



ASSOCIATED TRANSPORTATION ENGINEERS

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Since 1978

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July 11, 2018

18052L02

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815 West Ocean Avenue
Lompoc, CA 93436

TRAFFIC AND CIRCULATION STUDY FOR THE GUADALUPE RANCH ACRES PROJECT, CITY OF GUADALUPE

Associated Transportation Engineers (ATE) has prepared the following traffic and circulation study for the Guadalupe Ranch Acres Project (the "Project") proposed in the City of Guadalupe. The study reviews the trip generation estimates for the Projects, evaluates potential impacts based on the criteria adopted in the Congestion Management Program, and reviews site access and circulation.

PROJECT DESCRIPTION

The Project site is located on Escalante Street south of 11th Street, just east of the Mary Buren Elementary School in northeastern portion of the City. Figure 1 (attached) illustrates the Project site location. Escalante Street is a looped roadway that has two connections to 11th Street. The site is currently occupied with 55 multi-family housing units. The Project is proposing to demolish the existing 55 multi-family units and construct 80 new multi-family units (net increase of 25 units). The Project also includes a "First Five" center and clubhouse that would accommodate 75 preschool children. It is anticipated that approximately 35 of the preschool children would live on-site and 40 would come from the surrounding neighborhood. Access to Project would continue to be provided via a looped roadway with two access points on 11th Street. A separate drop-off and parking area would be provided in front of the First Five preschool building. Figure 2 shows the Project site plan.

PROJECT TRIP GENERATION ESTIAMTES

Trip generation estimates were developed for the Project using the rates contained in the Institute of Transportation Engineers' (ITE) Trip Generation Report. The ITE rates for Multi-Family Housing units (ITE Land Use Code #220) and Day Care Centers (Land Use Code #565) were selected for the analysis. Table 1 presents the trip generation estimates for the Project.

Table 1
Project Trip Generation Estimates

Land Use	Size	ADT(a)		AM Peak Hour		PM Peak Hour	
		Rate	Trips	Rate	Trips (In/Out)	Rate	Trips (In/Out)
Proposed Multi-Family	80 Units	7.32	600	0.46	37 (9/28)	0.56	45 (28/17)
Proposed Preschool(b)	40 Children	4.09	164	0.78	31(16/15)	0.79	32 (15/17)
Subtotal			764		68 (25/43)		77 (43/34)
Existing Multi-Family	55 Units	7.32	403	0.46	25 (6/19)	0.56	31 (20/11)
Net Trip Generation			361		43 (19/24)		46 (23/23)

(a) ADT = Average Daily Trips.

(b) Analysis assumes 35 children from on-site and 40 children from off-site.

Table 1 shows that the project is forecast to generate 361 average daily trips (ADT), 43 AM peak hour trips and 46 PM peak hour trips.

POTENTIAL TRAFFIC IMPACTS

Congestion Management Program Roadway System Impacts

The Santa Barbara County Association of Governments (SBCAG) has developed a set of traffic impact thresholds to assess the impacts of land use decisions made by local jurisdictions (including the City of Guadalupe) on regional transportation facilities located within the Congestion Management Program (CMP) roadway system.

According to the CMP criteria, projects that generate less than 500 ADT and less than 50 peak hour trips do not have the potential to generate significant impacts and are therefore consistent with the CMP. As shown in Table 1, the Project is forecast to generate 361 ADT, with 43 trips occurring during the AM peak hour and 46 trips during the PM peak hour. The Guadalupe Ranch Acres Project is therefore considered to be consistent with CMP standards and would not significantly impact the CMP roadway system in Guadalupe since it would generate less than 500 ADT and less than 50 peak hour trips.

Local Impacts

Roadway Levels of Service. As described, access to the Project site would continue to be provided via a loped road system with two connections to 11th Street. 11th Street is a 2-lane arterial that extends between State Route (SR) 1 west of the Project site and SR 166 southeast of the Project site. 11th Street serves commercial, school, residential, and agricultural uses in the eastern portion of Guadalupe.

Traffic counts show that 11th Street carries about 1,700 ADT adjacent to the Project site. The Existing and Existing + Project traffic volumes and levels of service for 11th Street are summarized in Table 2. For reference, traffic operations are expressed in terms of "Levels of Service" (LOS). LOS A through F are used to rate traffic operations, with LOS A indicating very good operations and low delays and LOS F indicating poor operations and high delays. Levels of service for roadways are based on standard engineering design capacities (see attached capacities), which show that 2-lane arterial streets such as 11th Street have a capacity to carry approximately 20,000 vehicles per day.

Table 2
11th Street Traffic Volumes and Levels of Service

Roadway Segment	Roadway Classification	Roadway Capacity	Existing		Project Added ADT	Existing + Project	
			ADT	LOS		ADT	LOS
11 TH Street	2-Lane Arterial	20,000 ADT	1,700	LOS A	361	2,061	LOS A

Note: LOS based on standard engineering design capacities.

As shown, 11th Street currently operates at LOS A and is forecast to operate at LOS A with Existing + Project traffic. LOS A represents relatively free flow operations with no congestion.

Site Driveway Levels of Service. Vehicular access to the site is proposed via the two driveway connections to 11th Street (see site plan). Both driveways would provide for inbound and outbound access. Vehicle delays and levels of service were calculated for the two 11th Street/Project Driveway intersections using the operations methodologies for Stop sign controlled intersections that are outlined in the Highway Capacity Manual (HCM).¹ Each movement required to yield (left-turns from 11th Street) or stop (left and right turns from the Project driveways) has an average delay per vehicle and a level of service rating. There is also average delay per vehicle and level of service rating presented for all movements that are required to yield or stop (i.e. overall intersection).

¹ Highway Capacity Manual, Transportation Research Board, 6th Edition, 2016.

Operations at the 11th Street/Project Driveway intersections were evaluated for the AM and PM peak hour commuter periods using the Existing + Project traffic volumes illustrated on Figure 3 (LOS worksheets attached). Table 3 presents the Existing + Project vehicle delays and levels of service for the two intersections. Existing + Project.

Table 3
11th Street/Project Driveway Operations – Existing + Project

Intersection / Movement	Delay/LOS (a)	
	AM Peak Hour	PM Peak Hour
<u>11th Street/Project Driveway West:</u>		
Westbound Left Turn	7.4 Sec LOS A	7.5 Sec LOS A
Northbound Left + Right Turn	9.3 Sec LOS A	9.4 Sec LOS A
Overall Intersection	8.9 Sec LOS A	8.8 Sec LOS A
<u>11th Street/Project Driveway East:</u>		
Eastbound Left Turn	7.4 Sec LOS A	7.4 Sec LOS A
Northbound Left + Right Turn	9.2 Sec LOS A	9.3 Sec LOS A
Overall Intersection	8.9 Sec LOS A	8.6 Sec LOS A

(a) LOS based on average seconds of delay per vehicle pursuant to HCM.

The data presented in Table 3 indicate that the Project driveways would operate at LOS A with low delays and vehicle queues.

Sight Distances. Drivers of vehicles turning to/from the Project's driveways on 11th Street should have unobstructed views along 11th Street that are sufficient in length to anticipate and avoid potential collisions. The Caltrans Highway Design Manual sight distance standards were used for the sight distance analysis.¹

ATE conducted a field review to determine if sight distances at the Project driveways that connect to 11th Street meet standards. The segment of 11th Street east of the Project site is posted with 35 MPH speed limit signs and the segment west of the site is posted with 25 MPH School speed limit signs (applicable when children are present). Floating car surveys found that vehicles travel in the 25-35 MPH range adjacent to the driveways. Based on Caltrans criteria, the minimum required corner sight distance for a 35 MPH design speed is 385 feet.

The segment of 11th Street west of the Project driveways is relatively flat and straight. The sight distance to the west extends to Peralta Street (and beyond). Figure 4 shows the line of sight looking west along 11th Street from the Project site. The sight distance to the west is about 545

¹ Highway Design Manual, California Department of Transportation, Sixth Edition, Updated May 2012.

feet from the western driveway to Peralta Street and about 780 feet from the eastern driveway to Peralta Street. These sight lines are well in excess of the 385-foot minimum standard.

The segment of 11th Street east of the Project driveways is also relatively flat and straight. The sight distance to the east extends to the horizontal curve in 11th Street, which is more than 2,000 feet east of both Project driveways. Figure 4 shows the line of sight looking east along 11th Street from the Project site. These sight lines are well in excess of the 385-foot minimum standard.

On-street parking is allowed along the shoulder of 11th Street adjacent to the Project driveways. Parking should be prohibited for 25 feet on each side of the Project driveways (red curb) in order to attain the minimum sight distances. Figure 5 illustrates the red curbs that are recommended adjacent to each driveway. In addition, obstructions that are 3.5 feet or more should be prohibited within the sight triangles adjacent to the Project driveways to ensure that adequate sight distances are provided for vehicles exiting the site (i.e. fences, walls, screens, landscaping, etc. should be limited in height adjacent to the Project driveways). Figure 5 illustrates the sight triangle areas at the project driveways.

This concludes our traffic and circulation study for the Guadalupe Court Residential Project.

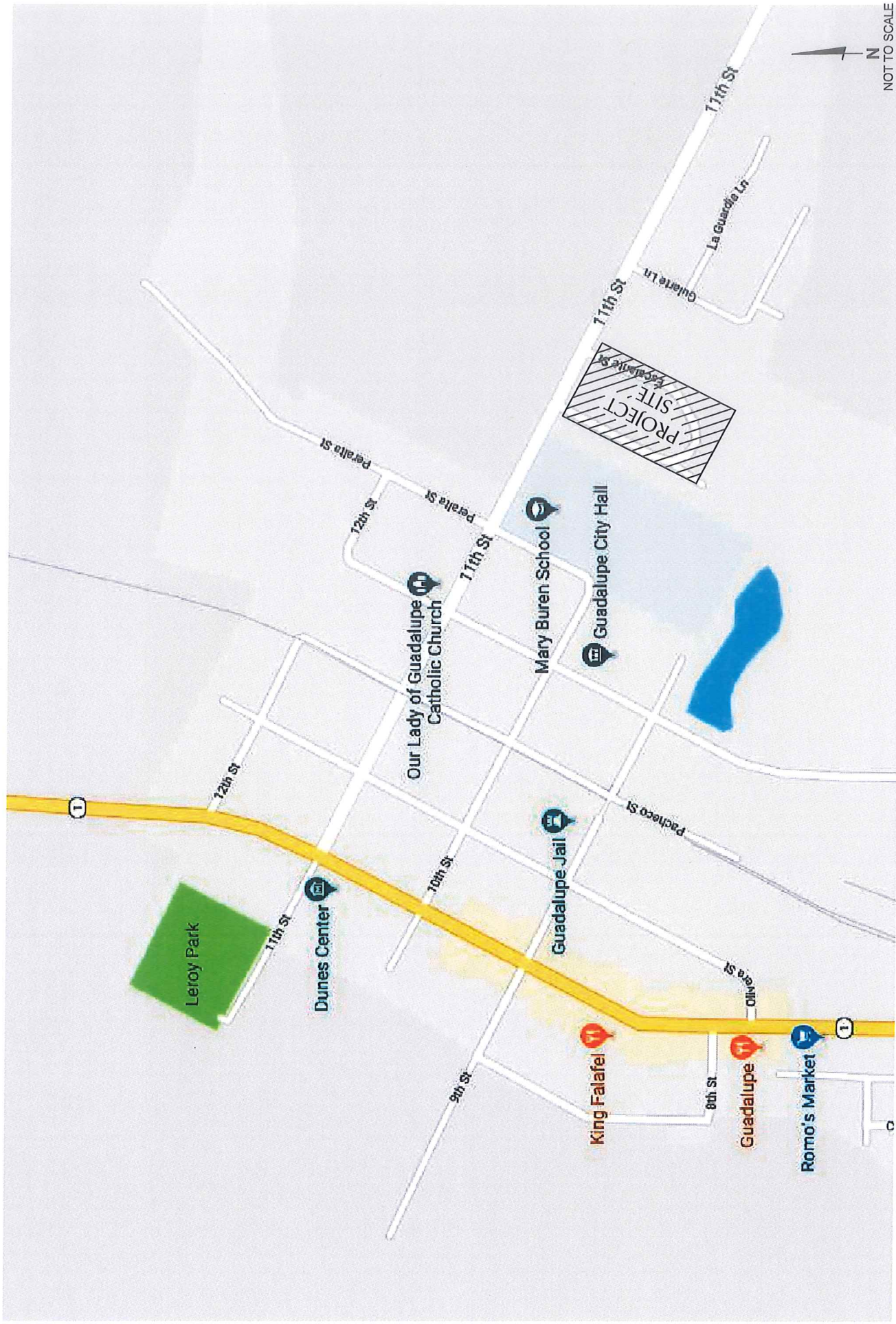
Associated Transportation Engineers,

A handwritten signature in black ink, appearing to read 'Scott A. Schell', with a stylized flourish at the end.

Scott A. Schell, AICP, PTP
Principal Transportation Planner

SAS/JSI/DLD

Attachments



PROJECT SITE LOCATION

FIGURE 1

RURAL
RESIDENTIAL

11 TH STREET

OPEN SPACE

RECREATION
AREA

GARDEN
AREA

MARY BUREN
ELEMENTARY SCHOOL

FIRST FIVE
CENTER &
CLUBHOUSE

FIRST FIVE
PLAYGROUND

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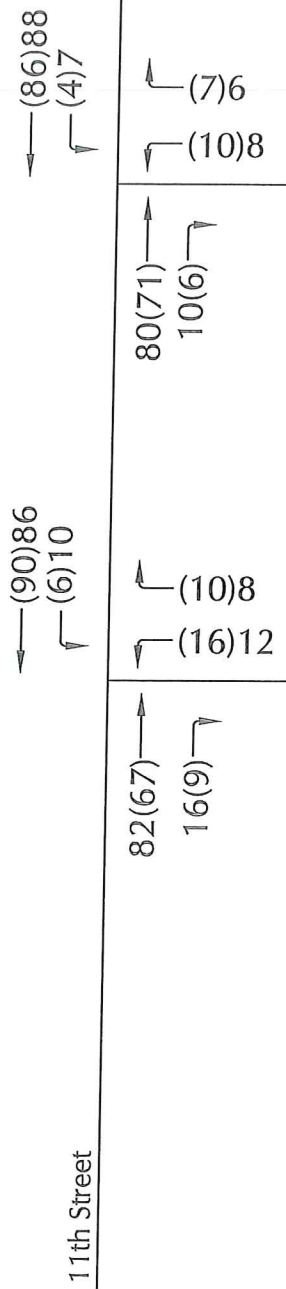


PROJECT SITE PLAN

FIGURE 2

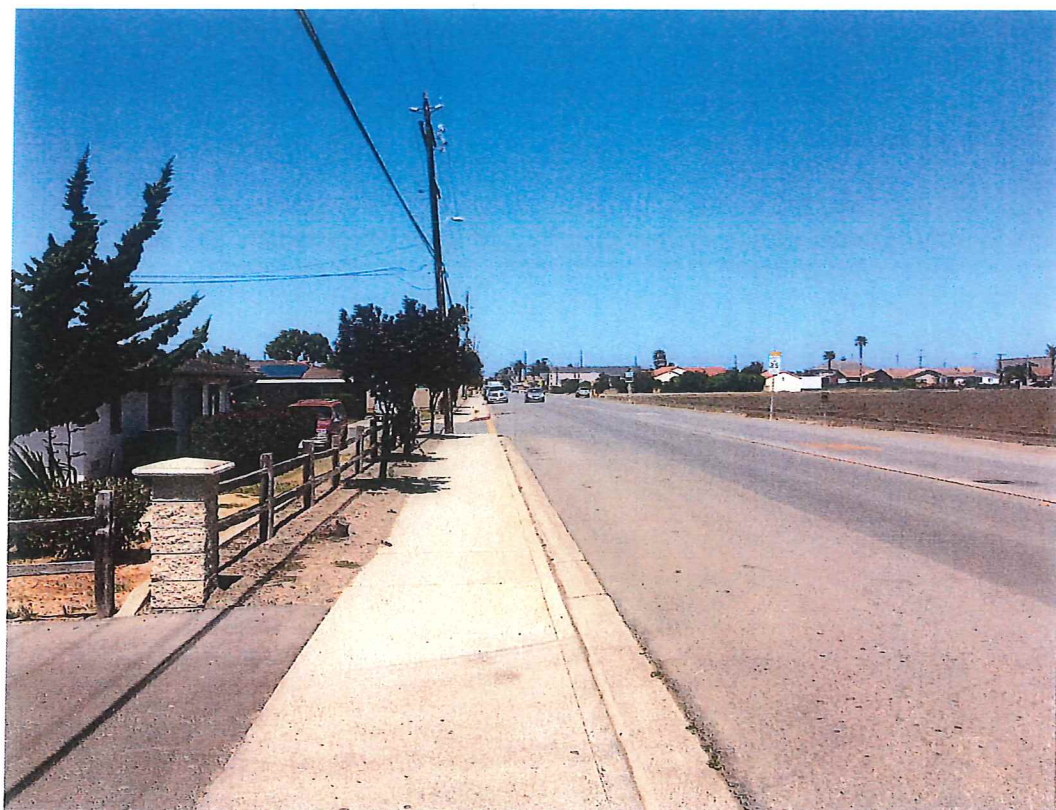
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LOOKING EAST FROM SITE



LOOKING WEST FROM SITE

DRIVEWAY SIGHT DISTANCES



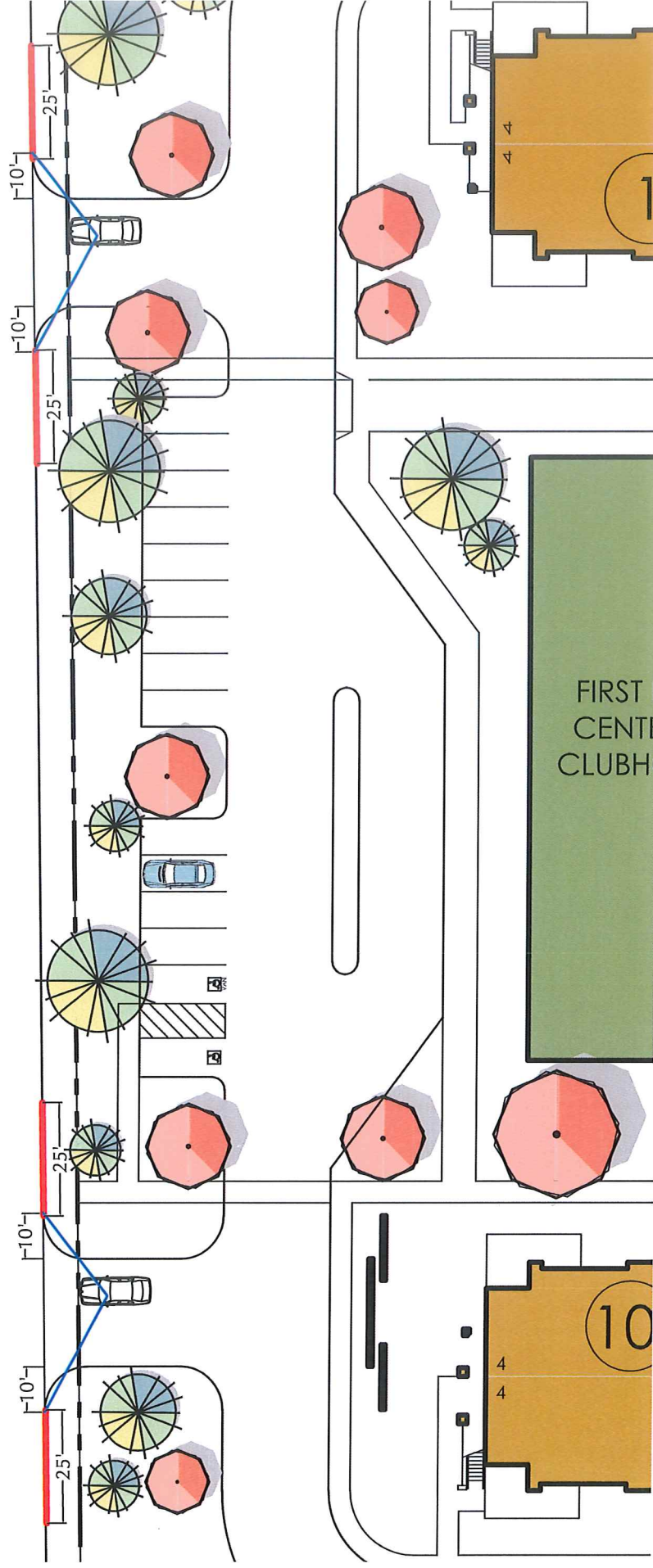
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FIGURE

4

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11 TH STREET



N
NOT TO SCALE

SANTA BARBARA COUNTY PUBLIC WORKS DEPARTMENT
ROADWAY DESIGN CAPACITIES

TYPE OF ROADWAY	# OF LANES	LOS A		LOS B		LOS C		LOS D		LOS E	
		Low	High	Low	High	Low	High	Low	High	Low	High
Arterial	2 Lanes	8,100	12,000	9,400	14,000	10,800	16,000	12,100	18,000	13,500	20,000
Arterial	4 Lanes	16,100	23,900	18,900	27,900	21,600	31,900	24,300	35,900	27,000	39,900
Major	2 Lanes	6,500	9,600	7,500	11,200	8,600	12,800	9,700	14,400	10,800	16,000
Major	4 Lanes	12,900	19,200	15,100	22,300	17,200	25,500	19,400	28,700	21,600	31,900
Collector	- -	4,600	7,100	5,400	8,200	6,200	9,400	6,900	10,600	7,700	11,800

The roadway capacities listed above are "rule of thumb" figures only. Some factors which affect these capacities are intersections (numbers and configuration), degrees of access control, roadway grades, design geometrics (horizontal and vertical alignment standards), sight distance, level of truck and bus traffic and level of pedestrian and bicycle traffic.



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HCS7 Two-Way Stop-Control Report

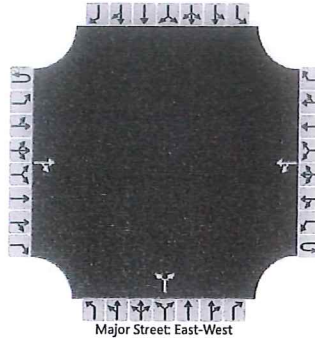
General Information

Analyst	ATE
Agency/Co.	ATE
Date Performed	6/22/2018
Analysis Year	2018
Time Analyzed	AM PEAK HOUR
Intersection Orientation	East-West
Project Description	EXISTING PEAK HOUR

Site Information

Intersection	11th Street/West Driveway
Jurisdiction	CITY OF GUADALUPE
East/West Street	11th Street
North/South Street	West Driveway
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			67	9		6	90			16		10				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						7					28					
Capacity, c (veh/h)						1508					857					
v/c Ratio						0.00					0.03					
95% Queue Length, Q ₉₅ (veh)						0.0					0.1					
Control Delay (s/veh)						7.4					9.3					
Level of Service (LOS)						A					A					
Approach Delay (s/veh)					0.5				9.3							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

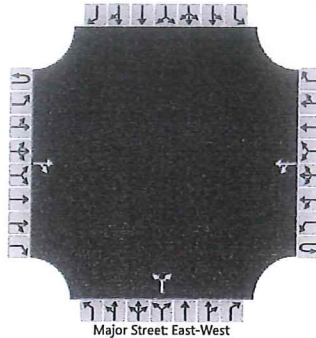
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Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			71	6		4	86			10		7				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
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Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						4					18					
Capacity, c (veh/h)						1507					866					
v/c Ratio						0.00					0.02					
95% Queue Length, Q ₉₅ (veh)						0.0					0.1					
Control Delay (s/veh)						7.4					9.2					
Level of Service (LOS)						A					A					
Approach Delay (s/veh)					0.4				9.2							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

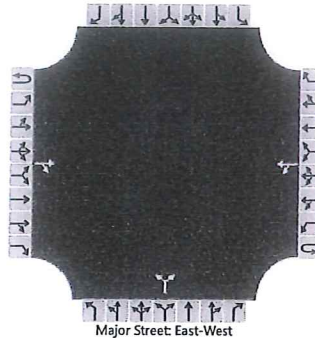
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Project Description	EXISTING PEAK HOUR

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North/South Street	West Driveway
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Lanes



Vehicle Volumes and Adjustments

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Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			82	16		10	86			12		8				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage					Undivided											

Critical and Follow-up Headways

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Critical Headway (sec)						4.13					6.43		6.23			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.23					3.53		3.33			

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						11					22					
Capacity, c (veh/h)						1478					833					
v/c Ratio						0.01					0.03					
95% Queue Length, Q ₉₅ (veh)						0.0					0.1					
Control Delay (s/veh)						7.5					9.4					
Level of Service (LOS)						A					A					
Approach Delay (s/veh)					0.8				9.4							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

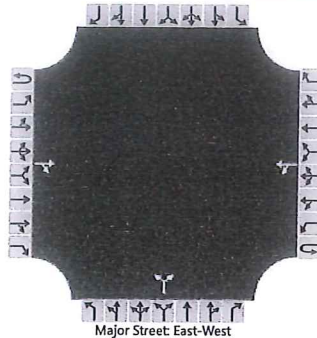
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North/South Street	East Driveway
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Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			80	10		7	88			8		6				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
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Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						8					15					
Capacity, c (veh/h)						1489					848					
v/c Ratio						0.01					0.02					
95% Queue Length, Q ₉₅ (veh)						0.0					0.1					
Control Delay (s/veh)						7.4					9.3					
Level of Service (LOS)						A					A					
Approach Delay (s/veh)					0.6				9.3							
Approach LOS									A							