Appendix I

Alpine Community Park Transportation Impact Study

Alpine Community Park

Transportation Impact Study

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Prepared for

ICF
525 B Street, Suite 1700
San Diego, CA 92101

Prepared by

CHEN RYAN
3900 Fifth Avenue, Suite 310
San Diego, CA 92103

ES.1 Project Setting

The Proposed Project will be located on the west side of South Grade Road, east of Tavern Road, and south of Alpine Boulevard, within the unincorporated community of Alpine, in San Diego County. The Proposed Project will construct 24 acres of regional park space including baseball fields, soccer fields, a skate park, equine staging area, corral, amphitheater, dog park, bike park, community garden, playground, shade structure, restrooms, picnic areas, RV Volunteer pad, and a parking lot.

Trip generation rates for the Proposed Project were derived from the SANDAG's (not so) Brief Guide to Vehicular Traffic Generation Rates for the San Diego Region (April 2002). Trip generation calculations are provided in Chapter 3. The Proposed Project would generate a total of 480 daily trips, including 20 trips (10-in / 10-out) during the AM peak hour and 39 trips (20-in / 19-out) during the PM peak hour.

Project access will be provided via two driveways located along South Grade Road. The first driveway will be located on the eastern side of the property as a new intersection leg of the South Grade Road and Calle de Compadres intersection and it will operate as an all-way stop-controlled intersection. The second driveway will be a new intersection located at the southern end of the property and it will operate as a side-street stop-controlled intersection. Both driveways will allow for full access.

The following two (2) roadway segments and five (5) intersections were analyzed in the study:

Roadway Segments

- South Grade Road, between Alpine Boulevard and Via Viejas
- South Grade Road, between Via Viejas and Tavern Road

After implementation of the Proposed Project, the roadway segment of South Grade Road, between Alpine Boulevard and Tavern Road will be divided as follows:

- South Grade Road, between Alpine Boulevard and Project Driveway #1 / Calle de Compadres
- South Grade Road, between Project Driveway #1 / Calle de Compadres and Via Viejas
- South Grade Road, between Via Viejas and Project Driveway #2
- South Grade Road, between Project Driveway #2 and Tavern Road

Intersections

1. East Victoria Road / South Grade Road & Alpine Boulevard (Signal)
2. South Grade Road & Project Driveway #1 / Calle De Compadres (SSSC)
3. South Grade Road & Via Viejas (SSSC)
4. Tavern Road & South Grade Road (AWSC)
5. Project Driveway #2 & South Grade Road (SSSC) [1]

[1] Project driveway does not exist under Existing conditions; therefore, it is only analyzed under "With Project" scenarios.

Freeway mainline segments were not analyzed since the Proposed Project is not anticipated to add more than 50 peak hour trips, in either direction, to a freeway mainline segment.

ES.2 Significant Impacts to Roadway Network and Mitigation Measures

The Proposed Project will not have a significant impact on any of the study roadway segments and intersections under each of the studied scenarios.

Existing Conditions

Roadway Segment Analysis

All roadway segments within the project study area currently operate at acceptable LOS B under Existing Conditions.

All roadway segments are also projected to operate at LOS C or better with the addition of Proposed Project traffic.

Based on the County of San Diego significance criteria outlined in Section 2.5 of this report, since the traffic associated with the Proposed Project would not cause a Circulation Element Road to operate at LOS E or F, the Proposed Project would not be associated with a significant impact to these roadway segments.

Intersection Analysis

All intersections within the project study area currently operate at acceptable LOS B during both the AM and PM peak hours.

All intersections are also projected to operate at LOS B or better during both the AM and PM peak hours with the addition of Proposed Project traffic.

Based on the County of San Diego significance criteria outlined in Section 2.5 of this report, the traffic associated with the Proposed Project would not add more than five peak hour trips to the critical movement of an unsignalized intersection and/or add more than one second of delay to a signalized intersection operating at a substandard level under Near-Term Year 2023 Base with Project conditions. Therefore, no significant project related impacts were identified, and no mitigation is required.

Near-Term Year 2023 Base Conditions

Roadway Segment Analysis

All roadway segments within the project study area would operate at acceptable LOS C or better under Near-Term Year 2023 Base Conditions.

All roadway segments are also projected to operate at LOS C or better with the addition of Proposed Project traffic.

Based on the County of San Diego significance criteria outlined in Section 2.5 of this report, since the traffic associated with the Proposed Project would not cause a Circulation Element Road to operate at LOS E or F, the Proposed Project would not be associated with a significant impact to these roadway segments.

Intersection Analysis

All intersections within the project study area would operate at acceptable LOS B during both the AM and PM peak hours under Near-Term Year 2023 Base conditions.

All intersections are also projected to operate at LOS B or better during both the AM and PM peak hours with the addition of Proposed Project traffic.

Based on the County of San Diego significance criteria outlined in Section 2.5 of this report, the traffic associated with the Proposed Project would not add more than five peak hour trips to the critical movement of an unsignalized intersection and/or add more than one second of delay to a signalized intersection operating at a substandard level under Near-Term Year 2023 Base with Project conditions. Therefore, no significant project related impacts were identified, and no mitigation is required.

ES.3 Site Access

The Proposed Project will be located north of South Grade Road, east of Tavern Road, and south of Alpine Boulevard, within the unincorporated community of Alpine, in San Diego County. Project access will be provided via the following two (2) driveways:

- South Grade Road & Project Driveway #1 / Calle de Compadres – This driveway would be a new leg of the South Grade Road / Calle Compadres intersection (opposing Calle de Compadres). It is located at the northern end of the property and would allow for full access. This would be an unsignalized all-way stop-controlled intersection. This driveway would include one inbound lane and one outbound lane.

  It is important to note that under Existing conditions this intersection is a three-legged T-intersection functioning as side-street stop-controlled with South Grade Road being uncontrolled and Calle De Compadres being stop-controlled. Thus, all-way stop-controlled intersection guidelines and options were considered to determine if the peak hour volumes at the intersection justified the installation of stop signs at the intersection for all directions of traffic. According to Caltrans California Manual on Uniform Traffic Control Devices (MUTCD) (2014), the intersection does not meet the minimum peak hour volumes for an all-way stop-controlled intersection. However, due to a number of pedestrian collisions occurring in the vicinity of this intersection, and since the project driveway at this intersection is considered an important and integral safety design feature of the Proposed Project, it is suggested that this intersection to be converted to an all-way stop-controlled intersection with implementation of the Alpine Community Park. All-way stop-controls would provide for an enhanced pedestrian safety route from the residential neighborhood on the east side of South Grade Road to the park as well as reduce the potential severity conflict between pedestrians and motorists.

- Project Driveway #2 & South Grade Road – This driveway would be a new intersection located on the southern end of the property and would allow for full-access. This is an unsignalized, side street stop-controlled intersection, with South Grade Road as uncontrolled and Project Driveway #2 being stop-controlled. This driveway would include one inbound lane and one outbound lane.

All project driveways are projected to operate at LOS A during both the AM and PM peak hours with the addition of Proposed Project traffic.

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1.0 Introduction

The purpose of this Transportation Impact Study (TIS) is to identify and document potential transportation related impacts associated with the Alpine Community Park Project (Proposed Project), as well as to recommend mitigation measures, as necessary, for any identified impacts to roadway segments, intersections, and freeway on-ramps associated with the Proposed Project.

1.1 Project Background

The Proposed Project will be located on the west side of South Grade Road, east of Tavern Road, and south of Alpine Boulevard, within the unincorporated community of Alpine, in San Diego County. The Proposed Project will construct 24 acres of regional park uses including baseball fields, soccer fields, a skate park, equine staging area, corral, amphitheater, dog park, bike park, community garden, playground, shade structure, restrooms, picnic areas, RV Volunteer pad, and a parking lot. **Table 1.1** provides more detailed information about the proposed amenities. **Figure 1.1** displays the Proposed Project regional location.

Proposed Project access will be provided via two driveways located along South Grade Road. The first driveway will be located on the eastern side of the property as a new leg of the South Grade Road and Calle de Compadres intersection and will operate as an all-way stop-controlled intersection. The second driveway will be a new intersection located at the southern end of the property and it will operate as a new side-street stop-controlled intersection. Both driveways will allow for full access.

Table 1.1 Project Amenities

Amenity	Count	Size
Baseball Field	1	90,000 sf
Basketball Courts	2	5,000 sf
Bike Skills Park	1	20,000 sf
Community Garden	1	5,000 sf
Concession Building	1	1,500 sf
Equestrian Staging Area	1	20,000 sf
Dog Park	1	2.5 acres
Multi-use trails	TBD	TBD
Open Lawn Area	TBD	TBD
Parking Lot	1	215,000 sf
Playground	2	(1) Playground 2-5 = 13,000 sf (1) Playground 5-12 = 21,000 sf
Ranger Office/Restroom	1	2,000 sf
Restroom	2	1,000 sf
RV Host Site	1	1,200 sf
Shaded Picnic Area	TBD	1,000 sf
Skate Park	1	20,000 sf
Soccer/Multi-use Field	4	(2) U12 - 49,500 sf (165x300) (2) U8 - 21,600 sf (120x180)
Softball Field	2	45,000 sf
Tennis Court	2	7,200 sf

1.2 Report Organization

Following this introduction chapter, this report is organized into the following sections:

2.0 Analysis Methodology – This chapter describes the methodologies and standards utilized to analyze the intersection traffic conditions.

3.0 Project Description – This chapter describes the Proposed Project including project trip generation, trip distribution, trip assignment, and study area.

4.0 Existing Conditions – This chapter describes the existing traffic network within the study area and provides analysis results for existing traffic conditions and existing traffic conditions with the addition of the Proposed Project. Mitigation measures, if necessary, for project related impacts are also identified.

5.0 Near-Term Traffic Conditions – This chapter describes near-term developments anticipated to generate additional study area trips by year 2023, the Proposed Project's opening year. Analysis results are provided for the No-Project (Year 2023 Base) and Year 2023 Base with Project conditions, along with recommended mitigation measures, if necessary.

6.0 Site Access, On-Site Circulation, Parking, and Queuing – This chapter addresses access and internal circulation within the project site, parking provided, and driveway queuing.

7.0 Pedestrian, Bicycle, and Transit Assessment – This chapter discusses the Proposed Project site's alternative transportation modes (walking, bicycling, and transit).



Alpine Community Park
Transportation Impact Study
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Figure 1.1
Proposed Project Regional Location

2.0 Analysis Methodology

This TIS was performed in accordance with the requirements of the County of San Diego Traffic Study Guidelines and in conformance with the enhanced California Environmental Quality Act (CEQA) project review process. Detailed information on roadway and intersection analysis methodologies, standards, and thresholds are discussed in the following sections.

2.1 Level of Service Definition

Level of Service (LOS) is a quantitative measure describing operational conditions within a traffic stream, and the motorist's and/or passengers' perception of operations. A LOS definition generally describes these conditions in terms of such factors as delay, speed, travel time, freedom to maneuver, interruptions in traffic flow, queuing, comfort, and convenience. **Table 2.1** describes generalized definitions of the various LOS categories (A through F) as applied to roadway operations.

Table 2.1 Level of Service Definitions

LOS Category	Definition of Operation
A	This LOS represents a completely free-flow condition, where the operation of vehicles is virtually unaffected by the presence of other vehicles and only constrained by the geometric features of the highway and by driver preferences.
B	This LOS represents a relatively free-flow condition, although the presence of other vehicles becomes noticeable. Average travel speeds are the same as in LOS A, but drivers have slightly less freedom to maneuver.
C	At this LOS the influence of traffic density on operations becomes marked. The ability to maneuver within the traffic stream is clearly affected by other vehicles.
D	At this LOS, the ability to maneuver is notably restricted due to traffic congestion, and only minor disruptions can be absorbed without extensive queues forming and the service deteriorating.
E	This LOS represents operations at or near capacity. LOS E is an unstable level, with vehicles operating with minimum spacing for maintaining uniform flow. At LOS E, disruptions cannot be dissipated readily thus causing deterioration down to LOS F.
F	At this LOS, forced or breakdown of traffic flow occurs, although operations appear to be at capacity, queues form behind these breakdowns. Operations within queues are highly unstable, with vehicles experiencing brief periods of movement followed by stoppages.

Source: Highway Capacity Manual 6th Edition

2.2 Roadway Segment Level of Service Standards and Thresholds

Roadway segment LOS standards and thresholds provide the basis for analysis of arterial roadway segment performance. The analysis of roadway segment LOS is based on the functional classification of the roadway, the maximum capacity, roadway geometrics, and existing or forecast Average Daily Traffic (ADT) volumes. **Table 2.2** presents the roadway segment capacity and LOS standards utilized to analyze roadways evaluated in this report. The actual capacity of a roadway facility varies according to its physical attributes. LOS D is considered acceptable within the County of San Diego. Typically, the performance and level of service of a roadway segment is heavily influenced by the ability of the arterial intersections to accommodate peak hour volumes.

Table 2.2 County of San Diego – Roadway Classifications and LOS Standards

No.	Travel Lanes	Design Speed	Road Classification	Level of Service (in ADT)		
				LOS C	LOS D	LOS E
6.1	6	65 mph	Expressway	70,000	**86,000**	108,000
6.2			Prime Arterial	44,600	**50,000**	57,000
4.1A	4	55 mph	Major Road with Raised Median	29,600	**33,400**	37,000
4.1B			Major Road with Intermittent Turn Lanes	27,400	**30,800**	34,200
4.2A		40 mph	Boulevard with Raised Median	24,000	**27,000**	30,000
4.2B			Boulevard with Intermittent Turn Lane	22,500	**25,000**	28,000
2.1A	2	45 mph	Community Collector with Raised Median	13,400	**15,000**	19,000
2.1B			Community Collector w/ Continuous Turn Lane	9,500	**13,500**	19,000
2.1C			Community Collector w/ Intermittent Turn Lane	9,500	**13,500**	19,000
2.1D			Community Collector with Improvement Options	9,500	**13500**	19,000
2.1E			Community Collector	7,100	**10,900**	16,200
2.2A	2	40 mph	Light Collector with Raised Median	9,500	**13,500**	19,000
2.2B			Light Collector with Continuous Turn Lane	9,500	**13,500**	19,000
2.2C			Light Collector with Intermittent Turn Lanes	9,500	**13,500**	19,000
2.2D			Light Collector with Improvement Options	9,500	**13,500**	19,000
2.2E			Light Collector	7,100	**10,900**	16,200
2.2F			Light Collector with Reduced Shoulder	7,800	**8,700**	9,700
2.3A	2	35 mph	Minor Collector with Raised Median	7,000	**8,000**	9,000
2.3B			Minor Collector with Intermittent Turn Lane	7,000	**8,000**	9,000
2.3C			Minor Collector	6,000	**7,000**	8,000

Source: County of San Diego, August 2011

Notes:
Bold numbers indicate the ADT thresholds for acceptable LOS.

These standards are generally used as long-range planning guidelines to determine the functional classification of roadways. The actual capacity of a roadway varies according to its physical attributes. Typically, the performance and LOS of a roadway segment is heavily influenced by the ability of its intersections to accommodate peak hour traffic volumes. For the purposes of this traffic analysis, LOS D is considered acceptable for circulation element roadway segments.

2.3 Peak Hour Intersection Level of Service Standards and Thresholds

This section presents the methodologies used to perform peak hour intersection capacity analysis for signalized intersections and unsignalized intersections. The following assumptions were utilized in conducting all intersection level of service analysis:

- Peak Hour Factor: Based on existing peak hour counts and applied to existing and near-term conditions.
- Signal Timing: Based on existing signal timing plans (as of April 2020), provided in **Appendix A**.

2.3.1 Signalized Intersection Analysis

The analysis of signalized intersections utilized the operational analysis procedure as outlined in the Highway Capacity Manual (HCM) 6th Edition signalized intersection analysis methodology. This method defines LOS in terms of delay, or more specifically, average stopped delay per vehicle. Delay is a measure

of driver and/or passenger discomfort, frustration, fuel consumption and lost travel time. This technique uses 1,900 vehicles per hour per lane (VPHPL) as the maximum saturation volume of an intersection. This saturation volume is adjusted to account for lane width, on-street parking, pedestrians, traffic composition (i.e., percentage trucks) and shared lane movements (i.e. through and right-turn movements originating from the same lane). The LOS criteria used for the analysis of signalized intersections are described in **Table 2.3**, identifying the thresholds of control delays and the associated LOS. The computerized analysis of intersection operations was performed utilizing the Synchro Version 10 traffic analysis software by Trafficware Ltd.

Table 2.3 Signalized Intersection LOS Operational Analysis

Average Stopped Delay Per Vehicle	Level of Service (LOS) Characteristics
≤10	LOS A describes operations with very low delay. This occurs when progression is extremely favorable, and most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
>10 – 20	LOS B describes operations with generally good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
>20 – 35	LOS C describes operations with higher delays, which may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
>35 – 55	LOS D describes operations with high delay, resulting from some combination of unfavorable progression, long cycle lengths, or high volumes. The influence of congestion becomes more noticeable, and individual cycle failures are noticeable.
>55 – 80	LOS E is considered the limit of acceptable delay. Individual cycle failures are frequent occurrences.
>80	LOS F describes a condition of excessively high delay, considered unacceptable to most drivers. This condition often occurs when arrival flow rates exceed the LOS D capacity of the intersection. Poor progression and long cycle lengths may also be major contributing causes to such delay.

Source: Highway Capacity Manual 6th Edition

2.3.2 Unsignalized Intersection Analysis

Unsignalized intersections, including side street and all way stop controlled intersections, were analyzed using the Highway Capacity Manual 6th Edition unsignalized intersection analysis methodology. The Synchro Version 10 traffic analysis software supports this methodology and was utilized to produce LOS results. The LOS for a side street stop controlled (SSSC) intersection is determined by the computed control delay and is defined for each minor movement. **Table 2.4** summarizes the LOS criteria for unsignalized intersections.

Table 2.4 LOS Criteria for Stop-Controlled Unsignalized Intersections

Average Stopped Delay Per Vehicle (sec/veh)	LOS
<10	A
>10 to <15	B
>15 to <25	C
>25 to <35	D
>35 to <50	E
>50	F

Source: Highway Capacity Manual 6th Edition

2.4 Determination of Study Area

County Guidelines require that the project study area includes all County Mobility Element roadways and intersections where the Proposed Project is projected to add 200 or more ADT and/or 25 or more peak hour trips.

2.5 Determination of Significant Impacts

This section outlines the thresholds for determination of significant project-related impacts on study area facilities.

2.5.1 Roadway Segments

Traffic volume increases from public or private projects that result in one or more of the following criteria will have a significant traffic volume of Level of Service traffic impact on a roadway segment, unless specific facts show that there are other circumstances that mitigate or avoid such impacts:

- The additional or redistributed ADT generated by the Proposed Project will significantly increase congestion on a Circulation Element Road or State Highway currently operating at LOS E or LOS F as identified in **Table 2.5**, or will cause a Circulation Element Road or State Highway to operate at LOS E or LOS F as a result of the Proposed Project, or

- The additional or redistributed ADT generated by the Proposed Project will cause a residential street to exceed its design capacity.

Table 2.5 Measures of Significant Project Impacts to Congestion on Roadway Segments – Allowable Increases on Congested Roadway Segments

Level of Service	Two-Lane Road	Four-Lane Road	Six-Lane Road
LOS E	200 ADT	400 ADT	600 ADT
LOS F	100 ADT	200 ADT	300 ADT

Source: County of San Diego, August 2011

Notes:

1. By adding Proposed Project trips to all other trips from a list of projects, this same table must be used to determine if total cumulative impacts are significant. If cumulative impacts are found to be significant, each project is responsible for mitigating its share of the cumulative impact.
2. The County may also determine impacts have occurred on roads even when a project's traffic or cumulative impacts do not trigger an unacceptable Level of Service, when such traffic uses a significant amount of remaining road capacity.

2.5.2 Signalized Intersections

Table 2.6 displays the measures of significant project impacts to congestion at signalized intersections.

Table 2.6 Measures of Significant Project Impacts to Congestion at Intersections – Allowable Increases at Congested Intersections

Level of Service	Signalized	Unsignalized
LOS E	Delay of 2 seconds	20 peak hour trips on a critical movement
LOS F	Delay of 1 second, or 5 peak hour trips on a critical movement	5 peak hour trips on a critical movement

Source: County of San Diego, August 2011

Notes:

1. A critical movement is an intersection movement (right turn, left turn, and through-movement) that experiences excessive queues, which typically operate at LOS F. Additionally, if a project adds significant volume to a minor roadway approach, a gap study should be provided that details the headways between vehicles on the major roadway.
2. By adding Proposed Project trips to all other trips from a list of projects, these same tables are used to determine if total cumulative impacts are significant. If cumulative impacts are found to be significant, each project is responsible for mitigating its share of the cumulative impact.
3. The County may also determine impacts have occurred on roads even when a project's direct or cumulative impacts do not trigger an unacceptable level of service, when such traffic uses a significant amount of remaining road capacity.
4. For determining significance at signalized intersections with LOS F conditions, the analysis must evaluate both the delay and the number of trips on a critical movement, exceedance of either criteria result in a significant impact.

2.5.3 Unsignalized Intersections

Traffic volume increases from public or private projects that result in one or more of the following criteria will have a significant traffic volume or Level of Service traffic impact on a roadway segment:

- The additional or redistributed ADT generated by the Proposed Project will add 20 or more peak hour trips to a critical movement of an unsignalized intersection, and cause the unsignalized intersection to operate below LOS D, or
- The additional or redistributed ADT generated by the Proposed Project will add 20 or more peak hour trips to a critical movement of an unsignalized intersection currently operating at LOS E, or
- The additional or redistributed ADT generated by the Proposed Project will add 5 or more peak hour trips to a critical movement of an unsignalized intersection, and cause the unsignalized intersection to operate at LOS F.
- The additional or redistributed ADT generated by the Proposed Project will add 5 or more peak hour trips to a critical movement of an unsignalized intersection currently operating at LOS F.
- Based upon an evaluation of existing accident rates, the signal priority list, intersection geometrics, proximity of adjacent driveways, sight distance or other factors, the project would significantly impact the operations of the intersection.

3.0 Project Traffic

This section describes the Proposed Project including the project's trip generation, trip distribution, and trip assignment.

3.1 Project Description

The Proposed Project will be located on the west side of South Grade Road, east of Tavern Road, and south of Alpine Boulevard, within the unincorporated community of Alpine, in San Diego County. The Proposed Project will construct 24 acres of regional park use including baseball fields, soccer fields, a skate park, equine staging area, corral, amphitheater, dog park, bike park, community garden, playground, shade structure, restrooms, picnic areas, RV Volunteer pad, and a parking lot. **Figure 3.1** illustrates the Proposed Project site plan.

3.2 Project Trip Generation, Distribution, and Assignment

3.2.1 Project Trip Generation

Trip generation rates for the Proposed Project were derived from the SANDAG's (not so) Brief Guide to Vehicular Traffic Generation Rates for the San Diego Region (April 2002). The project site is currently inactive open space; therefore, no existing trips were credited towards the project's net vehicle trip generation.

Table 3.1 displays the projected daily, as well as AM and PM peak hour, project trip generation.

Table 3.1 Project Trip Generation

Land Use	Units	Trip Rate	ADT	AM Peak Hour					PM Peak Hour				
				%	Trips	Split	In	Out	%	Trips	Split	In	Out
Regional Park (developed)	24 acres	20 / acre	480	4%	20	5:5	10	10	8%	39	5:5	20	19

Source: SANDAG (not so) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region, April 2002

As shown in Table 3.1, the Proposed Project would generate a total of 480 daily trips, including 20 trips (10-in / 10-out) during the AM peak hour and 39 trips (20-in / 19-out) during the PM peak hour.

3.2.2 Project Trip Distribution

In accordance to County of San Diego guidelines, since the Proposed Project is estimated to generate 480 daily trips, the project trip distribution was manually developed based upon project land uses, location, proximity to freeway access points, and corresponding land uses in the vicinity of the project site. **Figure 3.2** displays the trip distribution patterns associated with the Proposed Project.

3.2.3 Project Trip Assignment

Based upon the project trip generation and distribution, AM/PM peak hour project trips were assigned to the adjacent roadway network, as displayed in **Figure 3.3**.



SITE ELEMENT KEY

1. MULTI-USE TRAIL
2. ADMIN/RESTROOM
3. RESTROOM
4. SHADE PAVILION
5. SHADE SHELTER
6. SHADE SAIL
7. LEACH FIELD
8. SKATE PARK GATEWAY
9. COMMUNITY GARDEN
10. GARDEN STORAGE
11. NATURE PLAY AREA
12. 2-5 PLAY AREA
13. VOLUNTEER PAD
14. PICKLEBALL COURTS
15. BASKETBALL COURT
16. GAME TABLE PLAZA
17. PICNIC AREA
18. CORRAL
19. EQUESTRIAN STAGING
20. DROP-OFF/PICK-UP
21. BIKE PARK
22. SKATE PARK
23. BASEBALL FIELD
24. SOCCER FIELD OUTLINE
25. SECONDARY PARK ENTRANCE
26. PRIMARY PARK ENTRANCE
27. PARKING
28. DOG PARK
29. EXISTING TRAIL
30. EXISTING TREE/SHRUB
31. BERMED LANDSCAPE SCREEN
32. PARK MONUMENT SIGN
33. OPEN LAWN AREA
34. FITNESS STATIONS
35. ENGINEERED WOOD FIBER
36. TRASH ENCLOSURE
37. RETENTION BASIN
38. EXISTING LANDSCAPE/TERRAIN

PARKING SUMMARY

229	STANDARD SPACES
10	ADA SPACES
2	VOLUNTEER PAD SPACE
5	EQUESTRIAN STAGING SPACES
246	TOTAL SPACES

DPR DIRECTOR SIGNATURE/APPROVAL DATE

NORTH

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Figure 3.1
Proposed Project Site Plan

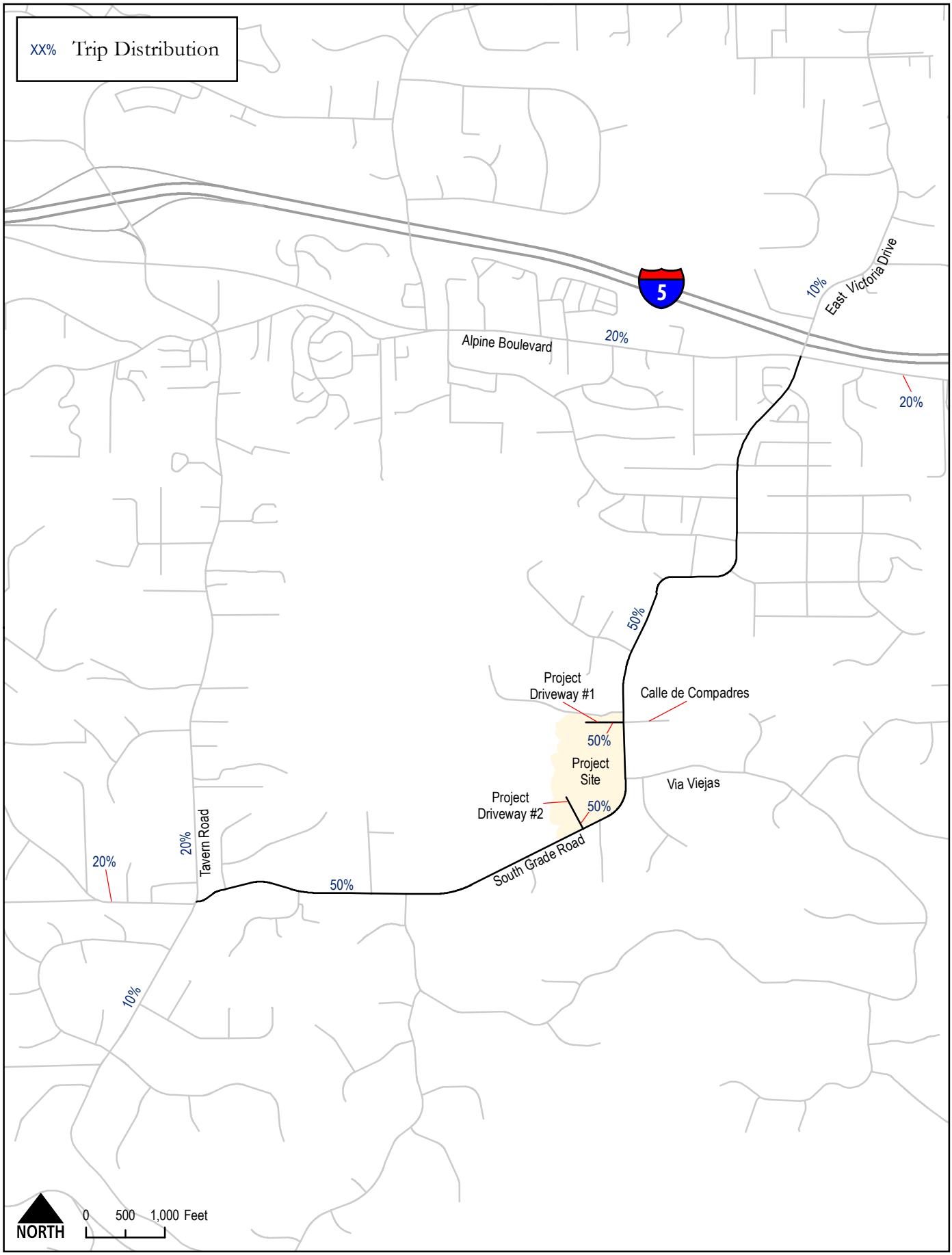

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Figure 3.2
Project Trip Distribution

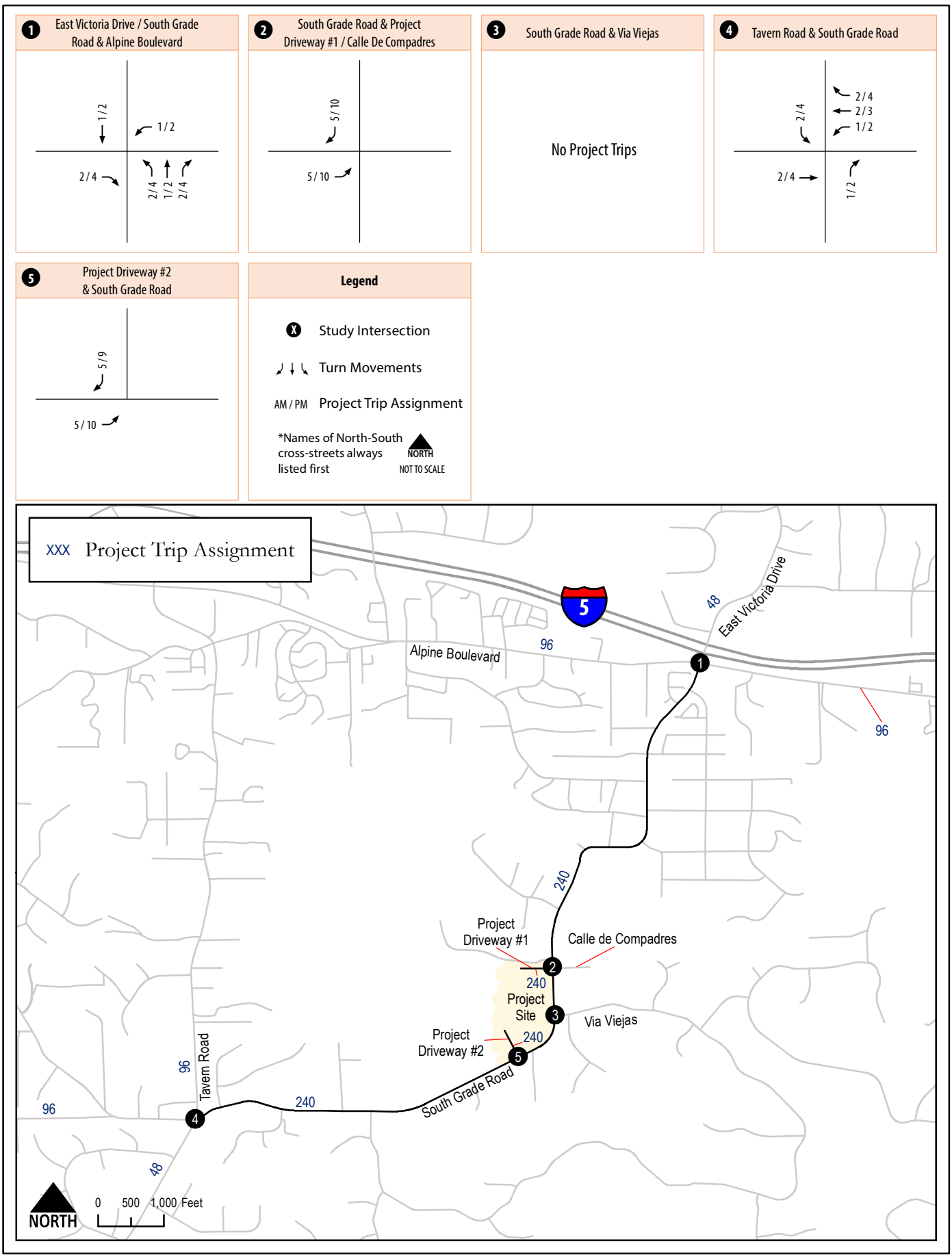

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Figure 3.3
Project Trip Assignment

3.3 Project Study Area

Based on the criteria previously outlines in Section 2.5 and the project trips assignment shown in Figure 3.3, the following two (2) roadway segments and five (5) intersections were analyzed in the study:

Roadway Segments

- South Grade Road, between Alpine Boulevard and Via Viejas
- South Grade Road, between Via Viejas and Tavern Road

After implementation of the proposed project, the roadway segment of South Grade Road, between Alpine Boulevard and Tavern Road will be divided as follows:

- South Grade Road, between Alpine Boulevard and Project Driveway #1 / Calle de Compadres
- South Grade Road, between Project Driveway #1 / Calle de Compadres and Via Viejas
- South Grade Road, between Via Viejas and Project Driveway #2
- South Grade Road, between Project Driveway #2 and Tavern Road

Intersections

1. East Victoria Road / South Grade Road & Alpine Boulevard (Signal)
2. South Grade Road & Project Driveway #1 / Calle De Compadres (SSSC)
3. South Grade Road & Via Viejas (SSSC)
4. Tavern Road & South Grade Road (AWSC)
5. Project Driveway #2 & South Grade Road (SSSC) [1]

[1] Project driveway does not exist under Existing conditions; therefore, it is only analyzed under "With Project" scenarios.

Additionally, the Proposed Project would not contribute 50 or more peak hour trips in either direction on Interstate 8 (I-8). Similarly, the Proposed Project would not add 20 or more peak hour trips to I-8 on/off ramps. Therefore, freeway and ramp impact analyses were not conducted. **Figure 3.4** illustrates the project study area.

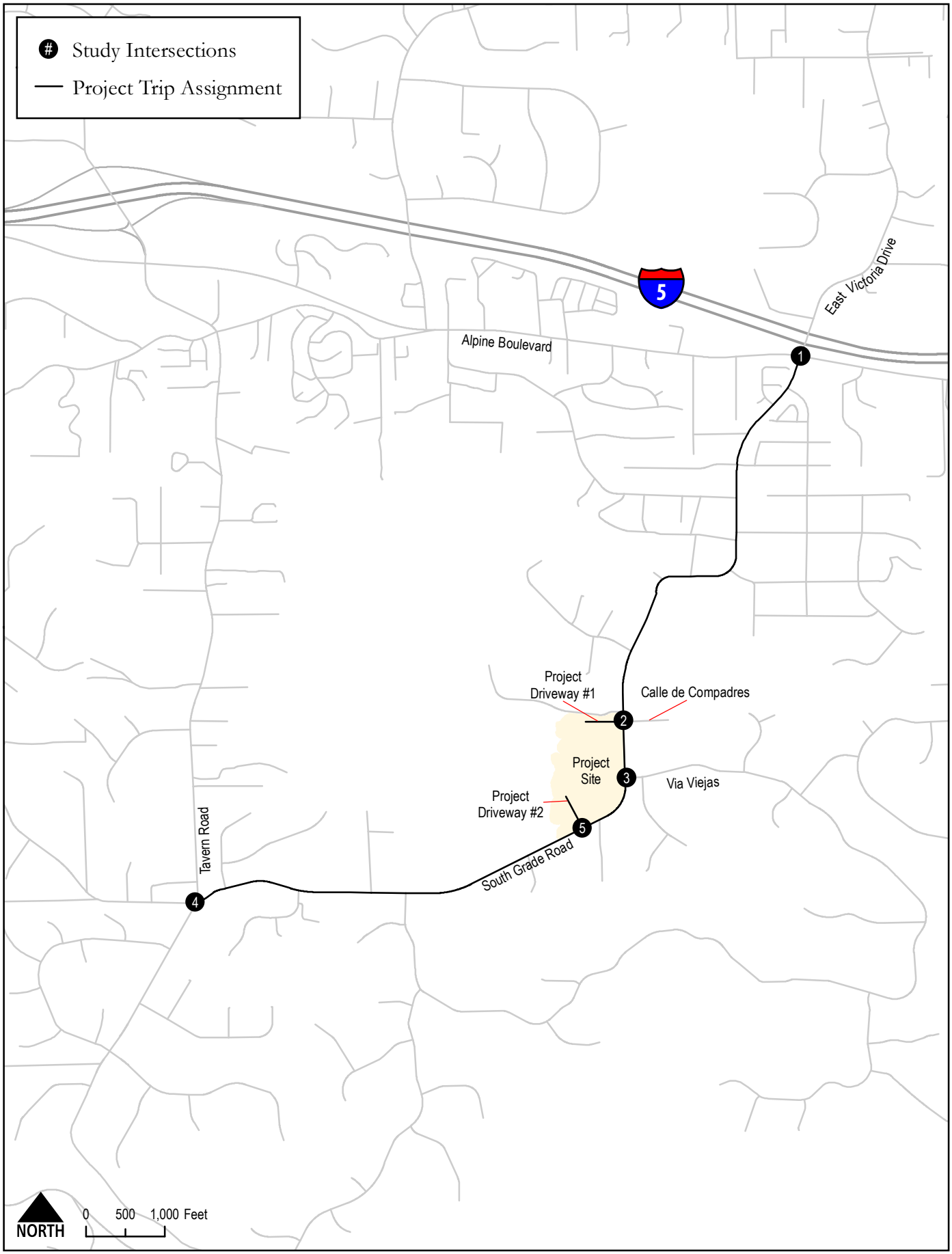

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Figure 3.4
Project Study Area

4.0 Existing Conditions

This section describes key study roadway segments, key study intersections, and daily roadway and peak hour intersection traffic volume information. Additionally, this section provides an analysis of Existing conditions both with and without the addition of project traffic. The scenarios analyzed in this section include:

- Existing
- Existing with Project

4.1 Existing Roadway Network

The following regional and locally significant roadway traverses the study area. The roadway characteristics are described below.

South Grade Road – Within the project study area, South Grade Road is a two-lane undivided roadway between Alpine Boulevard and Tavern Road with a posted speed limit of 40 miles per hour. Sidewalk facilities are intermittently present along both sides of the roadway. Additionally, there are no bicycle facilities along the roadway and parking is prohibited along both sides of the roadway. According to the County of San Diego General Plan Update, South Grade Road is classified as a Two-Lane Light Collector Roadway.

Table 4.1 provides a summary of the roadway characteristics for roadway that traverse the study area.

Table 4.1 Existing Roadway Characteristics

Roadway	From	To	Number of Lanes	Median Type	Sidewalk?	Bike lanes?	Transit Route	Posted Speed Limit
South Grade Road	Alpine Boulevard	Tavern Road	1 NB / 1 SB	None	Mostly Non-contiguous	None	None	40

As documented in Section 3.3, four intersections are included as part of the study area. **Figure 4.1** displays the existing functional classifications and intersection geometrics for the study area roadways and intersections.

4.2 Existing Roadway and Intersection Volumes

Traffic counts for roadway segments and intersections were conducted in March 2020 (prior to the shelter-in-place order associated with COVID-19) and June 2020 (during the shelter-in-place order) by Elite Traffic Dynamics, LLC. Traffic counts conducted in June reflected a decrease of at least 10% when compared to counts from March. Therefore, counts from June were adjusted to reflect normal conditions. Roadway segment counts from March were compared to those from June, and the average percent difference between both traffic counts was utilized to adjust counts from June.

Figure 4.2 shows both existing daily traffic volumes for study area roadway segments and the AM/PM peak hour turning movements for the study intersections. Traffic counts, including the adjusted traffic counts, are provided in **Appendix B**.

4.3 Existing Traffic Conditions

LOS analyses under Existing conditions were conducted using the methodologies described in Chapter 2.0. Roadway segment and intersection LOS analysis results are discussed below.

4.3.1 Roadway Segment Analysis

Table 4.2 displays roadway segment LOS and analysis results for key study roadway segments under Existing conditions.

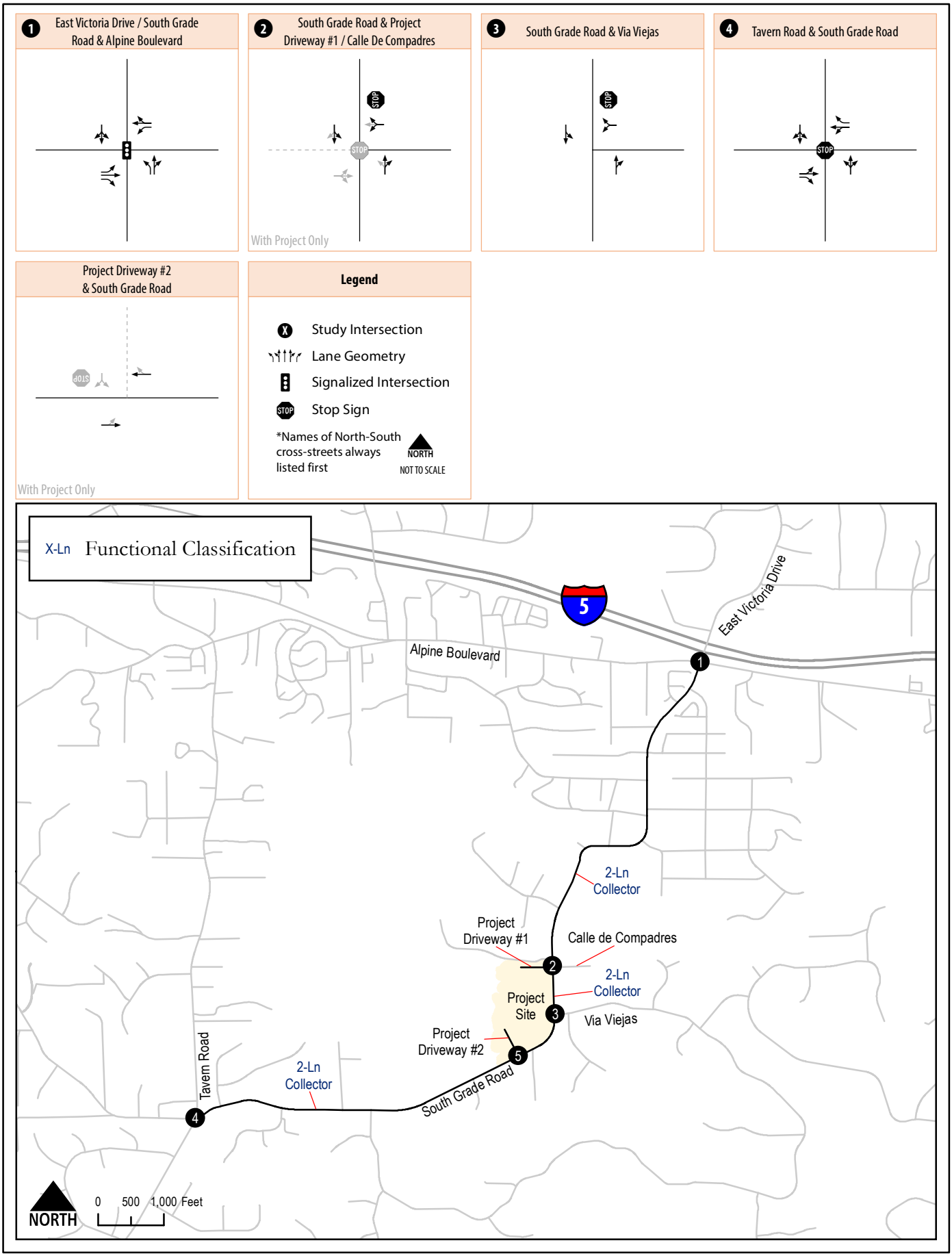

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Figure 4.1
Roadway and Intersection Geometrics

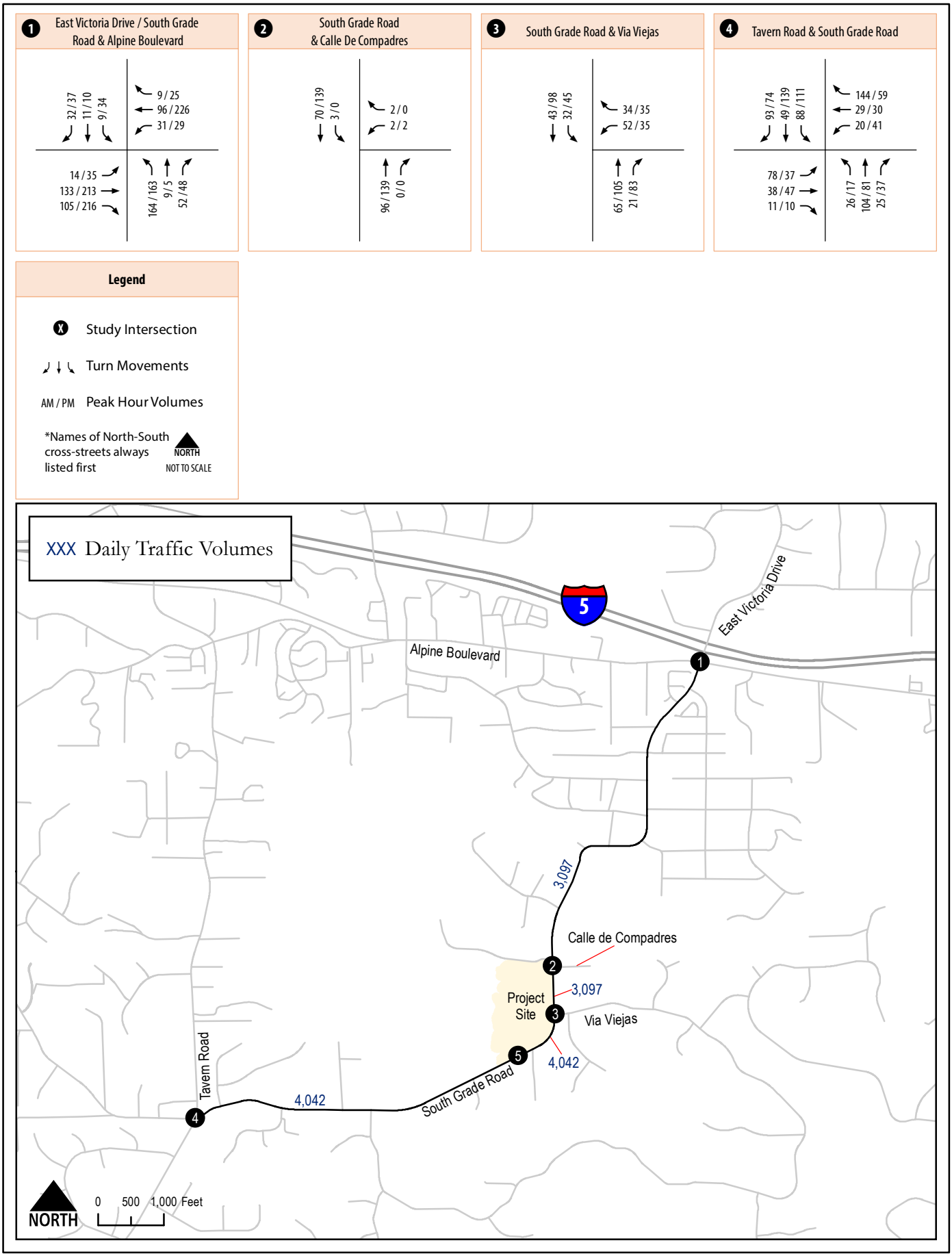

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Figure 4.2
Traffic Volumes
Existing Conditions

Table 4.2 Roadway Segment Level of Service Results – Existing Conditions

Roadway	Segment	Functional Classification	Daily Volume	LOS Threshold (LOS E)	V/C	LOS
South Grade Road	Alpine Boulevard to Via Viejas	2-Lane Light Collector	3,097	16,200	0.191	B
South Grade Road	Via Viejas to Tavern Road	2-Lane Light Collector	4,042	16,200	0.250	B

Notes:
V/C = Volume / Capacity

As shown in Table 4.2, all of the study roadway segments currently operate at acceptable LOS B.

4.3.2 Intersection Analysis

Table 4.3 displays intersection LOS and average vehicle delay results for the key study area intersections under Existing conditions. LOS calculation worksheets for Existing conditions are provided in **Appendix C**.

Table 4.3 Peak Hour Intersection Level of Service Results – Existing Conditions

#	Intersection	Control Type	AM Peak Hour		PM Peak Hour	
			Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS
1	East Victoria Road / South Grade Road & Alpine Boulevard	Signal	16.3	B	16.9	B
2	South Grade Road / Calle De Compadres	SSSC	9.2	A	10.3	B
3	South Grade Road / Via Viejas	SSSC	10.2	B	11.0	B
4	Tavern Road & South Grade Road	AWSC	13.4	B	10.6	B

Notes:
SSSC = Side-Street Stop-Controlled. For SSSC, the delay shown is the worst delay experienced by any of the approaches.
AWSC = All-Way Stop-Controlled. For AWSC, the delay shown is the average delay experienced by all approaches.

As shown in Table 4.3, all study area intersections currently operate at an acceptable LOS B during both the AM and PM peak hours.

4.4 Existing with Project Roadway Network and Traffic Volumes

Roadway and intersection geometrics under Existing with Project conditions were assumed to be identical to existing geometrics (displayed in Figure 4.1) with the addition of the following two project driveways:

- South Grade Road & Project Driveway #1 / Calle de Compadres – This driveway would be a new leg of the South Grade Road / Calle Compadres intersection (opposing Calle de Compadres). It is located at the northern end of the property and would allow for full access. This would be an unsignalized all-way stop-controlled intersection. This driveway would include one inbound lane and one outbound lane.

  It is important to note that under Existing conditions, this intersection is a three-legged T-intersection functioning as side-street stop-controlled with South Grade Road being uncontrolled and Calle De Compadres being stop-controlled. Thus, all-way stop-controlled intersection guidelines and options were considered to determine if the peak hour volumes at the intersection justified the installation of stop signs at the intersection for all directions of traffic. According to

Caltrans California Manual on Uniform Traffic Control Devices (MUTCD) (2014), the intersection does not meet the minimum peak hour volumes for an all-way stop-controlled intersection. However, due to a number of pedestrian collisions occurring in the vicinity of this intersection, and since the project driveway at this intersection is considered an important and integral safety design feature of the Proposed Project, it is suggested that this intersection to be converted to an all-way stop-controlled intersection with implementation of the Alpine Community Park. All-way stop-controls would provide for an enhanced pedestrian safety route from the residential neighborhood on the east side of South Grade Road to the park as well as reduce the potential severity conflict between pedestrians and motorists.

- Project Driveway #2 & South Grade Road – This driveway would be a new intersection located on the southern end of the property and would allow for full-access. This is an unsignalized, side street stop-controlled intersection, with South Grade Road as uncontrolled and Project Driveway #2 being stop-controlled. This driveway would include one inbound lane and one outbound lane.

Existing with Project traffic volumes were derived by combining the existing traffic volumes (displayed in Figure 4.2) and the project trip assignment volumes (displayed in Figure 3.3). Daily roadway and peak hour intersection volumes for this scenario are displayed in **Figure 4.3**.

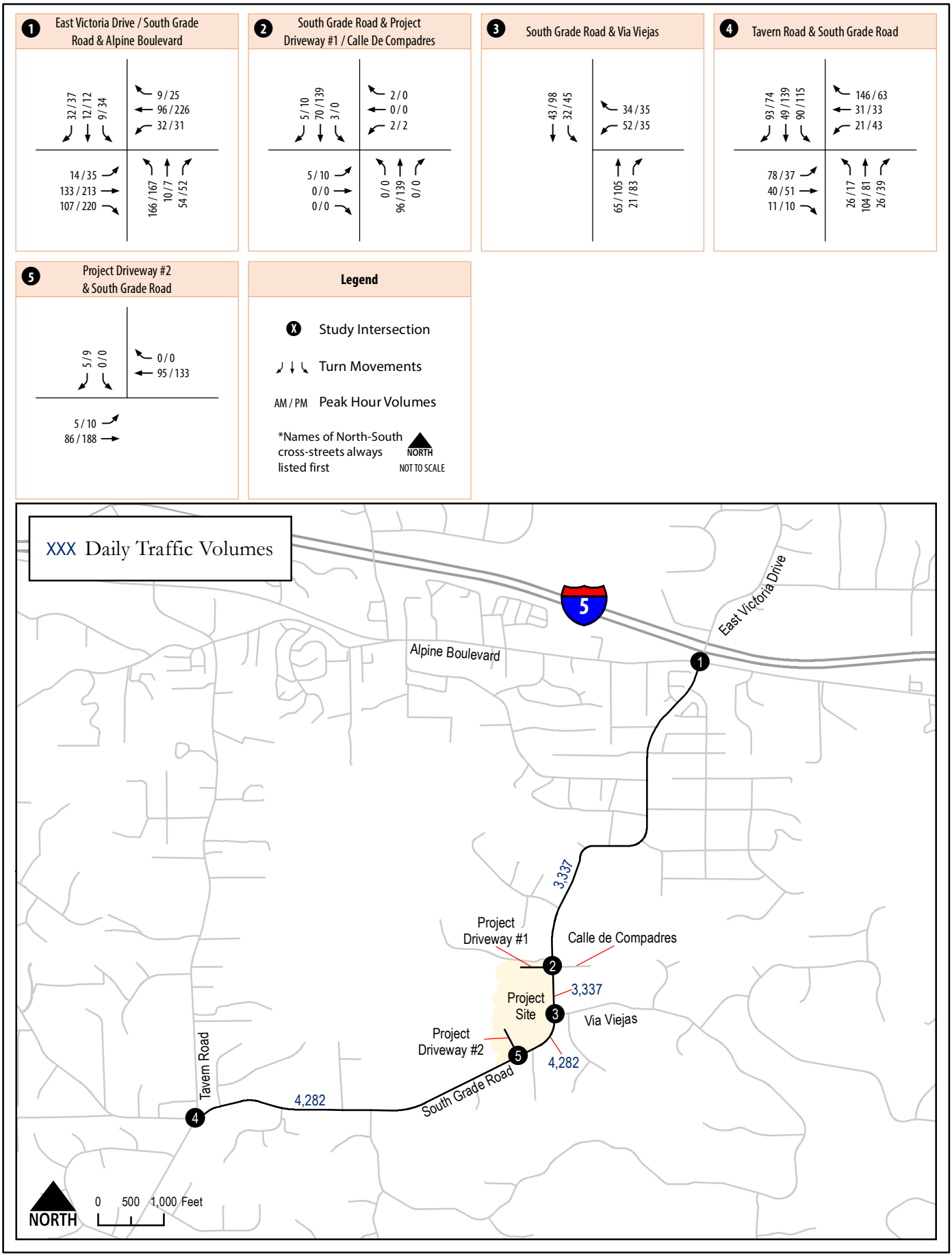

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Figure 4.3
Traffic Volumes
Existing with Project Conditions

4.5 Existing with Project Traffic Conditions

Analyses were conducted using the methodologies described in Chapter 2.0. Roadway segment and intersection LOS analysis results are discussed below.

4.5.1 Roadway Segment Analysis

Table 4.5 displays the LOS analysis results for key study area roadway segments under Existing with Project conditions.

Table 4.4 Roadway Segment Level of Service Results – Existing with Project Conditions

Roadway	Segment	Functional Classification	ADT	LOS Threshold (LOS E)	V/C	LOS	LOS w/o Project	ΔV/C	SI?
South Grade Road	Alpine Boulevard to Project Driveway #1 / Calle de Compadres	2-Lane Light Collector	3,337	16,200	0.206	B	B	0.015	N
South Grade Road	Project Driveway #1 / Calle de Compadres to Via de Viejas	2-Lane Light Collector	3,337	16,200	0.206	B	B	0.015	N
South Grade Road	Via de Viejas to Project Driveway #2	2-Lane Light Collector	4,282	16,200	0.264	C	B	0.015	N
South Grade Road	Project Driveway #2 to Tavern Road	2-Lane Light Collector	4,282	16,200	0.264	C	B	0.015	N

Notes:
V/C = Volume / Capacity
LOS = Level of Service
SI? = Significant Impact?

As shown in Table 4.5, all study area roadway segments are anticipated to operate at acceptable LOS C or better under Existing with Project conditions.

4.5.2 Intersection Analysis

Table 4.5 displays intersection LOS and average vehicle delay results under Existing with Project conditions. LOS calculation worksheets for Existing with Project conditions are provided in **Appendix D**.

Table 4.5 Peak Hour Intersection Level of Service Results – Existing with Project Conditions

#	Intersection	Control Type	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec) AM/PM	SI?
			Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS				
1	East Victoria Road / South Grade Road & Alpine Boulevard	Signal	16.4	B	17.1	B	16.3 / 16.9	B / B	0.1 / 0.2	N
2	South Grade Road & Project Driveway #1 / Calle De Compadres	AWSC	7.6	A	8.0	A	9.2 / 10.3	A / B	-1.6 / -2.3	N
3	South Grade Road / Via Viejas	SSSC	10.2	B	11.0	B	10.2 / 11.0	B / B	0.0 / 0.0	N
4	Tavern Road & South Grade Road	AWSC	13.6	B	10.8	B	13.4 / 10.6	B / B	0.2 / 0.2	N
5	Project Driveway #2 & South Grade Road	SSSC	8.8	A	9.0	A	N/A	N/A	N/A	N

Notes:
LOS = Level of Service
AWSC = All-Way Stop-Controlled. For AWSC, the delay shown is the average delay experienced by all approaches.
SSSC = Side-Street Stop-Controlled. For SSSC, the delay shown is the worst delay experienced by any of the approaches.
SI = Significant Impact?

As shown in Table 4.5, all of the study area intersections are anticipated continue to operate at acceptable LOS B or better during both the AM and PM peak hours with the addition of Proposed Project traffic.

4.6 Impact Significance and Mitigation

Based upon the significance criteria presented in Section 2.5 of this report, the addition of Proposed Project traffic would not cause a significant impact to study area roadway segments and intersections under Existing with Project conditions.

5.0 Near-Term Year Traffic Conditions

This section provides an analysis of Near-Term Base conditions both with and without the Proposed Project. The scenarios analyzed in this section include:

- Near-Term Year 2023 Base
- Near-Term Year 2023 Base with Project

5.1 Cumulative Project Traffic

The following project was identified by County of San Diego staff as a cumulative project, since it is anticipated to contribute traffic within the project study area:

- Rancho Nuevo Major Subdivision – This project is located at the eastern terminus of Via Tesoro in the Rancho Palo Verde Estates, a residential development in the Alpine community of unincorporated San Diego County. This project proposes to create 14 residential parcels on a 60.15-acre site.

The traffic generated from the project listed above was included in the Near-Term Year 2023 Base scenario. **Figure 5.1** displays the location of the cumulative project identified above.

5.2 Cumulative Projects Trip Generation

Table 5.1 displays the projected trip generation for the cumulative project described above. The trip generation assumptions were developed using trip generation rates outlined in SANDAG's (not so) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region (April, 2002). Trip distribution patterns and trip assignments were manually derived based on the geographical location of the cumulative project, the characteristics of the proposed land uses, and the nearest freeway facilities. Relevant excerpts from the source of information regarding the cumulative project are provided in **Appendix E**.

Table 5.1 Cumulative Project Trip Generation

Cumulative Project	Land Use	Daily Trips	AM Peak Hour (In / Out)	PM Peak Hour (In / Out)
Rancho Nuevo Major Subdivision	Estate	168	14 (4-in / 10-out)	17 (12-in / 5-out)

Source: SANDAG (not so) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region, April 2002

As shown, the cumulative project is anticipated to generate 168 daily trips, including 14 trips during the AM peak hour and 17 trips during the PM peak hour that will be dispersed throughout the Alpine community and beyond the Proposed Project's study area.

Figure 5.1 displays the location of the cumulative project and **Figure 5.2** displays the cumulative project trip assignment.

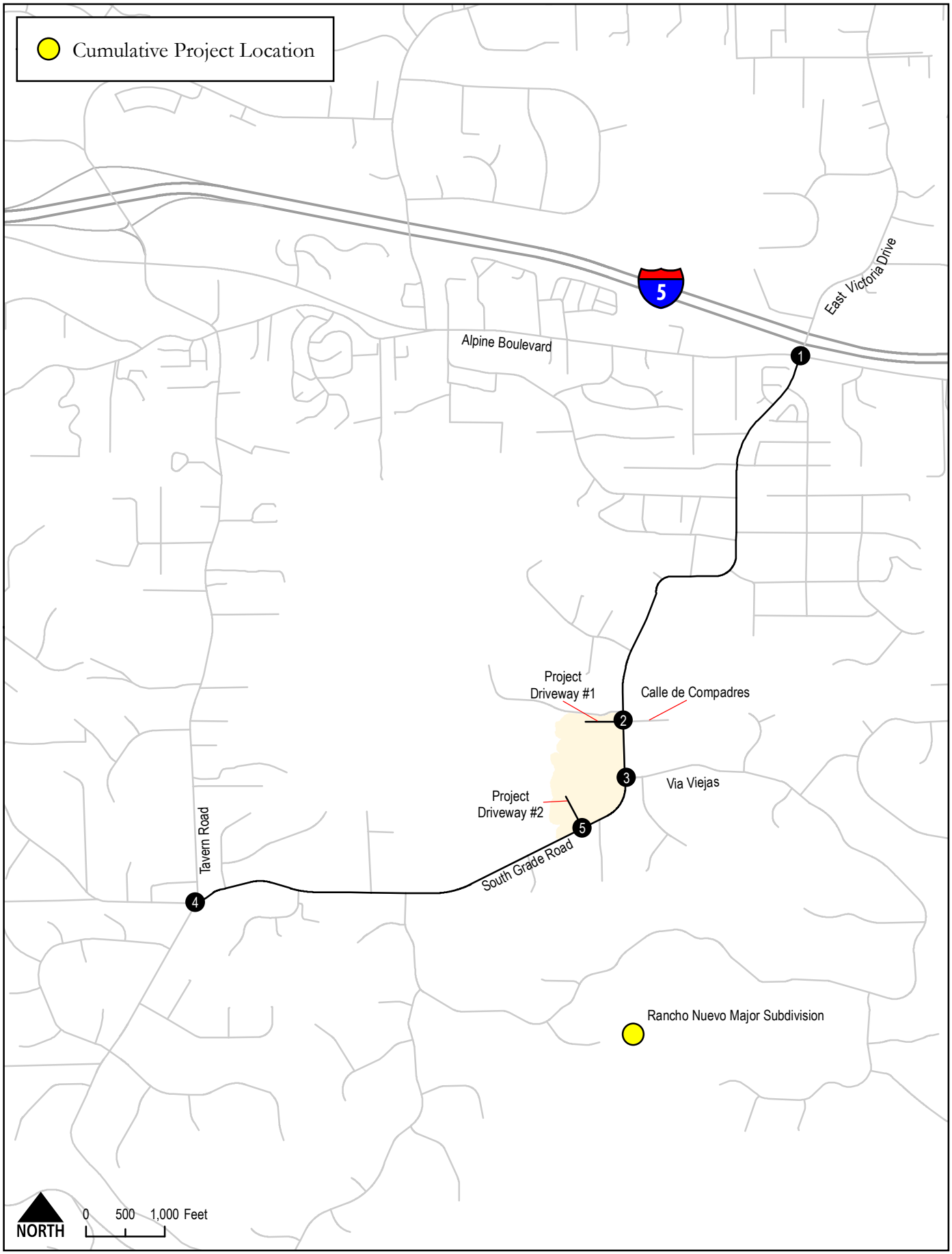

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Figure 5.1
Cumulative Project Location

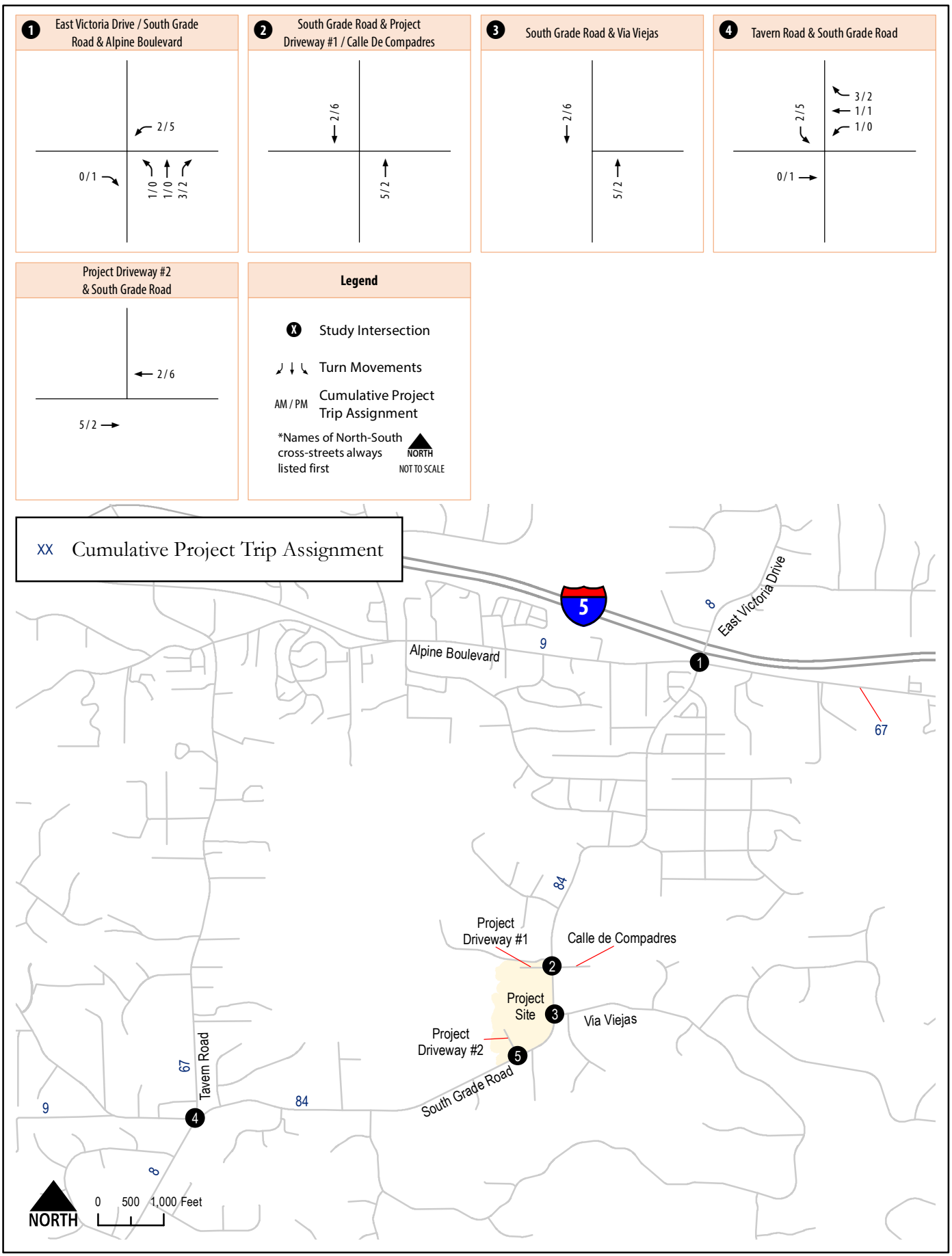

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Figure 5.2
Cumulative Project Trip Assignment

5.3 Near-Term Year 2023 Base Roadway Network and Traffic Volumes

Roadway and intersection geometrics under Near-Term Base conditions were assumed to be identical to the existing roadway geometrics, as shown in Figure 4.1.

The Near-Term Base scenario traffic volumes were derived by adding the additional trips generated by the cumulative projects listed in Section 5.1 (Figure 5.2) to the existing traffic volumes (Figure 4.2). **Figure 5.3** displays the average daily roadway and peak hour intersection volumes for the study roadway segments and intersections under the Near-Term Base conditions.

5.4 Near-Term Year 2023 Base Traffic Conditions

LOS analyses for Near-Term Base conditions were conducted using the methodologies described in Chapter 2.0. Roadway segment and intersection LOS analysis results are discussed separately below.

5.4.1 Roadway Segment Analysis

Table 5.2 displays the LOS analysis results for key roadway segments under Near-Term Year 2023 Base conditions.

Table 5.2 Roadway Segment Level of Service Results – Near-Term Year 2023 Base Conditions

Roadway	Segment	Functional Classification	Daily Volume	LOS Threshold (LOS E)	V/C	LOS
South Grade Road	Alpine Boulevard to Via Viejas	2-Lane Light Collector	3,185	16,200	0.197	B
South Grade Road	Via Viejas to Tavern Road	2-Lane Light Collector	4,130	16,200	0.255	C

Notes:
V/C = Volume / Capacity
LOS = Level of Service

As shown in Table 5.2, all of the study area roadway segments are anticipated to operate at acceptable LOS C or better under Near-Term Year 2023 Base conditions.

5.4.2 Intersection Analysis

Table 5.3 displays intersection LOS and average vehicle delay results for the key study area intersections under Near-Term Year Base conditions. LOS calculation worksheets for Near-Term Year 2023 Base conditions are provided in **Appendix F**.

Table 5.3 Peak Hour Intersection Level of Service Results – Near-Term Year 2023 Base Conditions

#	Intersection	Control Type	AM Peak Hour		PM Peak Hour	
			Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS
1	East Victoria Road / South Grade Road & Alpine Boulevard	Signal	16.3	B	17.0	B
2	South Grade Road / Calle De Compadres	SSSC	9.3	A	10.4	B
3	South Grade Road / Via Viejas	SSSC	10.2	B	11.0	B
4	Tavern Road & South Grade Road	AWSC	13.5	B	10.7	B

Notes:
SSSC = Side-Street Stop-Controlled. For SSSC, the delay shown is the worst delay experienced by any of the approaches.
AWSC = All-Way Stop-Controlled. For AWSC, the delay shown is the average delay experienced by all approaches.

As shown in Table 5.3, all study area intersections are anticipated to operate at an acceptable LOS B during both AM and PM peak hours under Near-Term Year 2023 Base conditions.

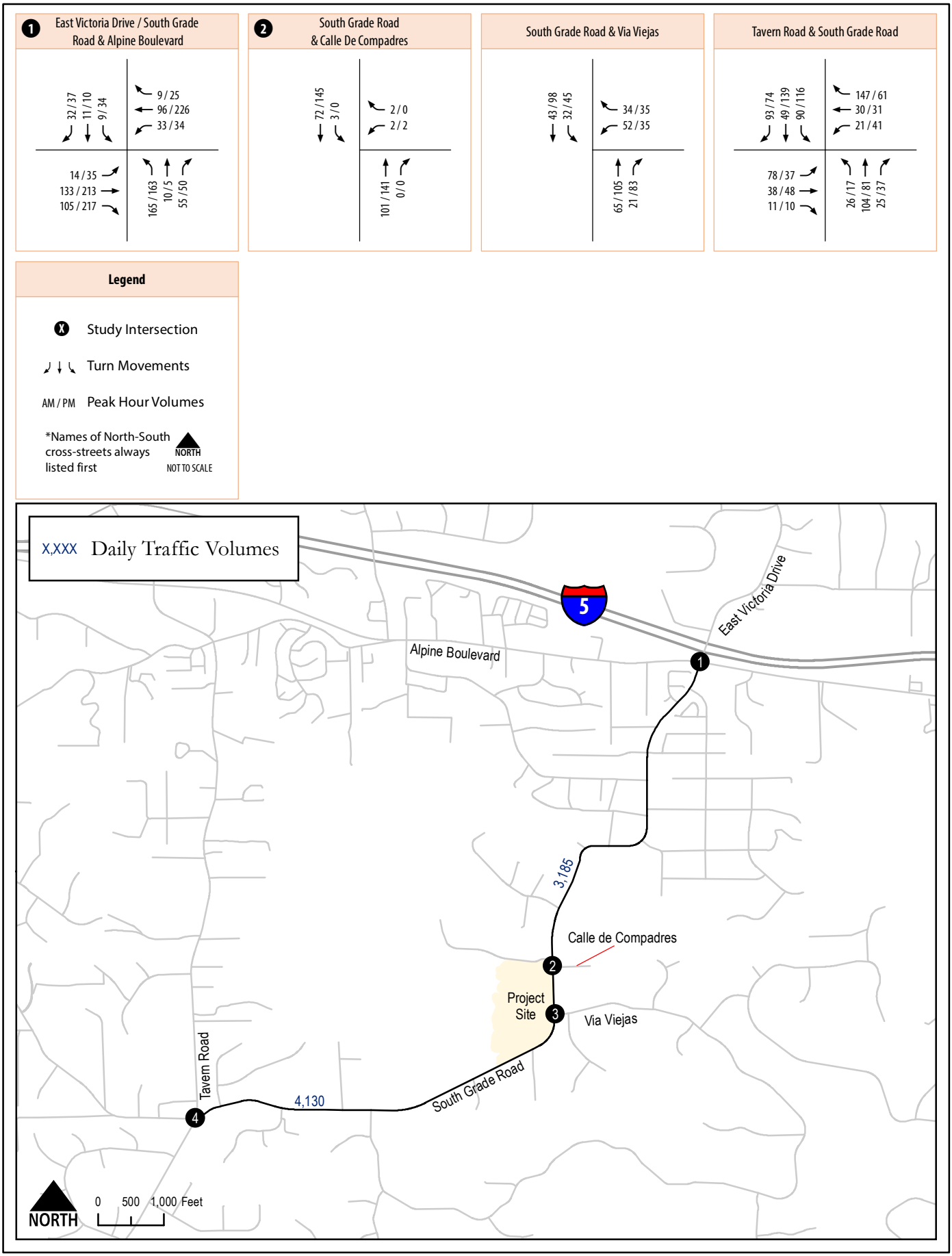

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Figure 5.3
Traffic Volumes
Near-Term Year 2023 Base Conditions

5.5 Near-Term Year 2023 Base with Project Roadway Network and Traffic Volumes

Roadway and intersection geometrics under Near-Term Year 2023 Base with Project conditions were assumed to be identical to existing geometrics (displayed in Figure 4.1) with the addition of the following two project driveways:

- South Grade Road & Project Driveway #1 / Calle de Compadres – This driveway would be a new leg of the South Grade Road / Calle Compadres intersection (Opposing Calle de Compadres). It is located at the northern end of the property and would allow for full access. This would be an unsignalized all-way stop-controlled intersection. This driveway would include one inbound lane and one outbound lane.

  It is important to note that under Existing conditions, this intersection is a three-legged T-intersection functioning as side-street stop-controlled with South Grade Road being uncontrolled and Calle De Compadres being stop-controlled. Thus, all-way stop-controlled intersection guidelines and options were considered to determine if the peak hour volumes at the intersection justified the installation of stop signs at the intersection for all directions of traffic. According to Caltrans MUTCD (2014), the intersection does not meet the minimum peak hour volumes for an all-way stop-controlled intersection. However, due to a number of pedestrian collisions occurring in the vicinity of this intersection, and since the project driveway at this intersection is considered an important and integral safety design feature of the Proposed Project, it is suggested that this intersection to be converted to an all-way stop-controlled intersection with implementation of the Alpine Community Park. All-way stop-controls would provide for an enhanced pedestrian safety route from the residential neighborhood on the east side of South Grade Road to the park as well as reduce the potential severity conflict between pedestrians and motorists.

- Project Driveway #2 & South Grade Road – This driveway would be a new intersection located on the southern end of the property and would allow for full-access. This is an unsignalized, side street stop-controlled intersection, with South Grade Road as uncontrolled and Project Driveway #2 being stop-controlled. This driveway would include one inbound lane and one outbound lane.

Near-Term Year 2023 Base with Project traffic volumes were derived by combining the Near-Term Year 2023 Base traffic volumes (displayed in Figure 5.3) and the project trip assignment volumes (displayed in Figure 3.3). Daily roadway and peak hour intersection volumes for this scenario are displayed in **Figure 5.4**.

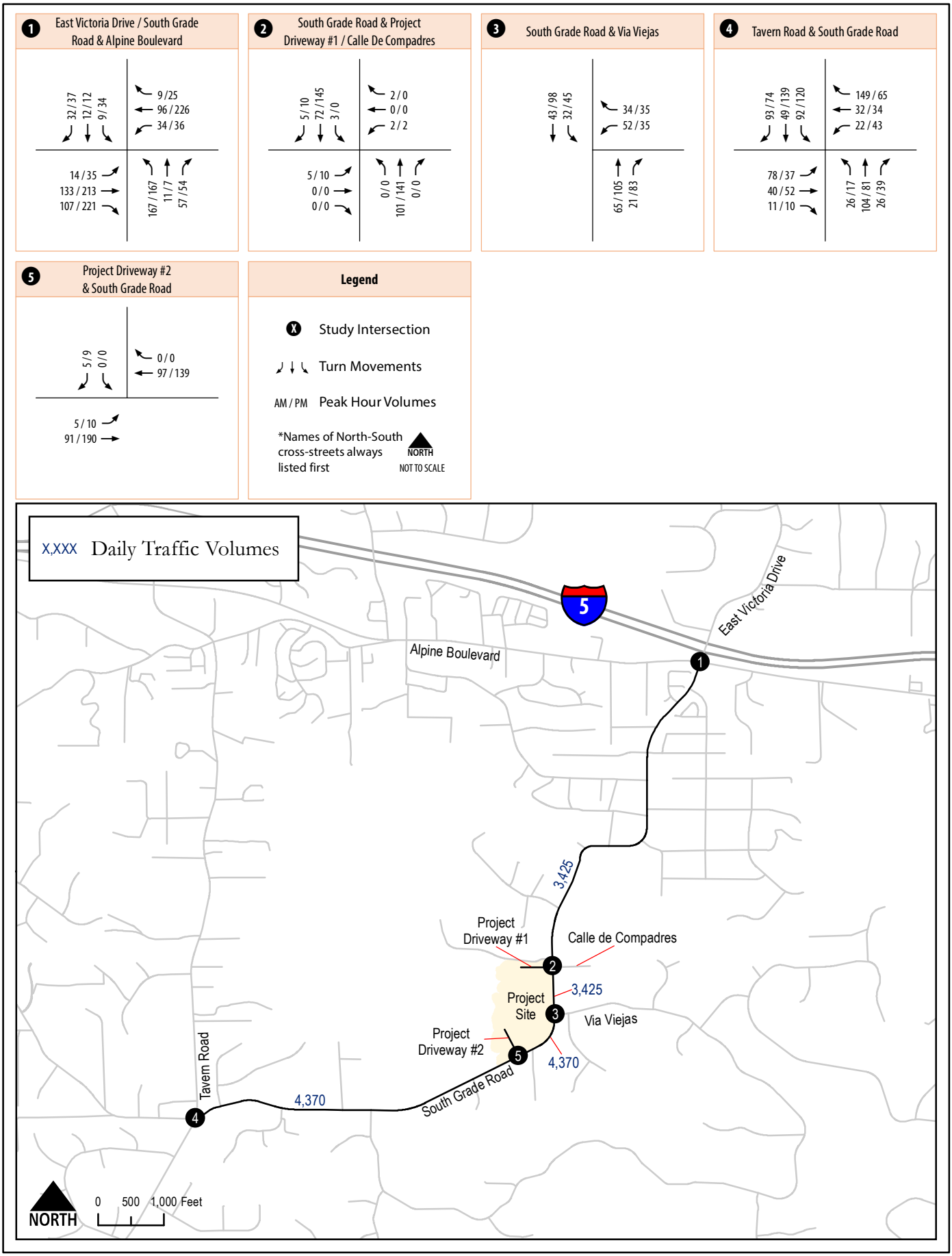

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Figure 5.4
Traffic Volumes
Near-Term Year 2023 Base with Project Conditions

5.6 Near-Term Year Base with Project Traffic Conditions

LOS analyses were conducted using the methodologies described in Chapter 2.0. Roadway segment and intersection LOS analysis results are discussed separately in the following sections.

5.6.1 Roadway Segment Analysis

Table 5.4 displays the LOS analysis results for key study area roadway segments under Near-Term Year 2023 Base with Project.

Table 5.4 Roadway Segment Level of Service Results – Near-Term Year 2023 Base with Project Conditions

Roadway	Segment	Functional Classification	ADT	LOS Threshold (LOS E)	V/C	LOS	LOS w/o Project	ΔV/C	SI?
South Grade Road	Alpine Boulevard to Project Driveway #1 / Calle de Compadres	2-Lane Light Collector	3,425	16,200	0.211	B	B	0.015	N
South Grade Road	Project Driveway #1 / Calle de Compadres to Via de Viejas	2-Lane Light Collector	3,425	16,200	0.211	B	B	0.015	N
South Grade Road	Via de Viejas to Project Driveway #2	2-Lane Light Collector	4,370	16,200	0.270	C	C	0.015	N
South Grade Road	Project Driveway #2 to Tavern Road	2-Lane Light Collector	4,370	16,200	0.270	C	C	0.015	N

Notes:
V/C = Volume / Capacity
LOS = Level of Service
SI? = Significant Impact?

As shown in Table 5.4, similar to Near-Term Year 2023 Base conditions, all study area roadway segments are anticipated to operate at acceptable LOS C or better under Near-Term Year 2023 Base conditions.

5.6.2 Intersection Analysis

Table 5.6 displays intersection LOS and average vehicle delay results under Near-Term Year 2023 Base with Project conditions. LOS calculation worksheets for Near-Term Year 2023 Base with Project conditions are provided in **Appendix G**.

Table 5.5 Peak Hour Intersection Level of Service Results – Near-Term Year 2023 Base with Project Conditions

#	Intersection	Control Type	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec) AM/PM	SI?
			Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS				
1	East Victoria Road / South Grade Road & Alpine Boulevard	Signal	14.2	B	17.2	B	16.3 / 17.0	B / B	-3.0 / 0.2	N
2	South Grade Road & Project Driveway #1 / Calle De Compadres	AWSC	7.6	A	8.1	A	9.3 / 10.4	A / B	-1.7 / - 2.3	N
3	South Grade Road / Via Viejas	SSSC	10.2	B	11.0	B	10.2 / 11.0	B / B	0.0 / 0.0	N
4	Tavern Road & South Grade Road	AWSC	13.7	B	10.9	B	13.5 / 10.7	B / B	0.2 / 0.2	N
5	Project Driveway #2 & South Grade Road	SSSC	8.8	A	9.1	A	N/A	N/A	N/A	N

Notes:
AWSC = All-Way Stop-Controlled. For AWSC, the delay shown is the average delay experienced by all approaches.
SSSC = Side-Street Stop-Controlled. For SSSC, the delay shown is the worst delay experienced by any of the approaches.
SI? = Significant Impact?

As shown in Table 5.5, all of the study intersections are anticipated to operate at acceptable LOS B or better during both the AM and PM peak hours with the addition of project traffic.

5.7 Impact Significance and Mitigation

Based upon the significance criteria presented in Section 2.5 of this report, the addition of Proposed Project traffic would not cause a significant impact to study area roadway segments and intersections under Near-Term Year 2023 Base with Project conditions. Therefore, no mitigation measures are required.

6.0 Site Access, On-Site Circulation, Driveway Queuing, and Parking

This chapter addresses access to the project site. Topics discussed include site-access and on-site circulation, parking, and driveway queuing.

6.1 Site Access and On-Site Vehicle Circulation

The Proposed Project will be located north of South Grade Road, east of Tavern Road, and south of Alpine Boulevard, within the unincorporated community of Alpine, in San Diego County. Project access will be provided via the following two (2) driveways:

- South Grade Road & Project Driveway #1 / Calle de Compadres – This driveway would be a new leg of the South Grade Road / Calle Compadres intersection (Opposing Calle de Compadres). It is located at the northern end of the property and would allow for full access. This would be an unsignalized all-way stop-controlled intersection. This driveway would include one inbound lane and one outbound lane.

  It is important to note that under Existing conditions, this intersection is a three-legged T-intersection functioning as side-street stop-controlled with South Grade Road being uncontrolled and Calle De Compadres being stop-controlled. Thus, all-way stop-controlled intersection guidelines and options were considered to determine if the peak hour volumes at the intersection justified the installation of stop signs at the intersection for all directions of traffic. According to Caltrans MUTCD (2014), the intersection does not meet the minimum peak hour volumes for an all-way stop-controlled intersection. However, due to a number of pedestrian collisions occurring in the vicinity of this intersection, and since the project driveway at this intersection is considered an important and integral safety design feature of the Proposed Project, it is suggested that this intersection to be converted to an all-way stop-controlled intersection with implementation of the Alpine Community Park. All-way stop-controls would provide for an enhanced pedestrian safety route from the residential neighborhood on the east side of South Grade Road to the park as well as reduce the potential severity conflict between pedestrians and motorists.

- Project Driveway #2 & South Grade Road – This driveway would be a new intersection located on the southern end of the property and would allow for full-access. This is an unsignalized, side street stop-controlled intersection, with South Grade Road as uncontrolled and Project Driveway #2 being stop-controlled. This driveway would include one inbound lane and one outbound lane.

The site is bisected by a primary internal north/south roadway that provides parking along sides and connects the two project driveways.

Table 6.1 displays intersection LOS and average vehicle delay results for the two analyzed project driveways under Existing with Project and Near-Term Year 2023 Base with Project conditions, as shown previously in Chapter 4 and Chapter 5, respectively, of this report.

Table 6.1 Peak Hour Project Driveway Level of Service Results

#	Intersection	Control Type	Existing with Project				Near-Term Base with Project			
			AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
			Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS
15	South Grade Road & Project Driveway #1 / Calle de Compadres	AWSC	8.0	A	8.9	A	8.0	A	8.9	A
16	Project Driveway #2 & South Grade Road	SSSC	9.1	A	9.8	A	9.1	A	9.8	A

Notes:
AWSC = All-Way Stop-Controlled. For AWSC, the delay shown is the average delay experienced by all approaches.
SSSC = Side-Street Stop-Controlled. For SSSC, the delay shown is the worst delay experienced by any of the approaches.

As shown in Table 6.1, the project driveways are projected to operate at LOS A during both the AM and PM peak hours with the addition of Proposed Project traffic.

6.2 Driveway Queueing

A queuing analysis was conducted for the Proposed Project's two driveways and the movements on South Grade Road to determine if extensive queues that impede with driveway operations could form along the roadways.

Table 6.2 shows the 95th percentile queue at the intersections of the project driveways and South Grade Road.

Table 6.2 Project Driveways and South Grade Road Queuing Analysis

Intersection	Movement	Storage (ft)[1]	95th Percentile Queue[2]			
			Existing + Project		Near Term + Project	
			AM	PM	AM	PM
South Grade Road & Project Driveway #1 / Calle de Compadres	NB	100	25	25	25	25
	SB	100	25	50	25	50
Project Driveway #2 & South Grade Road	SBR	100	0	0	0	0

Notes:
[1] Queues are rounded to the nearest 25 feet to represent one vehicle length.

As shown in Table 6.2, the vehicle queues at the project driveways and South Grade Road are expected to fit within the existing storage and would not impede traffic at the driveways or adjacent roadway system. Queuing analysis results are provided in **Appendix H**.

6.3 Parking

Parking will be incorporated within the proposed development. Per the County of San Diego Ordinance No. 10251, adopted in 2013, the Proposed Project is required to supply 240 vehicle spaces for the regional park. **Table 6.3** displays the Proposed Project's parking requirements.

Table 6.3 Parking Requirements

Type of Occupancy	Units	Requirement	Parking Spaces Required
County of San Diego Ordinance No. 10251			
Park with Structured Active Uses (e.g. basketball, ball fields, tennis, etc.)	24 acres	10 spaces / acre	240 spaces

7.0 Pedestrian, Bicycle, and Transit Assessment

This chapter discusses the project site's alternative transportation modes (walking, bicycling, and transit).

7.1 Pedestrian Facilities

There are no sidewalks directly adjacent to the project site along South Grade Road. As mentioned previously, the Project proposes to convert the intersection of South Grade Road & Calle De Compadres to an all-way stop-controlled and add Project Driveway #1 as the west leg. This would provide for an enhanced pedestrian safety route from the adjacent residential neighborhood as well as reduce the potential severity conflict between pedestrians and motorists.

Additionally, the intersection of South Grade Road & Via Viejas was considered to be converted to an all-way stop-controlled intersection and a warrant analysis was conducted based on all-way stop-control guidelines and options. According to Caltrans MUTCD (2014), this intersection does not meet the minimum peak hour volumes for an all-way stop-controlled intersection. However, due to the high pedestrian volumes that the Alpine Community Park is anticipated to generate, it is recommended to convert the intersection to an all-way stop-controlled intersection to control vehicle/pedestrian conflicts. All-way stop-controls would provide for an enhanced pedestrian safety route from the residential neighborhood on the east side of South Grade Road to the park as well as reduce the potential severity conflict between pedestrian and motorists. It is important to note that "STOP AHEAD" signs are recommended to be installed on the south leg of the intersection as the stopping sight distance at this approach is not met (360 feet required). All work shall be designed to the County's Traffic Engineer satisfaction.

Based on the preliminary review of the Proposed Project's site plan, the Proposed Project would not result in any impacts to pedestrians and would not conflict with existing or planned pedestrian facilities.

7.2 Bicycle Facilities

There are no bicycle lanes directly adjacent to the project site along South Grade Road. However, the County of San Diego General Plan Update specifies proposed Class II bike lanes along both sides of South Grade Road.

Based on the preliminary review of the Proposed Project's site plan, the Proposed Project would not result in any impacts to bicyclists and would not conflict with existing or planned bicycle facilities.

7.3 Transit

There are no transit facilities within a one-mile walking distance of the project site. Additionally, there are no future planned transit projects within the study area. Therefore, the Proposed Project would not conflict with existing or planned transit facilities and would not result in any impacts to transit facilities.

Appendix A
Signal Timing Sheets

Phase Timing - Bank 1								
	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
Min Green	**4**	**6**	**0**	**0**	**4**	**6**	**4**	**4**
Extension	**2.0**	**2.0**	**0.0**	**0.0**	**2.0**	**2.0**	**2.0**	**3.0**
Max	**17**	**40**	**0**	**0**	**17**	**40**	**25**	**25**
Max 2	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Cond Serve Check	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Clearance Timing								
Yellow Change	**4.1**	**4.8**	**0.0**	**0.0**	**4.1**	**4.8**	**4.4**	**4.4**
Red Clear	**0.5**	**1.0**	**0.0**	**0.0**	**0.5**	**1.0**	**1.0**	**1.0**
Pedestrian Timing								
Walk	**0**	**7**	**0**	**0**	**0**	**7**	**7**	**7**
Pedestrian Change	**0**	**18**	**0**	**0**	**0**	**14**	**27**	**20**
Advance/Delay Walk	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PE Min. Ped. Change	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Volume-Density								
Type 3 Disconnect	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Add per Vehicle	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Max Added Initial	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Min Gap	**2.0**	**1.5**	**0.0**	**0.0**	**2.0**	**1.5**	**2.0**	**3.0**
Max Gap	**2.0**	**2.1**	**0.0**	**0.0**	**2.0**	**2.1**	**2.0**	**3.0**
Reduce Every	**0.0**	**6.2**	**0.0**	**0.0**	**0.0**	**6.2**	**0.0**	**0.0**
Alternate Timing								
Alternate Walk	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Alternate Ped. Change	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Alternate Minimum	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Alternate Extension	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Phase Timing - Exclusive Pedestrian	
Exclusive Ped Assignment	_____
Exclusive Walk	**0**
Exclusive Pedestrian Change	**0**
Red Clear	**0.0**
Walk Output	**0**
Don't Walk Output	**0**

Phase Functions - Page 1	
Red Lock	_____
Yellow Lock	_____
Simultaneous Gap	_____
Rest In Walk	_____
Advance Walk	_____
Flashing Walk	_____
Max Extension	_____
Red Rest	_____
Dual Entry	_____
Sequential Timing	_____
Inhibit Ped Reservice	_____
Delay Walk	_____
Guaranteed Passage	_____
Conditional Service	_____

Phase Functions - Page 2	
Minimum Recall	**2 6**
Ped Recall	_____
Maximum Recall	_____
Green Flash	_____
Overlap Green Flash	_____
Flashing Yellow Arrow for PPLT	_____
Max2	_____
Soft Recall	_____
External Recall	_____
Manual Control Calls	_____
Fast Green Flash	_____
Fast Overlap Green Flash	_____
Semi-Actuated	_____

Appendix B
Traffic Counts

WEDNESDAY - MARCH 11, 2020 AREA: ALPINE PROJECT: ETD20-0313-02

S GRADE - ALPINE PARK TO ALPINE BL

AM	NB		SB		EB	WB		PM	NB		SB		EB	WB	
00:00	2		1					12:00	21		27				
00:15	2		1					12:15	26		23				
00:30	0		2					12:30	24		22				
00:45	1	5	4	8			13	12:45	23	94	24	96			190
01:00	1		3					13:00	19		31				
01:15	0		1					13:15	16		25				
01:30	0		0					13:30	34		25				
01:45	1	2	0	4			6	13:45	24	93	28	109			202
02:00	1		3					14:00	21		34				
02:15	0		3					14:15	15		43				
02:30	0		0					14:30	44		28				
02:45	3	4	2	8			12	14:45	28	108	40	145			253
03:00	1		1					15:00	55		43				
03:15	2		0					15:15	75		49				
03:30	1		0					15:30	35		38				
03:45	0	4	0	1			5	15:45	36	201	29	159			360
04:00	1		0					16:00	23		26				
04:15	0		1					16:15	31		30				
04:30	1		2					16:30	29		25				
04:45	3	5	2	5			10	16:45	24	107	27	108			215
05:00	1		0					17:00	28		31				
05:15	2		1					17:15	14		39				
05:30	7		2					17:30	31		33				
05:45	2	12	5	8			20	17:45	17	90	24	127			217
06:00	10		7					18:00	23		29				
06:15	9		6					18:15	18		27				
06:30	12		10					18:30	21		19				
06:45	9	40	11	34			74	18:45	19	81	24	99			180
07:00	19		20					19:00	26		26				
07:15	16		20					19:15	16		12				
07:30	19		37					19:30	15		12				
07:45	26	80	28	105			185	19:45	12	69	18	68			137
08:00	24		13					20:00	11		15				
08:15	12		24					20:15	14		11				
08:30	50		45					20:30	9		10				
08:45	70	156	30	112			268	20:45	6	40	15	51			91
09:00	39		29					21:00	4		13				
09:15	41		17					21:15	7		11				
09:30	19		18					21:30	5		13				
09:45	24	123	19	83			206	21:45	5	21	11	48			69
10:00	14		19					22:00	5		5				
10:15	19		23					22:15	5		4				
10:30	22		19					22:30	2		5				
10:45	31	86	20	81			167	22:45	1	13	2	16			29
11:00	25		18					23:00	1		1				
11:15	15		26					23:15	3		2				
11:30	20		23					23:30	1		3				
11:45	20	80	25	92			172	23:45	1	6	4	10			16
Total Vol.		597		541			1138			923		1036			1959

Daily Totals

NB	SB	EB	WB	Combined
1520	1577			3097

	AM			PM		
Split %	52.5%	47.5%	36.7%	47.1%	52.9%	63.3%
Peak Hour	08:30	08:15	08:30	14:30	14:45	14:45
Volume	200	128	321	202	170	363
P.H.F.	0.71	0.71	0.80	0.83	0.87	0.73

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WEDNESDAY - MARCH 11, 2020 AREA: ALPINE PROJECT: ETD20-0313-02

S GRADE - ALPINE PARK TO TAVERN RD

AM	NB	SB	EB		WB			PM	NB	SB	EB		WB		
00:00			3		2			12:00			19		21		
00:15			2		2			12:15			36		21		
00:30			0		2			12:30			37		24		
00:45			1	6	2	8	14	12:45			30	122	33	99	221
01:00			1		4			13:00			24		42		
01:15			1		2			13:15			27		35		
01:30			1		1			13:30			44		28		
01:45			1	4	0	7	11	13:45			31	126	31	136	262
02:00			1		2			14:00			36		33		
02:15			0		0			14:15			26		55		
02:30			1		1			14:30			55		35		
02:45			2	4	2	5	9	14:45			38	155	40	163	318
03:00			1		2			15:00			68		46		
03:15			2		0			15:15			95		50		
03:30			2		0			15:30			37		45		
03:45			2	7	2	4	11	15:45			59	259	39	180	439
04:00			1		1			16:00			38		19		
04:15			0		4			16:15			46		28		
04:30			1		6			16:30			42		25		
04:45			3	5	6	17	22	16:45			38	164	19	91	255
05:00			1		10			17:00			44		38		
05:15			2		6			17:15			38		34		
05:30			7		13			17:30			46		23		
05:45			3	13	20	49	62	17:45			29	157	32	127	284
06:00			6		22			18:00			27		29		
06:15			4		25			18:15			35		30		
06:30			13		25			18:30			34		17		
06:45			11	34	28	100	134	18:45			41	137	22	98	235
07:00			22		36			19:00			43		20		
07:15			26		52			19:15			28		18		
07:30			19		55			19:30			29		12		
07:45			32	99	45	188	287	19:45			18	118	10	60	178
08:00			32		25			20:00			28		14		
08:15			29		46			20:15			15		11		
08:30			51		68			20:30			31		10		
08:45			65	177	43	182	359	20:45			17	91	14	49	140
09:00			46		33			21:00			15		10		
09:15			31		42			21:15			8		8		
09:30			26		35			21:30			15		12		
09:45			20	123	31	141	264	21:45			6	44	13	43	87
10:00			17		23			22:00			6		3		
10:15			18		31			22:15			9		5		
10:30			25		31			22:30			3		4		
10:45			16	76	28	113	189	22:45			3	21	2	14	35
11:00			20		27			23:00			5		0		
11:15			20		21			23:15			5		3		
11:30			23		33			23:30			1		3		
11:45			28	91	32	113	204	23:45			2	13	3	9	22
Total Vol.				639		927	1566					1407		1069	2476

Daily Totals				
NB	SB	EB	WB	Combined
		2046	1996	4042

	AM			PM		
Split %	40.8%	59.2%	38.7%	56.8%	43.2%	61.3%
Peak Hour	08:30	08:15	08:15	15:00	14:45	15:00
Volume	193	190	381	259	181	439
P.H.F.	0.74	0.70	0.80	0.68	0.91	0.76

PREPARED BY: ELITE TRAFFIC DYNAMICS, LLC

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: ELITE TRAFFIC DYNAMICS, LLC

DATE:	LOCATION:	ALPINE	PROJECT #:	ETD20-0313-02
3/11/20	NORTH & SOUTH:	S GRADE	LOCATION #:	1
WEDNESDAY	EAST & WEST:	ALPINE BL	CONTROL:	SIGNAL

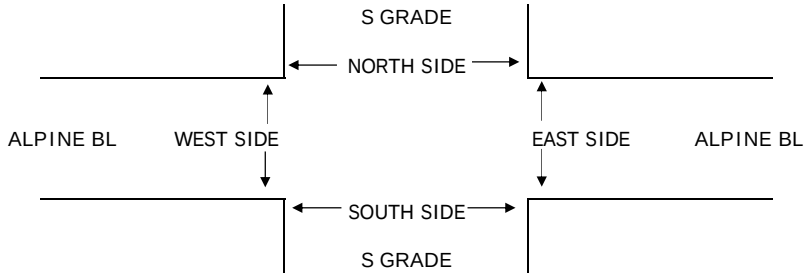
NOTES:

INCLUDES BIKE & PED

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, ▼ S

		NORTHBOUND S GRADE			SOUTHBOUND S GRADE			EASTBOUND ALPINE BL			WESTBOUND ALPINE BL			
	LANES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
AM	7:00 AM	18	3	15	4	2	7	2	22	8	6	21	0	108
	7:15 AM	28	2	9	5	4	8	1	19	11	6	25	4	122
	7:30 AM	24	1	11	2	5	7	1	23	14	10	28	4	130
	7:45 AM	22	1	9	6	2	2	7	31	17	9	22	1	129
	8:00 AM	32	3	11	2	2	3	2	34	21	6	21	0	137
	8:15 AM	36	1	4	1	5	11	2	23	26	6	25	4	144
	8:30 AM	45	3	13	1	2	6	5	32	27	10	28	4	176
	8:45 AM	51	2	24	5	2	12	5	44	31	9	22	1	208
	VOLUMES	256	16	96	26	24	56	25	228	155	62	192	18	1,154
	APPROACH %	70%	4%	26%	25%	23%	53%	6%	56%	38%	23%	71%	7%	
	APP/DEPART	368	/	59	106	/	241	408	/	350	272	/	504	0
	BEGIN PEAK HR		8:00 AM											
	VOLUMES	164	9	52	9	11	32	14	133	105	31	96	9	665
	APPROACH %	73%	4%	23%	17%	21%	62%	6%	53%	42%	23%	71%	7%	
	PEAK HR FACTOR		0.731			0.684			0.788			0.810		0.799
	APP/DEPART	225	/	32	52	/	147	252	/	194	136	/	292	0
PM	4:00 PM	38	3	13	5	3	4	7	58	51	9	46	6	243
	4:15 PM	47	0	15	4	2	4	5	69	47	7	37	7	244
	4:30 PM	29	5	7	0	0	7	9	62	54	11	44	8	236
	4:45 PM	45	2	12	6	2	8	12	57	41	6	51	6	248
	5:00 PM	49	0	15	8	1	10	11	51	58	4	54	5	266
	5:15 PM	28	2	11	11	4	8	7	57	62	9	62	10	271
	5:30 PM	41	1	10	9	3	11	5	48	55	10	59	4	256
	5:45 PM	32	4	7	10	2	12	10	46	44	9	50	7	233
	VOLUMES	309	17	90	53	17	64	66	448	412	65	403	53	1,997
	APPROACH %	74%	4%	22%	40%	13%	48%	7%	48%	44%	12%	77%	10%	
	APP/DEPART	416	/	136	134	/	494	926	/	591	521	/	776	0
	BEGIN PEAK HR		4:45 PM											
	VOLUMES	163	5	48	34	10	37	35	213	216	29	226	25	1,041
	APPROACH %	75%	2%	22%	42%	12%	46%	8%	46%	47%	10%	81%	9%	
	PEAK HR FACTOR		0.844			0.880			0.921			0.864		0.960
	APP/DEPART	216	/	65	81	/	255	464	/	295	280	/	426	0

U-TURNS					
	NB	SB	EB	WB	TTL
	X	X	X	X	
7:00 AM					0
7:15 AM					0
7:30 AM					0
7:45 AM			1		1
8:00 AM					0
8:15 AM					0
8:30 AM					0
8:45 AM					0
VOLUMES	0	0	1	0	1
4:00 PM					0
4:15 PM					0
4:30 PM					0
4:45 PM			1		1
5:00 PM					0
5:15 PM			1		1
5:30 PM					0
5:45 PM					0
VOLUMES	0	0	2	0	2



		PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM					0					0					0
	7:15 AM		1		1	2					0	1				1
	7:30 AM				1	1					0					0
	7:45 AM					0					0					0
	8:00 AM					0					0					0
	8:15 AM				1	1					0					0
	8:30 AM					0					0		1			1
	8:45 AM		1			1					0	1				1
	TOTAL	0	2	0	3	5	0	0	0	0	0	2	1	0	0	3
PM	4:00 PM		1			1					0					0
	4:15 PM					0					0		1			1
	4:30 PM		2		1	3					0	1	2			3
	4:45 PM					0					0					0
	5:00 PM					0					0		1			1
	5:15 PM		1		1	2					0					0
	5:30 PM					0					0	1				1
	5:45 PM					0					0					0
	TOTAL	0	4	0	2	6	0	0	0	0	0	2	4	0	0	6

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: ELITE TRAFFIC DYNAMICS, LLC

DATE:	LOCATION:	ALPINE	PROJECT #:	ETD20-0313-02
3/11/20	NORTH & SOUTH:	TAVERN RD	LOCATION #:	2
WEDNESDAY	EAST & WEST:	S GRADE	CONTROL:	STOP

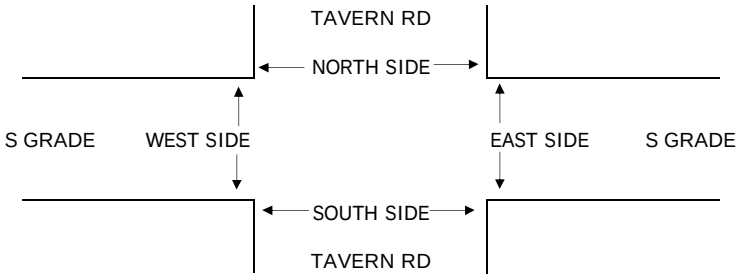
NOTES:

INCLUDES BIKE & PED

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

	NORTHBOUND TAVERN RD			SOUTHBOUND TAVERN RD			EASTBOUND S GRADE			WESTBOUND S GRADE			
LANES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
7:00 AM	1	23	7	6	9	6	13	6	4	5	5	26	111
7:15 AM	5	33	6	7	14	5	12	3	2	13	4	33	137
7:30 AM	1	42	2	16	13	14	31	2	4	9	4	47	185
7:45 AM	2	40	12	22	24	13	25	5	2	8	3	36	192
8:00 AM	3	23	7	9	15	8	6	5	3	0	5	19	103
8:15 AM	9	30	1	9	7	11	17	1	2	5	8	35	135
8:30 AM	10	29	10	26	13	39	31	16	2	9	12	48	245
8:45 AM	4	22	7	44	14	35	24	16	4	6	4	42	222
AM VOLUMES	35	242	52	139	109	131	159	54	23	55	45	286	1,330
AM APPROACH %	11%	74%	16%	37%	29%	35%	67%	23%	10%	14%	12%	74%	
AM APP/DEPART	329	/	687	379	/	187	236	/	245	386	/	211	0
AM BEGIN PEAK HR		8:00 AM											
AM VOLUMES	26	104	25	88	49	93	78	38	11	20	29	144	705
AM APPROACH %	17%	67%	16%	38%	21%	40%	61%	30%	9%	10%	15%	75%	
AM PEAK HR FACTOR		0.791			0.618			0.648			0.699		0.719
AM APP/DEPART	155	/	326	230	/	80	127	/	151	193	/	148	0
4:00 PM	4	20	6	26	33	14	13	12	3	6	3	9	149
4:15 PM	3	16	10	33	37	27	11	9	2	3	10	16	177
4:30 PM	2	19	3	27	19	16	8	8	1	7	6	13	129
4:45 PM	1	14	11	21	23	10	8	6	4	4	6	11	119
5:00 PM	4	22	9	33	33	18	5	15	3	13	9	18	182
5:15 PM	3	13	14	22	35	20	8	6	1	10	9	20	161
5:30 PM	5	23	7	28	36	18	12	12	3	9	6	11	170
5:45 PM	5	23	7	28	35	18	12	14	3	9	6	10	170
PM VOLUMES	27	150	67	218	251	141	77	82	20	61	55	108	1,257
PM APPROACH %	11%	61%	27%	36%	41%	23%	43%	46%	11%	27%	25%	48%	
PM APP/DEPART	244	/	335	610	/	332	179	/	367	224	/	223	0
PM BEGIN PEAK HR		5:00 PM											
PM VOLUMES	17	81	37	111	139	74	37	47	10	41	30	59	683
PM APPROACH %	13%	60%	27%	34%	43%	23%	39%	50%	11%	32%	23%	45%	
PM PEAK HR FACTOR		0.964			0.964			0.810			0.813		0.938
PM APP/DEPART	135	/	177	324	/	190	94	/	195	130	/	121	0

U-TURNS	NB	SB	EB	WB	TTL
	X	X	X	X	
7:00 AM		1			1
7:15 AM					0
7:30 AM					0
7:45 AM					0
8:00 AM					0
8:15 AM					0
8:30 AM					0
8:45 AM					0
AM VOLUMES	0	1	0	0	1
4:00 PM					0
4:15 PM					0
4:30 PM					0
4:45 PM					0
5:00 PM					0
5:15 PM					0
5:30 PM					0
5:45 PM					0
PM VOLUMES	0	0	0	0	0



	PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
7:00 AM					0					0					0
7:15 AM					0					0					0
7:30 AM					0					0					0
7:45 AM					0					0			1		1
8:00 AM					0					0					0
8:15 AM				1	1					0					0
8:30 AM					0					0	1				1
8:45 AM					0					0			1		1
AM TOTAL	0	0	0	1	1	0	0	0	0	0	1	0	2	0	3
4:00 PM				1	1					0					0
4:15 PM			1	2	3					0	1			1	2
4:30 PM					0					0					0
4:45 PM					0					0					0
5:00 PM			1		1					0					0
5:15 PM					0					0				1	1
5:30 PM					0					0					0
5:45 PM					0					0					0
PM TOTAL	0	0	2	3	5	0	0	0	0	0	1	0	0	2	3

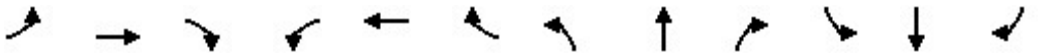
Roadway	Segment	ADT March	ADT June	Δ%
South Grade Road	Alpine Park to Alpine Boulevard	3097	2787	-10%
South Grade Road	Alpine Park to Tavern Road	4042	3468	-14%
			Average	**-12%**

Intersection	Peak Hour	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
South Grade Road & Calle De Compadres	AM	0	85	0	2	62	0	0	0	0	1	0	1
	PM	0	124	0	0	124	0	0	0	0	1	0	0
Adjusted Traffic Counts	AM	0	96	0	3	70	0	0	0	0	2	0	2
	PM	0	139	0	0	139	0	0	0	0	2	0	0

Intersection	Peak Hour	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
South Grade Road & Via Viejas	AM	0	58	18	28	38	0	0	0	0	46	0	30
	PM	0	93	74	40	87	0	0	0	0	31	0	31
Adjusted Traffic Counts	AM	0	65	21	32	43	0	0	0	0	52	0	34
	PM	0	105	83	45	98	0	0	0	0	35	0	35

*Traffic counts conducted June 2020 were adjusted to display an increase of 12% to account for traffic reduction since pre-COVID19 (March 2020 traffic counts)

Appendix C
Peak Hour Intersection Capacity Worksheets Existing Conditions



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	133	105	31	96	9	164	9	52	9	11	32
Future Volume (veh/h)	14	133	105	31	96	9	164	9	52	9	11	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	18	168	106	38	119	10	225	12	64	13	16	43
Peak Hour Factor	0.79	0.79	0.79	0.81	0.81	0.81	0.73	0.73	0.73	0.68	0.68	0.68
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	32	295	245	62	296	25	338	49	260	18	22	60
Arrive On Green	0.02	0.16	0.16	0.03	0.17	0.17	0.19	0.19	0.19	0.06	0.06	0.06
Sat Flow, veh/h	1781	1870	1550	1781	1698	143	1781	256	1368	302	371	997
Grp Volume(v), veh/h	18	168	106	38	0	129	225	0	76	72	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1550	1781	0	1840	1781	0	1624	1670	0	0
Q Serve(g_s), s	0.4	3.2	2.4	0.8	0.0	2.4	4.5	0.0	1.5	1.6	0.0	0.0
Cycle Q Clear(g_c), s	0.4	3.2	2.4	0.8	0.0	2.4	4.5	0.0	1.5	1.6	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.08	1.00		0.84	0.18		0.60
Lane Grp Cap(c), veh/h	32	295	245	62	0	321	338	0	308	100	0	0
V/C Ratio(X)	0.55	0.57	0.43	0.61	0.00	0.40	0.67	0.00	0.25	0.72	0.00	0.00
Avail Cap(c_a), veh/h	984	2264	1875	984	0	2227	1359	0	1239	1274	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	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.5	14.8	14.5	18.1	0.0	13.9	14.3	0.0	13.1	17.6	0.0	0.0
Incr Delay (d2), s/veh	5.4	0.6	0.5	3.6	0.0	0.3	2.3	0.0	0.4	3.6	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	0.2	1.2	0.7	0.3	0.0	0.8	1.7	0.0	0.5	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.9	15.5	14.9	21.7	0.0	14.2	16.5	0.0	13.5	21.2	0.0	0.0
LnGrp LOS	C	B	B	C	A	B	B	A	B	C	A	A
Approach Vol, veh/h		292			167			301			72	
Approach Delay, s/veh		15.8			15.9			15.8			21.2	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.9	11.8		7.7	5.3	12.4		12.6				
Change Period (Y+Rc), s	4.6	5.8		5.4	4.6	5.8		5.4				
Max Green Setting (Gmax), s	21.0	46.0		29.0	21.0	46.0		29.0				
Max Q Clear Time (g_c+I1), s	2.8	5.2		3.6	2.4	4.4		6.5				
Green Ext Time (p_c), s	0.0	0.8		0.2	0.0	0.5		1.1				

Intersection Summary			
HCM 6th Ctrl Delay		16.3	
HCM 6th LOS		B	

Notes

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

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	2	96	0	3	70
Future Vol, veh/h	2	2	96	0	3	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	50	50	92	92	73	73
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	4	104	0	4	96

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	208	104	0	0	104	0
Stage 1	104	-	-	-	-	-
Stage 2	104	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	780	951	-	-	1488	-
Stage 1	920	-	-	-	-	-
Stage 2	920	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	778	951	-	-	1488	-
Mov Cap-2 Maneuver	778	-	-	-	-	-
Stage 1	920	-	-	-	-	-
Stage 2	917	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.2	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	856	1488	-
HCM Lane V/C Ratio	-	-	0.009	0.003	-
HCM Control Delay (s)	-	-	9.2	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	4.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	52	34	65	21	32	43
Future Vol, veh/h	52	34	65	21	32	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	76	76	86	86	69	69
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	45	76	24	46	62

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	242	88	0	0	100	0
Stage 1	88	-	-	-	-	-
Stage 2	154	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	746	970	-	-	1493	-
Stage 1	935	-	-	-	-	-
Stage 2	874	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	722	970	-	-	1493	-
Mov Cap-2 Maneuver	722	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	846	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	3.2
HCM LOS	B		

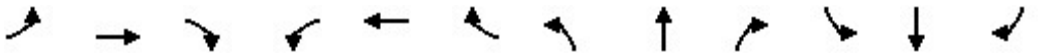
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	803	1493	-
HCM Lane V/C Ratio	-	-	0.141	0.031	-
HCM Control Delay (s)	-	-	10.2	7.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

Intersection	
Intersection Delay, s/veh	13.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	78	38	11	20	29	144	26	104	25	88	49	93
Future Vol, veh/h	78	38	11	20	29	144	26	104	25	88	49	93
Peak Hour Factor	0.65	0.65	0.65	0.70	0.70	0.70	0.79	0.79	0.79	0.62	0.62	0.62
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	120	58	17	29	41	206	33	132	32	142	79	150
Number of Lanes	0	1	1	0	1	1	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	13.1	11.3	11.9	15.8
HCM LOS	B	B	B	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	17%	67%	0%	41%	0%	38%
Vol Thru, %	67%	33%	0%	59%	0%	21%
Vol Right, %	16%	0%	100%	0%	100%	40%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	155	116	11	49	144	230
LT Vol	26	78	0	20	0	88
Through Vol	104	38	0	29	0	49
RT Vol	25	0	11	0	144	93
Lane Flow Rate	196	178	17	70	206	371
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.324	0.346	0.028	0.131	0.333	0.57
Departure Headway (Hd)	5.954	6.975	5.916	6.759	5.836	5.535
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	598	512	600	527	611	649
Service Time	4.041	4.761	3.701	4.541	3.617	3.607
HCM Lane V/C Ratio	0.328	0.348	0.028	0.133	0.337	0.572
HCM Control Delay	11.9	13.5	8.9	10.6	11.5	15.8
HCM Lane LOS	B	B	A	B	B	C
HCM 95th-tile Q	1.4	1.5	0.1	0.4	1.5	3.6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	213	216	29	226	25	163	5	48	34	10	37
Future Volume (veh/h)	35	213	216	29	226	25	163	5	48	34	10	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	232	188	34	263	26	194	6	51	39	11	37
Peak Hour Factor	0.92	0.92	0.92	0.86	0.86	0.86	0.84	0.84	0.84	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	420	348	56	371	37	288	27	233	53	15	51
Arrive On Green	0.03	0.22	0.22	0.03	0.22	0.22	0.16	0.16	0.16	0.07	0.07	0.07
Sat Flow, veh/h	1781	1870	1547	1781	1671	165	1781	170	1441	761	215	722
Grp Volume(v), veh/h	38	232	188	34	0	289	194	0	57	87	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1547	1781	0	1836	1781	0	1611	1698	0	0
Q Serve(g_s), s	0.9	4.5	4.4	0.8	0.0	6.0	4.2	0.0	1.3	2.1	0.0	0.0
Cycle Q Clear(g_c), s	0.9	4.5	4.4	0.8	0.0	6.0	4.2	0.0	1.3	2.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.89	0.45		0.43
Lane Grp Cap(c), veh/h	61	420	348	56	0	407	288	0	261	119	0	0
V/C Ratio(X)	0.62	0.55	0.54	0.61	0.00	0.71	0.67	0.00	0.22	0.73	0.00	0.00
Avail Cap(c_a), veh/h	903	2077	1718	903	0	2039	1247	0	1128	1189	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	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	19.7	14.2	14.2	19.8	0.0	14.9	16.3	0.0	15.1	18.9	0.0	0.0
Incr Delay (d2), s/veh	3.8	0.4	0.5	4.0	0.0	0.9	2.7	0.0	0.4	3.2	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	0.4	1.6	1.3	0.3	0.0	2.2	1.7	0.0	0.4	0.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.6	14.6	14.7	23.8	0.0	15.7	19.0	0.0	15.5	22.0	0.0	0.0
LnGrp LOS	C	B	B	C	A	B	B	A	B	C	A	A
Approach Vol, veh/h		458			323			251			87	
Approach Delay, s/veh		15.4			16.6			18.2			22.0	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.9	15.1		8.3	6.0	15.0		12.1				
Change Period (Y+Rc), s	4.6	5.8		5.4	4.6	5.8		5.4				
Max Green Setting (Gmax), s	21.0	46.0		29.0	21.0	46.0		29.0				
Max Q Clear Time (g_c+I1), s	2.8	6.5		4.1	2.9	8.0		6.2				
Green Ext Time (p_c), s	0.0	1.2		0.3	0.0	1.2		0.9				

Intersection Summary			
HCM 6th Ctrl Delay		16.9	
HCM 6th LOS		B	

Notes

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

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	0	139	0	0	139
Future Vol, veh/h	2	0	139	0	0	139
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	25	25	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	0	156	0	0	156

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	312	156	0	0	156	0
Stage 1	156	-	-	-	-	-
Stage 2	156	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	681	890	-	-	1424	-
Stage 1	872	-	-	-	-	-
Stage 2	872	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	681	890	-	-	1424	-
Mov Cap-2 Maneuver	681	-	-	-	-	-
Stage 1	872	-	-	-	-	-
Stage 2	872	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	681	1424	-
HCM Lane V/C Ratio	-	-	0.012	-	-
HCM Control Delay (s)	-	-	10.3	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	2.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	35	35	105	83	45	98
Future Vol, veh/h	35	35	105	83	45	98
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	79	79	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	45	133	105	51	111

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	399	186	0	0	238	0
Stage 1	186	-	-	-	-	-
Stage 2	213	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	607	856	-	-	1329	-
Stage 1	846	-	-	-	-	-
Stage 2	823	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	582	856	-	-	1329	-
Mov Cap-2 Maneuver	582	-	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	789	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	2.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	693	1329	-
HCM Lane V/C Ratio	-	-	0.13	0.038	-
HCM Control Delay (s)	-	-	11	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

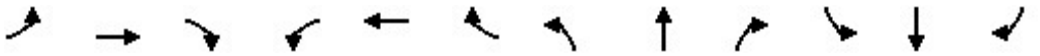
Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	37	47	10	41	30	59	17	81	37	111	139	74
Future Vol, veh/h	37	47	10	41	30	59	17	81	37	111	139	74
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	46	58	12	51	37	73	18	84	39	116	145	77
Number of Lanes	0	1	1	0	1	1	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	10.1	9.4	9.3	11.8
HCM LOS	B	A	A	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	13%	44%	0%	58%	0%	34%
Vol Thru, %	60%	56%	0%	42%	0%	43%
Vol Right, %	27%	0%	100%	0%	100%	23%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	135	84	10	71	59	324
LT Vol	17	37	0	41	0	111
Through Vol	81	47	0	30	0	139
RT Vol	37	0	10	0	59	74
Lane Flow Rate	141	104	12	88	73	338
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.199	0.179	0.018	0.152	0.106	0.449
Departure Headway (Hd)	5.082	6.227	5.292	6.241	5.237	4.792
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	710	579	679	577	687	743
Service Time	3.082	3.941	3.006	3.953	2.949	2.884
HCM Lane V/C Ratio	0.199	0.18	0.018	0.153	0.106	0.455
HCM Control Delay	9.3	10.3	8.1	10.1	8.6	11.8
HCM Lane LOS	A	B	A	B	A	B
HCM 95th-tile Q	0.7	0.6	0.1	0.5	0.4	2.3

Appendix D
Peak Hour Intersection Capacity Worksheets Existing with Project Conditions



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	133	107	32	96	9	166	10	54	9	12	32
Future Volume (veh/h)	14	133	107	32	96	9	166	10	54	9	12	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	18	168	108	40	119	10	227	14	67	13	18	43
Peak Hour Factor	0.79	0.79	0.79	0.81	0.81	0.81	0.73	0.73	0.73	0.68	0.68	0.68
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	32	293	243	64	297	25	342	54	258	18	25	59
Arrive On Green	0.02	0.16	0.16	0.04	0.17	0.17	0.19	0.19	0.19	0.06	0.06	0.06
Sat Flow, veh/h	1781	1870	1550	1781	1698	143	1781	281	1347	294	407	973
Grp Volume(v), veh/h	18	168	108	40	0	129	227	0	81	74	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1550	1781	0	1840	1781	0	1628	1675	0	0
Q Serve(g_s), s	0.4	3.2	2.4	0.8	0.0	2.4	4.5	0.0	1.6	1.7	0.0	0.0
Cycle Q Clear(g_c), s	0.4	3.2	2.4	0.8	0.0	2.4	4.5	0.0	1.6	1.7	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.08	1.00		0.83	0.18		0.58
Lane Grp Cap(c), veh/h	32	293	243	64	0	322	342	0	312	102	0	0
V/C Ratio(X)	0.56	0.57	0.44	0.62	0.00	0.40	0.66	0.00	0.26	0.73	0.00	0.00
Avail Cap(c_a), veh/h	978	2250	1864	978	0	2214	1351	0	1234	1270	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	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.6	14.9	14.6	18.2	0.0	14.0	14.3	0.0	13.1	17.6	0.0	0.0
Incr Delay (d2), s/veh	5.4	0.7	0.5	3.6	0.0	0.3	2.2	0.0	0.4	3.7	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	0.2	1.2	0.7	0.4	0.0	0.8	1.7	0.0	0.5	0.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.0	15.6	15.1	21.8	0.0	14.3	16.5	0.0	13.6	21.3	0.0	0.0
LnGrp LOS	C	B	B	C	A	B	B	A	B	C	A	A
Approach Vol, veh/h		294			169			308			74	
Approach Delay, s/veh		15.9			16.1			15.8			21.3	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.0	11.8		7.7	5.3	12.5		12.7				
Change Period (Y+Rc), s	4.6	5.8		5.4	4.6	5.8		5.4				
Max Green Setting (Gmax), s	21.0	46.0		29.0	21.0	46.0		29.0				
Max Q Clear Time (g_c+I1), s	2.8	5.2		3.7	2.4	4.4		6.5				
Green Ext Time (p_c), s	0.0	0.8		0.2	0.0	0.5		1.1				

Intersection Summary		
HCM 6th Ctrl Delay		16.4
HCM 6th LOS		B

Notes

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

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	0	2	0	2	0	96	0	3	70	5
Future Vol, veh/h	5	0	0	2	0	2	0	96	0	3	70	5
Peak Hour Factor	0.92	0.92	0.92	0.50	0.50	0.50	0.92	0.92	0.92	0.73	0.73	0.73
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	0	0	4	0	4	0	104	0	4	96	7
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	7.6	7.2	7.6	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	100%	50%	4%
Vol Thru, %	100%	0%	0%	90%
Vol Right, %	0%	0%	50%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	96	5	4	78
LT Vol	0	5	2	3
Through Vol	96	0	0	70
RT Vol	0	0	2	5
Lane Flow Rate	104	5	8	107
Geometry Grp	1	1	1	1
Degree of Util (X)	0.117	0.007	0.009	0.119
Departure Headway (Hd)	4.037	4.504	4.1	4.005
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	887	783	859	894
Service Time	2.065	2.596	2.193	2.033
HCM Lane V/C Ratio	0.117	0.006	0.009	0.12
HCM Control Delay	7.6	7.6	7.2	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0	0	0.4

Intersection	
Int Delay, s/veh	4.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	52	34	65	21	32	43
Future Vol, veh/h	52	34	65	21	32	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	76	76	86	86	69	69
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	45	76	24	46	62

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	242	88	0	0	100	0
Stage 1	88	-	-	-	-	-
Stage 2	154	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	746	970	-	-	1493	-
Stage 1	935	-	-	-	-	-
Stage 2	874	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	722	970	-	-	1493	-
Mov Cap-2 Maneuver	722	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	846	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	3.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	803	1493	-
HCM Lane V/C Ratio	-	-	0.141	0.031	-
HCM Control Delay (s)	-	-	10.2	7.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

Intersection	
Intersection Delay, s/veh	13.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	78	40	11	21	31	146	26	104	26	90	49	93
Future Vol, veh/h	78	40	11	21	31	146	26	104	26	90	49	93
Peak Hour Factor	0.65	0.65	0.65	0.70	0.70	0.70	0.79	0.79	0.79	0.62	0.62	0.62
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	120	62	17	30	44	209	33	132	33	145	79	150
Number of Lanes	0	1	1	0	1	1	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	13.2	11.4	12.1	16.2
HCM LOS	B	B	B	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	17%	66%	0%	40%	0%	39%
Vol Thru, %	67%	34%	0%	60%	0%	21%
Vol Right, %	17%	0%	100%	0%	100%	40%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	156	118	11	52	146	232
LT Vol	26	78	0	21	0	90
Through Vol	104	40	0	31	0	49
RT Vol	26	0	11	0	146	93
Lane Flow Rate	197	182	17	74	209	374
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.329	0.353	0.028	0.14	0.34	0.58
Departure Headway (Hd)	5.999	7.008	5.954	6.789	5.868	5.577
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	594	510	596	524	607	644
Service Time	4.092	4.802	3.747	4.578	3.655	3.653
HCM Lane V/C Ratio	0.332	0.357	0.029	0.141	0.344	0.581
HCM Control Delay	12.1	13.6	8.9	10.7	11.7	16.2
HCM Lane LOS	B	B	A	B	B	C
HCM 95th-tile Q	1.4	1.6	0.1	0.5	1.5	3.7

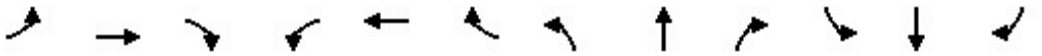
Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	86	95	0	0	5
Future Vol, veh/h	5	86	95	0	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	5	93	103	0	0	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	103	0	-	0	206	103
Stage 1	-	-	-	-	103	-
Stage 2	-	-	-	-	103	-
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	1489	-	-	-	782	952
Stage 1	-	-	-	-	921	-
Stage 2	-	-	-	-	921	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1489	-	-	-	779	952
Mov Cap-2 Maneuver	-	-	-	-	779	-
Stage 1	-	-	-	-	917	-
Stage 2	-	-	-	-	921	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1489	-	-	-	952
HCM Lane V/C Ratio	0.004	-	-	-	0.006
HCM Control Delay (s)	7.4	0	-	-	8.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	213	220	31	226	25	167	7	52	34	12	37
Future Volume (veh/h)	35	213	220	31	226	25	167	7	52	34	12	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	232	192	36	263	26	199	8	56	39	14	37
Peak Hour Factor	0.92	0.92	0.92	0.86	0.86	0.86	0.84	0.84	0.84	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	416	344	58	369	37	296	34	235	54	19	51
Arrive On Green	0.03	0.22	0.22	0.03	0.22	0.22	0.17	0.17	0.17	0.07	0.07	0.07
Sat Flow, veh/h	1781	1870	1547	1781	1671	165	1781	202	1414	738	265	700
Grp Volume(v), veh/h	38	232	192	36	0	289	199	0	64	90	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1547	1781	0	1836	1781	0	1616	1703	0	0
Q Serve(g_s), s	0.9	4.6	4.6	0.8	0.0	6.1	4.4	0.0	1.4	2.2	0.0	0.0
Cycle Q Clear(g_c), s	0.9	4.6	4.6	0.8	0.0	6.1	4.4	0.0	1.4	2.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.88	0.43		0.41
Lane Grp Cap(c), veh/h	61	416	344	58	0	406	296	0	269	124	0	0
V/C Ratio(X)	0.63	0.56	0.56	0.62	0.00	0.71	0.67	0.00	0.24	0.73	0.00	0.00
Avail Cap(c_a), veh/h	892	2053	1698	892	0	2015	1232	0	1118	1178	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	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	20.0	14.5	14.5	20.0	0.0	15.1	16.4	0.0	15.2	19.0	0.0	0.0
Incr Delay (d2), s/veh	3.9	0.4	0.5	3.9	0.0	0.9	2.6	0.0	0.5	3.0	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	0.4	1.7	1.4	0.4	0.0	2.2	1.7	0.0	0.5	0.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.9	14.9	15.0	23.9	0.0	16.0	19.0	0.0	15.6	22.0	0.0	0.0
LnGrp LOS	C	B	B	C	A	B	B	A	B	C	A	A
Approach Vol, veh/h		462			325			263			90	
Approach Delay, s/veh		15.7			16.8			18.2			22.0	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.0	15.1		8.4	6.0	15.1		12.4				
Change Period (Y+Rc), s	4.6	5.8		5.4	4.6	5.8		5.4				
Max Green Setting (Gmax), s	21.0	46.0		29.0	21.0	46.0		29.0				
Max Q Clear Time (g_c+I1), s	2.8	6.6		4.2	2.9	8.1		6.4				
Green Ext Time (p_c), s	0.0	1.2		0.3	0.0	1.2		0.9				

Intersection Summary			
HCM 6th Ctrl Delay		17.1	
HCM 6th LOS		B	

Notes

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

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	0	0	2	0	0	0	139	0	0	139	10
Future Vol, veh/h	10	0	0	2	0	0	0	139	0	0	139	10
Peak Hour Factor	0.92	0.92	0.92	0.25	0.25	0.25	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	0	0	8	0	0	0	156	0	0	156	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	7.9	7.9	8	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	100%	100%	0%
Vol Thru, %	100%	0%	0%	93%
Vol Right, %	0%	0%	0%	7%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	139	10	2	149
LT Vol	0	10	2	0
Through Vol	139	0	0	139
RT Vol	0	0	0	10
Lane Flow Rate	156	11	8	167
Geometry Grp	1	1	1	1
Degree of Util (X)	0.178	0.015	0.011	0.188
Departure Headway (Hd)	4.092	4.84	4.844	4.044
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	871	744	743	882
Service Time	2.144	2.841	2.845	2.095
HCM Lane V/C Ratio	0.179	0.015	0.011	0.189
HCM Control Delay	8	7.9	7.9	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.6	0	0	0.7

Intersection	
Int Delay, s/veh	2.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	35	35	105	83	45	98
Future Vol, veh/h	35	35	105	83	45	98
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	79	79	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	45	133	105	51	111

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	399	186	0	0	238	0
Stage 1	186	-	-	-	-	-
Stage 2	213	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	607	856	-	-	1329	-
Stage 1	846	-	-	-	-	-
Stage 2	823	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	582	856	-	-	1329	-
Mov Cap-2 Maneuver	582	-	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	789	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	2.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	693	1329	-
HCM Lane V/C Ratio	-	-	0.13	0.038	-
HCM Control Delay (s)	-	-	11	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	37	51	10	43	33	63	17	81	39	115	139	74
Future Vol, veh/h	37	51	10	43	33	63	17	81	39	115	139	74
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	46	63	12	53	41	78	18	84	41	120	145	77
Number of Lanes	0	1	1	0	1	1	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	10.3	9.5	9.5	12.2
HCM LOS	B	A	A	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	12%	42%	0%	57%	0%	35%
Vol Thru, %	59%	58%	0%	43%	0%	42%
Vol Right, %	28%	0%	100%	0%	100%	23%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	137	88	10	76	63	328
LT Vol	17	37	0	43	0	115
Through Vol	81	51	0	33	0	139
RT Vol	39	0	10	0	63	74
Lane Flow Rate	143	109	12	94	78	342
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.203	0.189	0.018	0.164	0.114	0.469
Departure Headway (Hd)	5.123	6.266	5.341	6.275	5.277	4.944
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	701	574	670	572	680	735
Service Time	3.154	3.999	3.074	4.005	3.006	2.944
HCM Lane V/C Ratio	0.204	0.19	0.018	0.164	0.115	0.465
HCM Control Delay	9.5	10.5	8.2	10.2	8.7	12.2
HCM Lane LOS	A	B	A	B	A	B
HCM 95th-tile Q	0.8	0.7	0.1	0.6	0.4	2.5

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	188	133	0	0	9
Future Vol, veh/h	10	188	133	0	0	9
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	11	204	145	0	0	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	145	0	-	0	371	145
Stage 1	-	-	-	-	145	-
Stage 2	-	-	-	-	226	-
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	1437	-	-	-	630	902
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	812	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1437	-	-	-	624	902
Mov Cap-2 Maneuver	-	-	-	-	624	-
Stage 1	-	-	-	-	874	-
Stage 2	-	-	-	-	812	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1437	-	-	-	902
HCM Lane V/C Ratio	0.008	-	-	-	0.011
HCM Control Delay (s)	7.5	0	-	-	9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Appendix E
Cumulative Project Information

Rancho Nuevo Major Subdivision; 3100 5475 (TM)

Summary

SCH Number	2011021015
Lead Agency	San Diego County
Document Title	Rancho Nuevo Major Subdivision; 3100 5475 (TM)
Document Type	NOD - Notice of Determination
Received	7/26/2012
Posted	7/26/2012
Present Land Use	A 70; Limited Agriculture; (1) Residential
Document Description	The proposed project is a major subdivision to create 14 residential parcels on a 60.15-acre site; three additional lots are proposed for private roads that would be maintained in accordance with a Private Road Maintenance Agreement. The project site is located at the eastern terminus of Via Tesoro in the Rancho Palo Verde Estates residential development, which is located south of Interstate 8 in the Alpine Community Planning area of unincorporated San Diego County.
Contact Information	Kristina Jeffers San Diego County 5201 Ruffin Road, Suite B San Diego, CA 92123 Phone : (858) 694-2604

Location

Coordinates	32°48'41"N 116°45'21"W
Counties	San Diego
Cross Streets	Via Viejas Oeste/ Via Tesoro
Zip	91901
Total Acres	60.15
Parcel #	520-060-08-00, 520-160-02-00
State Highways	I-8
Schools	Boulder Oaks ES, Joan MacQueen MS, Alpine Community Day
Township	16S
Range	02E
Section	3
Base	SBB&M
Other Location Info	City/Nearest Community: Alpine
Other Information	Cont. Schools: Alpine Christian, Day-McKellar Preparatory

Notice of Determination

Approving Agency	County of San Diego Planning Commission

Approving Agency Role Lead Agency

Approved On 7/20/2012

Final Environmental Document Available at
County of San Diego Department of Planning and Land Use, M.S. O650 5201 Ruffin Road, Suite B, San Diego, CA 92123

Determinations

(1) The project will have a significant impact on the environment
No

(2a) An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA
No

(2b) A Mitigated or a Negative Declaration was prepared for this project pursuant to the provisions of CEQA
Yes

(2c) An other document type was prepared for this project pursuant to the provisions of CEQA
No

(3) Mitigated measures were made a condition of the approval of the project
Yes

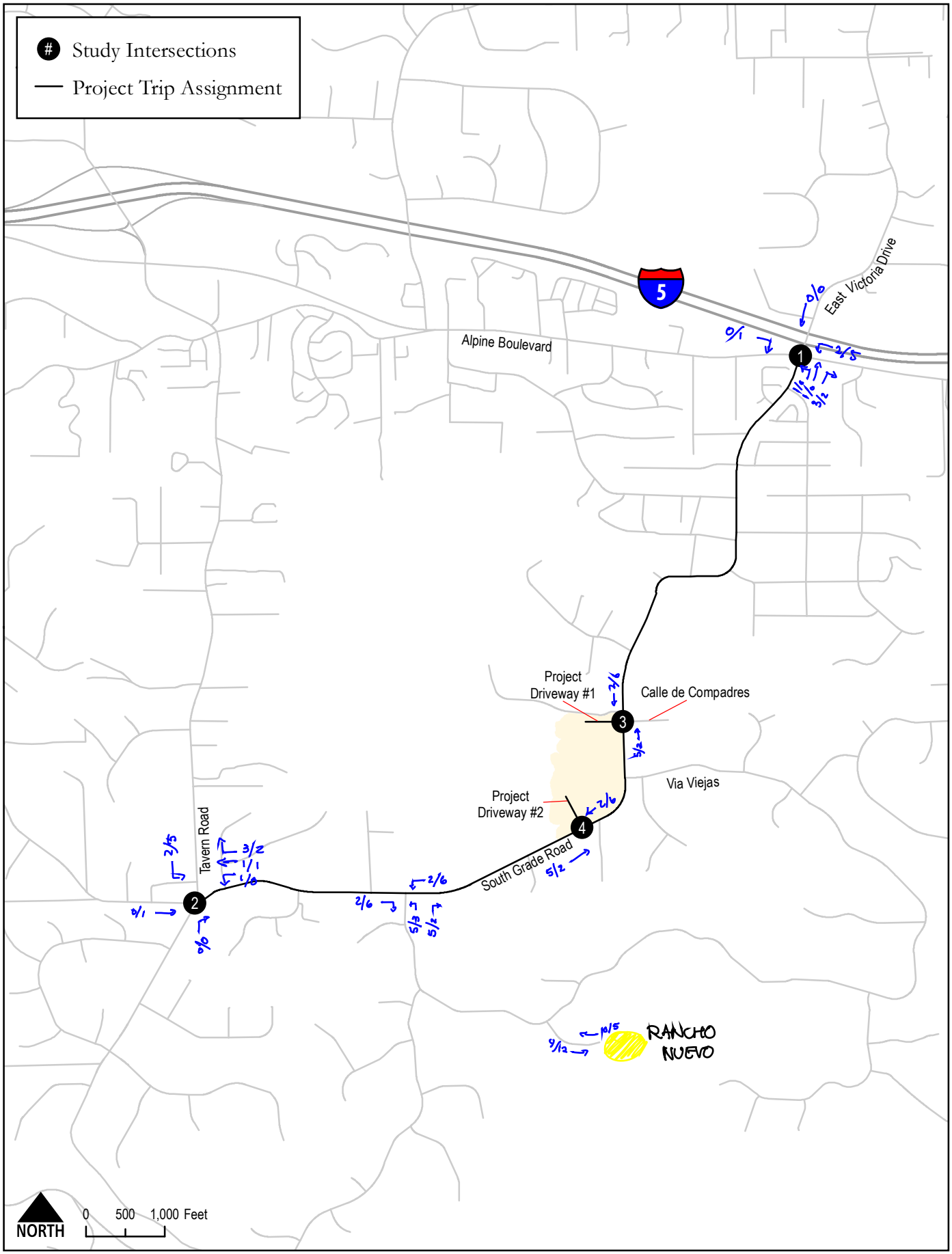
(4) A mitigation reporting or monitoring plan was adopted for this project
N/A

(5) A Statement of Overriding Considerations was adopted for this project
N/A

(6) Findings were made pursuant to the provisions of CEQA
N/A

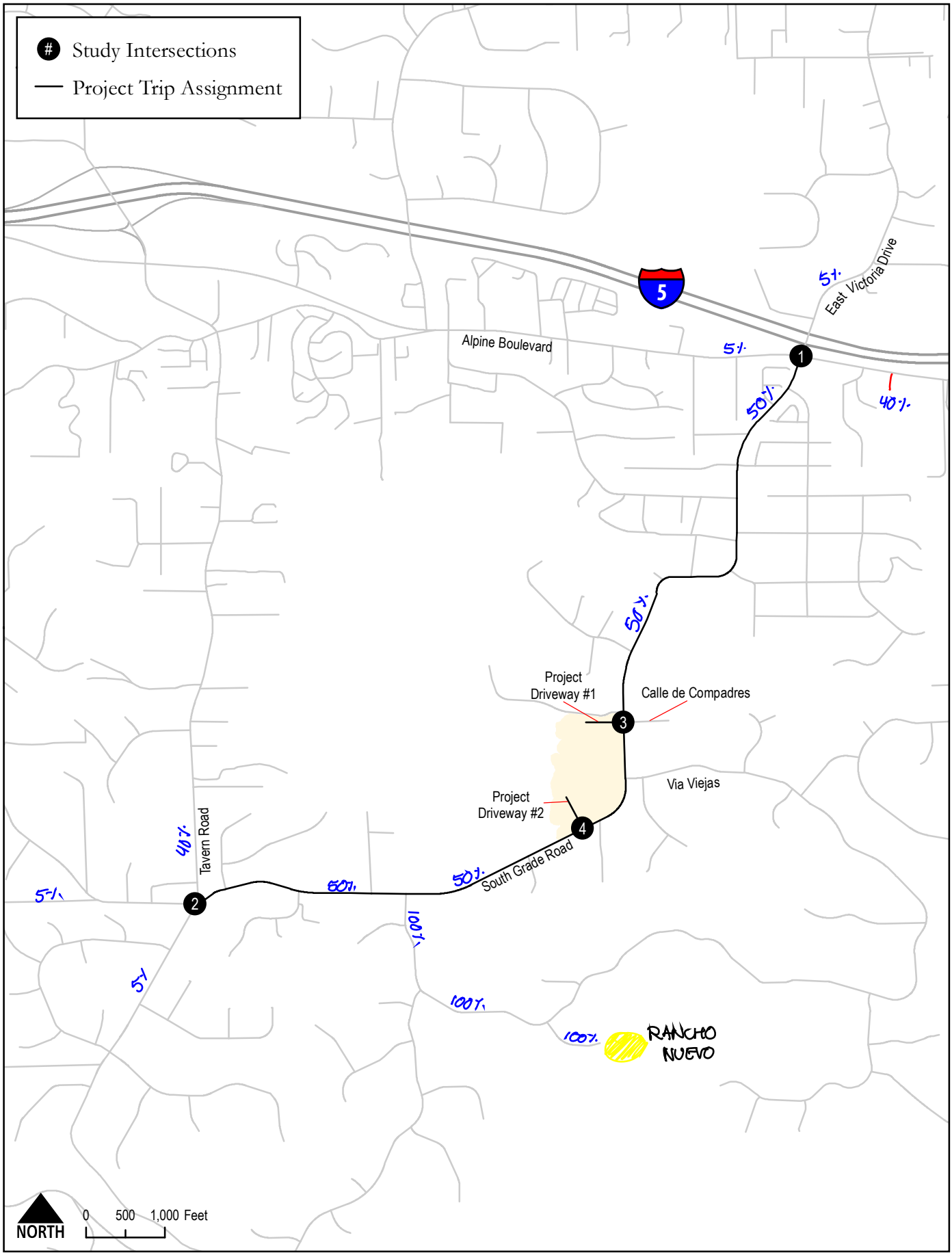
Disclaimer: The document was originally posted before CEQAnet had the capability to host attachments for the public. To obtain the original attachments for this document, please contact the lead agency at the contact information listed above. You may also contact the OPR via email at state.clearinghouse@opr.ca.gov or via phone at (916) 445-0613.

CB



Alpine Community Park
Traffic Analysis Memorandum
CHEN RYAN

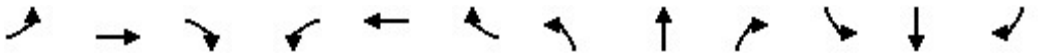
Figure 5
~~*Project Study Area*~~
Cum. Proj. Trip Assign.



Alpine Community Park
Traffic Analysis Memorandum
CHEN RYAN

Figure 5
~~*Project Study Area*~~
Cumulative Project Trip Dist.

Appendix F
Peak Hour Intersection Capacity Worksheets Near-Term Base Conditions



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	133	105	33	96	9	165	10	55	9	11	32
Future Volume (veh/h)	14	133	105	33	96	9	165	10	55	9	11	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	18	168	106	41	119	10	226	14	68	13	16	43
Peak Hour Factor	0.79	0.79	0.79	0.81	0.81	0.81	0.73	0.73	0.73	0.68	0.68	0.68
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	32	294	243	66	298	25	341	53	258	18	22	60
Arrive On Green	0.02	0.16	0.16	0.04	0.18	0.18	0.19	0.19	0.19	0.06	0.06	0.06
Sat Flow, veh/h	1781	1870	1550	1781	1698	143	1781	278	1350	302	371	997
Grp Volume(v), veh/h	18	168	106	41	0	129	226	0	82	72	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1550	1781	0	1840	1781	0	1627	1670	0	0
Q Serve(g_s), s	0.4	3.2	2.4	0.9	0.0	2.4	4.5	0.0	1.6	1.6	0.0	0.0
Cycle Q Clear(g_c), s	0.4	3.2	2.4	0.9	0.0	2.4	4.5	0.0	1.6	1.6	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.08	1.00		0.83	0.18		0.60
Lane Grp Cap(c), veh/h	32	294	243	66	0	323	341	0	312	100	0	0
V/C Ratio(X)	0.56	0.57	0.44	0.62	0.00	0.40	0.66	0.00	0.26	0.72	0.00	0.00
Avail Cap(c_a), veh/h	979	2252	1866	979	0	2216	1352	0	1235	1268	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	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.6	14.9	14.6	18.1	0.0	14.0	14.3	0.0	13.2	17.7	0.0	0.0
Incr Delay (d2), s/veh	5.4	0.7	0.5	3.6	0.0	0.3	2.2	0.0	0.4	3.6	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	0.2	1.2	0.7	0.4	0.0	0.8	1.7	0.0	0.5	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.0	15.6	15.0	21.7	0.0	14.3	16.5	0.0	13.6	21.3	0.0	0.0
LnGrp LOS	C	B	B	C	A	B	B	A	B	C	A	A
Approach Vol, veh/h		292			170			308			72	
Approach Delay, s/veh		15.9			16.0			15.7			21.3	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.0	11.8		7.7	5.3	12.5		12.7				
Change Period (Y+Rc), s	4.6	5.8		5.4	4.6	5.8		5.4				
Max Green Setting (Gmax), s	21.0	46.0		29.0	21.0	46.0		29.0				
Max Q Clear Time (g_c+I1), s	2.9	5.2		3.6	2.4	4.4		6.5				
Green Ext Time (p_c), s	0.0	0.8		0.2	0.0	0.5		1.1				

Intersection Summary			
HCM 6th Ctrl Delay		16.3	
HCM 6th LOS		B	

Notes

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

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	2	101	0	3	72
Future Vol, veh/h	2	2	101	0	3	72
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	50	50	92	92	73	73
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	4	110	0	4	99

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	217	110	0	0	110	0
Stage 1	110	-	-	-	-	-
Stage 2	107	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	771	943	-	-	1480	-
Stage 1	915	-	-	-	-	-
Stage 2	917	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	769	943	-	-	1480	-
Mov Cap-2 Maneuver	769	-	-	-	-	-
Stage 1	915	-	-	-	-	-
Stage 2	914	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.3	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	847	1480	-
HCM Lane V/C Ratio	-	-	0.009	0.003	-
HCM Control Delay (s)	-	-	9.3	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	4.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	52	34	65	21	32	43
Future Vol, veh/h	52	34	65	21	32	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	76	76	86	86	69	69
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	45	76	24	46	62

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	242	88	0	0	100	0
Stage 1	88	-	-	-	-	-
Stage 2	154	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	746	970	-	-	1493	-
Stage 1	935	-	-	-	-	-
Stage 2	874	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	722	970	-	-	1493	-
Mov Cap-2 Maneuver	722	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	846	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	3.2
HCM LOS	B		

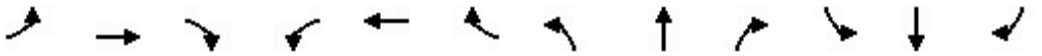
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	803	1493	-
HCM Lane V/C Ratio	-	-	0.141	0.031	-
HCM Control Delay (s)	-	-	10.2	7.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

Intersection	
Intersection Delay, s/veh	13.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	78	38	11	21	30	147	26	104	25	90	49	93
Future Vol, veh/h	78	38	11	21	30	147	26	104	25	90	49	93
Peak Hour Factor	0.65	0.65	0.65	0.70	0.70	0.70	0.79	0.79	0.79	0.62	0.62	0.62
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	120	58	17	30	43	210	33	132	32	145	79	150
Number of Lanes	0	1	1	0	1	1	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	13.1	11.4	12	16.1
HCM LOS	B	B	B	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	17%	67%	0%	41%	0%	39%
Vol Thru, %	67%	33%	0%	59%	0%	21%
Vol Right, %	16%	0%	100%	0%	100%	40%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	155	116	11	51	147	232
LT Vol	26	78	0	21	0	90
Through Vol	104	38	0	30	0	49
RT Vol	25	0	11	0	147	93
Lane Flow Rate	196	178	17	73	210	374
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.326	0.347	0.028	0.137	0.342	0.578
Departure Headway (Hd)	5.988	7.007	5.947	6.78	5.855	5.563
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	594	510	597	525	609	644
Service Time	4.079	4.798	3.737	4.565	3.638	3.637
HCM Lane V/C Ratio	0.33	0.349	0.028	0.139	0.345	0.581
HCM Control Delay	12	13.5	8.9	10.7	11.7	16.1
HCM Lane LOS	B	B	A	B	B	C
HCM 95th-tile Q	1.4	1.5	0.1	0.5	1.5	3.7



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	213	217	34	226	25	163	5	50	34	10	37
Future Volume (veh/h)	35	213	217	34	226	25	163	5	50	34	10	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	232	189	40	263	26	194	6	54	39	11	37
Peak Hour Factor	0.92	0.92	0.92	0.86	0.86	0.86	0.84	0.84	0.84	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	412	341	63	371	37	290	26	235	53	15	51
Arrive On Green	0.03	0.22	0.22	0.04	0.22	0.22	0.16	0.16	0.16	0.07	0.07	0.07
Sat Flow, veh/h	1781	1870	1547	1781	1671	165	1781	161	1449	761	215	722
Grp Volume(v), veh/h	38	232	189	40	0	289	194	0	60	87	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1547	1781	0	1836	1781	0	1610	1698	0	0
Q Serve(g_s), s	0.9	4.6	4.5	0.9	0.0	6.0	4.2	0.0	1.3	2.1	0.0	0.0
Cycle Q Clear(g_c), s	0.9	4.6	4.5	0.9	0.0	6.0	4.2	0.0	1.3	2.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.90	0.45		0.43
Lane Grp Cap(c), veh/h	61	412	341	63	0	407	290	0	262	119	0	0
V/C Ratio(X)	0.62	0.56	0.55	0.63	0.00	0.71	0.67	0.00	0.23	0.73	0.00	0.00
Avail Cap(c_a), veh/h	902	2075	1716	902	0	2037	1246	0	1126	1187	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	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	19.8	14.4	14.4	19.7	0.0	14.9	16.3	0.0	15.1	18.9	0.0	0.0
Incr Delay (d2), s/veh	3.8	0.5	0.5	3.8	0.0	0.9	2.7	0.0	0.4	3.2	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	0.4	1.7	1.4	0.4	0.0	2.2	1.7	0.0	0.5	0.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.6	14.8	14.9	23.5	0.0	15.8	19.0	0.0	15.5	22.1	0.0	0.0
LnGrp LOS	C	B	B	C	A	B	B	A	B	C	A	A
Approach Vol, veh/h		459			329			254			87	
Approach Delay, s/veh		15.6			16.7			18.2			22.1	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	14.9		8.3	6.0	15.0		12.1				
Change Period (Y+Rc), s	4.6	5.8		5.4	4.6	5.8		5.4				
Max Green Setting (Gmax), s	21.0	46.0		29.0	21.0	46.0		29.0				
Max Q Clear Time (g_c+I1), s	2.9	6.6		4.1	2.9	8.0		6.2				
Green Ext Time (p_c), s	0.0	1.2		0.3	0.0	1.2		0.9				

Intersection Summary			
HCM 6th Ctrl Delay		17.0	
HCM 6th LOS		B	

Notes

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

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	0	141	0	0	145
Future Vol, veh/h	2	0	141	0	0	145
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	25	25	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	0	158	0	0	163

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	321	158	0	0	158	0
Stage 1	158	-	-	-	-	-
Stage 2	163	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	673	887	-	-	1422	-
Stage 1	871	-	-	-	-	-
Stage 2	866	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	673	887	-	-	1422	-
Mov Cap-2 Maneuver	673	-	-	-	-	-
Stage 1	871	-	-	-	-	-
Stage 2	866	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	673	1422	-
HCM Lane V/C Ratio	-	-	0.012	-	-
HCM Control Delay (s)	-	-	10.4	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	2.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	35	35	105	83	45	98
Future Vol, veh/h	35	35	105	83	45	98
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	79	79	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	45	133	105	51	111

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	399	186	0	0	238	0
Stage 1	186	-	-	-	-	-
Stage 2	213	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	607	856	-	-	1329	-
Stage 1	846	-	-	-	-	-
Stage 2	823	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	582	856	-	-	1329	-
Mov Cap-2 Maneuver	582	-	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	789	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	2.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	693	1329	-
HCM Lane V/C Ratio	-	-	0.13	0.038	-
HCM Control Delay (s)	-	-	11	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

Intersection	
Intersection Delay, s/veh	10.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	37	48	10	41	31	61	17	81	37	116	139	74
Future Vol, veh/h	37	48	10	41	31	61	17	81	37	116	139	74
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	46	59	12	51	38	75	18	84	39	121	145	77
Number of Lanes	0	1	1	0	1	1	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	10.2	9.4	9.4	12
HCM LOS	B	A	A	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	13%	44%	0%	57%	0%	35%
Vol Thru, %	60%	56%	0%	43%	0%	42%
Vol Right, %	27%	0%	100%	0%	100%	22%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	135	85	10	72	61	329
LT Vol	17	37	0	41	0	116
Through Vol	81	48	0	31	0	139
RT Vol	37	0	10	0	61	74
Lane Flow Rate	141	105	12	89	75	343
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.199	0.182	0.018	0.155	0.11	0.458
Departure Headway (Hd)	5.096	6.251	5.319	6.259	5.26	4.808
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	706	576	675	575	685	740
Service Time	3.111	3.963	3.031	3.97	2.97	2.905
HCM Lane V/C Ratio	0.2	0.182	0.018	0.155	0.109	0.464
HCM Control Delay	9.4	10.4	8.1	10.1	8.6	12
HCM Lane LOS	A	B	A	B	A	B
HCM 95th-tile Q	0.7	0.7	0.1	0.5	0.4	2.4

Appendix G
Arterial Level of Service Analysis Worksheets Near-Term Base with Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	133	107	34	96	9	167	11	57	9	12	32
Future Volume (veh/h)	14	133	107	34	96	9	167	11	57	9	12	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	18	168	108	42	119	10	229	15	71	13	18	43
Peak Hour Factor	0.79	0.79	0.79	0.81	0.81	0.81	0.73	0.73	0.73	0.68	0.68	0.68
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	60	382	317	95	380	32	403	64	304	29	40	95
Arrive On Green	0.03	0.20	0.20	0.05	0.22	0.18	0.23	0.23	0.19	0.10	0.10	0.06
Sat Flow, veh/h	1781	1870	1550	1781	1698	143	1781	284	1344	294	407	973
Grp Volume(v), veh/h	18	168	108	42	0	129	229	0	86	74	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1550	1781	0	1840	1781	0	1628	1675	0	0
Q Serve(g_s), s	0.4	3.0	2.3	0.9	0.0	2.2	4.4	0.0	1.7	1.6	0.0	0.0
Cycle Q Clear(g_c), s	0.4	3.0	2.3	0.9	0.0	2.2	4.4	0.0	1.7	1.6	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.08	1.00		0.83	0.18		0.58
Lane Grp Cap(c), veh/h	60	382	317	95	0	412	403	0	369	163	0	0
V/C Ratio(X)	0.30	0.44	0.34	0.44	0.00	0.31	0.57	0.00	0.23	0.45	0.00	0.00
Avail Cap(c_a), veh/h	1007	2340	1940	1007	0	2303	1417	0	1296	1333	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	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.0	13.3	13.0	17.5	0.0	12.4	13.1	0.0	12.6	16.7	0.0	0.0
Incr Delay (d2), s/veh	1.0	0.3	0.2	1.2	0.0	0.2	1.3	0.0	0.3	0.7	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	0.2	1.1	0.7	0.3	0.0	0.8	1.5	0.0	0.5	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.0	13.6	13.2	18.7	0.0	12.6	14.4	0.0	12.9	17.4	0.0	0.0
LnGrp LOS	B	B	B	B	A	B	B	A	B	B	A	A
Approach Vol, veh/h		294			171			315			74	
Approach Delay, s/veh		13.8			14.1			14.0			17.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.0	11.8		7.7	5.3	12.5		12.6				
Change Period (Y+Rc), s	4.6	5.8		5.4	4.6	5.8		5.4				
Max Green Setting (Gmax), s	21.0	46.0		29.0	21.0	46.0		29.0				
Max Q Clear Time (g_c+I1), s	2.9	5.0		3.6	2.4	4.2		6.4				
Green Ext Time (p_c), s	0.0	0.8		0.2	0.0	0.5		1.2				

Intersection Summary		
HCM 6th Ctrl Delay		14.2
HCM 6th LOS		B

Notes

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

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	0	2	0	2	0	101	0	3	72	5
Future Vol, veh/h	5	0	0	2	0	2	0	101	0	3	72	5
Peak Hour Factor	0.92	0.92	0.92	0.50	0.50	0.50	0.92	0.92	0.92	0.73	0.73	0.73
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	0	0	4	0	4	0	110	0	4	99	7
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	7.6	7.2	7.6	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	100%	50%	4%
Vol Thru, %	100%	0%	0%	90%
Vol Right, %	0%	0%	50%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	101	5	4	80
LT Vol	0	5	2	3
Through Vol	101	0	0	72
RT Vol	0	0	2	5
Lane Flow Rate	110	5	8	110
Geometry Grp	1	1	1	1
Degree of Util (X)	0.123	0.007	0.009	0.122
Departure Headway (Hd)	4.039	4.517	4.114	4.01
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	887	780	855	893
Service Time	2.068	2.613	2.21	2.039
HCM Lane V/C Ratio	0.124	0.006	0.009	0.123
HCM Control Delay	7.6	7.6	7.2	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0	0	0.4

Intersection	
Int Delay, s/veh	4.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	52	34	65	21	32	43
Future Vol, veh/h	52	34	65	21	32	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	76	76	86	86	69	69
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	45	76	24	46	62

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	242	88	0	0	100	0
Stage 1	88	-	-	-	-	-
Stage 2	154	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	746	970	-	-	1493	-
Stage 1	935	-	-	-	-	-
Stage 2	874	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	722	970	-	-	1493	-
Mov Cap-2 Maneuver	722	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	846	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	3.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	803	1493	-
HCM Lane V/C Ratio	-	-	0.141	0.031	-
HCM Control Delay (s)	-	-	10.2	7.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

Intersection	
Intersection Delay, s/veh	13.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	78	40	11	22	32	149	26	104	26	92	49	93
Future Vol, veh/h	78	40	11	22	32	149	26	104	26	92	49	93
Peak Hour Factor	0.65	0.65	0.65	0.70	0.70	0.70	0.79	0.79	0.79	0.62	0.62	0.62
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	120	62	17	31	46	213	33	132	33	148	79	150
Number of Lanes	0	1	1	0	1	1	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	13.3	11.5	12.1	16.4
HCM LOS	B	B	B	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	17%	66%	0%	41%	0%	39%
Vol Thru, %	67%	34%	0%	59%	0%	21%
Vol Right, %	17%	0%	100%	0%	100%	40%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	156	118	11	54	149	234
LT Vol	26	78	0	22	0	92
Through Vol	104	40	0	32	0	49
RT Vol	26	0	11	0	149	93
Lane Flow Rate	197	182	17	77	213	377
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.331	0.355	0.028	0.146	0.348	0.587
Departure Headway (Hd)	6.03	7.039	5.985	6.81	5.887	5.603
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	590	506	592	523	607	638
Service Time	4.129	4.836	3.78	4.6	3.675	3.684
HCM Lane V/C Ratio	0.334	0.36	0.029	0.147	0.351	0.591
HCM Control Delay	12.1	13.7	9	10.8	11.8	16.4
HCM Lane LOS	B	B	A	B	B	C
HCM 95th-tile Q	1.4	1.6	0.1	0.5	1.6	3.8

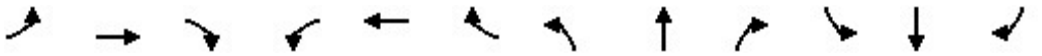
Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	91	97	0	0	5
Future Vol, veh/h	5	91	97	0	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	5	99	105	0	0	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	105	0	-	0	214	105
Stage 1	-	-	-	-	105	-
Stage 2	-	-	-	-	109	-
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	1486	-	-	-	774	949
Stage 1	-	-	-	-	919	-
Stage 2	-	-	-	-	916	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1486	-	-	-	771	949
Mov Cap-2 Maneuver	-	-	-	-	771	-
Stage 1	-	-	-	-	915	-
Stage 2	-	-	-	-	916	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1486	-	-	-	949
HCM Lane V/C Ratio	0.004	-	-	-	0.006
HCM Control Delay (s)	7.4	0	-	-	8.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	213	221	36	226	25	167	7	54	34	12	37
Future Volume (veh/h)	35	213	221	36	226	25	167	7	54	34	12	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	232	193	42	263	26	199	8	58	39	14	37
Peak Hour Factor	0.92	0.92	0.92	0.86	0.86	0.86	0.84	0.84	0.84	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	408	338	66	369	37	297	33	237	54	19	51
Arrive On Green	0.03	0.22	0.22	0.04	0.22	0.22	0.17	0.17	0.17	0.07	0.07	0.07
Sat Flow, veh/h	1781	1870	1547	1781	1671	165	1781	196	1419	738	265	700
Grp Volume(v), veh/h	38	232	193	42	0	289	199	0	66	90	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1547	1781	0	1836	1781	0	1615	1703	0	0
Q Serve(g_s), s	0.9	4.6	4.7	1.0	0.0	6.1	4.4	0.0	1.5	2.2	0.0	0.0
Cycle Q Clear(g_c), s	0.9	4.6	4.7	1.0	0.0	6.1	4.4	0.0	1.5	2.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.88	0.43		0.41
Lane Grp Cap(c), veh/h	61	408	338	66	0	406	297	0	269	124	0	0
V/C Ratio(X)	0.63	0.57	0.57	0.64	0.00	0.71	0.67	0.00	0.25	0.73	0.00	0.00
Avail Cap(c_a), veh/h	892	2051	1697	892	0	2014	1232	0	1117	1177	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	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	20.0	14.6	14.6	19.9	0.0	15.1	16.4	0.0	15.2	19.0	0.0	0.0
Incr Delay (d2), s/veh	3.9	0.5	0.6	3.8	0.0	0.9	2.6	0.0	0.5	3.0	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	0.4	1.7	1.4	0.4	0.0	2.2	1.7	0.0	0.5	0.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.9	15.1	15.2	23.7	0.0	16.0	19.0	0.0	15.7	22.1	0.0	0.0
LnGrp LOS	C	B	B	C	A	B	B	A	B	C	A	A
Approach Vol, veh/h		463			331			265			90	
Approach Delay, s/veh		15.9			17.0			18.2			22.1	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	15.0		8.5	6.0	15.1		12.4				
Change Period (Y+Rc), s	4.6	5.8		5.4	4.6	5.8		5.4				
Max Green Setting (Gmax), s	21.0	46.0		29.0	21.0	46.0		29.0				
Max Q Clear Time (g_c+I1), s	3.0	6.7		4.2	2.9	8.1		6.4				
Green Ext Time (p_c), s	0.0	1.2		0.3	0.0	1.2		0.9				

Intersection Summary		
HCM 6th Ctrl Delay		17.2
HCM 6th LOS		B

Notes

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

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	0	0	2	0	0	0	141	0	0	145	10
Future Vol, veh/h	10	0	0	2	0	0	0	141	0	0	145	10
Peak Hour Factor	0.92	0.92	0.92	0.25	0.25	0.25	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	0	0	8	0	0	0	158	0	0	163	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	7.9	7.9	8.1	8.1
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	100%	100%	0%
Vol Thru, %	100%	0%	0%	94%
Vol Right, %	0%	0%	0%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	141	10	2	155
LT Vol	0	10	2	0
Through Vol	141	0	0	145
RT Vol	0	0	0	10
Lane Flow Rate	158	11	8	174
Geometry Grp	1	1	1	1
Degree of Util (X)	0.18	0.015	0.011	0.196
Departure Headway (Hd)	4.097	4.858	4.863	4.047
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	870	741	740	881
Service Time	2.15	2.859	2.864	2.098
HCM Lane V/C Ratio	0.182	0.015	0.011	0.198
HCM Control Delay	8.1	7.9	7.9	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0	0	0.7

Intersection	
Int Delay, s/veh	2.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	35	35	105	83	45	98
Future Vol, veh/h	35	35	105	83	45	98
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	79	79	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	45	133	105	51	111

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	399	186	0	0	238	0
Stage 1	186	-	-	-	-	-
Stage 2	213	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	607	856	-	-	1329	-
Stage 1	846	-	-	-	-	-
Stage 2	823	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	582	856	-	-	1329	-
Mov Cap-2 Maneuver	582	-	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	789	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	2.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	693	1329	-
HCM Lane V/C Ratio	-	-	0.13	0.038	-
HCM Control Delay (s)	-	-	11	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

Intersection	
Intersection Delay, s/veh	10.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	37	52	10	43	34	65	17	81	39	120	139	74
Future Vol, veh/h	37	52	10	43	34	65	17	81	39	120	139	74
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	46	64	12	53	42	80	18	84	41	125	145	77
Number of Lanes	0	1	1	0	1	1	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	10.3	9.6	9.5	12.4
HCM LOS	B	A	A	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	12%	42%	0%	56%	0%	36%
Vol Thru, %	59%	58%	0%	44%	0%	42%
Vol Right, %	28%	0%	100%	0%	100%	22%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	137	89	10	77	65	333
LT Vol	17	37	0	43	0	120
Through Vol	81	52	0	34	0	139
RT Vol	39	0	10	0	65	74
Lane Flow Rate	143	110	12	95	80	347
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.204	0.192	0.018	0.166	0.118	0.478
Departure Headway (Hd)	5.151	6.289	5.366	6.292	5.298	4.964
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	696	571	667	570	676	732
Service Time	3.181	4.022	3.099	4.024	3.029	2.964
HCM Lane V/C Ratio	0.205	0.193	0.018	0.167	0.118	0.474
HCM Control Delay	9.5	10.5	8.2	10.3	8.7	12.4
HCM Lane LOS	A	B	A	B	A	B
HCM 95th-tile Q	0.8	0.7	0.1	0.6	0.4	2.6

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	190	139	0	0	9
Future Vol, veh/h	10	190	139	0	0	9
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	11	207	151	0	0	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	151	0	-	0	380	151
Stage 1	-	-	-	-	151	-
Stage 2	-	-	-	-	229	-
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	1430	-	-	-	622	895
Stage 1	-	-	-	-	877	-
Stage 2	-	-	-	-	809	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1430	-	-	-	616	895
Mov Cap-2 Maneuver	-	-	-	-	616	-
Stage 1	-	-	-	-	869	-
Stage 2	-	-	-	-	809	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1430	-	-	-	895
HCM Lane V/C Ratio	0.008	-	-	-	0.011
HCM Control Delay (s)	7.5	0	-	-	9.1
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Appendix H
Queuing Analysis Results

HCM 6th INTERSECTION	
Node #	3
Zone:	
X East (ft):	-2231
Y North (ft):	-4666
Z Elevation (ft):	0
Description	
Control Type	Unsig
HCM Control Type	AWSC
HCM Intersection Delay (s)	8
HCM Intersection LOS	A

HCM 6th LANE	NBLn1	EBLn1	WBLn1	SBLn1
Sign Control	Stop	Stop	Stop	Stop
Traffic Volume by Lane (vph)	151	5	0	152
Left Turning Volume (vph)	0	5	0	0
Through Volume (vph)	151	0	0	147
Right Turning Volume (vph)	0	0	0	5
Lane Flow Rate (vph)	164	5	0	165
Geometry Group	1	1	1	1
Degree of Utilization, X	0.185	0.007	0	0.186
Departure Headway, Hd	4.067	4.836	4.645	4.046
Convergence (Y/N)	Yes	Yes	Yes	Yes
Capacity (vph)	880	745	0	884
Service Time (s)	2.103	2.836	2.645	2.083
HCM Lane V/C Ratio	0.186	0.007	0	0.187
HCM Control Delay (s)	8	7.9	7.6	8
HCM Lane LOS	A	A	N	A
HCM 95th Percentile Queue (veh)	0.7	0	0	0.7

HCM 6th INTERSECTION	
Node #	4
Zone:	
X East (ft):	-2850
Y North (ft):	-6115
Z Elevation (ft):	0
Description	
Control Type	Unsig
HCM Control Type	TWSC
HCM Intersection Delay (s)	0.2
HCM Intersection LOS	—
Analysis Period (Hr)	0.25
Ped Walking Speed (ft/s)	3.5
Include Upstream Signal?	No

MOVEMENT S
Lanes and Sharing
Traffic Volume (vph
Future Volume (vph
Conflicting Peds. (#
Sign Control
Storage Length (ft)
Vehicles in median
Grade (%)
Peak Hour Factor
Growth Factor
Adjusted Flow (vph
Heavy Vehicles (%
Right Turn Channe
Curb Radius (ft)
Approach Data
Major/Minor
Conflicting Flow Ra
Critical Headway
Critical Headway S
Critical Headway S
Follow-up Headwa

HCM 6th LANE	EBL	EBT	WBT	WBR	SBLn1
Capacity (vph)	1419	-	-	-	885
HCM Lane V/C Ratio	0.004	-	-	-	0.006
HCM Control Delay (s)	7.547	0	-	-	9.1
HCM Lane LOS	A	A	-	-	A
HCM 95th Percentile Queue (veh)	0	-	-	-	0