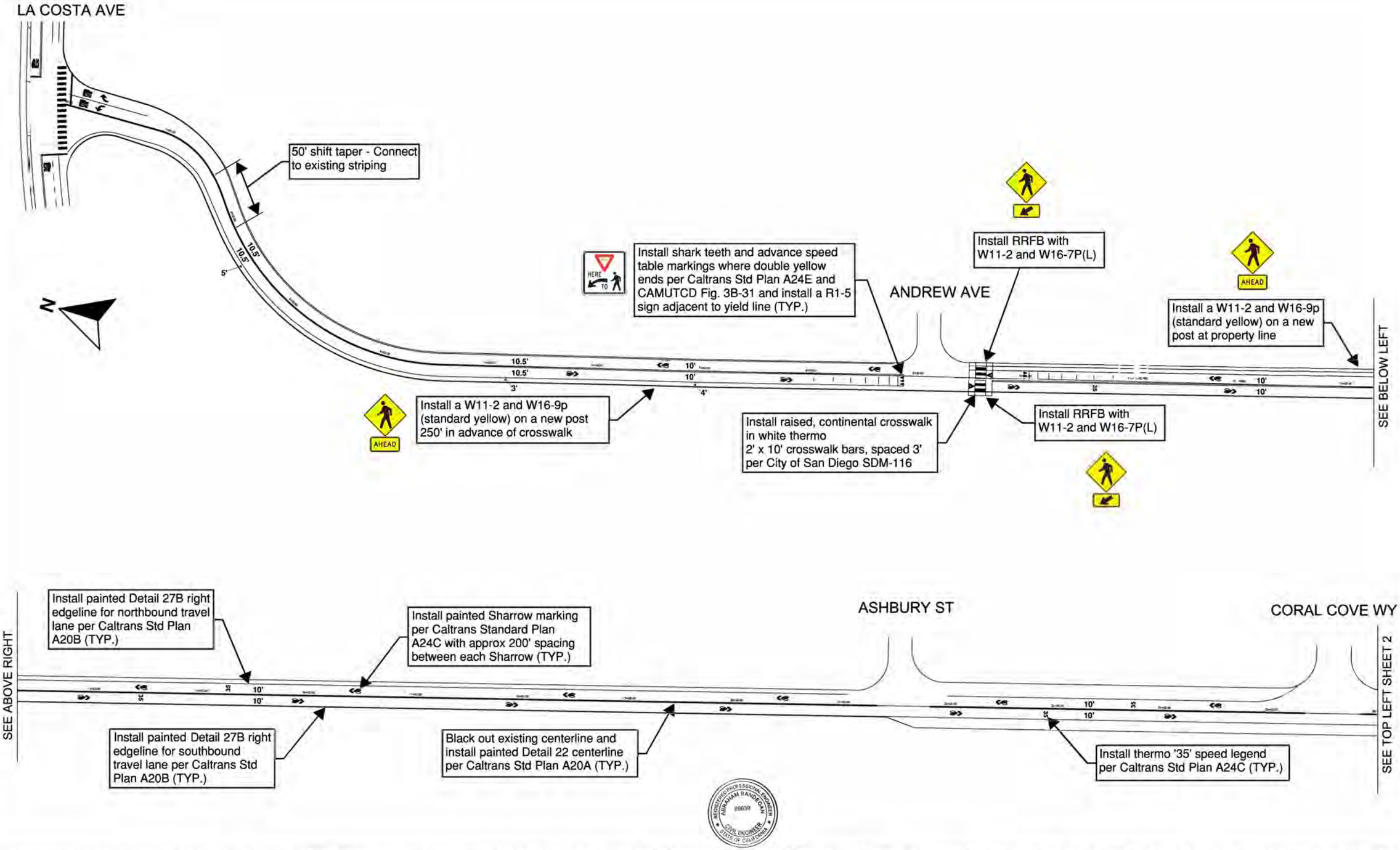


*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Does the Intersection Meet Peak Hour Signal Warrants?:	
PART A	**NO**
PART B	**NO**

APPENDIX F

VULCAN AVENUE SAFETY AND MOBILITY ENHANCEMENTS PROJECT PLANS



REGISTERED PROFESSIONAL ENGINEER ABRAHAM BANDEGAN 89639 CIVIL ENGINEER STATE OF CALIFORNIA

CHANGE NO.	DESCRIPTION	APPROVED	DATE

BENCHMARK

DESCRIPTION: _____
LOCATION: _____
RECORD FROM: ROS 18416
ELEVATION: _____ DATUM: NAVD88

AS-BUILT APPROVALS

ENGINEER'S NAME: _____ DATE: _____
CITY ENGINEER _____ DATE _____

	INT.	DATE
PUBLIC WORKS		
PLANNING		
REVIEWER		
INSPECTOR		

DESIGNED BY: INITIALS | DRAWN BY: INITIALS | CHECKED BY: INITIALS

PLANS PREPARED UNDER SUPERVISION OF
ABRAHAM BANDEGAN
DATE 8/19/2021
R.C.E. NO.: 89639
EXP.: 3/31/2023

ENGINEERING DIVISION APPROVALS

RECOMMENDED: _____
ABRAHAM BANDEGAN 8/19/2021
DAT_ _____

APPROVED: _____
JIL T. RANKSTON 8/19/2021
DA_ _____

CITY OF ENCINITAS - DEVELOPMENT SERVICES DEPARTMENT

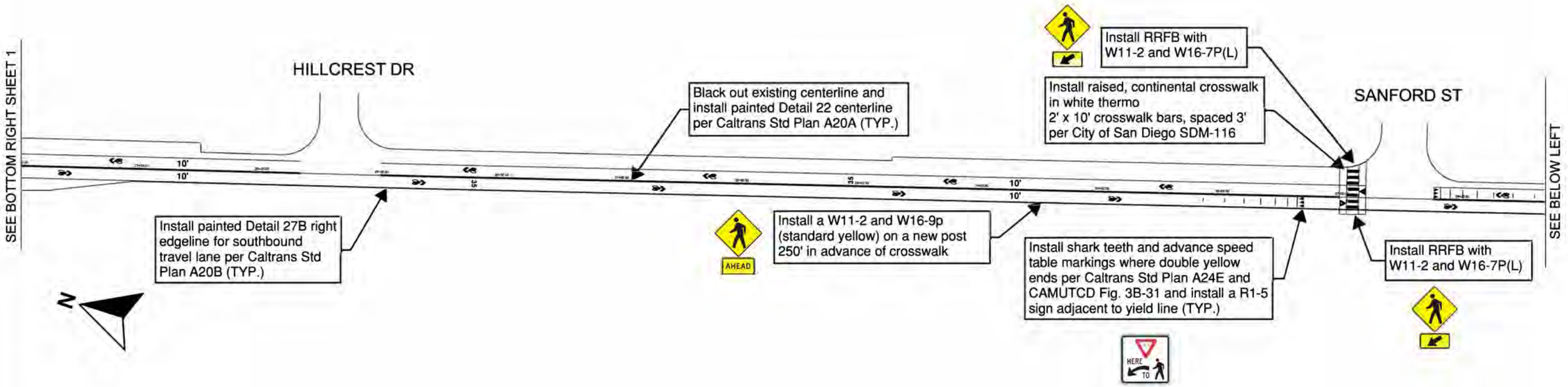
IMPROVEMENT PLAN FOR:
SITE ADDRESS
OWNER
APN

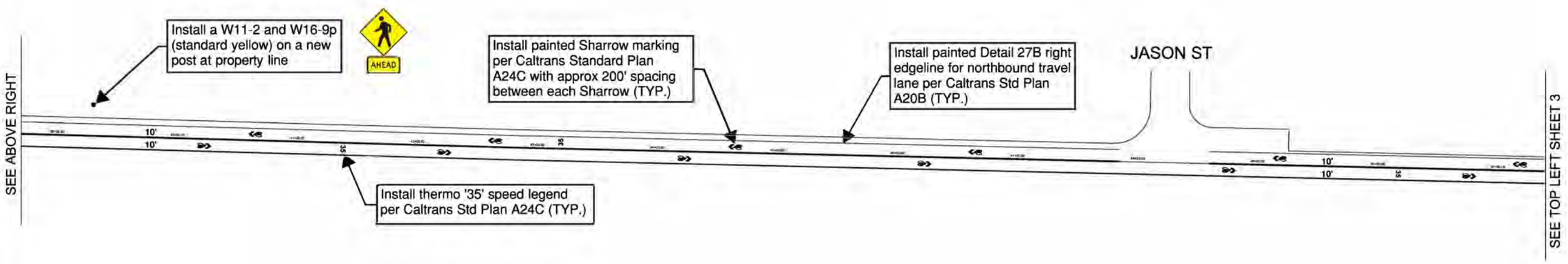
PLANNING CASE NO: _____ TPM/TM/CDP/DR/MUP/MIP/EIA, etc.

DRAWING NO.

XXXXX-I

SHEET 1 OF 6





REGISTERED PROFESSIONAL ENGINEER ABRAHAM BANDEGAN 89639 CIVIL ENGINEER STATE OF CALIFORNIA

CHANGE NO.	DESCRIPTION	APPROVED	DATE

BENCHMARK
DESCRIPTION:
LOCATION:
RECORD FROM: ROS 18416
ELEVATION: DATUM: NAVD88

AS-BUILT APPROVALS

	INT.	DATE
PUBLIC WORKS		
PLANNING		
REVIEWER		
INSPECTOR		

ENGINEER'S NAME DATE
CITY ENGINEER DATE

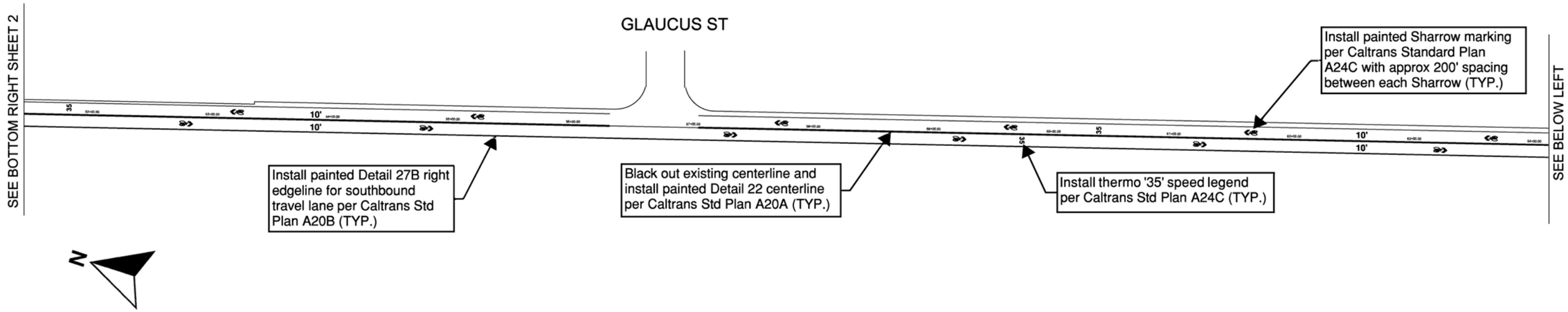
DESIGNED BY: INITIALS	DRAWN BY: INITIALS	CHECKED BY: INITIALS

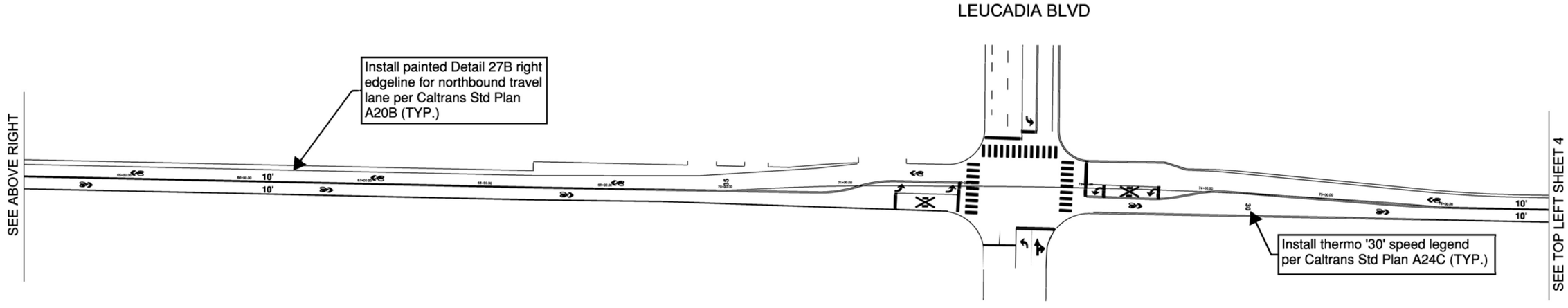
PLANS PREPARED UNDER SUPERVISION OF
ABRAHAM BANDEGAN
DATE:
R.C.E. NO.:
EXP.:

ENGINEERING DIVISION APPROVALS
RECOMMENDED: ABRAHAM BANDEGAN DATE
APPROVED: JILL T. BANKSTON DATE

CITY OF ENCINITAS - DEVELOPMENT SERVICES DEPARTMENT
IMPROVEMENT PLAN FOR:
SITE ADDRESS
OWNER
APN
PLANNING CASE NO: TPM/TM/CDP/DR/MUP/MIN/EIA, etc.

DRAWING NO.
XXXXX-I
SHEET 2 OF 6





REGISTERED PROFESSIONAL ENGINEER ABRAHAM BANDEGAN 89639 CIVIL ENGINEER STATE OF CALIFORNIA

CHANGE NO.	DESCRIPTION	APPROVED	DATE

BENCHMARK

DESCRIPTION: _____
LOCATION: _____
RECORD FROM: ROS 18416
ELEVATION: _____ DATUM: NAVD88

AS-BUILT APPROVALS

ENGINEER'S NAME DATE
CITY ENGINEER DATE

	INT.	DATE
PUBLIC WORKS		
PLANNING		
REVIEWER		
INSPECTOR		

DESIGNED BY: INITIALS	DRAWN BY: INITIALS	CHECKED BY: INITIALS

PLANS PREPARED UNDER SUPERVISION OF
ABRAHAM BANDEGAN
DATE: _____
R.C.E. NO.: _____
EXP.: _____

ENGINEERING DIVISION APPROVALS

RECOMMENDED: ABRAHAM BANDEGAN DATE
APPROVED: JILL T. BANKSTON DATE

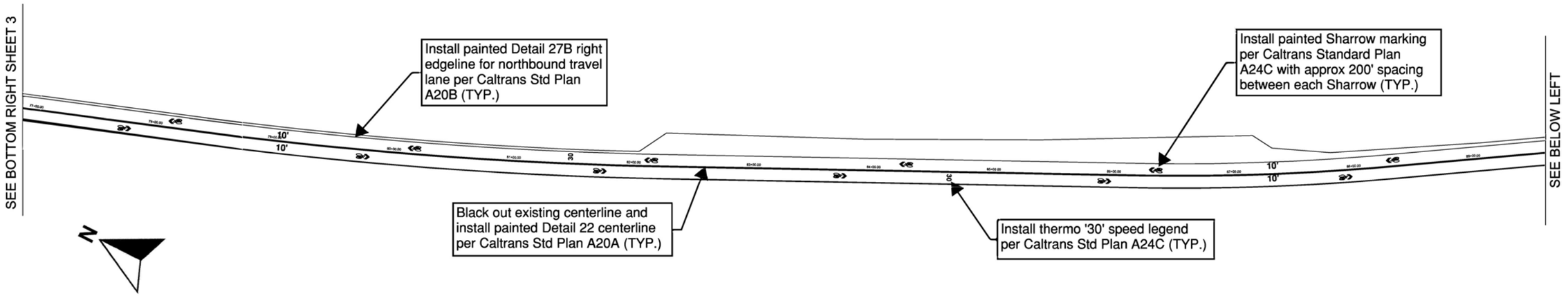
CITY OF ENCINITAS - DEVELOPMENT SERVICES DEPARTMENT

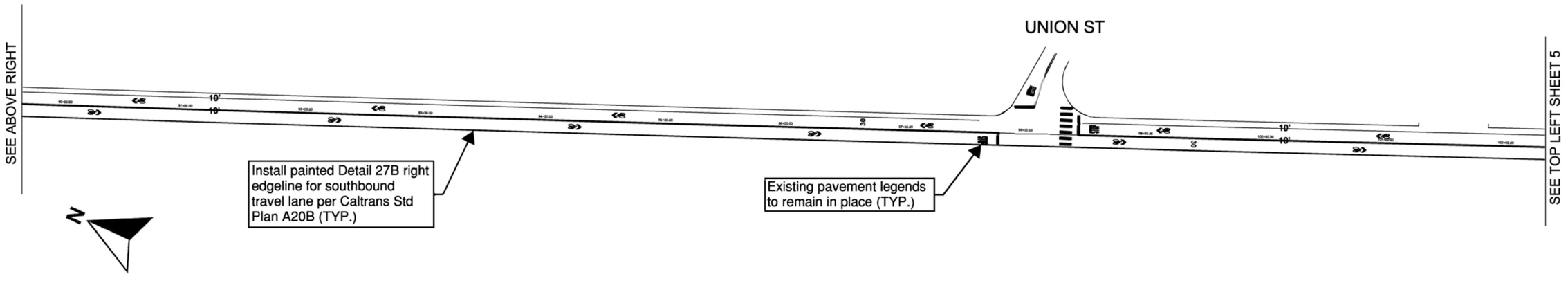
IMPROVEMENT PLAN FOR:
SITE ADDRESS
OWNER
APN
PLANNING CASE NO: _____ TPM/TM/CDP/DR/MUP/MIN/EIA, etc.

DRAWING NO.

XXXXX-I

SHEET 3 OF 6





REGISTERED PROFESSIONAL ENGINEER ABRAHAM BANDEGAN 89639 CIVIL ENGINEER STATE OF CALIFORNIA

CHANGE NO.	DESCRIPTION	APPROVED	DATE

BENCHMARK

DESCRIPTION: _____
LOCATION: _____
RECORD FROM: ROS 18416
ELEVATION: _____ DATUM: NAVD88

AS-BUILT APPROVALS

ENGINEER'S NAME DATE
CITY ENGINEER DATE

	INT.	DATE
PUBLIC WORKS		
PLANNING		
REVIEWER		
INSPECTOR		

DESIGNED BY: INITIALS	DRAWN BY: INITIALS	CHECKED BY: INITIALS

PLANS PREPARED UNDER SUPERVISION OF
ABRAHAM BANDEGAN
DATE: _____
R.C.E. NO.: _____
EXP.: _____

ENGINEERING DIVISION APPROVALS

RECOMMENDED: ABRAHAM BANDEGAN DATE
APPROVED: JILL T. BANKSTON DATE

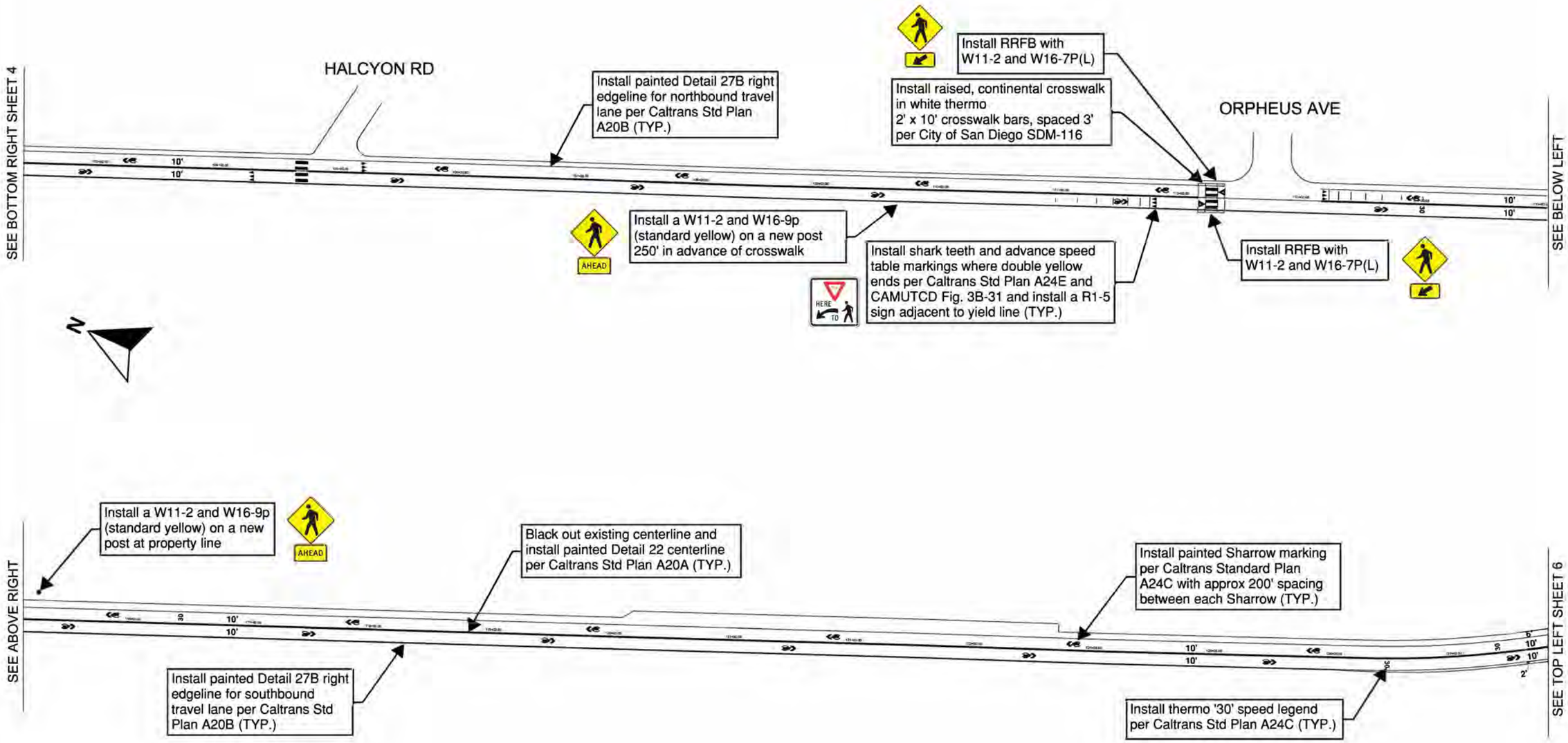
CITY OF ENCINITAS - DEVELOPMENT SERVICES DEPARTMENT

IMPROVEMENT PLAN FOR:
SITE ADDRESS
OWNER
APN
PLANNING CASE NO: _____ TPM/TM/CDP/DR/MUP/MIN/EIA, etc.

DRAWING NO.

XXXXX-I

SHEET 4 OF 6



REGISTERED PROFESSIONAL ENGINEER ABRAHAM BANDEGAN 89639 CIVIL ENGINEER STATE OF CALIFORNIA

CHANGE NO.	DESCRIPTION	APPROVED	DATE

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DRAWING NO.

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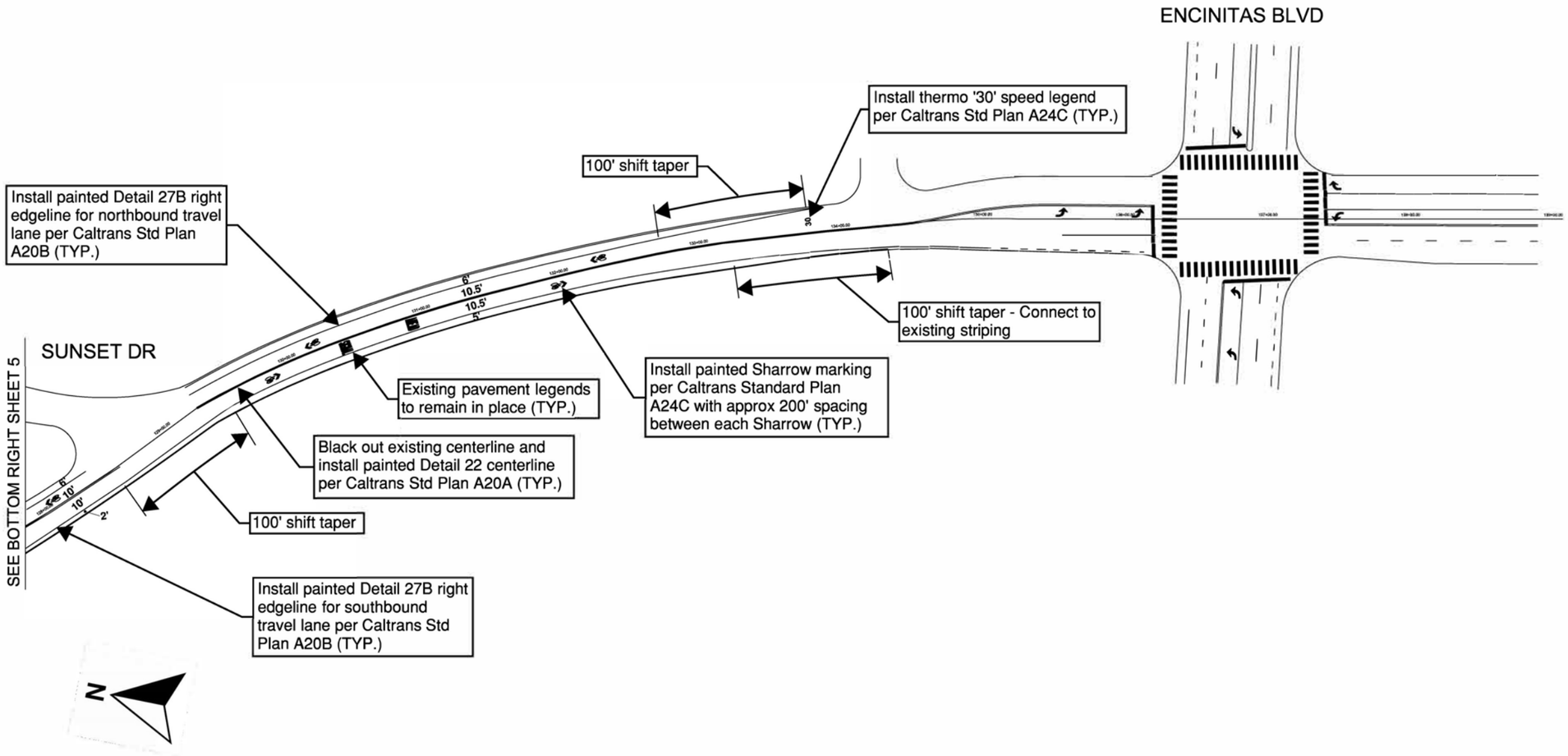
SHEET 5 OF 6



REGISTERED PROFESSIONAL ENGINEER
ABRAHAM BANDEGAN
89639
CIVIL ENGINEER
STATE OF CALIFORNIA

CHANGE NO.	DESCRIPTION	APPROVED	DATE

BENCHMARK

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SITE ADDRESS
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DRAWING NO.
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SHEET 6 OF 6