Appendix H Traffic Impact Analysis

Appendices

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Memorandum

To/Attention	Solana Beach School District	**Date**	April 5, 2019
From	IBI Group	**Project No**	116257
cc			
Subject	Solana Vista Elementary School Modernization Traffic Analysis		

IBI Group has been retained to prepare a traffic study for the proposed modernization to Solana Vista Elementary School in Solana Beach, CA. This traffic analysis was prepared in accordance with the County of San Diego *Traffic Impact Guidelines* and the San Diego Regional Traffic Engineers Council (SANTEC)/Institute of Transportation Engineers (ITE) *Guidelines for Traffic Impact Studies.* This technical memorandum includes a description of the project, trip generation estimates for the project, trip distribution, identification of an ambient growth rate, queuing and circulation analysis, and an evaluation of intersection and roadway segment levels of service.

PROJECT DESCRIPTION

The District-owned property is encompassed by Santa Rufina Drive on the east, San Patricio Drive on the south, and Santa Victoria on the north and west. The elementary school is surrounded exclusively by residential land uses. The main entrance to the school is currently through a parking lot at the intersection of Santa Victoria and Santa Carina and available vehicle loading areas are also located along Santa Victoria.

The District proposes to reconstruct a single story new school buildings as well as a more optimized entry driveway which will allow the accommodation of a larger onsite vehicle loading and parking. The project would also improve vehicle drop-off/pick-up zones in order to enhance the safety of vehicle loading operations and onsite vehicular circulation increasing the amount of parking stalls available and expanding the driveway and curb space of the drop-off/pick-up zones. Although parking and drop-off/pick-up zones will increase in size, the project is projected to result in the elimination of two classrooms. As a result, the enrollment for 2018-2019 is 348 students whereas the prior year enrollment in 2017-2018 was 383.

STUDY AREA INTERSECTIONS AND ROADWAY SEGMENTS

Based on the calculated project trip generation and distribution, the following intersections and roadway segments were selected for analysis (below).

- Study Intersections
    1. Santa Carina & Santa Victoria
    2. Santa Cecelia & Santa Victoria
    3. Santa Bartola & Santa Victoria
- Roadway Segments
    1. Santa Victoria from Santa Carina to Santa Helena

Turning movement count data was collected on Tuesday, June 12, 2018 during the AM peak period (7:00 AM to 9:00 AM). Average Daily Traffic (ADT) counts at the study area roadway segments were taken on the same day.

TRAFFIC STUDY PERIODS AND SCENARIOS

This study analyzes typical weekday daily and AM peak hour conditions. Daily conditions were analyzed for a 24-hour period at the study area roadway segment. For intersections, the AM peak hour is defined as the highest one hour of traffic occurring during the AM peak period. Traffic operations for the study area intersections and roadway segment were evaluated for each of the following scenarios:

- Existing Conditions (2018-19)
- Existing Conditions (2018-19) with Project
- Opening Year (2021-22) without Project
- Opening Year (2021-22) with Project

For the purpose of this analysis, the project opening year for background traffic conditions is 2021. Per discussion with the Solana Beach School District, an ambient growth rate of 2% per year was used to forecast the future volumes. Based on the school's hours of operation (8:00 AM to 3:00 PM), analysis at the study area intersections focuses on the AM peak hour as trips to and from the school would typically not occur during the PM peak period (4:00PM to 6:00PM).

LEVEL OF SERVICE AND THRESHOLDS OF SIGNIFICANCE

Unsignalized Intersection Analysis

Unsignalized intersections, including two-way and all-way stop controlled intersections, were analyzed using the Chapters 19 and 20 methodology of the Highway Capacity Manual (HCM 2010). The level of service for a side street stop-controlled (SSSC) intersection is determined by the computed or measured control delay at each minor-street movement. LOS F would occur when the volume-to-capacity ratio exceeds 1.0, regardless of the control delay. Table 1 outlines the level of service for unsignalized intersections.

Table 1: Level of Service for Unsignalized Intersections

LEVEL OF SERVICE	DESCRIPTION	CONTROL DELAY (SEC/VEH)
A	Little or no delays	0.0 – 10.0
B	Short traffic delays	10.1 – 15.0
C	Average traffic delays	15.1 – 25.0
D	Long traffic delays	25.1 – 35.0
E	Very long traffic delays	35.1 – 50.0
F	Extreme traffic delays with intersection capacity exceeded	50.1 or more

Source: Highway Capacity Manual (2010)

Determination of Significant Impacts

Solana Beach School District complies with the traffic study requirements identified in the SANTEC/ITE Guidelines, as summarized in Table 2.

Table 2 SANTEC/ITE Guidelines- Measure of Significant Project Traffic Impacts

Level of Service with Project*	Allowable Change due to Project Impact**					
	Freeways		Roadway Segments		Intersections	Ramp Metering
	V/C	Speed (mph)	V/C	Speed (mph)	Delay (sec.)	Delay (min.)
D, E, & F (or ramp meter delays above 15 min.)	0.01	1	0.02	1	2	2

NOTES:
• All level of service measurements are based upon HCM procedures for peak-hour conditions. However, V/C ratios for Roadway Segments may be estimated on an ADT/24-hour traffic volume basis (using Table 2 or a similar LOS chart for each jurisdiction). The acceptable LOS for freeways, roadways, and intersections is generally "D" ("C" for undeveloped or not densely developed locations per jurisdiction definitions). For metered freeway ramps, LOS does not apply. However, ramp meter delays above 15 minutes are considered excessive.
•• If a proposed project's traffic causes the values shown in the table to be exceeded, the impacts are determined to be significant.. These changes may be measured from appropriate computer programs or expanded manual spreadsheets. The project applicant shall then identify feasible mitigation (within the Traffic Impact Study [TIS] report) that will maintain the traffic facility at an acceptable LOS. If the LOS with the proposed project becomes unacceptable (see above • note), or if the project adds a significant amount of peak-hour trips to cause any traffic queues to exceed on- or off-ramp storage capacities, the project applicant shall be responsible for mitigating significant impact changes.

KEY: V/C = Volume to Capacity ratio
Speed = Speed measured in miles per hour
Delay = Average stopped delay per vehicle measured in seconds for intersections, or minutes for ramp meters
LOS = Level of Service

LOS analysis and technical procedures presented in this study are consistent with the SANTEC/ITE *Guidelines for Traffic Impact Studies (TIS) in the San Diego Region*.

EXISTING CONDITIONS (2018-19)

This section presents the Existing Conditions (2018-19) of the project study area; this scenario will serve as the base for which all subsequent scenarios are assessed. Descriptions of the existing roadway network and intersection level of service analysis results for the Existing Year (2018-19) No Project scenario are included in this section.

Existing Roadway Network

Selected roadways that are located in the vicinity of the project corridor are described in this section. Items of note include existing geometry, pedestrian and bicycle facilities, speed limit, and adjacent land uses. The selected roadways are as follows:

Santa Victoria
Santa Victoria is a two-lane undivided roadway that runs north and south west of the project site and east and west north of the project site. The posted speed limit is 25 miles per hour. Sidewalks are located on both sides of the corridor and three crosswalks on the south, east, and west legs at the Santa Carina intersection. The land use adjacent to the corridor is comprised of residential housing and an educational facility. There are no dedicated bicycle lanes. On-street parking is permitted on both sides of the roadway along with striping to accommodate the parked vehicles.

Santa Cecelia
Santa Cecelia is a two-lane undivided roadway that runs east and west within the study area. The speed limit is 25 miles per hour. Sidewalks are accessible only on the west side along the roadway and there are no crosswalks at its intersection with Santa Victoria. The land use surrounding the roadway includes residential housing. There are no exclusive bicycle lanes and on-street parking is permitted along both side of the corridor.

Santa Bartola
Santa Bartola is a two-lane undivided roadway that runs eat and west within the study area. The speed limit is 25 miles per hour. Sidewalks are accessible only on the west side along the corridor and there are no crosswalks at its intersection with Santa Victoria. The land use around the corridor is made up of primarily residential housing. Bicycle lanes are not present and on-street parking is allowed along both sides of the roadway.

Existing Site Access and Internal Circulation

A field review of the project site was conducted to evaluate existing traffic patterns including access points and vehicle queueing. The field observations were conducted on Wednesday, September 12, 2018 during the morning drop-off period from 7:30am to 9:30am. The morning observation period coincided with the school bell schedule and began an hour before and after classes started.

The school has a total of two access points, both of which are located along Santa Victoria. The access to the parking is lot (primarily used by staff) is provided via the intersection of Santa Victoria and Santa Carina. Left-turn and u-turn movements out of the school were prohibited during drop-off and pick-up operations at this location. The second access point, which serves as the primary curb-side drop-off location, is located at the intersection of Santa Victoria and Santa Dominga. Vehicles outside of this drop-off driveway would stack onto the south side of Santa Victoria, which is striped to allow for this operation.

The morning drop-off period occurs approximately 30 minutes before students are allowed onto the playground and ends approximately 10 minutes after classes begin at 8:30am. Traffic cones

were placed by school staff to redirect traffic accordingly approximately 30 minutes before the students' arrival. The cones were positioned in order to discourage eastbound vehicles from turning right at the entrance of the parking lot to drop-off students. Additionally, the cones assisted in allowing vehicles to stack along Santa Dominga without affecting the eastbound through vehicles. During the drop-off period, approximately half of the vehicles utilized the curbside of the driveway, while the other half of the vehicles parked on-street which allowed parents to walk their children onto campus facilities. This behavior results in high usage of the crosswalks at the intersection of Santa Victoria and Santa Carina. A total of four crossing guards were present for the morning drop-off period to assist with safe transportation of pedestrians and vehicles. Additionally, there was a guard facilitating the movement of vehicles along the driveway where curbside drop-off occurred. There were three guards at the intersection of Santa Victoria and Santa Carina where crosswalks were available as well as one crossing guard at the driveway at Santa Victoria and Santa Dominga.

The Santa Carina parking lot location operates relatively smoothly as minimal vehicle queueing was observed due to vehicles mainly using the Santa Dominga driveway for drop-offs. The driveway at Santa Dominga experienced higher usage with vehicle queueing. Vehicles traveling east along Santa Victoria to access the Santa Dominga drop-off location observed a queuing that went back as far as the Santa Cecelia and Santa Victoria intersection. The congested drop-off period lasts for approximately 15 minutes and the driveway queue spill onto the roadway. The total length of the queue within the driveway and the vehicles that spill onto the roadway is about 320 feet. Approximate queue lengths for the morning drop-off period are summarized below in Table 3. The site plan, circulation, and approximate queue length are depicted in Figure 1. The circulation plan provided by the school can be found in Appendix B.

Table 3: Existing Approximate Queue Lengths

PERIOD	LOCATION	OBSERVED VEHICLE QUEUE LENGTH
Morning Drop-Off	Santa Carina Parking Lot	0 cars
	Santa Dominga Driveway	16 cars (320 ft)

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FIGURE 1: EXISTING ACCESS AND CIRCULATION

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Average Daily Traffic

The average daily traffic volumes for the study area roadway segment under Existing Conditions are summarized in Table 4. Roadway segment volumes have been included for noise and air quality purposes. Existing roadway segment volumes are extracted from 24-hour counts which can be found in Appendix A.

Table 4: Existing Year (2018-19) No Project Roadway Segment Data Collection Summary

ID	ROADWAY	SOURCE	EXISTING ADT
1	Santa Victoria from Santa Carina to Santa Helena	Counts Unlimited, June 2018	662

Intersection Level of Service

Intersection performance was determined using the methods outlined earlier. Table 5 summarizes the existing levels of service at the study area intersections. Existing study intersection geometries are shown in Figure 2. Additionally, Existing Year (2018-19) No Project AM peak hour turning movement volumes are shown in Figure 3. All three study intersections currently operate at an acceptable level of service during both peak hours.

Table 5: Existing Year (2018-19) No Project Intersection LOS

INTERSECTION		Intersection Control	AM	
			Delay (S)	LOS
1	Santa Carina & Santa Victoria	AWSC[1]	7.4	A
2	Santa Cecelia & Santa Victoria	TWSC[2]	8.7	A
3	Santa Bartola & Santa Victoria	TWSC	9.2	A

[1] All-way stop controlled
[2] Two-way stop controlled

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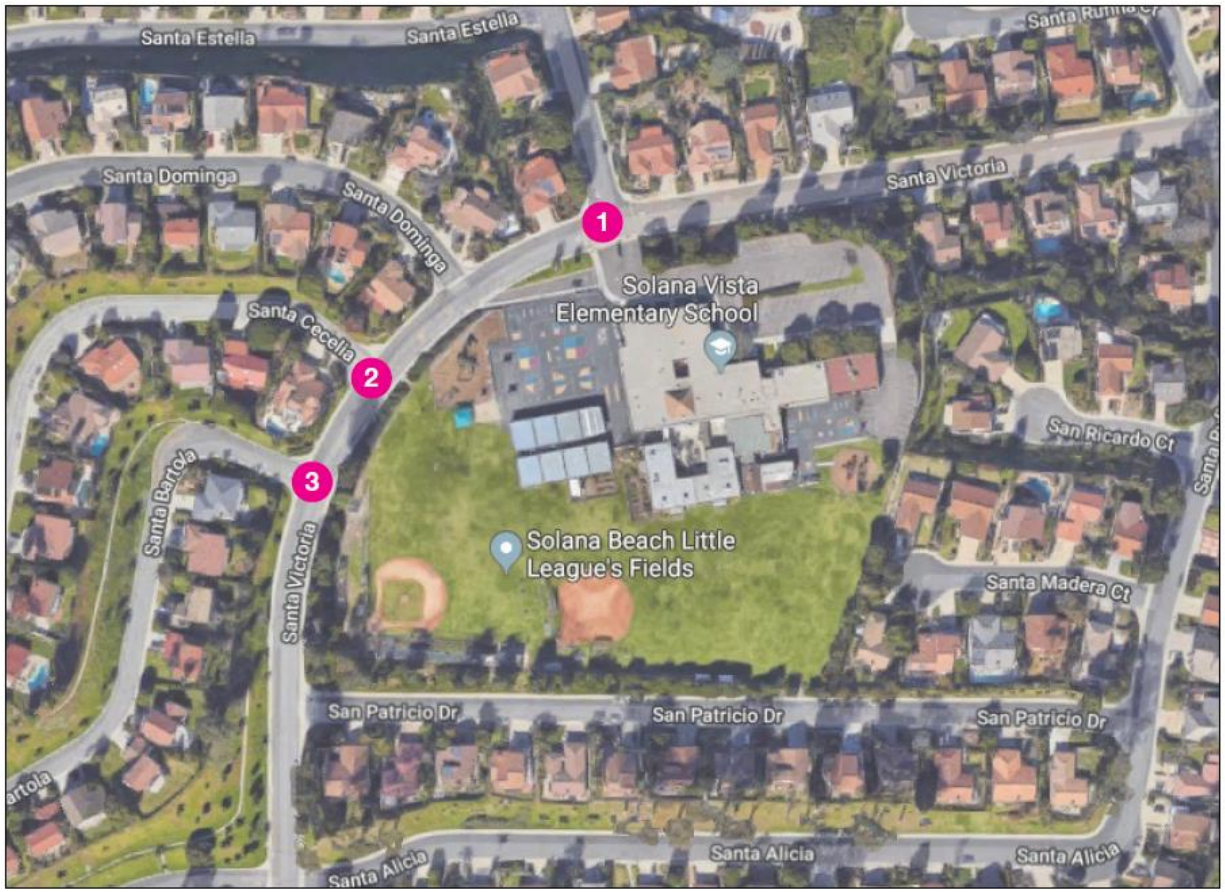
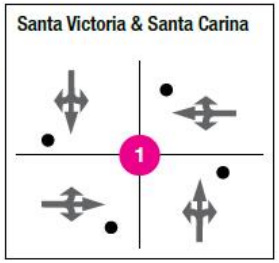
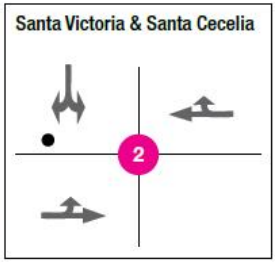
FIGURE 2: EXISTING YEAR (2018-19) NO PROJECT INTERSECTION GEOMETRY







LEGEND

Study Intersection

● Stop Sign

N

FIGURE 3: EXISTING YEAR (2018-19) NO PROJECT VOLUMES – AM PEAK HOUR

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OPENING YEAR (2021-22) NO PROJECT

This section presents the ADT, intersection LOS analysis for the Opening Year (2021-22) No Project scenario. Associated lane geometries and traffic controls remain unchanged from those utilized in the Existing Year (2018-19) No Project scenario. Opening Year (2021-22) No Project traffic volumes were developed by applying a 2 percent annual growth rate to Existing Year (2018-19) counts. The 2 percent ambient growth rate was derived from consultation with the Solana Beach School District.

Average Daily Traffic

The average daily traffic for the study area roadway segment in the Opening Year (2021-22) No Project scenario is presented in Table 6.

Table 6: Opening Year (2021-22) No Project Roadway Segment Summary

ID	ROADWAY	SOURCE	OPENING NP ADT
1	Santa Victoria from Santa Carina to Santa Helena	Counts Unlimited, June 2018	689

Intersection Level of Service

A summary of the AM peak hour intersection level of service analysis results for the Opening Year (2021-22) No Project scenario is presented in Table 7. Opening Year (2021-22) No Project AM peak hour turning movement volumes are shown in Figure 4. All three intersections are forecast to continue to operate at acceptable levels of service during Opening Year No Project conditions.

Table 7: Opening Year (2021-22) No Project Intersection LOS

INTERSECTION		Intersection Control	AM	
			Delay (S)	LOS
1	Santa Carina & Santa Victoria	AWSC	7.5	A
2	Santa Cecelia & Santa Victoria	TWSC	8.7	A
3	Santa Bartola & Santa Victoria	TWSC	9.3	A

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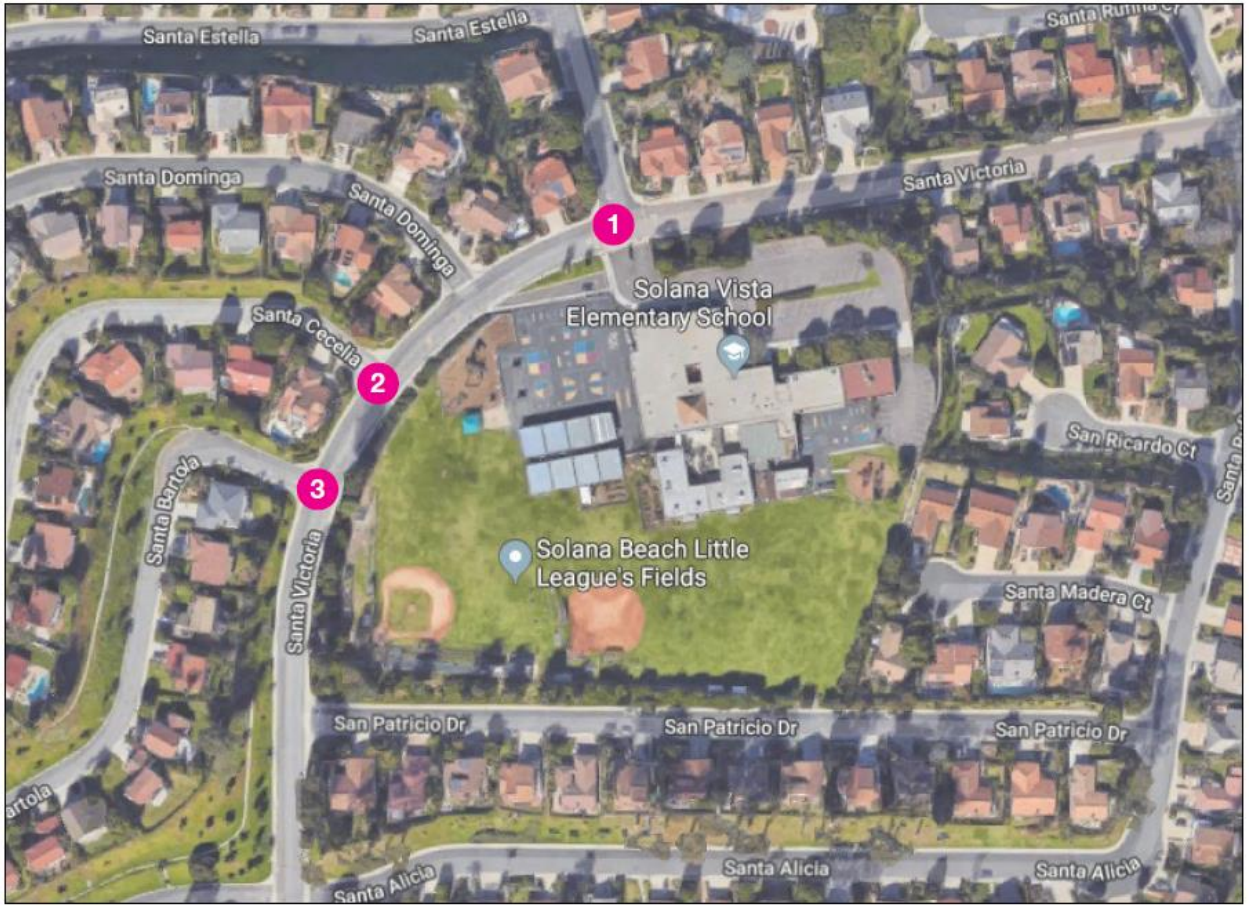
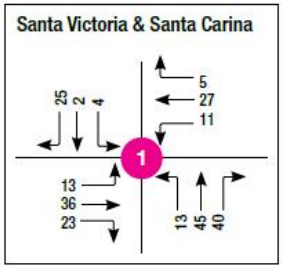
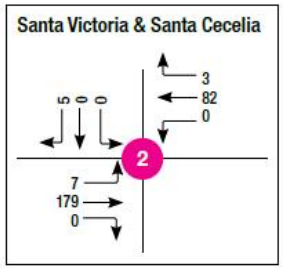
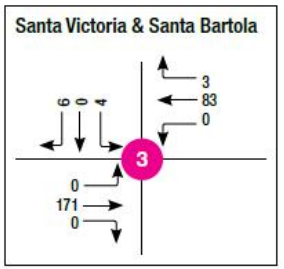
FIGURE 4: OPENING YEAR (2021-22) NO PROJECT VOLUMES – AM PEAK HOUR









LEGEND

(#) Study Intersection

AM Peak Hour Volume

N

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PROJECT CONDITIONS

A description of the methods utilized to generate, distribute, and assign project-generated traffic to intersections within the study area are presented in this section.

Trip Generation and Distribution

The trip generation for the Solana Vista Elementary School Modernization Study has been estimated using rates published in the SANTEC/ITE *Guidelines for Traffic Impact Studies (TIS) in the San Diego Region.* The proposed project would not eliminate the school's existing programs, and it is not the intent of the project to expand the school enrollment capacity. Understanding year-to-year fluctuating enrollment, a 10-year enrollment average was used to establish the school's existing baseline with an average classroom size of 22 students per classroom. Over the past 10 years, the average enrollment at Solana Vista School was 383 students. The project proposes a build out of a total of 24 classrooms, resulting in a design capacity of 325-350 students. As such, this assessment assumes an enrollment decrease of approximately 30-50 students. A decrease of 30 students was utilized in order to be conservative.

The project is expected to generate a negative net daily count of 48 trips, with a decrease of 9 inbound and 6 outbound trips during the AM peak hour. Table 8 presents the resultant AM peak hour trip generation for the proposed project.

Table 8 Project Trip Generation and Rates

Source	Land Use	Students	Trip Generation			
			Daily	AM Peak Hour		
				In	Out	Total
Rates						
SANDAG	Elementary School	-30	1.6	0.31	0.2	0.51
Project Trips						
SANDAG	Elementary School	-30	-48	-9	-6	-15

Trip generation rates:
1. SANDAG (Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region

Based on the trip generation, the study area intersections are expected to experience project-related traffic decreases as shown in Figure 5.

Pedestrian Safety

Pedestrian safety and circulation was considered under project conditions. Vehicle speeds along Santa Victoria were observed to be within the 25 miles per hour school zone speeds. Field observations for pick-up/drop-off periods also did not reveal pedestrian safety concerns. In addition, the proposed project would expand and enhance existing pick-up/drop-off areas, coupled with continued use of crossing guards and coning to direct pedestrians and traffic. As such, additional measures are not needed at this time as vehicle speeds and field observations indicate acceptable pedestrian safety/circulation patterns.

Project Construction Phasing

In order to accommodate the implementation of the project, construction will be needed. The existing parking lot on Santa Victoria will be reconstructed to provide more available parking

stalls and an extended driveway for more curb space, relieving any queuing during the morning hours. Additionally, there will be construction of new classrooms, as well as improvements of campus facilities to support the school's educational program.

Construction to enhance and improve the drop-off/pick-up zone will commence in one phase. In June 2020, the demolition of the entire school will occur. Immediately following demolition, construction of new classroom facilities will begin.

During the demolition and construction phase, students in the third grade will temporarily be hosted at Skyline Elementary School while the Kindergarten through second grade students will be temporarily hosted at Solana Highlands Elementary school. Construction is scheduled to begin in June 2020. Once the new facilities are completed, all students K-3 will return to the new campus buildings. A phased turn over of buildings may occur with the release of the multipurpose room, kitchen building and fields immediately following the classroom and building.

Based on the 2017-2018 school year enrollment at Solana Vista Elementary provided by the California Department of Education, an approximate total of 109 third grade students will be moved to Skyline Elementary during the 2020-21 school year. Although curbside drop-off/pick-up is not permitted due to vehicles being prohibited from parking on-street, Skyline Elementary has a parking lot that is accessible. There is also a two-lane curbside drop-off/pickup area located at the main parking lot in front of the school building. As this is a temporary condition, no significant traffic impacts are anticipated. The District will provide appropriate pick-up and drop-off facilities during the temporary relocation of students to Skyline Elementary.

Students, K-2, will be transported to Solana Highlands for the 2020-21 school year. Solana Highlands is accessible through a driveway of approximately 500 feet consisting of a passing lane and a curbside lane for easy drop-off/pick-ups. The Solana Beach School District will be providing bus transportation from Solana Beach to Solana Highlands. Four to five buses will be supplied to provide transportation for both the AM and PM hours. An approximate 240 students will be relocated which equates to 384 daily trips and 123 of those trips will occur in the AM peak hour with an inbound of 75 trips and an outbound of 48 trips. The capacity of a standard school bus for grades K-6 can seat a total of 72 passengers which results in a range of 288-360 passengers for four to five buses. As such, the 240 K-2 students would generate a maximum of five bus trips to and from the schools.

With Project Site Access and Internal Circulation

The proposed improvements include provision of a single ingress location and two egress locations. The main entrance point for parents and staff will be provided on Santa Victoria and between Santa Cecelia and Santa Bartola via two entry lanes (one drop-off lane for queueing and one passing lane to exit or to access the parking lot). This two-lane ingress point provides about 800 feet of available stacking per lane, which is an improvement to the existing operation that stacks cars onto Santa Victoria. The surface lots will be utilized by staff and visitors. Additionally, the egress point of the main entrance will be a right and left turn configuration whereas the secondary exit at Santa Victoria/Santa Carina will provide two exit lanes - a shared through-straight and a right-turn lane. The new lane configuration is illustrated on Figure 6. Pedestrians will enter and exit the campus without crossing through the drop-off/pickup lanes within the school parking lot. The proposed site plan can be seen in Figure 7.

A queuing of approximately 16 vehicles was observed in the existing conditions which led to some vehicles spilling onto the roadway from the Santa Dominga access point. The proposed circulation plan will be able to accommodate the observed existing queuing as it contains well over the required 320 feet of driveway. With only one ingress point, it is a substantial

improvement from the existing drop-off/pick-up operations since there are two lanes in circulation. Drop-offs/pick-ups will no longer stack on the street due to the approximate 800 feet of improved driveway for one entry lane that is available on-site which improves the overall safety for vehicles and pedestrians. Additionally, the exit driveway at Santa Carina and Santa Victoria will be able to accommodate the queuing of vehicles leaving the campus with no spills into the adjacent parking lots. The queue at this intersection is less than a car's length for both Existing Year and Opening Year scenarios.

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FIGURE 5: ESTIMATED TRIP DISTRIBUTION

FIGURE 6: WITH PROJECT INTERSECTION GEOMETRY

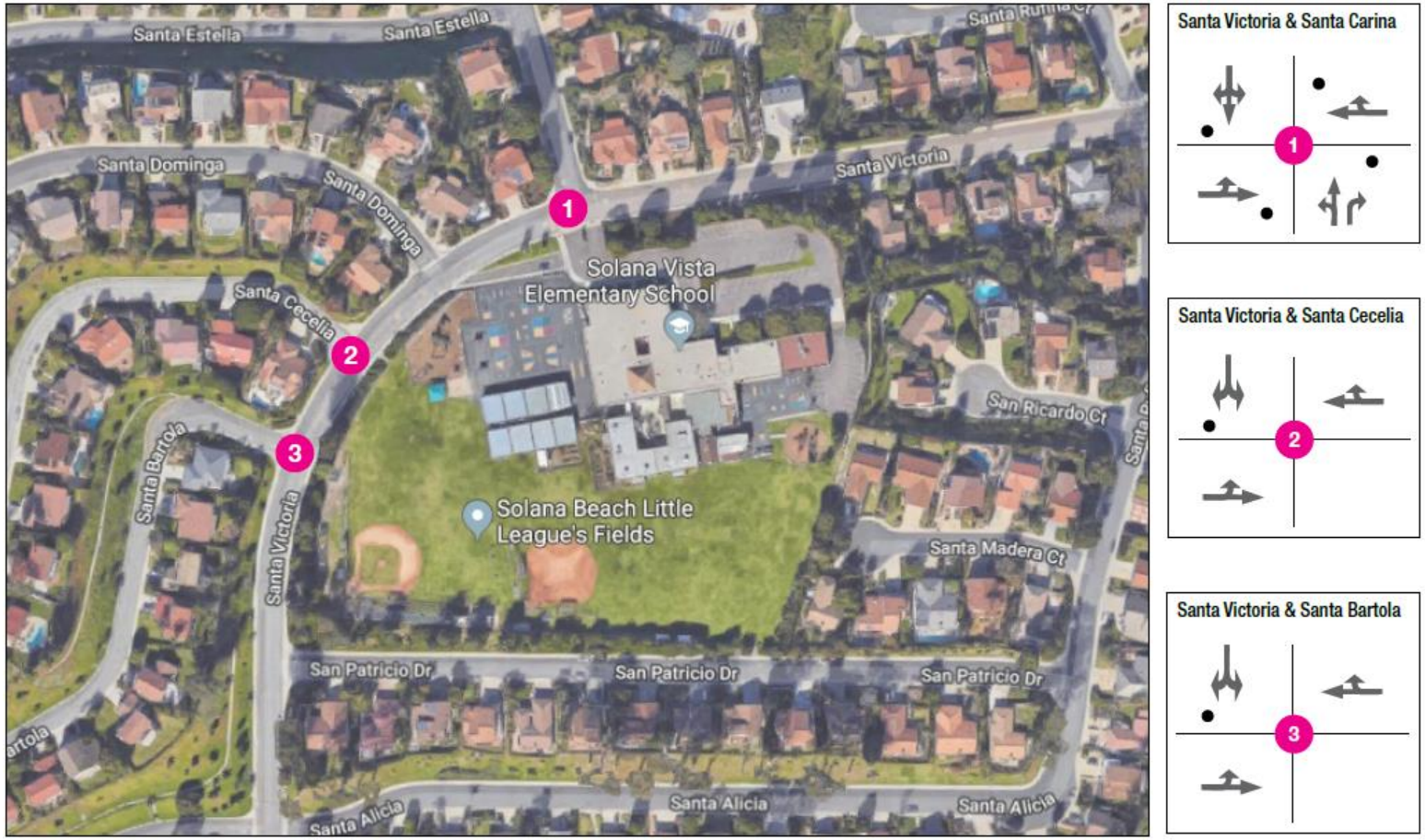
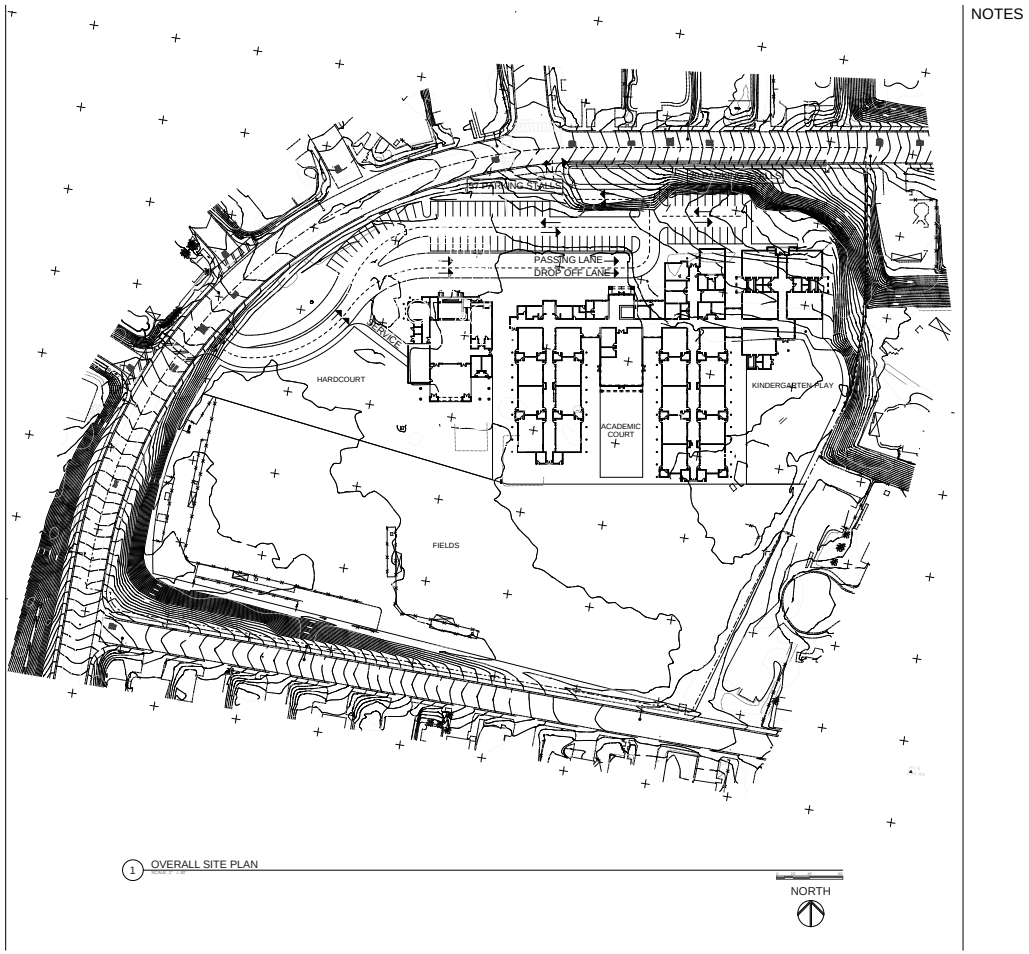


FIGURE 7: WITH PROJECT SITE PLAN AND CIRCULATION



NOTES

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309 NORTH RIOS ROAD SOLANA BEACH CALIFORNIA 92075

REVISIONS

MARK	DATE	DESCRIPTION

PROJECT NO #Pln
MODEL FILE:
SHEET TITLE
OVERALL SITE PLAN

A-101

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EXISTING YEAR (2018-19) WITH PROJECT

This section includes an analysis of the Existing Year (2018-19) With Project scenario. Results for the average daily traffic and intersection level of service for the Existing Year (2018-19) With Project scenario are presented in this section.

Average Daily Traffic

The average daily traffic for selected links generated by the project as well as in the Existing Year (2018-19) With Project scenarios are presented in Table 9 below. Road segment volumes have been included for noise and air quality purposes.

Table 9: Existing Year (2018-19) With Project Roadway Segment Summary

ID	ROADWAY	SOURCE	EXISTING NP ADT	EXISTING WP ADT
1	Santa Victoria from Santa Carina to Santa Helena	Counts Unlimited, June 2018	662	614

Intersection Level of Service

The peak hour turning movement volumes presented in Figure 8 were utilized in order to assess intersection performance. A summary of the AM peak hour intersection level of service analysis results for the Existing Year (2018-19) With Project scenario is presented in Table 10. The results of the proposed project will not generate any anticipated significant impacts to the study intersections.

Table 10: Existing Year (2018-19) With Project Intersection LOS

INTERSECTION		Intersection Control	EXISTING		W/ PROJECT	
			V/C or Delay (S)	LOS	Delay (S)	LOS
1	Santa Carina & Santa Victoria	AWSC	7.4	A	7.4	A
2	Santa Cecelia & Santa Victoria	TWSC	8.7	A	8.7	A
3	Santa Bartola & Santa Victoria	TWSC	9.2	A	9.1	A

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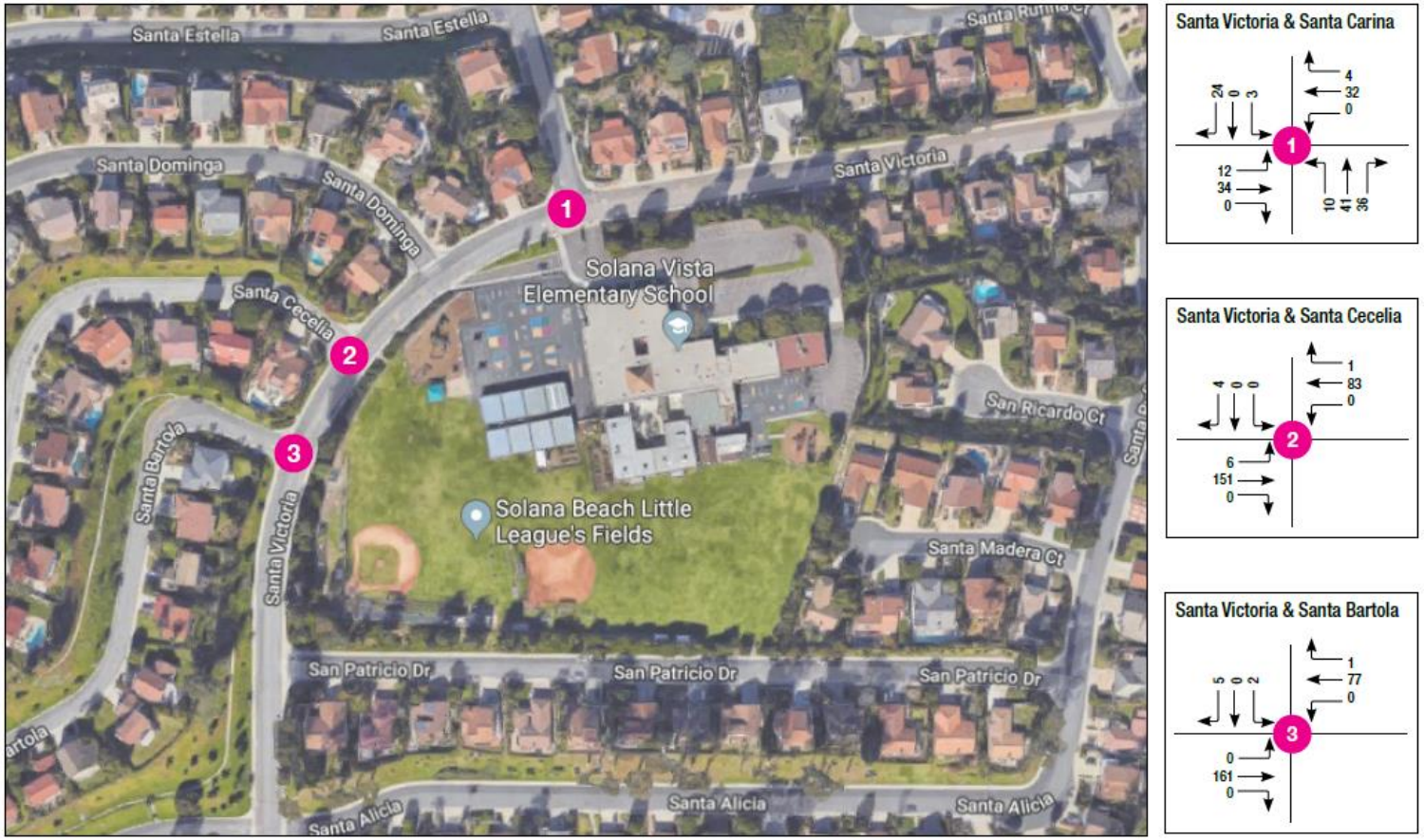
FIGURE 8: EXISTING YEAR (2018-19) WITH PROJECT VOLUMES – AM PEAK HOUR



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OPENING YEAR (2021-22) WITH PROJECT

This section presents the ADT and intersection LOS analysis for the Opening Year (2021-22) With Project scenario. Associated lane geometries and controls are consistent with those used in the Opening Year (2021-22) No Project scenario.

Average Daily Traffic

The average daily traffic for selected links generated by the project as well as in the Opening Year (2021-22) With Project scenarios are presented in Table 11 below. Road segment volumes have been included for noise and air quality purposes.

Table 11: Opening Year (2021-22) With Project Roadway Segment Summary

ID	ROADWAY	SOURCE	OPENING NP ADT	OPENING WP ADT
1	Santa Victoria from Santa Carina to Santa Helena	Counts Unlimited, June 2018	689	641

Intersection Level of Service

The peak hour turning movement volumes presented in Figure 9 were utilized in order to assess intersection performance. A summary of the AM peak hour intersection level of service analysis results for the Opening Year (2021-22) With Project scenario is presented in Table 12. The results of the proposed project will not generate any anticipated significant impacts to the study intersections.

Table 12: Opening Year (2021-22) With Project Intersection LOS

INTERSECTION		Intersection Control	OPENING YEAR		W/ PROJECT	
			V/C or Delay (S)	LOS	Delay (S)	LOS
1	Santa Carina & Santa Victoria	AWSC	7.5	A	7.5	A
2	Santa Cecelia & Santa Victoria	TWSC	8.7	A	8.8	A
3	Santa Bartola & Santa Victoria	TWSC	9.3	A	9.2	A

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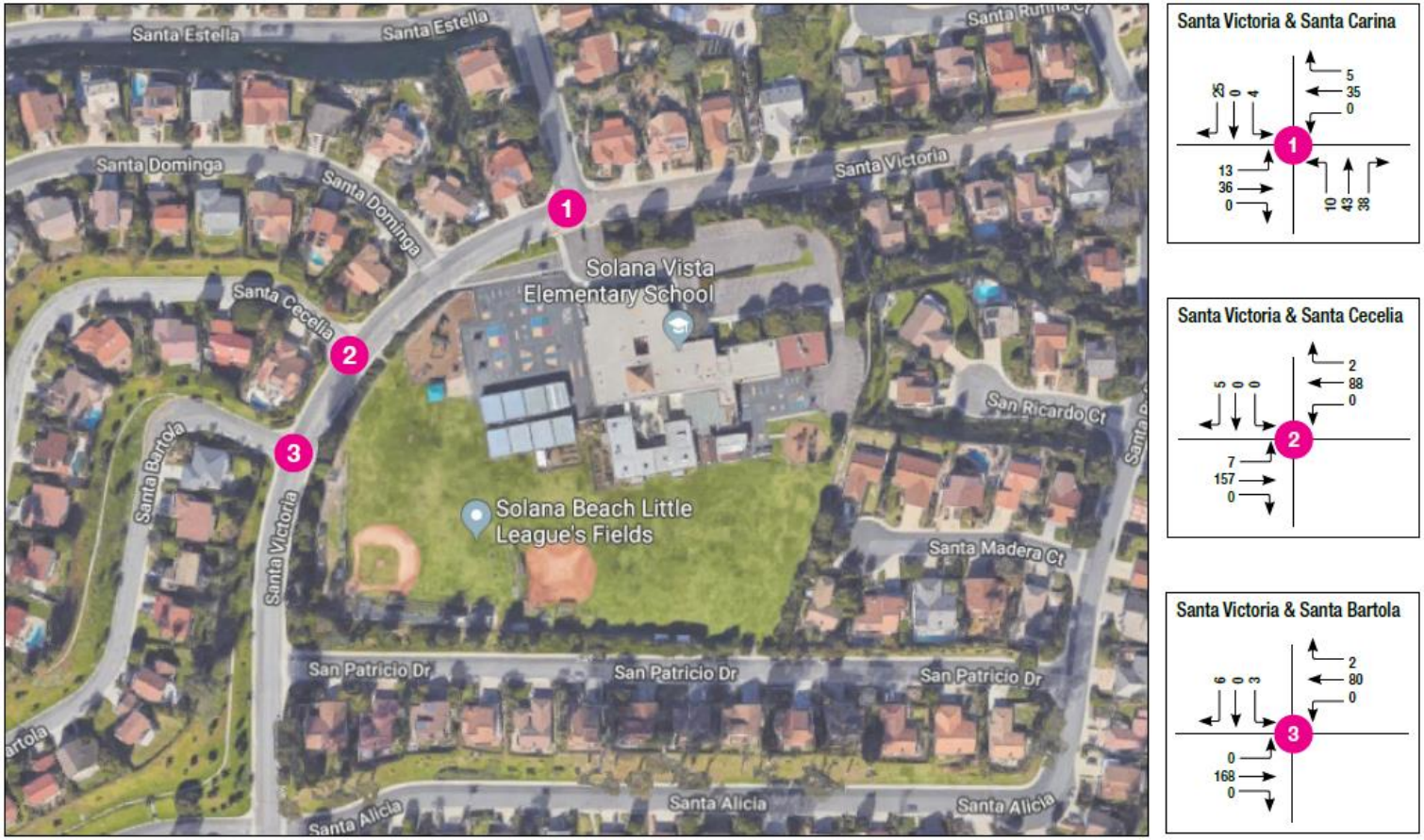
FIGURE 9: OPENING YEAR (2021-22) WITH PROJECT VOLUMES – AM PEAK HOUR



IBI GROUP
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CONCLUSIONS

Based on the results of the level of service analysis, the proposed modernization and reconstruction to Solana Vista Elementary School can be implemented without significantly impact any of the study intersections or roadway segment. All three study intersections, as well as the single study roadway segment operate at an acceptable level of service under both Existing Year (2018-19) and Opening Year (2021-22) with Project scenarios. Since there were no significant impacts with addition of the project, mitigation measures were not necessary for the analysis.

The proposed site plan will be able to accommodate the existing queue observed.

Appendix A – Turning Movement & Roadway Segment Counts

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

City of Solana Beach
N/S: Santa Cecilia
E/W: Santa Victoria
Weather: Clear

File Name : 01_SLB_Santa Carina_Santa Victoria_AM
Site Code : 20218510
Start Date : 6/12/2018
Page No : 1

Groups Printed- Total Volume

	Santa Carina Southbound				Santa Victoria Westbound				School Driveway Northbound				Santa Victoria Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	3	3	0	3	0	3	1	0	0	1	2	3	0	5	12
07:15 AM	5	0	3	8	2	4	2	8	1	0	1	2	0	1	0	1	19
07:30 AM	1	0	0	1	1	0	1	2	4	0	0	4	1	2	2	5	12
07:45 AM	0	0	2	2	5	0	1	6	2	0	0	2	0	0	5	5	15
Total	6	0	8	14	8	7	4	19	8	0	1	9	3	6	7	16	58
08:00 AM	1	0	4	5	6	1	0	7	2	0	1	3	6	7	11	24	39
08:15 AM	0	0	8	8	3	17	0	20	0	25	26	51	5	20	5	30	109
08:30 AM	0	0	7	7	0	2	1	3	3	16	9	28	1	6	2	9	47
08:45 AM	2	1	5	8	1	5	3	9	7	2	2	11	0	1	4	5	33
Total	3	1	24	28	10	25	4	39	12	43	38	93	12	34	22	68	228
Grand Total	9	1	32	42	18	32	8	58	20	43	39	102	15	40	29	84	286
Apprch %	21.4	2.4	76.2		31	55.2	13.8		19.6	42.2	38.2		17.9	47.6	34.5		
Total %	3.1	0.3	11.2	14.7	6.3	11.2	2.8	20.3	7	15	13.6	35.7	5.2	14	10.1	29.4	

	Santa Carina Southbound				Santa Victoria Westbound				School Driveway Northbound				Santa Victoria Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	1	0	4	5	**6**	1	0	7	2	0	1	3	**6**	7	**11**	24	39
08:15 AM	0	0	**8**	**8**	3	**17**	0	**20**	0	**25**	**26**	**51**	5	**20**	5	**30**	**109**
08:30 AM	0	0	7	7	0	2	1	3	3	16	9	28	1	6	2	9	47
08:45 AM	**2**	**1**	5	8	1	5	**3**	9	**7**	2	2	11	0	1	4	5	33
Total Volume	3	1	24	28	10	25	4	39	12	43	38	93	12	34	22	68	228
% App. Total	10.7	3.6	85.7		25.6	64.1	10.3		12.9	46.2	40.9		17.6	50	32.4		
PHF	.375	.250	.750	.875	.417	.368	.333	.488	.429	.430	.365	.456	.500	.425	.500	.567	.523

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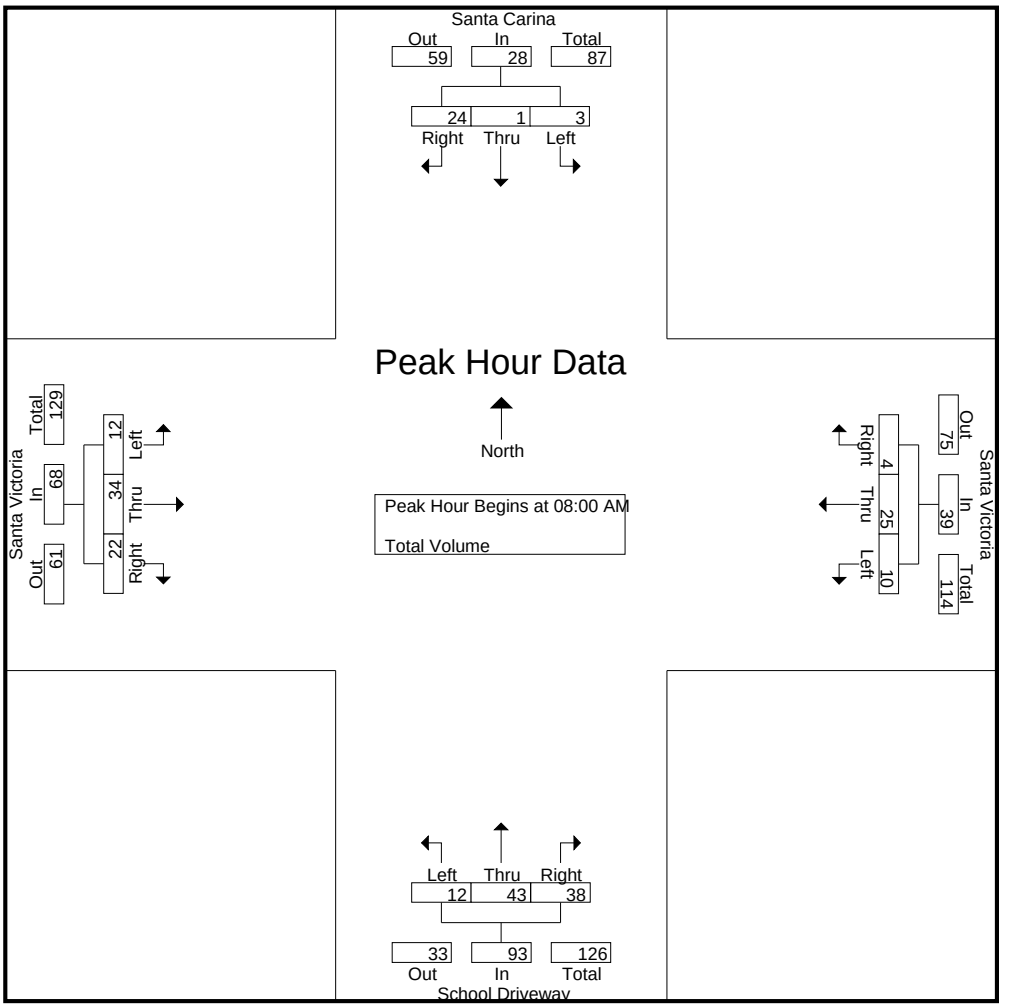
City of Solana Beach
N/S: Santa Cecilia
E/W: Santa Victoria
Weather: Clear

File Name : 01_SLB_Santa Carina_Santa Victoria_AM
Site Code : 20218510
Start Date : 6/12/2018
Page No : 2



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

	08:00 AM				08:00 AM				08:00 AM				07:45 AM			
+0 mins.	1	0	4	5	**6**	1	0	7	2	0	1	3	0	0	5	5
+15 mins.	0	0	**8**	**8**	3	**17**	0	**20**	0	**25**	**26**	**51**	**6**	7	**11**	24
+30 mins.	0	0	7	7	0	2	1	3	3	16	9	28	5	**20**	5	**30**
+45 mins.	**2**	**1**	5	8	1	5	**3**	9	**7**	2	2	11	1	6	2	9
Total Volume	3	1	24	28	10	25	4	39	12	43	38	93	12	33	23	68
% App. Total	10.7	3.6	85.7		25.6	64.1	10.3		12.9	46.2	40.9		17.6	48.5	33.8	
PHF	.375	.250	.750	.875	.417	.368	.333	.488	.429	.430	.365	.456	.500	.413	.523	.567

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

City of Solana Beach
N/S: Santa Cecilia
E/W: Santa Victoria
Weather: Clear

File Name : 02_SLB_Santa Cecilia_Santa Victoria_AM
Site Code : 20218510
Start Date : 6/12/2018
Page No : 1

Groups Printed- Total Volume

	Santa Cecilia Southbound			Santa Victoria Westbound			Santa Victoria Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
07:00 AM	1	0	1	6	0	6	0	6	6	13
07:15 AM	0	1	1	5	3	8	1	3	4	13
07:30 AM	1	0	1	4	0	4	1	9	10	15
07:45 AM	0	2	2	4	0	4	1	8	9	15
Total	2	3	5	19	3	22	3	26	29	56
08:00 AM	0	1	1	4	0	4	0	33	33	38
08:15 AM	0	1	1	33	2	35	5	104	109	145
08:30 AM	0	1	1	26	0	26	1	31	32	59
08:45 AM	0	1	1	15	0	15	0	4	4	20
Total	0	4	4	78	2	80	6	172	178	262
Grand Total	2	7	9	97	5	102	9	198	207	318
Apprch %	22.2	77.8		95.1	4.9		4.3	95.7		
Total %	0.6	2.2	2.8	30.5	1.6	32.1	2.8	62.3	65.1	

	Santa Cecilia Southbound			Santa Victoria Westbound			Santa Victoria Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	0	**1**	**1**	4	0	4	0	33	33	38
08:15 AM	0	1	1	**33**	**2**	**35**	**5**	**104**	**109**	**145**
08:30 AM	0	1	1	26	0	26	1	31	32	59
08:45 AM	0	1	1	15	0	15	0	4	4	20
Total Volume	0	4	4	78	2	80	6	172	178	262
% App. Total	0	100		97.5	2.5		3.4	96.6		
PHF	.000	1.00	1.00	.591	.250	.571	.300	.413	.408	.452

Counts Unlimited
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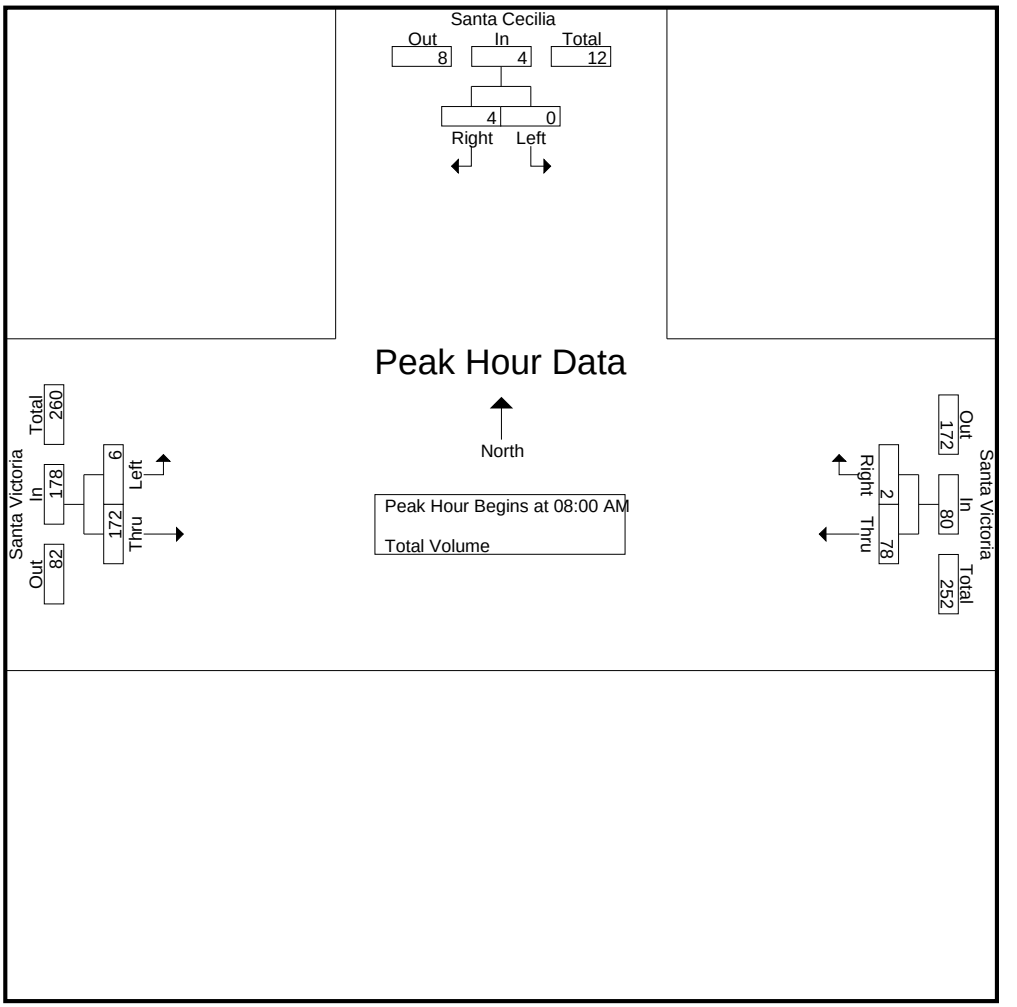
City of Solana Beach
N/S: Santa Cecilia
E/W: Santa Victoria
Weather: Clear

File Name : 02_SLB_Santa Cecilia_Santa Victoria_AM
Site Code : 20218510
Start Date : 6/12/2018
Page No : 2



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

	07:00 AM			08:00 AM			07:45 AM		
+0 mins.	**1**	0	1	4	0	4	1	8	9
+15 mins.	0	1	1	**33**	**2**	**35**	0	33	33
+30 mins.	1	0	1	26	0	26	**5**	**104**	**109**
+45 mins.	0	**2**	**2**	15	0	15	1	31	32
Total Volume	2	3	5	78	2	80	7	176	183
% App. Total	40	60		97.5	2.5		3.8	96.2	
PHF	.500	.375	.625	.591	.250	.571	.350	.423	.420

Counts Unlimited
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(951) 268-6268

City of Solana Beach
N/S: Santa Bartola
E/W: Santa Victoria
Weather: Clear

File Name : 03_SLB_Santa Bartola_Santa Victoria_AM
Site Code : 20218510
Start Date : 6/12/2018
Page No : 1

Groups Printed- Total Volume

	Santa Bartola Southbound			Santa Victoria Westbound			Santa Victoria Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
07:00 AM	1	0	1	6	0	6	1	6	7	14
07:15 AM	0	1	1	6	0	6	0	4	4	11
07:30 AM	0	0	0	4	0	4	0	10	10	14
07:45 AM	0	0	0	5	0	5	0	10	10	15
Total	1	1	2	21	0	21	1	30	31	54
08:00 AM	1	2	3	5	0	5	0	37	37	45
08:15 AM	1	0	1	34	1	35	0	99	99	135
08:30 AM	0	1	1	25	0	25	0	23	23	49
08:45 AM	1	2	3	15	1	16	0	5	5	24
Total	3	5	8	79	2	81	0	164	164	253
Grand Total	4	6	10	100	2	102	1	194	195	307
Apprch %	40	60		98	2		0.5	99.5		
Total %	1.3	2	3.3	32.6	0.7	33.2	0.3	63.2	63.5	

	Santa Bartola Southbound			Santa Victoria Westbound			Santa Victoria Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	**1**	**2**	**3**	5	0	5	0	37	37	45
08:15 AM	1	0	1	**34**	**1**	**35**	0	**99**	**99**	**135**
08:30 AM	0	1	1	25	0	25	0	23	23	49
08:45 AM	1	2	3	15	1	16	0	5	5	24
Total Volume	3	5	8	79	2	81	0	164	164	253
% App. Total	37.5	62.5		97.5	2.5		0	100		
PHF	.750	.625	.667	.581	.500	.579	.000	.414	.414	.469

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City of Solana Beach
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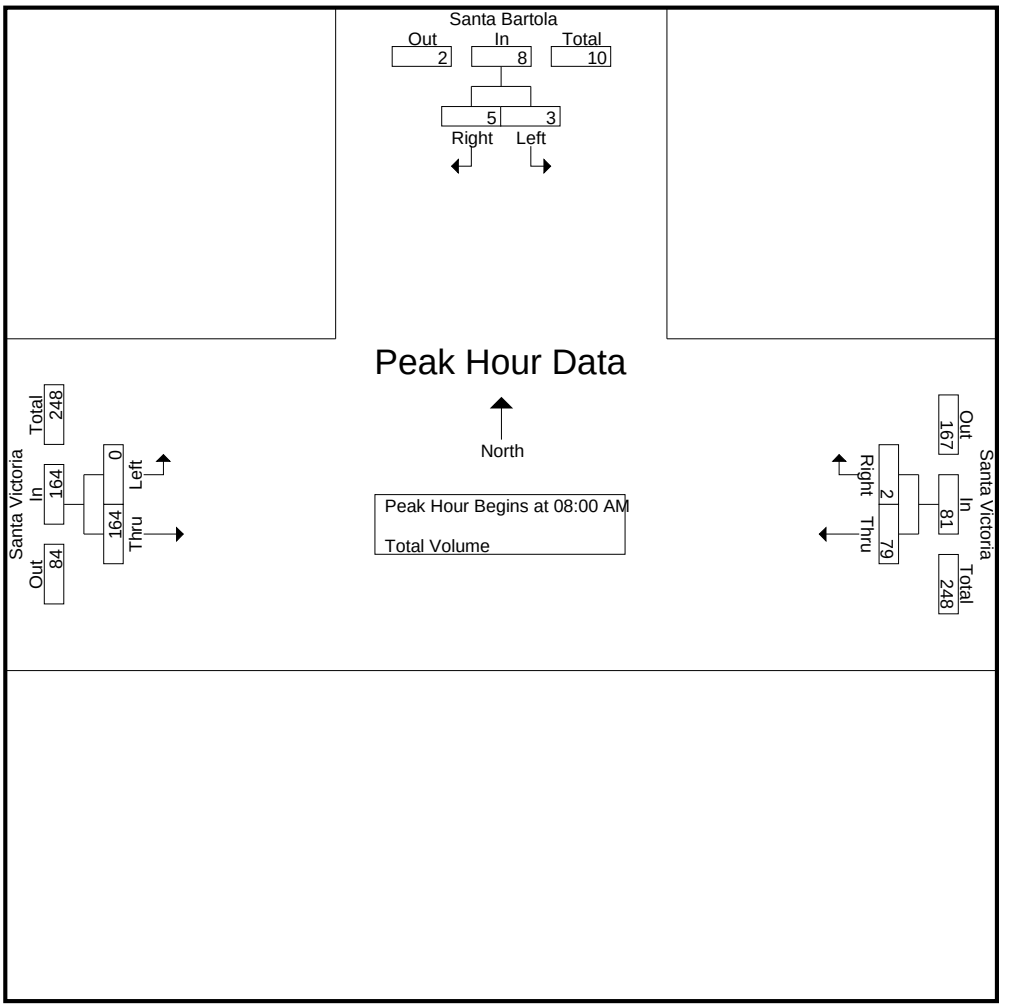
E/W: Santa Victoria
Weather: Clear

File Name : 03_SLB_Santa Bartola_Santa Victoria_AM
Site Code : 20218510
Start Date : 6/12/2018



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

	08:00 AM			08:00 AM			07:45 AM		
+0 mins.	**1**	**2**	**3**	5	0	5	0	10	10
+15 mins.	1	0	1	**34**	**1**	**35**	0	37	37
+30 mins.	0	1	1	25	0	25	0	**99**	**99**
+45 mins.	1	2	3	15	1	16	0	23	23
Total Volume	3	5	8	79	2	81	0	169	169
% App. Total	37.5	62.5		97.5	2.5		0	100	
PHF	.750	.625	.667	.581	.500	.579	.000	.427	.427

Counts Unlimited, Inc.

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

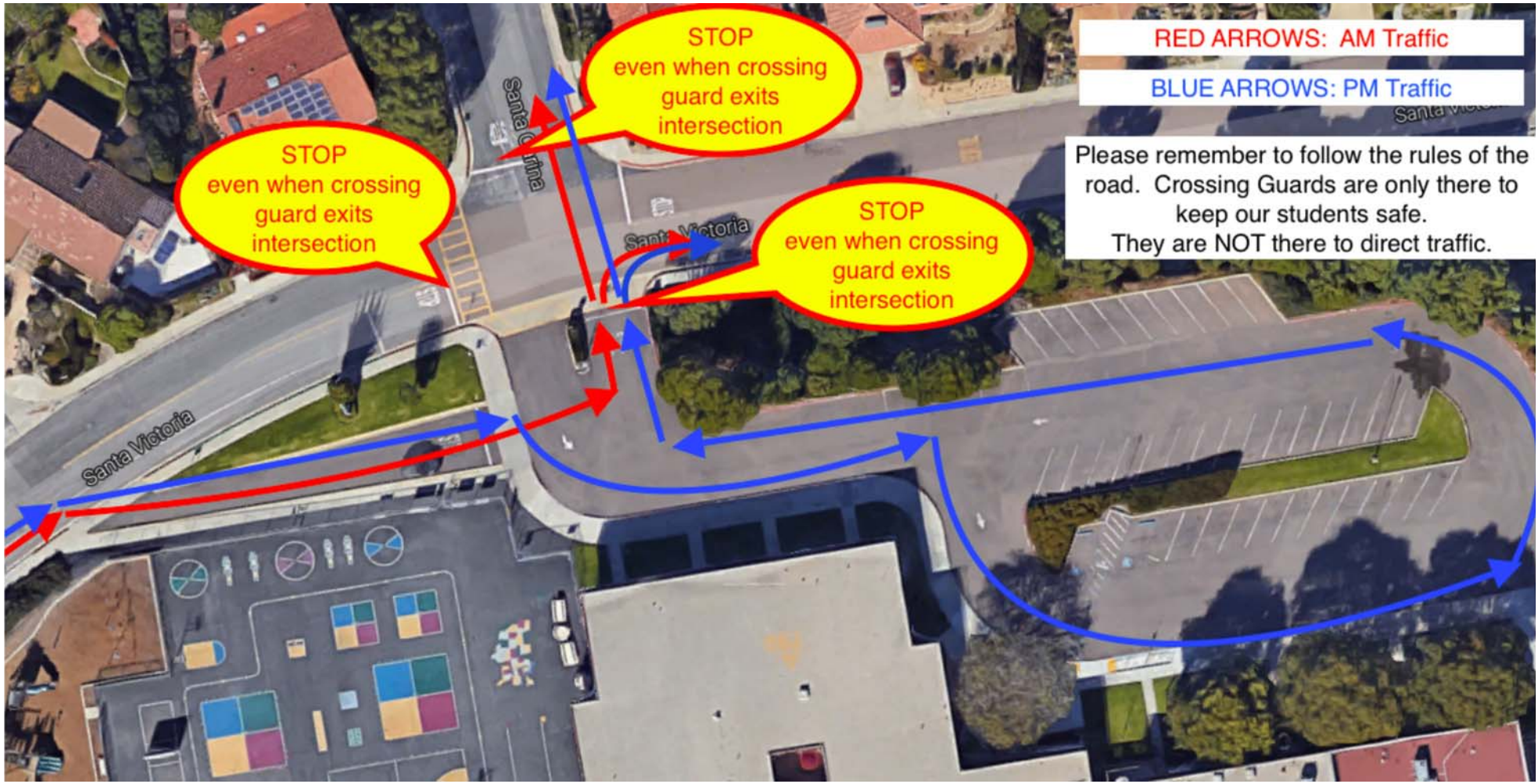
City of Solana Beach
Santa Victoria
B/ Santa Carina - Santa Helena
24 Hour Directional Volume Count

SNB001
Site Code: 202-18510

Start Time	12-Jun-18 Tue	Eastbound Morning	Eastbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Westbound Morning	Westbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		1	1			1	5				
12:15		0	0			0	3				
12:30		0	4			1	2				
12:45		0	6	1	11	0	9	2	19	3	30
01:00		0	2			1	3				
01:15		0	4			0	6				
01:30		1	5			0	2				
01:45		0	6	1	17	0	7	1	18	2	35
02:00		0	4			0	5				
02:15		0	**7**			1	8				
02:30		0	**15**			0	**14**				
02:45		0	**44**	0	70	1	**14**	2	41	2	111
03:00		0	**26**			0	**9**				
03:15		0	6			0	**12**				
03:30		1	8			0	10				
03:45		1	5	2	45	0	6	0	37	2	82
04:00		0	12			0	5				
04:15		1	1			0	3				
04:30		0	2			0	8				
04:45		0	5	1	20	0	14	0	30	1	50
05:00		0	3			1	4				
05:15		0	2			0	5				
05:30		0	4			1	6				
05:45		1	4	1	13	1	3	3	18	4	31
06:00		1	4			1	2				
06:15		0	6			0	2				
06:30		1	2			2	0				
06:45		1	1	3	13	4	3	7	7	10	20
07:00		3	6			3	3				
07:15		7	4			8	3				
07:30		3	2			2	0				
07:45		0	3	13	15	6	0	19	6	32	21
08:00		**9**	1			**7**	3				
08:15		**46**	3			**20**	1				
08:30		**15**	2			**3**	2				
08:45		**5**	1	75	7	**9**	2	39	8	114	15
09:00		1	2			4	0				
09:15		3	2			4	2				
09:30		3	3			5	2				
09:45		3	1	10	8	2	0	15	4	25	12
10:00		2	0			5	0				
10:15		3	0			2	0				
10:30		1	1			2	2				
10:45		6	1	12	2	3	1	12	3	24	5
11:00		2	0			7	1				
11:15		3	0			5	0				
11:30		3	1			5	0				
11:45		2	0	10	1	2	0	19	1	29	2
Total		129	222	129	222	119	192	119	192	248	414
Combined Total		351		351		311		311		662	
AM Peak	-	08:00	-	-	-	08:00	-	-	-	-	-
Vol.	-	75	-	-	-	39	-	-	-	-	-
P.H.F.		0.408				0.488					
PM Peak	-	-	02:15	-	-	-	02:30	-	-	-	-
Vol.	-	-	92	-	-	-	49	-	-	-	-
P.H.F.			0.523				0.875				
Percentage		36.8%	63.2%			38.3%	61.7%				
ADT/AADT		ADT 662		AADT 662							

Prepared for Solana Beach School District

Appendix B – Solana Vista Elementary Traffic Circulation Plan


STOP
even when crossing
guard exits
intersection
STOP
even when crossing
guard exits
intersection
STOP
even when crossing
guard exits
intersection
RED ARROWS: AM Traffic
BLUE ARROWS: PM Traffic
Please remember to follow the rules of the road. Crossing Guards are only there to keep our students safe.
They are NOT there to direct traffic.
Santa Victoria
Santa Victoria

Appendix C – Synchro Reports (NP)

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	34	22	10	25	4	12	43	38	3	1	24
Future Vol, veh/h	12	34	22	10	25	4	12	43	38	3	1	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	37	24	11	27	4	13	47	41	3	1	26
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	7.5	7.5	7.5	6.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	13%	18%	26%	11%
Vol Thru, %	46%	50%	64%	4%
Vol Right, %	41%	32%	10%	86%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	93	68	39	28
LT Vol	12	12	10	3
Through Vol	43	34	25	1
RT Vol	38	22	4	24
Lane Flow Rate	101	74	42	30
Geometry Grp	1	1	1	1
Degree of Util (X)	0.111	0.083	0.05	0.031
Departure Headway (Hd)	3.94	4.036	4.21	3.721
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	902	880	843	949
Service Time	2	2.096	2.274	1.797
HCM Lane V/C Ratio	0.112	0.084	0.05	0.032
HCM Control Delay	7.5	7.5	7.5	6.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.3	0.2	0.1

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	172	78	2	0	4
Future Vol, veh/h	6	172	78	2	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	187	85	2	0	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	87	0	-	0	287	86
Stage 1	-	-	-	-	86	-
Stage 2	-	-	-	-	201	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1509	-	-	-	703	973
Stage 1	-	-	-	-	937	-
Stage 2	-	-	-	-	833	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1509	-	-	-	699	973
Mov Cap-2 Maneuver	-	-	-	-	699	-
Stage 1	-	-	-	-	932	-
Stage 2	-	-	-	-	833	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1509	-	-	-	973
HCM Lane V/C Ratio	0.004	-	-	-	0.004
HCM Control Delay (s)	7.4	0	-	-	8.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	164	79	2	3	5
Future Vol, veh/h	0	164	79	2	3	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	178	86	2	3	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	88	0	-	0	265	87
Stage 1	-	-	-	-	87	-
Stage 2	-	-	-	-	178	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1508	-	-	-	724	971
Stage 1	-	-	-	-	936	-
Stage 2	-	-	-	-	853	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1508	-	-	-	724	971
Mov Cap-2 Maneuver	-	-	-	-	724	-
Stage 1	-	-	-	-	936	-
Stage 2	-	-	-	-	853	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.2
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1508	-	-	-	861
HCM Lane V/C Ratio	-	-	-	-	0.01
HCM Control Delay (s)	0	-	-	-	9.2
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	36	23	11	27	5	13	45	40	4	2	25
Future Vol, veh/h	13	36	23	11	27	5	13	45	40	4	2	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	39	25	12	29	5	14	49	43	4	2	27
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	7.5	7.5	7.6	7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	13%	18%	26%	13%
Vol Thru, %	46%	50%	63%	6%
Vol Right, %	41%	32%	12%	81%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	98	72	43	31
LT Vol	13	13	11	4
Through Vol	45	36	27	2
RT Vol	40	23	5	25
Lane Flow Rate	107	78	47	34
Geometry Grp	1	1	1	1
Degree of Util (X)	0.117	0.088	0.055	0.035
Departure Headway (Hd)	3.959	4.059	4.221	3.776
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	896	874	840	934
Service Time	2.024	2.123	2.29	1.857
HCM Lane V/C Ratio	0.119	0.089	0.056	0.036
HCM Control Delay	7.6	7.5	7.5	7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.3	0.2	0.1

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	179	82	3	0	5
Future Vol, veh/h	7	179	82	3	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	195	89	3	0	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	92	0	-	0	302	91
Stage 1	-	-	-	-	91	-
Stage 2	-	-	-	-	211	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1503	-	-	-	690	967
Stage 1	-	-	-	-	933	-
Stage 2	-	-	-	-	824	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1503	-	-	-	686	967
Mov Cap-2 Maneuver	-	-	-	-	686	-
Stage 1	-	-	-	-	927	-
Stage 2	-	-	-	-	824	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1503	-	-	-	967
HCM Lane V/C Ratio	0.005	-	-	-	0.006
HCM Control Delay (s)	7.4	0	-	-	8.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	171	83	3	4	6
Future Vol, veh/h	0	171	83	3	4	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	186	90	3	4	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	93	0	-	0	278	92
Stage 1	-	-	-	-	92	-
Stage 2	-	-	-	-	186	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1501	-	-	-	712	965
Stage 1	-	-	-	-	932	-
Stage 2	-	-	-	-	846	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1501	-	-	-	712	965
Mov Cap-2 Maneuver	-	-	-	-	712	-
Stage 1	-	-	-	-	932	-
Stage 2	-	-	-	-	846	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1501	-	-	-	845
HCM Lane V/C Ratio	-	-	-	-	0.013
HCM Control Delay (s)	0	-	-	-	9.3
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Appendix D – Synchro Reports (WP)

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	34	0	0	32	4	10	41	36	3	0	25
Future Vol, veh/h	12	34	0	0	32	4	10	41	36	3	0	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	37	0	0	35	4	11	45	39	3	0	27
Number of Lanes	0	1	0	0	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	1
HCM Control Delay	7.6	7.4	7.5	6.9
HCM LOS	A	A	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1
Vol Left, %	20%	0%	26%	0%	11%
Vol Thru, %	80%	0%	74%	89%	0%
Vol Right, %	0%	100%	0%	11%	89%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	51	36	46	36	28
LT Vol	10	0	12	0	3
Through Vol	41	0	34	32	0
RT Vol	0	36	0	4	25
Lane Flow Rate	55	39	50	39	30
Geometry Grp	7	7	2	2	5
Degree of Util (X)	0.074	0.044	0.059	0.045	0.032
Departure Headway (Hd)	4.803	4.004	4.227	4.116	3.744
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	742	888	836	857	942
Service Time	2.555	1.755	2.309	2.202	1.822
HCM Lane V/C Ratio	0.074	0.044	0.06	0.046	0.032
HCM Control Delay	7.9	6.9	7.6	7.4	6.9
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.2	0.1	0.2	0.1	0.1

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	151	83	1	0	4
Future Vol, veh/h	6	151	83	1	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	164	90	1	0	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	91	0	-	0	269	91
Stage 1	-	-	-	-	91	-
Stage 2	-	-	-	-	178	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1504	-	-	-	720	967
Stage 1	-	-	-	-	933	-
Stage 2	-	-	-	-	853	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1504	-	-	-	716	967
Mov Cap-2 Maneuver	-	-	-	-	716	-
Stage 1	-	-	-	-	928	-
Stage 2	-	-	-	-	853	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1504	-	-	-	967
HCM Lane V/C Ratio	0.004	-	-	-	0.004
HCM Control Delay (s)	7.4	0	-	-	8.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	161	77	1	2	5
Future Vol, veh/h	0	161	77	1	2	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	175	84	1	2	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	85	0	-	0	260	85
Stage 1	-	-	-	-	85	-
Stage 2	-	-	-	-	175	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1512	-	-	-	729	974
Stage 1	-	-	-	-	938	-
Stage 2	-	-	-	-	855	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1512	-	-	-	729	974
Mov Cap-2 Maneuver	-	-	-	-	729	-
Stage 1	-	-	-	-	938	-
Stage 2	-	-	-	-	855	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1512	-	-	-	889
HCM Lane V/C Ratio	-	-	-	-	0.009
HCM Control Delay (s)	0	-	-	-	9.1
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	36	0	0	35	5	10	43	38	4	0	25
Future Vol, veh/h	13	36	0	0	35	5	10	43	38	4	0	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	39	0	0	38	5	11	47	41	4	0	27
Number of Lanes	0	1	0	0	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	1
HCM Control Delay	7.6	7.4	7.6	7
HCM LOS	A	A	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1
Vol Left, %	19%	0%	27%	0%	14%
Vol Thru, %	81%	0%	73%	88%	0%
Vol Right, %	0%	100%	0%	12%	86%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	53	38	49	40	29
LT Vol	10	0	13	0	4
Through Vol	43	0	36	35	0
RT Vol	0	38	0	5	25
Lane Flow Rate	58	41	53	43	32
Geometry Grp	7	7	2	2	5
Degree of Util (X)	0.077	0.046	0.063	0.05	0.033
Departure Headway (Hd)	4.814	4.018	4.241	4.12	3.786
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	740	884	833	856	931
Service Time	2.57	1.773	2.325	2.208	1.868
HCM Lane V/C Ratio	0.078	0.046	0.064	0.05	0.034
HCM Control Delay	8	7	7.6	7.4	7
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.2	0.1	0.2	0.2	0.1

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	157	88	2	0	5
Future Vol, veh/h	7	157	88	2	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	171	96	2	0	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	98	0	-	0	284	97
Stage 1	-	-	-	-	97	-
Stage 2	-	-	-	-	187	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1495	-	-	-	706	959
Stage 1	-	-	-	-	927	-
Stage 2	-	-	-	-	845	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1495	-	-	-	702	959
Mov Cap-2 Maneuver	-	-	-	-	702	-
Stage 1	-	-	-	-	921	-
Stage 2	-	-	-	-	845	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1495	-	-	-	959
HCM Lane V/C Ratio	0.005	-	-	-	0.006
HCM Control Delay (s)	7.4	0	-	-	8.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	168	80	2	3	6
Future Vol, veh/h	0	168	80	2	3	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	183	87	2	3	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	89	0	-	0	271	88
Stage 1	-	-	-	-	88	-
Stage 2	-	-	-	-	183	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1506	-	-	-	718	970
Stage 1	-	-	-	-	935	-
Stage 2	-	-	-	-	848	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1506	-	-	-	718	970
Mov Cap-2 Maneuver	-	-	-	-	718	-
Stage 1	-	-	-	-	935	-
Stage 2	-	-	-	-	848	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.2
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1506	-	-	-	868
HCM Lane V/C Ratio	-	-	-	-	0.011
HCM Control Delay (s)	0	-	-	-	9.2
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0