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Traffic Impact Study for the Allied Propane Facility

in the

County of Napa

Draft Report

January 13, 2014

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Executive Summary

The proposed project would construct a gas station for autos (8 vehicle fueling positions) and trucks (7 fueling islands), a convenience market and four electric vehicle charging stations on the undeveloped portion of the site located at 221 Devlin Road in Napa County. Vehicular access to the project site is proposed via two new driveways off of Devlin Road.

The project is expected to generate 13 new trips during the a.m. peak hour and 21 new trips during the p.m. peak hour after deductions are made for pass-by and diverted link trips.

The study area includes four intersections that were evaluated during the weekday a.m. and p.m. peak hours. Under Existing Conditions, all of the study intersections but one operate acceptably during both peak hours and would continue to do so with the addition of project-generated traffic. Soscol Ferry Road/Devlin Road operates unacceptably during the p.m. peak hour and would continue to do so with project traffic added. However, the project would add fewer than 50 p.m. peak hour trips, resulting in a less-than-significant impact.

Under Future Conditions, all the study intersection but one would operate unacceptably during both peak hours and would continue to do so with the addition of project generated traffic. The project would add fewer than 50 peak hour trips at any of the study intersections operating unacceptably, resulting in a less-than-significant impact.

Existing bicycle facilities are expected to be adequate. However, to improve accessibility for project patrons and employees who wish to travel to and from the site via a bike, it is recommended that bike racks be installed at the site. Existing transit routes and bus stops adjacent to the project site on Devlin Road are anticipated to adequately serve the project-generated transit trips.

Sight distances at the proposed new project driveway on Devlin Road are adequate. Internal circulation for trucks would be adequate.

A left-turn lane and a right-turn lane is warranted at the northern project driveway on Devlin Road. Installation of turn lanes is therefore recommended.

Introduction

This report presents an analysis of the potential traffic impacts that would be associated with development of a proposed Allied Propane facility to be located at 221 Devlin Road in the County of Napa. The traffic study was completed in accordance with the criteria established by the County of Napa, and is consistent with standard traffic engineering techniques.

Prelude

The purpose of a traffic impact study is to provide County staff and policy makers with data that they can use to make an informed decision regarding the potential traffic impacts of a proposed project, and any associated improvements that would be required in order to mitigate these impacts to a level of insignificance as defined by the County's General Plan or other policies. Vehicular traffic impacts are typically evaluated by determining the number of new trips that the proposed use would be expected to generate, distributing these trips to the surrounding street system based on existing travel patterns or anticipated travel patterns specific to the proposed project, then analyzing the impact the new traffic would be expected to have on critical intersections or roadway segments. Impacts relative to safety, including for pedestrians and bicyclists, and to transit are also addressed.

Project Profile

The project site is located at 221 Devlin Road and is currently partially developed with an office building and warehouse including propane tanks. The project as proposed would construct a gas station for autos (8 vehicle fueling positions) and trucks (7 fueling islands), a convenience market and four electric vehicle charging stations on the undeveloped portion of the site. Vehicular access to the project site is proposed via two new full access driveways off of Devlin Road.

Operational Analysis

Study Area and Periods

The study area consists of the following intersections:

1. Soscol Ferry Road/Devlin Road
2. SR 29-12/SR 221-Soscol Ferry Road
3. Airport Boulevard/Devlin Road
4. SR 29/SR 12-Airport Boulevard

Operating conditions during the a.m. and p.m. peak periods were evaluated to capture the highest potential impacts for the proposed project as well as the highest volumes on the local transportation network. The morning peak hour occurs between 7:00 and 9:00 a.m. and reflects conditions during the home to work or school commute, while the p.m. peak hour occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion during the homeward bound commute.

Study Intersections

Soscol Ferry Road/Devlin Road is an unsignalized, four-legged intersection; the northern leg is a gated driveway that serves a commercial/industrial development. The Soscol Ferry Road eastbound and westbound approaches are uncontrolled while the northbound Devlin Road approach is stop-controlled.

SR 29-12/SR 221-Soscol Ferry Road is a four-legged, signalized intersection with protected left-turn phasing on all four approaches. The northbound SR 29 approach has a free right turn that operates outside the influence of the traffic signal, so this movement was not included in the analysis.

Airport Boulevard/Devlin Road is a signalized, tee-intersection with protected left-turn phasing on the eastbound Airport Boulevard approach.

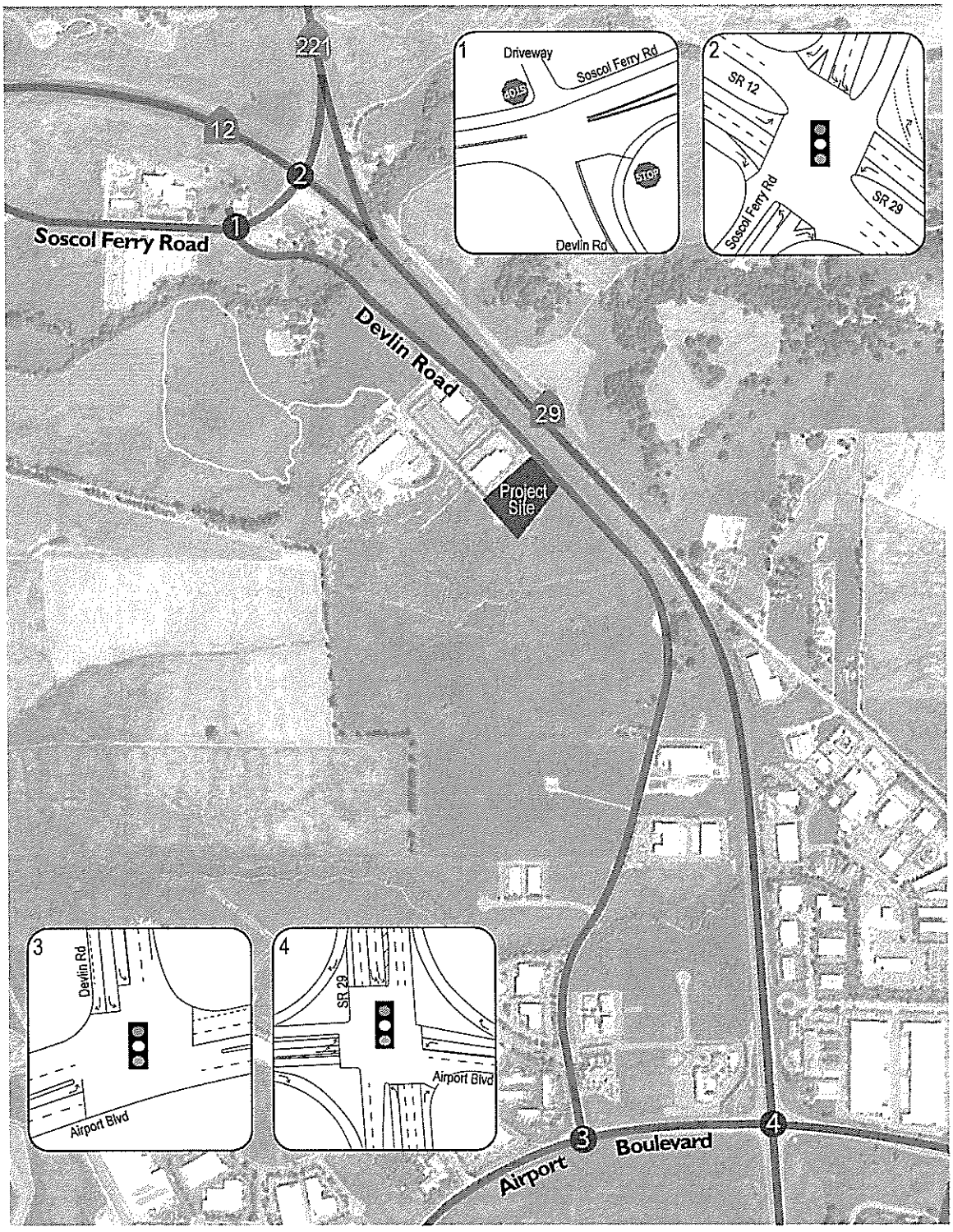
SR 29/SR 12-Airport Boulevard is a four-way, signalized intersection with protected left-turn phasing on all approaches. Right-turn lanes are channelized on all four approaches of this intersection except the SR 29 northbound approach. The locations of the study intersections and the existing lane configurations and controls are shown in Figure 1.

Alternative Modes of Transportation

Bicycle Facilities

The *Highway Design Manual*, California Department of Transportation (Caltrans), 2012, classifies bikeways into three categories:

- *Class I Multi-Use Path*: a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.
- *Class II Bike Lane*: a striped and signed lane for one-way bike travel on a street or highway.
- *Class III Bike Route*: signing only for shared use with motor vehicles within the same travel lane on a street or highway.



North

Not to Scale

LEGEND

● Study Intersection

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Figure 1 – Study Area and Lane Configurations

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In the project area, a Class II bike lane exists on Devlin Road and Airport Boulevard. Bicyclists may ride on the shoulder along Soscol Ferry Road. Bicyclists ride in the roadway and/or on sidewalks along all other streets within the project study area.

Transit Facilities

Transit service in Napa County is provided by the VINE, a fixed-route bus service providing service to the cities of Calistoga, St. Helena, Napa, American Canyon, the Town of Yountville, and other parts of Unincorporated Napa County. Route 11 provides regional service between the City of Vallejo and the Redwood Park and Ride in the City of Napa with stops located on both sides of Devlin Road within a quarter mile distance from the project site. Route 11 operates daily with approximately 30- to 60-minutes headways. Weekday service operates between the hours of 5:30 a.m. and 9:00 p.m., Saturday service between the hours of 6:00 a.m. and 8:00 p.m., and Sunday service between the hours of 8:00 a.m. and 8:00 p.m. Two bicycles can be carried on Vine buses. Bike rack space is on a first come, first served basis.

Intersection Level of Service Methodologies

Level of Service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. A unit of measure that indicates a level of delay generally accompanies the LOS designation.

The study intersections were analyzed using Traffix analysis software and methodologies published in the *Highway Capacity Manual* (HCM), Transportation Research Board, 2000. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle.

The Levels of Service for the study intersection of Soscol Ferry Road/SR 29 which has side-street stop controls was analyzed using the "Two-Way Stop-Controlled" intersection capacity method from the HCM. This methodology determines a level of service for each minor turning movement by estimating the level of average delay in seconds per vehicle. Results are presented for individual movements together with the weighted overall average delay for the intersection.

The remaining three study intersections are controlled by traffic signals and were evaluated using the signalized methodology from the HCM. This methodology is based on factors including traffic volumes, green time for each movement, phasing, whether or not the signals are coordinated, truck traffic, and pedestrian activity. Average stopped delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology. For purposes of this study, delays were calculated using optimized signal timing.

The ranges of delay associated with the various levels of service are indicated in Table 1.

Table 1
Intersection Level of Service Criteria

LOS	Two-Way Stop-Controlled	Signalized
A	Delay of 0 to 10 seconds. Gaps in traffic are readily available for drivers exiting the minor street.	Delay of 0 to 10 seconds. Most vehicles arrive during the green phase, so do not stop at all.
B	Delay of 10 to 15 seconds. Gaps in traffic are somewhat less readily available than with LOS A, but no queuing occurs on the minor street.	Delay of 10 to 20 seconds. More vehicles stop than with LOS A, but many drivers still do not have to stop.
C	Delay of 15 to 25 seconds. Acceptable gaps in traffic are less frequent, and drivers may approach while another vehicle is already waiting to exit the side street.	Delay of 20 to 35 seconds. The number of vehicles stopping is significant, although many still pass through without stopping.
D	Delay of 25 to 35 seconds. There are fewer acceptable gaps in traffic, and drivers may enter a queue of one or two vehicles on the side street.	Delay of 35 to 55 seconds. The influence of congestion is noticeable, and most vehicles have to stop.
E	Delay of 35 to 50 seconds. Few acceptable gaps in traffic are available, and longer queues may form on the side street.	Delay of 55 to 80 seconds. Most, if not all, vehicles must stop and drivers consider the delay excessive.
F	Delay of more than 50 seconds. Drivers may wait for long periods before there is an acceptable gap in traffic for exiting the side streets, creating long queues.	Delay of more than 80 seconds. Vehicles may wait through more than one cycle to clear the intersection.

Reference: *Highway Capacity Manual*, Transportation Research Board, 2000

Traffic Operation Standards

Level of Service Standard

Per the *Napa County General Plan* (2009), the County has adopted the following LOS standard:

- The County shall seek to maintain a LOS D or better at all signalized intersections, except where the level of service already exceeds this standard (i.e., LOS E or F) and where increased intersection capacity is not feasible within the existing right-of-way.

- No single level of service standard is appropriate for unsignalized intersections, which shall be evaluated on a case-by case basis to determine if signal warrants are met. For analysis purposes, LOS D was considered as acceptable.

Since two of the study intersection fall within Caltrans jurisdiction, the Caltrans standard was also considered. In the *Guide for the Preparation of Traffic Impact Studies*, Caltrans indicates that they endeavor to maintain operation at the transition from LOS C to LOS D; however, where operation is already below LOS C, the existing measure of effectiveness should be maintained.

Threshold of Significance

Napa County has not established threshold of significance criteria. However, the following significance criteria applied in the *Napa Pipe EIR* (Napa County 2009) was used in this analysis.

- At a signalized intersection, degrade the a.m. or p.m. peak hour level of service from an acceptable LOS D or better to LOS E or F.

- At a signalized intersection, increase traffic volumes at an intersection already operating at LOS E or F by more than 50 vehicles per hour in the a.m. or p.m. peak hour.

- At an unsignalized intersection, degrade the a.m. or p.m. peak hour level of service from an acceptable LOS D or better to LOS E or F and the worst-case approach would experience total delay of more than 4.0 vehicle-hours (for a single lane approach) or more than 5.0 vehicle hours (for a multi-lane approach).

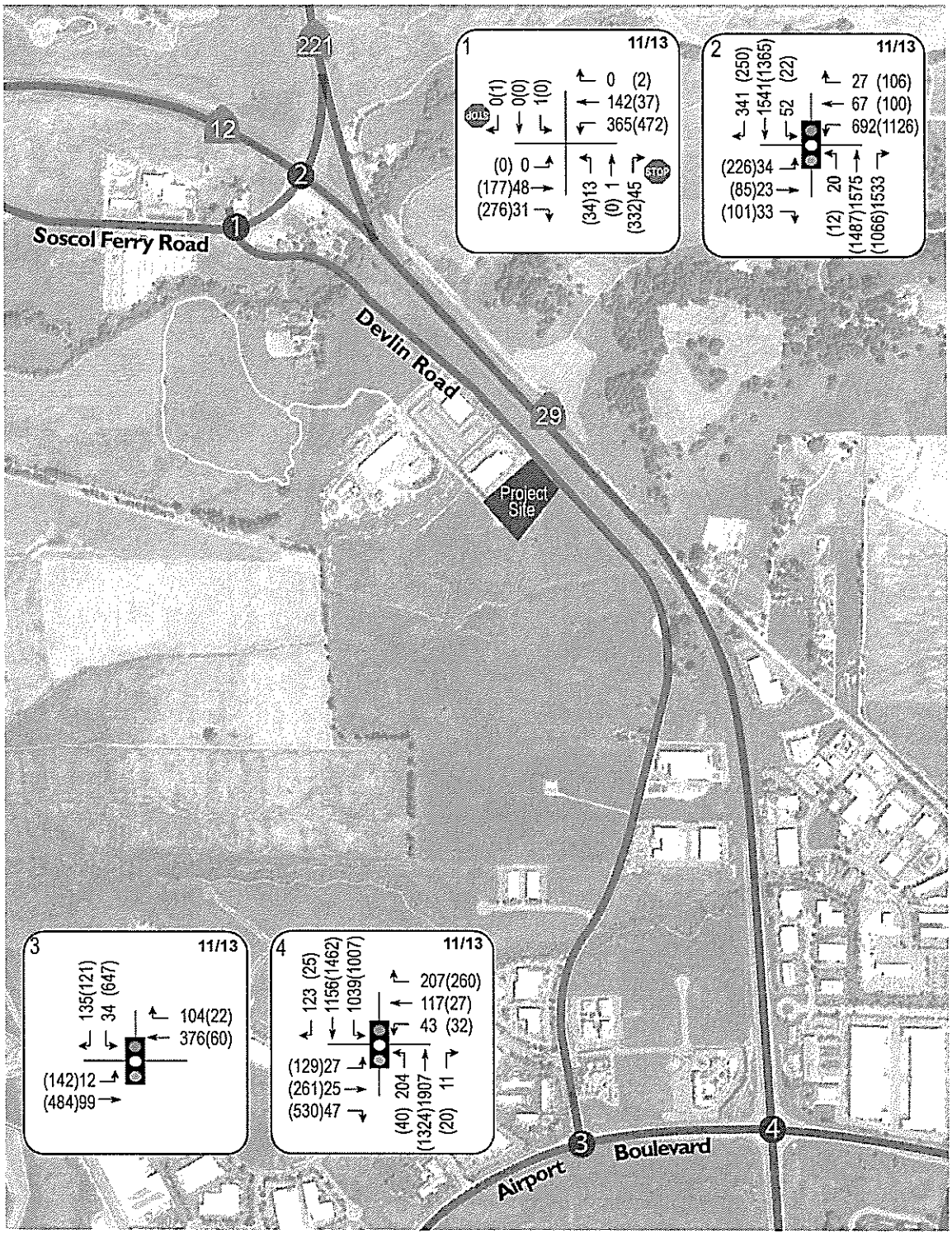
- At an unsignalized intersection, increase traffic volumes at an intersection already operating at LOS E or F by more than 50 vehicles per hour in the a.m. or p.m. peak hour.

Existing Conditions

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the a.m. and p.m. peak periods. This condition does not include project-generated traffic volumes. Traffic volume data was collected on a typical weekday in November 2013 and are shown in Figure 2.

Intersection Levels of Service

Under Existing Conditions, the study intersections operate acceptably except the intersection of Soscol Ferry Road/Devlin Road (including the stop controlled northbound Devlin Road approach), which operates at an unacceptable LOS F during the p.m. peak hour. A summary of the intersection level of service calculations is contained in Table 2, and copies of the Level of Service calculations are provided in Appendix A.



North

Not to Scale

LEGEND

- Study Intersection
- xx A.M. Peak Hour Volume
- (xx) P.M. Peak Hour Volume

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Figure 2 – Existing Traffic Volumes

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Table 2
Existing Peak Hour Intersection Levels of Service

Study Intersection *Approach*	Existing Conditions			
	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. Soscol Ferry Rd/Devlin Rd	6.1	A	**61.9**	**F**
Northbound (Devlin Rd) Approach	*14.8*	*B*	**	*F*
2. SR 29-12/SR 221-Soscol Ferry Rd	21.4	C	33.7	C
3. Airport Blvd/Devlin Rd	14.0	B	19.0	B
4. SR 29/SR 12-Airport Blvd	26.2	C	24.8	C

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* ** = delay greater than 120 seconds; **Bold** text = deficient operation

It should be noted that the operational results for the two intersections on SR 29 are better than has been reported in other recent studies, including the *Napa Pipe EIR,* which was referenced for this analysis. These other studies were based on counts taken in 2007, and the counts performed in 2013 for this study indicate that volumes have decreased substantially at both locations. Reduced traffic volumes since 2007 have been documented due to the increase in unemployment, resulting in fewer workers on the roads during peak commute times.

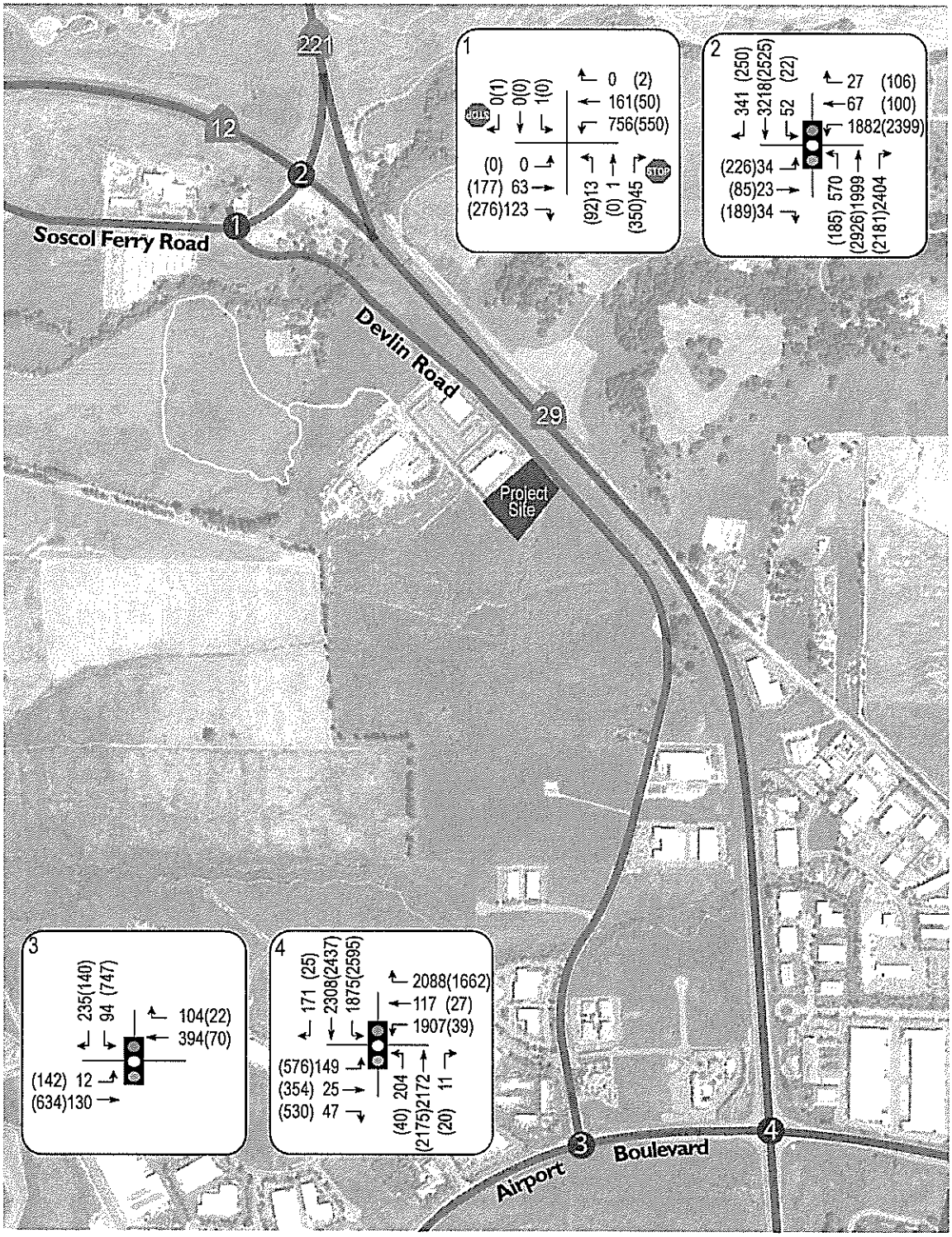
Future Conditions

Traffic Volumes

The Future traffic scenario represents General Plan buildout at an estimated time horizon of the year 2030. Future projected traffic volumes for the year 2030 were obtained from the Solano Transportation Authority who maintains the joint Napa County/Solano County 2010-2030 Travel Demand Forecasting Model. The model is calibrated on a regional basis, and as such the configuration or base volumes of some study intersections in the model do not accurately represent existing conditions. Where this occurred, adjustments were made to the model output to represent existing conditions.

The model data were provided in the form of segment volumes, which were translated to turning movement volumes at study intersections along SR 29 using the "Furness" method. The Furness method is an iterative process that employs existing turn movement data, existing link volumes and future link volumes to project likely turning future movement volumes at intersections. In some instances, the model projected a traffic volume decrease. Decreases are attributable to assumed infrastructure improvements and forecast changes in demographic data throughout the region. Rather than assume volume decreases, existing counts were maintained as a "floor." This is a common technique used to ensure that the future projections are conservative.

At the study intersections of Soscol Ferry Road/Devlin Road and Airport Boulevard/Devlin Road, future traffic volumes were developed by balancing the volumes with nearby intersections, regional growth trends presented in the model and engineering judgment. The Future Conditions traffic volumes are shown in Figure 3.



North

Not to Scale

LEGEND

- Study Intersection
- xx A.M. Peak Hour Volume
- (xx) P.M. Peak Hour Volume

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Figure 3 – Future Traffic Volumes

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Planned Roadway Improvements

Per the *Plan Bay Area*, March 2013, the following improvements are planned near the study area:

- Construct a new flyover from southbound SR 221 to southbound SR 29, including auxiliary lane to SR 12/SR 29.
- Construct a new interchange at the intersection of SR 29/12-Airport Boulevard.
- Extend Devlin Road from Airport Boulevard to Green Island Road.

However, funding for the above listed improvements has not been identified; therefore, these improvement were not included in the Future Conditions traffic analysis.

Intersection LOS

Under the anticipated future volumes, the Airport Boulevard/Devlin Road intersection is expected to operate at an acceptable LOS B during both peak hours. All of the remaining study intersections are anticipated to operate unacceptably during both peak hours. A summary of the intersection level of service calculations is provided Table 3 and copies of the Level of Service calculations are provided in Appendix A.

Table 3
Future Peak Hour Levels of Service

Study Intersection *Approach*	**Future Conditions**			
	AM Peak		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**
1. Soscol Ferry Rd/Devlin Rd	28.3	D	**	**F**
Northbound (Devlin Road) Approach	**	***F***	**	***F***
2. SR 29-12/SR 221-Soscol Ferry Rd	**	**F**	**	**F**
3. Airport Blvd/Devlin Rd	17.1	B	19.0	B
4. SR 29/SR 12-Airport Blvd	**	**F**	**	**F**

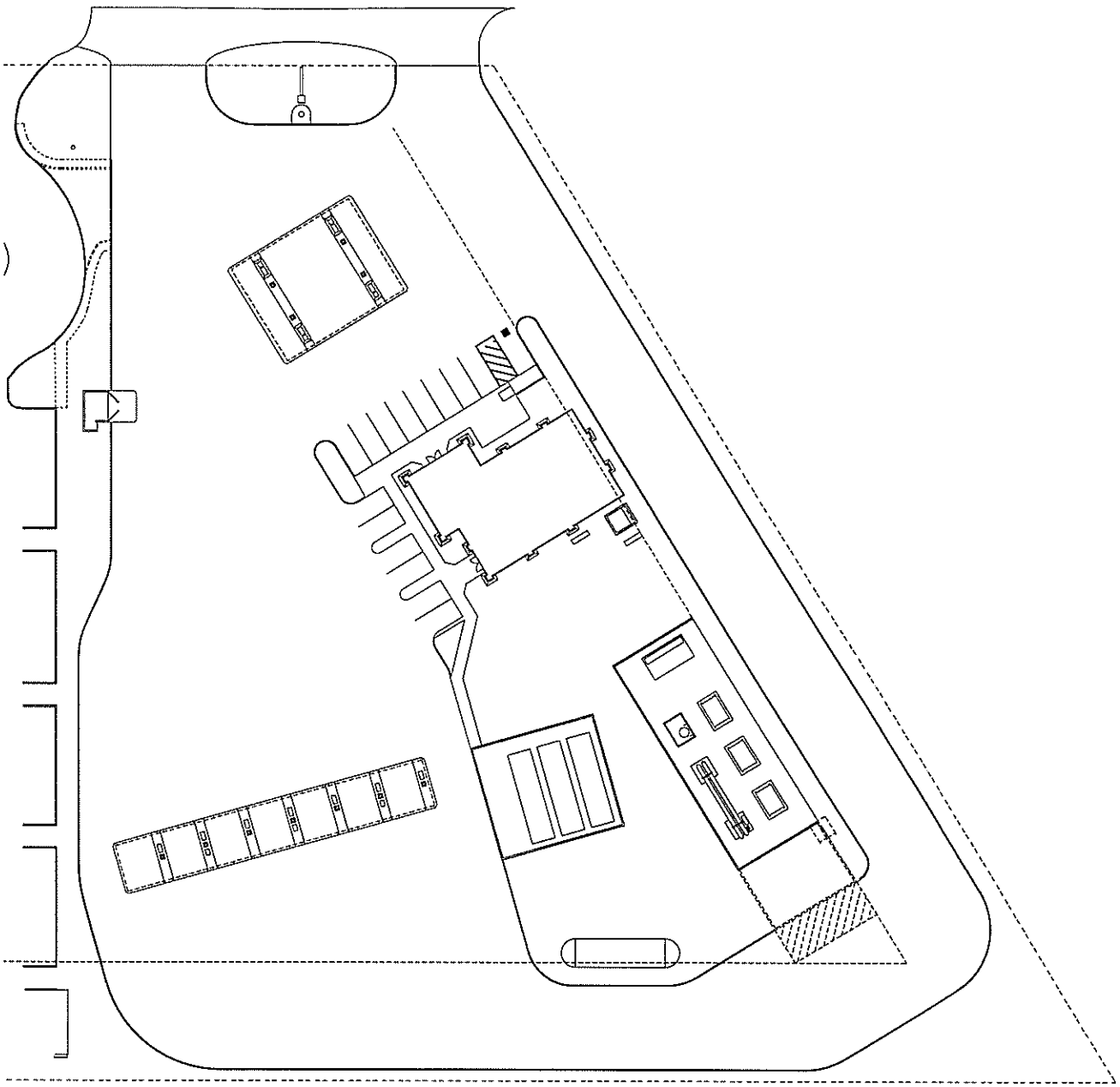
Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* ** = delay greater than 120 seconds; **Bold** text = deficient operation

Project Description

The project consists of a gas station for autos (8 vehicle fueling positions) and trucks (7 fueling islands), a convenience market and four electric vehicle charging stations to be constructed on the undeveloped portion of the site located at 221 Devlin Road. Vehicular access to the project site is proposed via two new full access driveways off of Devlin Road. The proposed project site plan is shown in Figure 4.

Trip Generation

The anticipated trip generation for the proposed project was estimated using standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 9th Edition, 2012 for a Gasoline/Service Station with Convenience Market land use (ITE LU #945). The project would include 7 fueling islands for trucks; however, such a land use is not included in the ITE publication. Trip generation rates for a "Truck Stop" given in the *Truck Trip Generation Study*, Transportation Engineering



North

Not to Scale

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Figure 4 – Site Plan

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and Planning, Inc., August 2003 were considered. The primary function of a truck stop is to provide fueling for truckers which matches the proposed project description. The trip generation rates (including daily, a.m. and p.m. peak hour) for a truck stop were determined to be reasonable and were therefore used to estimate trip generation for the proposed project related to truck use. Excerpts from the *Truck Trip Generation Study* are provided in Appendix B.

Finally, the project would also include four electric vehicle charging stations; however this use is also not included in the ITE publication. In general, it takes several hours for an electric vehicle to fully recharge, resulting in a very low turnover potential and therefore little to no impact on peak period traffic volumes. Because of this, no adjustments were made to the trip generation projections to account for the electric vehicle charging station.

Pass-by Trips

Some portion of traffic associated with the proposed project will be drawn from existing traffic on nearby streets. These vehicle trips are not considered "new," but are instead comprised of drivers who are already driving on the adjacent street system and choose to make an interim stop, and are referred to as "pass-by." For the proposed project, vehicles that travel northbound or southbound along Devlin Road and make an interim stop at the project site were considered as pass-by trips. The percentage of these pass-by trips was developed based on information provided in the *Trip Generation Handbook: An ITE Recommended Practice*, ITE, 2004. The pass-by data presented by ITE varies in the range of 46 to 72 percent of total trips during the a.m. and p.m. peak hour. A pass-by reduction rate of 55 percent, which is at the lower end of the range, was conservatively applied to the analysis.

Diverted Link Trips

Diverted linked trips are trips that are attracted from the traffic volumes on roadways within the vicinity of the generator but require a diversion from that roadway to another roadway to gain access to the site. For the proposed project, motorists travelling southbound on SR 29 and westbound on SR 221 and who wish to stop at the project site would require a diversion from SR 29 and SR 221 to Devlin Road and were therefore considered as diverted link trips. Based on the data presented in ITE for diverted linked trips, which varies in the range of 19 to 43 percent of total trips, a diverted-linked trip reduction of 30 percent was applied to the analysis.

Drivers coming from SR 29 southbound and SR 221 westbound would need to slightly alter their path of travel to enter and exit the site; therefore, turning volumes at the SR 29-SR 12/SR 221-Sosocol Ferry Road and Soscol Ferry Road/Devlin Road were manually adjusted to reflect the diversion.

Because of the delay associated with left turns from SR 29 toward Devlin Road, it was assumed that northbound drivers would not to divert to this location. Rather, they would be expected to take advantage of other opportunities to purchase fuel along the route.

Total Project Trip Generation

The proposed project is expected to generate an average of 1,544 daily trips including 89 trips during the a.m. peak hour and 142 trips during the p.m. peak hour. After deductions are taken into account for the pass-by and diverted link trips, the project would be expected to generate 13 new trips during the a.m. peak hour and 21 new trips during the p.m. peak hour. The trip generation summary is provided in Table 4.

Table 4
Trip Generation Summary

Land Use	Units	Daily		Weekday AM Peak Hour				Weekday PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Proposed											
Gasoline/Service Station with Convenience Market	8 vfp	162.78	1,302	10.16	81	41	40	13.51	108	54	54
Truck Stops	7 fi	34.56	242	1.19	8	4	4	4.81	34	18	16
Total Project Trips			***1,544***		***89***	***45***	***44***		***142***	***72***	***70***
Pass-by Trips (from Devlin Rd)				*-55%*	*-49*	*-25*	*-24*	*-55%*	*-78*	*-40*	*-38*
Diverted Link Trips (from SR 29 north and SR 221)				*-30%*	*-27*	*-14*	*-13*	*-30%*	*-43*	*-22*	*-21*
Net-New Project Primary Trips					**13**	**6**	**7**		**21**	**10**	**11**

Notes: vfp = vehicle fueling positions; fi = fueling islands

Trip Distribution

The pattern used to allocate new project trips to the street network was based on the proximity of the neighboring commercial land uses, as well as the allocation of the bulk of project trips as either pass-by or diverted link trips. It was anticipated that all of the net-new project trips would be local in nature originating from the Napa Valley Corporate Drive area and Airport Boulevard west of Devlin Road. The applied trip distribution is summarized in Table 5 and the resulting trips (including diverted-link trips) are shown in Figure 5.

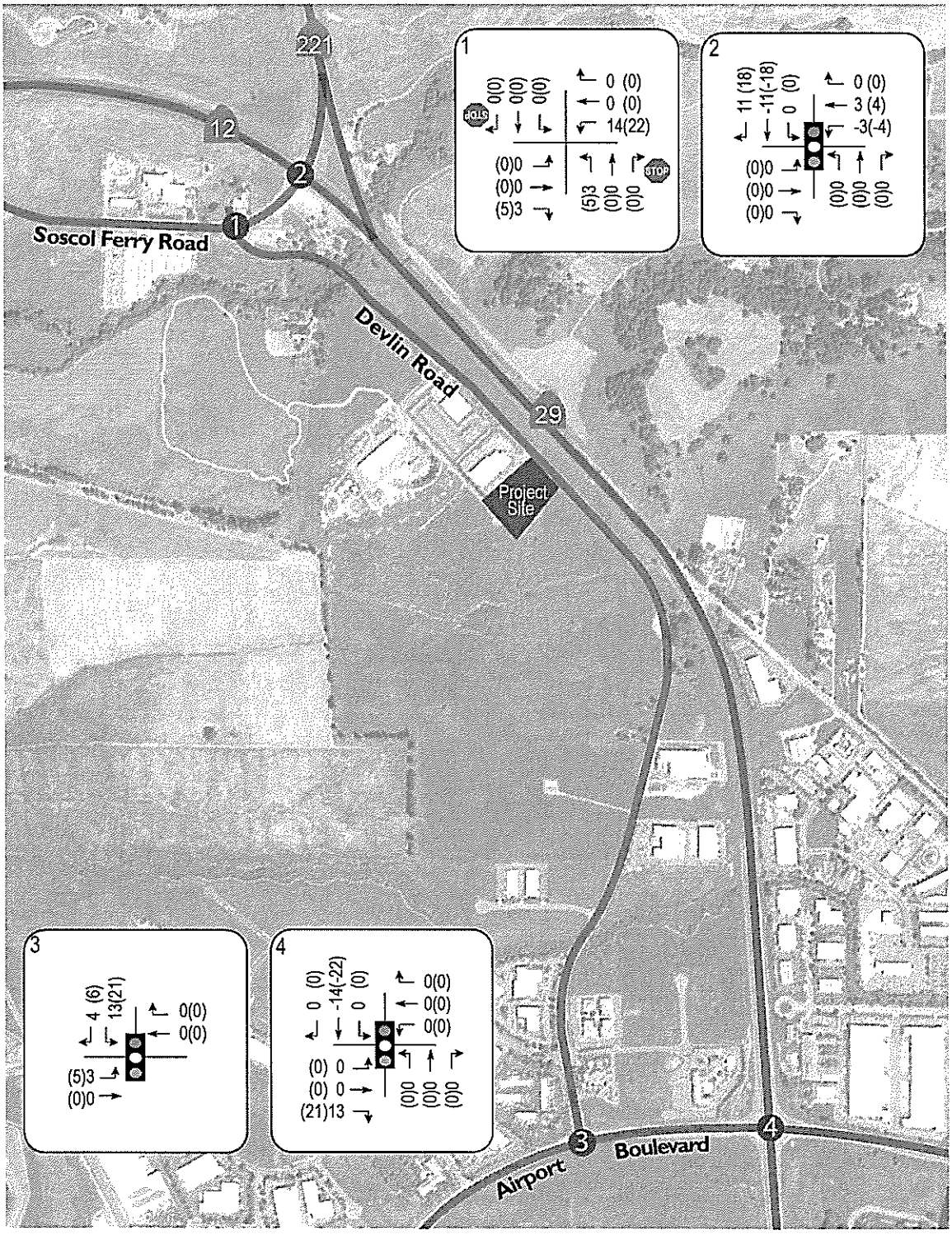
Table 5
Trip Distribution Summary

Route	Trip Distribution Percent (%)
To and from north via Napa Valley Corporate Dr	50 %
To and from west via Airport Blvd	50 %
TOTAL	**100%**

Intersection Operation

Existing plus Project Conditions

Upon the addition of project-related traffic to the existing volumes, the study intersection of Soscol Ferry Road/Devlin Road would continue to operate acceptably during the a.m. peak hour and unacceptably during the p.m. peak hour. However, the project does not add more than 50 trips during the p.m. peak hour, resulting in a less-than-significant impact. All the remaining intersections are expected to operate acceptably with the addition of project-generated traffic. A summary of the intersection level of service calculations is provided in Table 6 with Existing Conditions values shown for comparison.



North

Not to Scale

LEGEND

- Study Intersection
- xx A.M. Peak Hour Volume
- (xx) P.M. Peak Hour Volume

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Figure 5 – Project Traffic Volumes

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Table 6
Existing and Existing plus Project Peak Hour Intersection Levels of Service

Study Intersection *Approach*	Existing Conditions				Existing plus Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Soscol Ferry Rd/Devlin Rd	6.1	A	**61.9**	**F**	6.3	A	**101.4**	**F**
Northbound (Devlin Rd) Approach	*14.8*	*B*	**	***F***	*16.7*	*C*	**	***F***
2. SR 29-SR 12/SR 221-Soscol Ferry Rd	21.4	C	33.7	C	21.3	C	33.4	C
3. Airport Blvd/Devlin Rd	14.0	B	19.0	B	14.6	B	19.0	B
4. SR 29/SR 12-Airport Blvd	26.2	C	24.8	C	26.2	C	24.9	C

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* ** = delay greater than 120 seconds; **Bold** text = deficient operation

It should be noted that with the addition of project-related traffic volumes, average delay at the intersection of SR 29-SR 12/SR 221-Soscol Ferry Road decreases during both peak hours. While this is counter-intuitive, this condition occurs when a project adds trips to movements that are currently underutilized or have delays that are below the intersection average, resulting in a better balance between approaches and lower overall average delay. The project adds traffic predominantly to the southbound right-turn movement, which has an average delay that is lower than the average for the intersection as a whole, resulting in a slight reduction in the overall average delay. The conclusion could incorrectly be drawn that the project actually improves operation based on this data alone; however, it is more appropriate to conclude that the project trips are expected to make use of excess capacity, so drivers will experience little, if any, change in conditions as a result of the project.

Finding: The study intersections are expected to continue operating acceptably at the same levels of service upon the addition of project-generated traffic except at the intersection of Soscol Ferry Road/ Devlin Road which would continue to operate unacceptably during the p.m. peak hour. The project adds fewer than 50 peak hour trips to this intersection, resulting in a less-than-significant impact.

Future plus Project Conditions

Upon the addition of project-generated traffic to the anticipated future volumes, the Airport Boulevard/ Devlin Road intersection is expected to operate at an acceptable LOS B during both peak hours. All of the remaining study intersections are anticipated to continue operating unacceptably during both peak hours with the addition of project-generated traffic. It should be noted that the project adds fewer than 50 peak hour trips during to any of the study intersections, resulting in a less-than-significant impact. A summary of the intersection level of service calculations are provided in Table 7 with Future Conditions values shown for comparison.

Table 7
Future and Future plus Project Peak Hour Levels of Service

Study Intersection *Approach*	Future Conditions				Future plus Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Soscol Ferry Rd/Devlin Rd	28.3	D	**	F	**60.8**	**F**	**	**F**
Northbound (Devlin Rd) Approach	**	*F*	**	*F*	**	*F*	**	*F*
2. SR 29-12/SR 221-Soscol Ferry Rd	**	**F**	**	**F**	**	**F**	**	**F**
3. Airport Blvd/Devlin Rd	17.1	B	19.0	B	17.4	B	19.0	B
4. SR 29/SR 12-Airport Blvd	**	**F**	**	**F**	**	**F**	**	**F**

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*; ** = delay greater than 120 seconds; **Bold** text = deficient operation

Finding: All of the study intersections but one would continue operating unacceptably during both peak hours with the addition of project-generated traffic. The project adds fewer than 50 trips during either of the peak hour at any of the study intersection, resulting in a less-than-significant impact.

Bicycle Facilities

Existing bicycle facilities, including Class II bike lanes on Devlin Road and Airport Boulevard, would provide adequate access for bicyclists.

Bicycle Storage

The project site plan does not identify any bicycle parking or storage facilities, restricting the accessibility of project employees who may wish to travel to and from project site via a bike. Further, bicyclists riding on Devlin Road might want to make an interim stop at the convenience store portion of the project. Therefore, it is recommended that bike racks be installed at the project site.

Finding: Existing bicycle facilities are expected to be adequately serving the project site.

Recommendation: Bike racks should be installed at the project site to improve accessibility for project patrons and employees.

Transit

Existing transit routes are adequate to accommodate project-generated transit trips. Existing transit stops located on Devlin Road are within acceptable walking distance of the site.

Finding: Existing transit routes and bus stops adjacent to the project site are expected to adequately serve the project-generated transit trips.

Access and Circulation

Site Access

The site would be accessed by two new driveways along the frontage of the project on Devlin Road. Both the northern and the southern driveways would have full access, with vehicles allowed to enter and exit.

Sight Distance

At unsignalized intersections a substantially clear line of sight should be maintained between the driver of a vehicle waiting at the crossroad and the driver of an approaching vehicle. Adequate time must be provided for the waiting vehicle to either cross, turn left, or turn right, without requiring the through traffic to radically alter their speed.

Sight distances along Devlin Road at proposed project driveways were evaluated based on sight distance criteria contained in the *Highway Design Manual* published by Caltrans. The recommended sight distance for minor street approaches that are either a private road or a driveway is based on stopping sight distance, with the approach travel speeds used as the basis for determining the recommended sight distance. The speed limit is not posted on Devlin Road; however a speed limit of 55 mph was conservatively assumed for the sight distance evaluation. For a speed of 55 mph, the recommended stopping sight distance for a private driveway is 500 feet.

Sight distance at the proposed driveways was field measured. Devlin Road near the project vicinity is reasonably flat and straight in both directions. Available sight lines are more than adequate and meet the recommended distance.

Access Analysis

Left-Turn Lane Warrants

The need for a left-turn lane on Devlin Road at the northern project driveway was evaluated based on the criteria contained in the *Napa County Road and Street Standards*, 2011. Based on the turning movement volumes obtained at the intersection of Soscol Ferry Road/Devlin Road and Airport Boulevard/Devlin Road in November 2013, Devlin Road has an approximate average daily traffic (ADT) volume of 1,100 vehicles near the project driveways.

Using the County's criteria, for an average daily traffic volume of 1,100 vehicles on Devlin Road, a left-turn lane would be warranted if a project driveway has an ADT of 150 vehicles or more. The proposed project would generate a weekday average of 1,544 trips. Based on this traffic level, a left-turn lane is warranted at the northern project driveway.

The criteria published by the County of Napa are based solely on average daily traffic (ADT) volumes. This criterion does not account for factors such as the directionality of traffic or traffic levels during the peak versus off-peak periods. Therefore, an additional review was completed that focused on potential operational and safety impacts of the proposed project to determine if a left-turn lane would be needed.

The evaluation was based on criteria contained in the *Intersection Channelization Design Guide*, National Cooperative Highway Research Program (NCHRP) Report No. 279, Transportation Research Board, 1985, as well as a more recent update of the methodology developed by the Washington State Department of Transportation. The NCHRP report references a methodology developed by M. D. Harmelink that includes equations that can be applied to expected or actual traffic volumes in order to

determine the need for a left-turn pocket based on safety issues. This is a common analysis technique that is applied in numerous cities and counties in the region, and is consistent with methodologies used by Caltrans.

Existing plus project and future plus project volumes during the weekday p.m. peak hour were used for this analysis. Using these traffic volumes, a left-turn lane is warranted at the northern project under both Existing Conditions and Future Conditions with the addition of project generated traffic. The warrant calculations are provided in Appendix C.

Finding: A left-turn lane is warranted at the northern driveway.

Recommendation: A left-turn lane should be provided on Devlin Road at the northerly driveway as part of the site improvements.

Right-Turn Lane Warrants

The need for a right-turn lane on Devlin Road at the northern project driveway was evaluated solely based on criteria contained in the *Intersection Channelization Design Guide* as the County does not have criterion for right-turn lanes. A right-turn lane is warranted under Existing plus Project volumes during the p.m. peak hour assuming that the bulk of right turns would be at the northerly driveway. The warrant calculations are provided in Appendix C.

Finding: A right-turn lane is warranted at the northerly driveway.

Recommendation: A right-turn lane should be provided on Devlin Road at the northerly driveway as part of the site improvements.

On-Site Circulation

On-site circulation was evaluated for trucks (fueling and delivering gas) to check for adequate maneuverability, including room to navigate internally and from/to the proposed driveways into Devlin Road. Based on the site plan review, the most direct route for a truck would be to enter the site from the proposed northern driveway and proceed westbound towards the truck fueling islands. After fueling the trucks would make a counter-clockwise movement to exit the site from the southern driveway. Based on the information provided by the project team, which includes truck turning diagram for AASHTO design vehicle type WB-67 (Interstate Semitrailer), it appears that the site circulation would be adequate. The truck turning diagram is included in Appendix D.

Conclusions and Recommendations

Conclusions

- The project is anticipated to generate 13 new trips during the a.m. peak hour and 21 new trips during the p.m. peak hour.
- Under existing conditions, Soscol Ferry Road/Devlin Road operates at an unacceptable LOS F during the p.m. peak hour; it would continue to do so with the addition of project generated traffic. The project would add fewer than 50 peak hour trips at this intersection, resulting in a less-than-significant impact. All the remaining intersections are expected to operate acceptably without and with the addition of project-generated traffic during both peak hours.
- Under Future Conditions, the Airport Boulevard/Devlin Road intersection is expected to operate at an acceptable LOS B during both peak hours without and with the addition of project generated traffic. All of the remaining study intersections are anticipated to operate unacceptably during both peak hours without and with the addition of project-generated traffic. However, the project would add fewer than 50 peak hour trips at any of the study intersection, resulting in a less-than significant impact.
- Existing bicycle facilities would adequately serve the project site. Transit facilities serving the project site are expected to be adequate.
- Acceptable clear sight lines are available in both directions from the proposed driveways. Site circulation for trucks (fueling and delivery purposes) is expected to be adequate.
- Installation of a left-turn lane and a right-turn lane is warranted at the northern project driveway.

Recommendations

- It is recommended that bike racks be installed at the project site to improve accessibility for project patrons and employees.
- It is recommended that a left-turn lane be installed at the northern project driveway.
- It is recommended that a right turn lane be installed at the northern project driveway.

Study Participants and References

Study Participants

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