

“J”

Traffic Study



Traffic Impact Study for the Canard Winery



Prepared for the County of Napa

Submitted by
W-Trans

December 30, 2015

RECEIVED

DEC 31 2015

Napa County Planning, Building
& Environmental Services



**TRAFFIC ENGINEERING
TRANSPORTATION PLANNING**
Balancing Functionality and Livability since 1995
w-trans.com

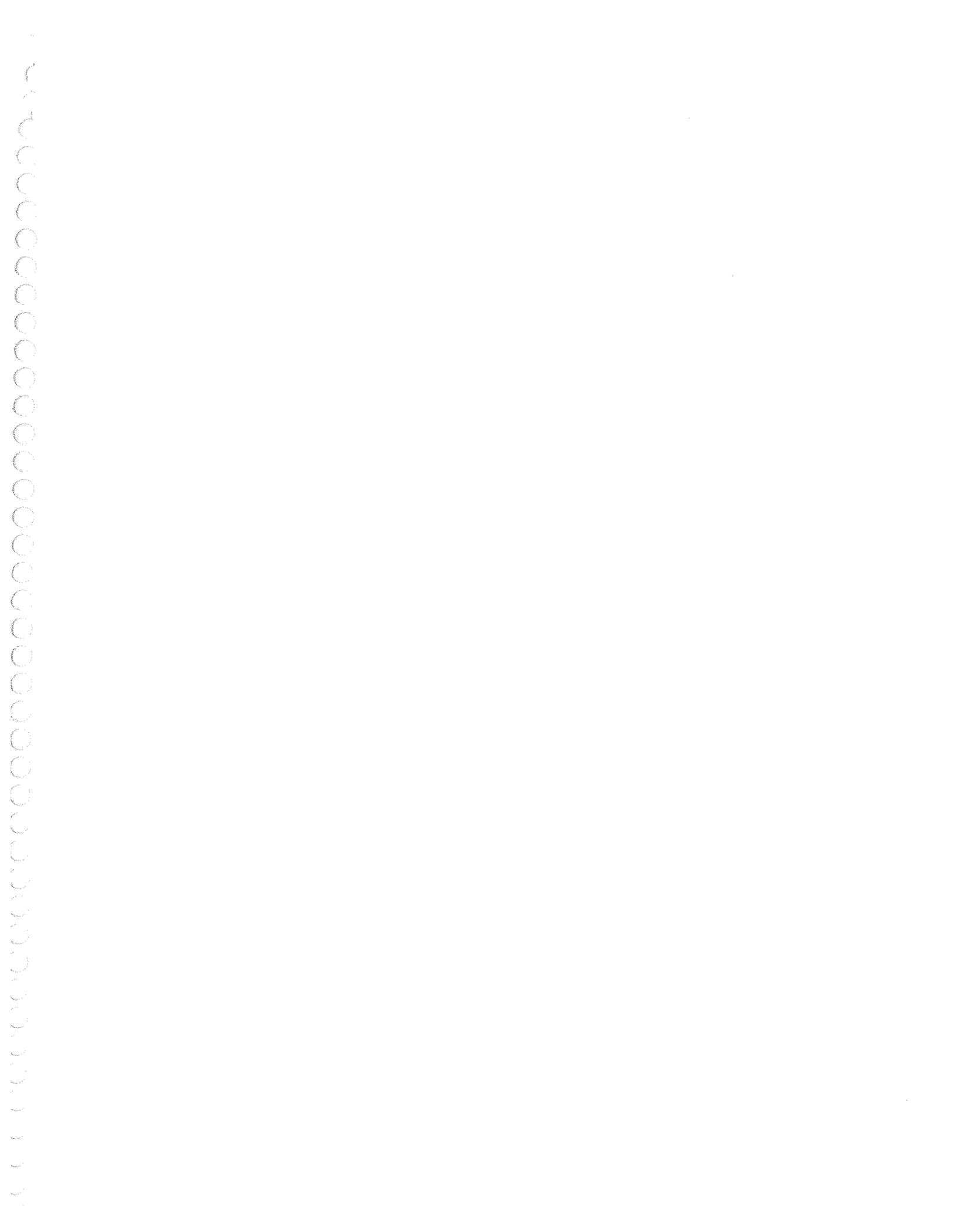


Table of Contents

Executive Summary	1
Introduction.....	2
Transportation Setting.....	4
Capacity Analysis	6
Alternative Modes	15
Access and Circulation.....	16
Conclusions and Recommendations	17
Study Participants and References.....	18

Figures

1. Lane Configurations and Existing Traffic Volumes	3
2. Future and Project Traffic Volumes.....	9
3. Site Plan	11

Tables

1. Two-Way Stop-Controlled Intersection Level of Service Criteria	6
2. Existing PM Peak Hour Intersection Levels of Service.....	7
3. Cumulative PM Peak Hour Intersection Levels of Service	10
4. Project Trip Generation	12
5. Trip Distribution Assumptions.....	12
6. Existing PM Peak Hour Intersection Levels of Service.....	13
7. Cumulative PM Peak Hour Intersection Levels of Service	14

Appendices

- A. Intersection Level of Service Calculations
- B. Napa Trip Generation Spreadsheet
- C. Left-turn Lane Warrant

Executive Summary

The proposed Canard Winery is to be located at 1016 Dunaweal Lane in the County of Napa. It would convert an existing vineyard into a small winery permitted for production of up to 10,000 gallons annually. It is understood that there would be an average of four visitors on a weekday and six on weekend days with three full-time employees, including the owner who lives on-site. The proposed project would be expected to generate 12 daily trips with 5 during the p.m. peak hour.

Six annual agricultural promotional events are proposed with the project. The largest event would occur twice a year with a maximum of 100 guests. This would result in an estimated 18 trips during any single hour in in each direction on Dunaweal Lane north and south of the project site. Given that the events are infrequent, would occur outside of the peak periods, and result in a minimal increase in traffic, the agricultural promotion events were not included in the daily trip generation and resulting intersection analysis.

Potential project impacts were evaluated at the intersections of Dunaweal Lane/Silverado Trail and Dunaweal Lane/State Route (SR) 29. Both intersections are expected to operate acceptably at LOS A overall, with the minor approaches operating at LOS A or B, under the existing conditions and upon the addition of project-generated trips.

Under Cumulative conditions the intersections are expected to continue operating acceptably at LOS A overall though the Dunaweal Lane minor approaches at Silverado Trail and SR 29 are projected to operate at LOS E and F, respectively. Upon the addition of project generated trips to the cumulative volumes the intersections are expected to continue operating at the same levels of service as without the project. Based on the low and likely imperceptible increase in delay at the intersections and the overall acceptable intersection LOS, the project would result in a less-than-significant impact.

Access to the site would be from the existing driveway located about 600 feet south of the Silverado Trail. The proposed project would modify the existing access to the site to include a flared right turn from southbound Dunaweal Lane approach. The proposed access road would be 20 feet wide with a paved asphalt concrete surface. The driveway would have adequate sight lines in each direction though it is recommended that any landscaping or signing placed along the frontage be sited so that it does not block visibility from the perspective of a driver.

The need for a left-turn lane at the project driveway was analyzed under the cumulative plus project volumes. Based on the *Napa County Road and Street Standards, 2011*, a left-turn lane at the driveway is not warranted.

Facilities for pedestrians and bicyclists proposed on-site adequately serve the expected patrons.

Introduction

This report presents an analysis of the potential traffic impacts that would be associated with development of a proposed winery with production of up to 10,000 gallons at 1016 Dunaweal Lane 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

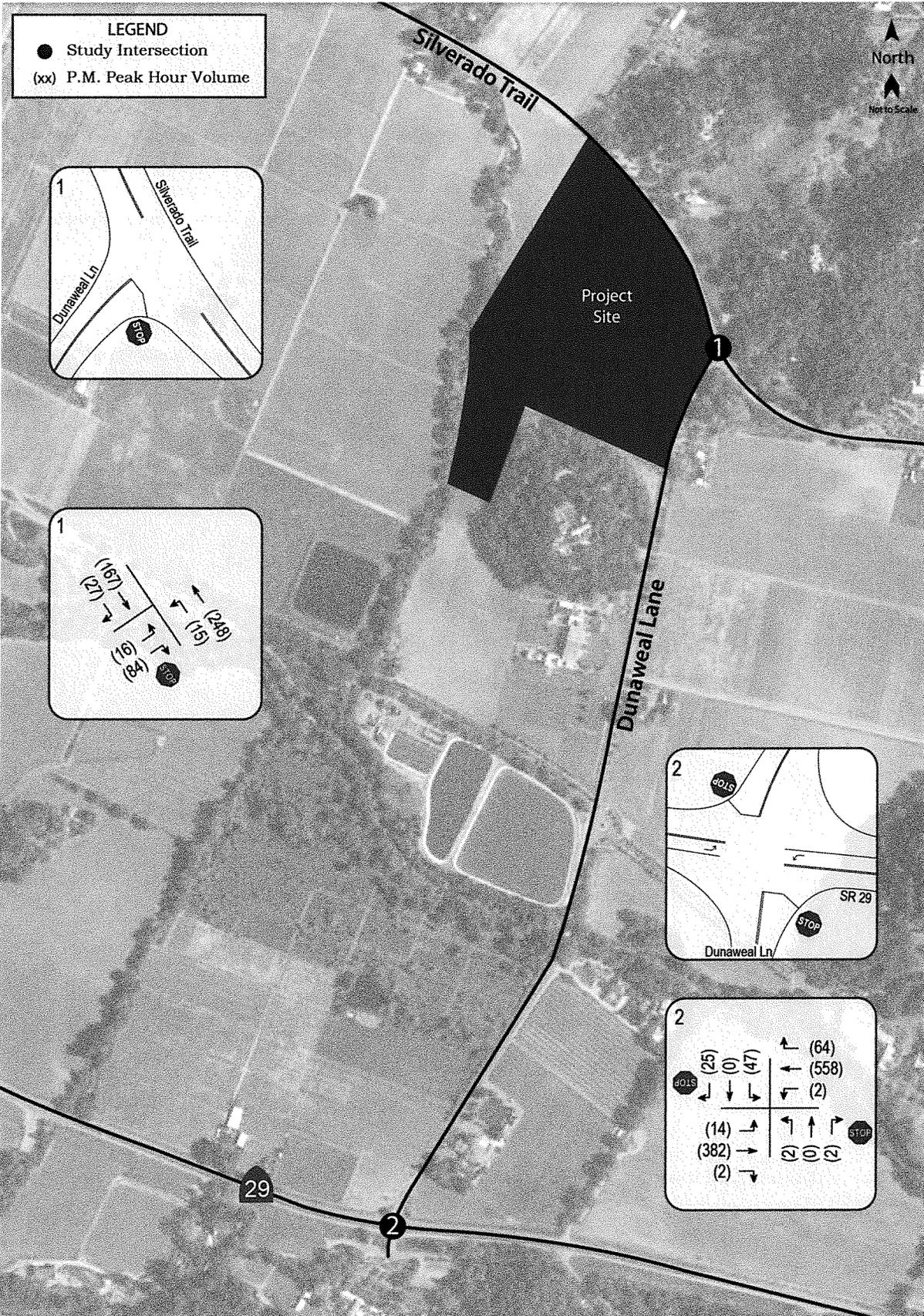
The purpose of a traffic impact study is to provide County staff and policy makers with data that they can use to make an informed decision regarding the potential traffic impacts of a proposed project, and any associated improvements that would be required in order to mitigate these impacts to a level 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 access for pedestrians and bicyclists are also addressed.

Project Profile

Canard Vineyards produces approximately 80 to 100 tons of grapes annually, with about 20 tons sold to nearby wineries and the remaining moved off-site to a custom crush facility. There are currently no tasting or production facilities on the site, and the owner is the only full-time employee. Existing buildings include a metal barn, the primary residence occupied by the owners, and a three-car garage/barn/storage structure accessory to the residence.

The proposed project application would allow for a maximum of 10,000 gallons of annual production, with the grapes typically all coming from on-site. The production facilities would include an 800 square foot covered crush pad and a 1,280 square foot pad for wine fermentation and storage tanks. A tasting room would be constructed on the lower floor of the existing garage/barn/storage structure and it is understood that operation would include an average of four visitors on a weekday and six on the weekend with a maximum of 10 visitors daily for tours and tastings. The second story of this building, which has a separate exterior entrance, would remain accessory to the residence. There could be up to three full-time employees, including the owner, year round and one part-time employee during harvest. Proposed marketing events include four wine club events with up to 75 attendees and two wine auction events with up to 100 persons attending. While the intention would be to use only grapes grown on-site, the request includes a possible import of up to 10 percent of the grapes if needed for blending purposes.

The project site is located at 1016 Dunaweal Lane, as shown in Figure 1.



Traffic Impact Study for the Canard Winery
Figure 1 – Lane Configurations and Existing Traffic Volumes



Transportation Setting

Operational Analysis

Study Area and Periods

The study area consists of the following intersections:

1. State Route (SR) 29/Dunaweal Lane
2. Silverado Trail/Dunaweal Lane

Operating conditions during the p.m. peak period were evaluated to capture the highest potential impacts for the proposed project as well as the highest volumes on the local transportation network. The evening 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

The study area was selected to include the two locations where the project would generate the highest number of vehicle turning movements, which in turn would reflect the locations with the greatest potential transportation impacts. Beyond these two intersections the added trips would be almost entirely comprised of through movements, which are generally not the critical movements for a corridor such as SR 29. Further, the number of project-generated trips would be considerably lower at locations further from Dunaweal Lane as the trips disperse wherever paths diverge, such as at the intersections of Dunaweal Lane with SR 29 and Silverado Trail.

Silverado Trail/Dunaweal Lane is a tee intersection with stop controls and a flared right-turn lane on the northbound terminating Dunaweal Lane approach.

SR 29/Dunaweal Lane is a four-legged stop-controlled intersection with flared right-turn lanes on both the northbound and southbound Dunaweal Lane approaches.

The locations of the study intersections and the existing lane configurations and controls are shown in Figure 1.

Alternative Modes

As the winery is set in a rural setting, visitors and guests would typically be expected to drive to the site, though some bicycle traffic is anticipated.

Pedestrian Facilities

Pedestrian facilities such as sidewalks and crosswalks that are typical in urban settings are generally inappropriate in a rural setting such as the study area. As a result, there are no existing pedestrian facilities and if there are pedestrians they typically walk along the edge of the road.

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.

In the project area, there are currently no bicycle facilities on Dunaweal Lane as is standard for many low volumes two-lane roads in the county. Bicyclists are often encountered on Silverado Trail where there are Class II bike lanes to accommodate their travel.

Transit Facilities

There are no fixed transit routes that serve the site.

Capacity Analysis

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 the unsignalized “Two-Way Stop-Controlled” intersection capacity methodology from 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 methodology applied 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 ranges of delay associated with the various levels of service are indicated in Table 1.

Table 1 – Two-Way Stop-Controlled Intersection Level of Service Criteria

LOS A	Delay of 0 to 10 seconds. Gaps in traffic are readily available for drivers exiting the minor street.
LOS 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.
LOS 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.
LOS 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.
LOS E	Delay of 35 to 50 seconds. Few acceptable gaps in traffic are available, and longer queues may form on the side street.
LOS 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.

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

Traffic Operation Standards

Caltrans

Because SR 29 is a state highway, Caltrans has jurisdiction over the study intersection at SR 29/ Dunaweal Lane. Caltrans indicates that they endeavor to maintain operation at the transition from LOS C to LOS D. Based on previous discussions with Caltrans staff, it is understood that the standard is to be applied to the overall average intersection delay and *not* that associated with any single movement or approach. Under this approach, if one movement experiences very high delay and also has moderate to high traffic volumes, the overall delay and level of service should reflect the critical nature of the condition. However, if one movement is expected to experience high delay, but has very low traffic volumes, the overall intersection operation will likely still meet Caltrans standards.

County of Napa

According to Policy CIR-16 of the *Napa County General Plan, 2008*, "No single level of service standard is appropriate for un-signalized intersections, which shall be evaluated on a case-by-case basis to determine if signal warrants are met." For analysis purposes it was assumed that the impact at Silverado Trail/Dunaweal Lane would be considered significant if project-added traffic caused operation to fall to LOS E or F on an approach for which the Peak Hour Volume Signal Warrant is met.

Existing Conditions

Using the turning movement data collected at the two study intersections together with the current configurations, existing operating conditions at each intersection were evaluated. As shown in Table 2, both intersections are currently operating at LOS A or B overall and on all approaches. Copies of the calculations for all scenarios are provided in Appendix A. The existing traffic volumes are shown in Figure 1.

Study Intersection Approach	Existing Conditions	
	Delay	LOS
1. Silverado Trail/Dunaweal Ln	1.8	A
<i>Westbound (Silverado) Left-turn</i>	7.6	A
<i>Northbound (Dunaweal) Approach</i>	8.9	A
2. SR 29/Dunaweal Ln	0.9	A
<i>Northbound (Dunaweal) Approach</i>	9.7	A
<i>Southbound (Dunaweal) Approach</i>	11.6	B
<i>Eastbound (SR 29) Left-turn</i>	8.9	A
<i>Westbound (SR 29) Left-turn</i>	8.1	A

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service

With all approaches at LOS A or B, the current operation of both intersections would be considered acceptable. While weekend operation was not evaluated, given the similarity of volumes on a weekday versus a weekend day together with the very low average delays currently being encountered, it appears reasonable to conclude that operation during the weekend peak period is also low and therefore acceptable.

Cumulative (2030) Conditions

Volume Derivation

Future projected traffic volumes were obtained from the Solano Transportation Authority (STA) who maintains the joint Napa County/Solano County 2010-2030 Travel Demand Forecasting Model. These future volume projections assume full build-out of all currently vacant parcels based on their development potential, so would reasonably be expected to encompass development both in the County and in the neighboring communities of Calistoga and St. Helena, such as the Calistoga Hills Resort and Silver Rose projects.

The data used included directional segment volumes along SR 29 and Silverado Trail for the p.m. peak hour. Using the 2030 and 2010 model volumes a growth factor of 1.45 was determined for SR 29. This growth factor was applied to turning movements to and from Dunaweal Lane and the difference from the 2010 and 2030

volumes were added to the existing volumes for the through movements. This resulted in a total volume difference of 78 vehicle trips between existing conditions and the projected year 2030 p.m. peak hour volumes. These trips were added to existing volumes on Dunaweal Lane to achieve Cumulative volumes.

As much of Dunaweal Lane is currently developed, these 78 p.m. peak hour trips would reflect any increase in use of an existing winery or if any parcels were converted new wineries. To quantify this, if three *new* wineries were operating with four full-time and two part-time employees and an average of 60 guests per weekday each, together they would generate a total of 66 p.m. peak hour trips per the Napa county trip generation rates.

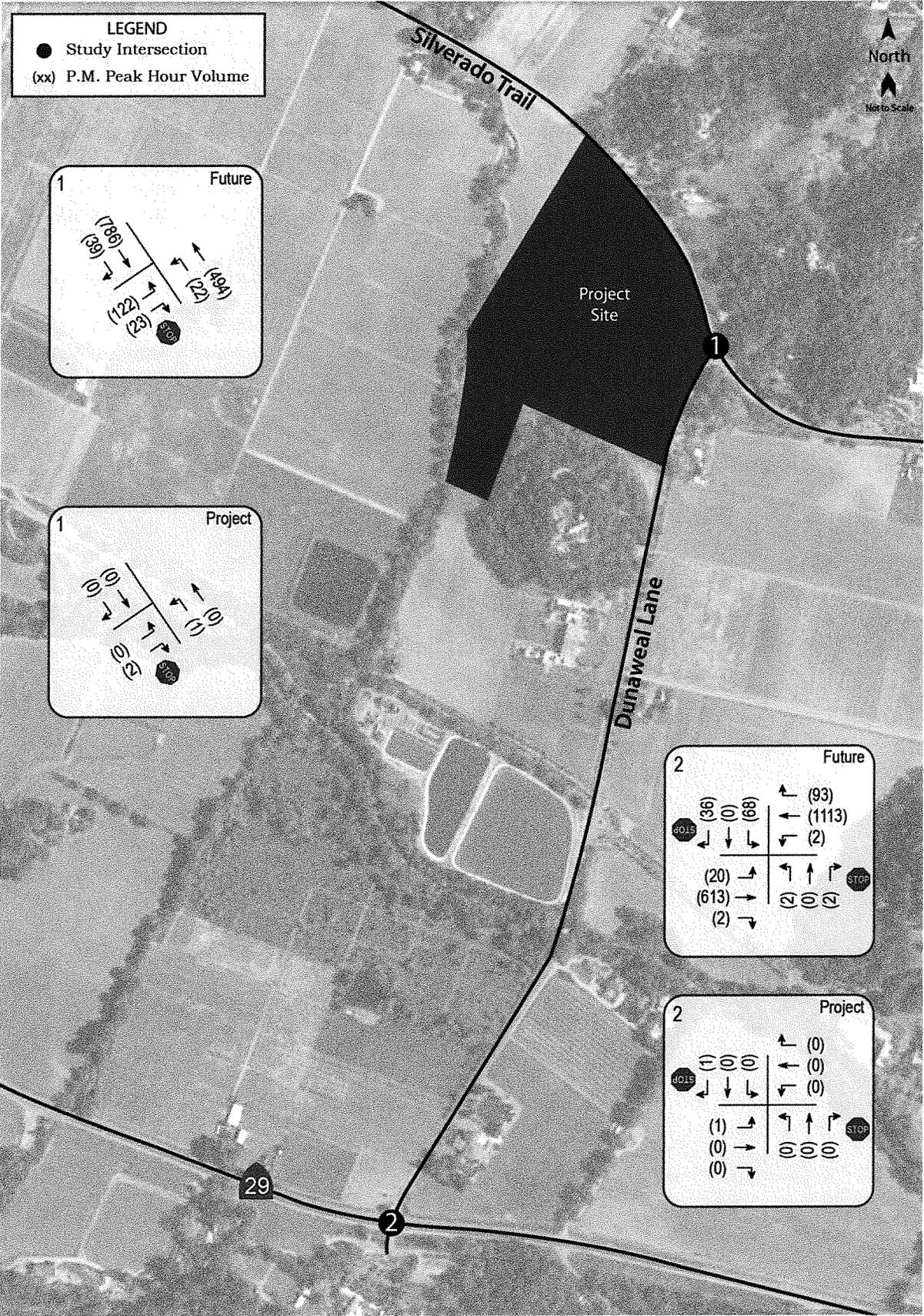
There are three existing wineries along Dunaweal Lane in the vicinity of the project study area: Clos Pegase, Twomey Winery, and Sterling Winery. As each of these are pre-existing wineries, it is reasonable to assume that they are included in the 2010 and 2030 model volumes as well as the count data obtained at the two study intersections. Similarly, if each of these three wineries increased to the same extent described for the hypothetical *new* wineries, the increase in trip generation would be the same. It should be noted the Napa Winery Trip Generation sheet does not take into account that many winery visitors would go to more than one winery in a day and as such, these drivers are already on the road and do not create a new trip, though for estimating purposes it was assumed that they would.

The growth factor used to determine the p.m. peak future volumes was also compared to the projected growth in daily traffic volumes for select roads as described in the Napa County General Plan, Table CIR-B. While future volumes are not provided for any roadways in the study area, there were volumes for two segments north and south of Dunaweal Lane on SR 29 and one for Silverado Trail at Sage Canyon. These estimated projected increases range from 52 percent, for SR 12 north of Zinfandel Lane, to nine percent, for SR 12 north of Tubbs Lane. As such, the growth factor of 1.45, or 45 percent, used on Dunaweal Lane appears to be consistent with the General Plan projections.

The future volumes for the intersections are shown in Figure 2.

Intersection Operation

Based on these projected future volumes, the two study intersections are expected to operate acceptably overall, though the northbound Dunaweal approach to Silverado Trail is expected to operate at LOS E and the southbound Dunaweal Lane approach to SR 29 is expected to operate at LOS F. Because both intersections would continue to operate acceptably overall, under the standards applied this is considered acceptable. These results are shown in Table 3.



Traffic Impact Study for the Canard Winery
Figure 2 – Future and Project Traffic Volumes



Table 3 – Cumulative PM Peak Hour Intersection Levels of Service

Study Intersection Approach	Future Conditions	
	Delay	LOS
1. Silverado Trail/Dunaweal Ln <i>Westbound (Silverado) Left-turn</i> <i>Northbound (Dunaweal) Approach</i>	3.9	A
	9.5	A
	38.7	E
2. SR 29/Dunaweal Ln <i>Northbound (Dunaweal) Approach</i> <i>Southbound (Dunaweal) Approach</i> <i>Eastbound (SR 29) Left-turn</i> <i>Westbound (SR 29) Left-turn</i>	9.6	A
	20.3	C
	**	F
	11.4	B
	8.7	A

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service;
** = delay greater than 120 seconds

Project Description

The project would allow for a maximum of 10,000 gallons of annual production, with the grapes typically all coming from on-site. There could be up to three full-time employees year round and one part-time employee during harvest. A tasting room would be constructed on the lower floor of an existing structure and it is understood that operation would include an average of four visitors on a weekday and six on the weekend with a maximum of 10 visitors daily for tours and tastings. While the intention would be to use only grapes grown on-site, the request includes a possible importation of up to ten percent of the grapes if needed for blending purposes. The site currently has a vineyard that produces up to 100 tons of grapes annually. About 20 tons are sold to nearby wineries and the remaining fruit is moved off-site to a custom crush facility. Proposed marketing events include four wine club events with up to 75 attendees and two wine auction events with up to 100 persons attending.

The proposed project site plan is shown in Figure 3.

Trip Generation

The County of Napa's Winery Traffic Information/Trip Generation Sheet was used to determine the anticipated traffic that would be generated by the proposed production facility and tasting room. A copy of this worksheet is provided in Appendix B. Since this is a small family winery and some employees will potentially be owners who live on site, the actual trip counts may be less than projected using the County's standard formulas.

The County of Napa's Winery Traffic Information/Trip Generation Sheet does not include guidance on inbound versus outbound trips, so based on data collected by W-Trans at a Sonoma County winery it was assumed that two thirds of trips at the winery would be outbound during the weekday p.m. peak hour since most of the trips would be associated with employees and customers leaving at closure of the winery. A summary of the project's trip generation potential is provided in Table 4.

Table 4 - Project Trip Generation

Land Use	Daily Trips	Weekday PM Peak		
	Weekday	Trips	In	Out
Winery plus Tasting Room	12	5	2	3

It is noted that because the grapes are grown on-site there will be a benefit in terms of the reduction in truck traffic associated with harvest, when larger trucks would typically be used, versus the smaller trucks and loads that would be associated with deliveries of materials such as barrels and bottles and that would be dispersed more evenly over the course of the year rather than being consolidated into the short time period of harvest.

Trip Distribution

The pattern used to allocate new project trips to the street network was determined by reviewing existing turning movements at the study intersections as well as employment patterns for residents of Napa County as indicated by the 2000 Census. Based on the applied assumptions as well as the source of the trips (employees versus guests), the trip generation assumptions shown in Table 5 were applied.

Table 5 - Trip Distribution Assumptions

Route	Percent
North Via SR 128	30%
South Via Silverado Trail	70%
TOTAL	100%

Agricultural Promotional Events

Two different sized wine-marketing and agricultural promotion events are proposed as part of the Use Permit, including four 75-person wine club and two 100-person wine auction events, for a total of six events. It was assumed that the maximum-sized event would require eight staff and two truck deliveries. Using the County-established occupancy of 2.8 persons per vehicle for guests and solo occupancy for staff, a maximum-sized 100-person event would be expected to generate 92 trip ends on Dunaweal Lane, including 46 inbound trips and 46 outbound trips. This size of event would occur twice a year and take place during the off-peak hours, with staff arriving an hour or more prior to the start and leaving one or more after its conclusion. Alone, guests would generate about 36 trips for arrival and 36 for departure, with these trips generally occurring over more than an hour's time. Distributed evenly to the north and south, the largest promotional event would be expected to generate a maximum of 18 trips during any single hour in each direction on Dunaweal Lane north and south of the project driveway.

Given that this and that other promotional events are infrequent (six times per year, or one every other month on average), not part of typical daily operation and often occur outside the peak period for traffic, together with the minimal increase in traffic associated with the largest promotional event proposed, the promotional events were not included in the daily trip generation and resulting intersection operation analysis.

Intersection Operation

Existing plus Project Conditions

Upon the addition of project-related traffic to the Existing volumes, the study intersections are expected to continue operating acceptably at LOS A. The minor approaches are expected to operate at LOS A or B. These results are summarized in Table 6. Project traffic volumes are shown in Figure 3.

Table 6 – Existing PM Peak Hour Intersection Levels of Service

Study Intersection Approach	Existing Conditions		Existing plus Project	
	Delay	LOS	Delay	LOS
1. Silverado Trail/Dunaweal Ln <i>Westbound (Silverado) Left-turn</i> <i>Northbound (Dunaweal) Approach</i>	1.8	A	1.9	A
	7.6	A	7.6	A
	8.9	A	9.0	A
2. SR 29/Dunaweal Ln <i>Northbound (Dunaweal) Approach</i> <i>Southbound (Dunaweal) Approach</i> <i>Eastbound (SR 29) Left-turn</i> <i>Westbound (SR 29) Left-turn</i>	0.9	A	0.9	A
	9.7	A	9.7	A
	11.6	B	11.5	B
	8.9	A	8.9	A
	8.1	A	8.1	A

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service

It should be noted that with the addition of project-related traffic volumes, average delay during the p.m. peak hour at the Southbound Dunaweal Lane approach decreases. While this is counter-intuitive, this condition occurs when a project adds trips to movements that have delays that are below the intersection average, resulting lower overall average delay. The project adds traffic to the right-turn movement, which has an average delay that is lower than the average for the approach as a whole, resulting in a slight reduction in the 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 be added to a lower-delay movement, and the resulting change would be imperceptible.

Finding – The study intersections are expected to continue operating acceptably at the same levels of service upon the addition of project-generated traffic.

Cumulative (2030) plus Project Conditions

Upon the addition of project-generated traffic to the anticipated Cumulative volumes, the study intersections are expected to operate acceptably as a whole though the Dunaweal Lane approaches to Silverado Trail and SR 29 will continue operating at LOS E and LOS F, respectively. The project results in little change to the average delay at Silverado Trail/Dunaweal Lane, making this impact less-than-significant under County criteria. Similarly, as the intersection of SR 29/Dunaweal Lane is expected to continue operating acceptably overall with project traffic added to future volumes, the impact under the Caltrans criterion is also less-than-significant. The Cumulative plus Project operating conditions are summarized in Table 7.

Table 7 – Cumulative PM Peak Hour Intersection Levels of Service

Study Intersection Approach	Future Conditions		Future plus Project	
	Delay	LOS	Delay	LOS
1. Silverado Trail/Dunaweal Ln	3.9	A	4.0	A
<i>Westbound (Silverado) Left-turn</i>	9.5	A	9.6	A
<i>Northbound (Dunaweal) Approach</i>	38.7	E	38.7	E
2. SR 29/Dunaweal Ln	9.6	A	9.8	B
<i>Northbound (Dunaweal) Approach</i>	20.3	C	20.4	C
<i>Southbound (Dunaweal) Approach</i>	**	F	**	F
<i>Eastbound (SR 29) Left-turn</i>	11.4	B	11.4	B
<i>Westbound (SR 29) Left-turn</i>	8.7	A	8.7	A

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service;
 ** = delay greater than 120 seconds

Finding – The study intersections will continue operating acceptably overall with project traffic added, at the same Levels of Service as without it. The impact is therefore less-than-significant.

Access and Circulation

Site Access

Access to the site would be via a driveway approximately 600 feet south of the Silverado Trail. The proposed project would modify the existing access to the site to include a flared right turn from southbound Dunaweal Lane into the project site. The proposed access road would be 20 feet wide with a paved asphalt concrete surface.

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 distance should be measured from a 3.5-foot height at the location of the driver on the minor road to a 4.25-foot object height in the center of the approaching lane of the major road. Set-back for the driver on the crossroad shall be a minimum of 15 feet, measured from the edge of the traveled way.

Sight distance along Dunaweal Lane at the project driveway was 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 are based on stopping sight distance with approach travel speeds used as the basis for determining the recommended sight distance. Additionally, the stopping sight distance needed for a following driver to stop if there is a vehicle waiting to turn into a side street or driveway is evaluated based on stopping sight distance criterion and the approach speed on the major street.

The stopping sight distance criterion for private street intersections was applied for evaluation purposes. Based on a design speed of 45 mph, the minimum stopping sight distance needed is 360 feet. Site distances to the north and south of the proposed project driveway as well as along Dunaweal Lane exceed 360 feet, so are adequate.

Stopping sight distance can be impeded by signs or landscaping, so care should be taken in designing the frontage improvements to insure that any signs or plants added are either placed outside the sight line area or are outside the three to seven-foot area where driver sight lines occur.

Access Analysis

Left-Turn Lane Warrants

The need for a left-turn lane on Dunaweal Lane at the project driveway was evaluated based on criteria contained in the *Napa County Road and Street Standards*, 2011. Because future average daily traffic volumes on Dunaweal Lane are not available, a recently obtained count for a weekday was used for this analysis.

The proposed project would generate a weekday average of 12 trips daily trips. Using the County's criteria, and based on the daily volume of 1,575 vehicles on Dunaweal Lane, a left-turn lane would not be warranted. The left-turn lane warrant graph is provided in Appendix C.

Conclusions and Recommendations

Conclusions

- The proposed Canard Winery would be expected to generate 12 daily trips with 5 trips during the p.m. peak hour.
- Of the six annual agricultural promotional events, the largest event would be expected to generate up to 18 trips during any single hour in each direction on Dunaweal Lane north and south of the project driveway.
- Upon the addition of the project trips to the existing traffic volume, the intersections would continue to operate acceptably at LOS A overall.
- With the addition of project-related trips to the projected future volumes, the intersections are expected to maintain LOS A operation overall. The Dunaweal Lane approaches at both of the study intersections are expected to operate at LOS F with or without the project; however based on the significance criterion established, the project has a less-than-significant impact.
- The pedestrian and bicycle facilities proposed on-site would adequately serve the expected patrons.
- Sight distance from and approaching the project driveway is adequate.
- A left-turn lane is neither warranted nor recommended.

Recommendations

- Any landscaping or signing placed along the frontage should either be well back from the road or of a height that does not block visibility from the perspective of a driver.

Study Participants and References

Study Participants

Principal in Charge	Dalene J. Whitlock, PE, PTOE
Assistant Engineer	Briana Byrne, EIT
Technician/Graphics	Deborah J. Mizell
Editing/Formatting	Angela McCoy

References

Highway Capacity Manual, Transportation Research Board, 2000
Highway Design Manual, 6th Edition, California Department of Transportation, 2012
Napa County General Plan, County of Napa, 2013
Napa County Road and Street Standards, County of Napa, 2011
United States Census Bureau, <http://www.census.gov/>

NAX107



Appendix A

Intersection Level of Service Calculations



 PM Peak Hour - Existing plus Project Conditions
 Canard Winery Traffic Impact Study
 County of Napa

Trip Generation Report

Forecast for pm

Zone #	Subzone	Amount	Units	Rate		Trips		Trips In	Trips Out	Total % Of Trips Total
				In	Out	In	Out			
1		1.00	winery	2.00	3.00	2	3	5	100.0	5
	Zone 1	Subtotal				2	3	5	100.0	5

TOTAL						2	3	5	100.0	

PM Peak Hour - Existing plus Project Conditions
Canard Winery Traffic Impact Study
County of Napa

Level of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1 Silverado Trail/Dunaweal Ln

Average Delay (sec/veh): 1.9 Worst Case Level of Service: A [9.0]

Street Name: Dunaweal Ln Silverado Trail
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

Control: Stop Sign Stop Sign Uncontrolled Uncontrolled
Rights: Include Include Include Include
Lanes: 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Volume Module: >> Count Date: 17 Sep 2014 << 4:45 - 5:45 pm

Base Vol: 16 0 84 0 0 0 0 0 0 167 27 15 248 0
Growth 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 1.00
Initial Bse: 16 0 84 0 0 0 0 0 0 167 27 15 248 0
Added Vol: 0 0 2 0 0 0 0 0 0 0 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 16 0 86 0 0 0 0 0 0 167 27 16 248 0
User 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 1.00
PHF Adj: 0.94 0.94 0.94 0.94 0.94 0.94 0.94 0.94 0.94 0.94 0.94 0.94 0.94
PHF Volume: 17 0 91 0 0 0 0 0 0 177 29 17 264 0
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0 0 0
FinalVolume: 17 0 91 0 0 0 0 0 0 177 29 17 264 0

Critical Gap Module:

Critical Gp: 6.4 6.5 6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx 4.1 xxxx xxxxx
FollowUpTim: 3.5 4.0 3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx 2.2 xxxx xxxxx

Capacity Module:
Conflict Vol: 489 192 xxxx xxxx xxxxx xxxx xxxx xxxxx 206 xxxx xxxxx
Potent Cap.: 542 482 855 xxxx xxxx xxxxx xxxx xxxx xxxxx 1377 xxxx xxxxx
Move Cap.: 536 476 855 xxxx xxxx xxxxx xxxx xxxx xxxxx 1377 xxxx xxxxx
Volume/Cap: 0.03 0.00 0.11 xxxx xxxx xxxxx xxxx xxxx xxxxx 0.01 xxxx xxxxx

Level of Service Module:

2Way95thQ: xxxx xxxx xxxxx xxxx xxxx xxxxx xxxx xxxx xxxxx 0.0 xxxx xxxxx
Control Del: xxxxx xxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 7.6 xxxx xxxxx
LOS by Move: * * * * *
Movement: LT - LTR - RT
Shared Cap.: xxxx 1014 xxxxx xxxx xxxx xxxxx xxxx xxxx xxxxx xxxx xxxx xxxxx
SharedQueue: xxxxx 0.4 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 0.0 xxxx xxxxx
Shrd ConDel: xxxxx 9.0 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 7.6 xxxx xxxxx
Shared LOS: * A * * * * *
ApproachDel: 9.0 xxxxxx xxxxxx
ApproachLOS: A *

Note: Queue reported is the number of cars per lane.

PM Peak Hour - Existing plus Project Conditions
Canard Winery Traffic Impact Study
County of Napa

Level of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #2 SR 29/Dunaweal Ln

Average Delay (sec/veh): 0.9 Worst Case Level of Service: B [11.5]

Street Name: Dunaweal Ln SR 29
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

Control: Stop Sign Stop Sign Uncontrolled Uncontrolled
Rights: Include Include Include Include
Lanes: 0 0 1 0 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0

Volume Module: >> Count Date: 16 Sep 2014 << 4:00 - 5:00 pm

Base Vol: 2 0 2 47 0 25 14 382 2 2 558 64
Growth 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
Initial Bse: 2 0 2 47 0 25 14 382 2 2 558 64
Added Vol: 0 0 0 0 0 0 0 0 1 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 2 0 2 47 0 26 15 382 2 2 558 64
User 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
PHF Adj: 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93
PHF Volume: 2 0 2 51 0 28 16 412 2 2 601 69
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0 0
FinalVolume: 2 0 2 51 0 28 16 412 2 2 601 69

Critical Gap Module:

Critical Gp: 7.1 6.5 6.2 7.1 6.5 6.2 4.1 xxxx xxxxx 4.1 xxxx xxxxx
FollowUpTim: 3.5 4.0 3.3 3.5 4.0 3.3 2.2 xxxx xxxxx 2.2 xxxx xxxxx

Capacity Module:
Conflict Vol: 1099 1120 413 1086 1086 636 670 xxxxx xxxxx 414 xxxx xxxxx
Potent Cap.: 192 208 644 196 218 482 930 xxxx xxxxx 1156 xxxx xxxxx
Move Cap.: 178 204 644 192 214 482 930 xxxx xxxxx 1156 xxxx xxxxx
Volume/Cap: 0.01 0.00 0.00 0.26 0.00 0.06 0.02 xxxx xxxxx 0.00 xxxx xxxxx

Level of Service Module:

2Way95thQ: xxxx xxxx xxxxx xxxx xxxx xxxxx 0.1 xxxx xxxxx 0.0 xxxx xxxxx
Control Del: xxxxx xxxx xxxxx xxxxx xxxx xxxxx 8.9 xxxx xxxxx 8.1 xxxx xxxxx
LOS by Move: * * * * *
Movement: LT - LTR - RT
Shared Cap.: xxxx 764 xxxxx xxxx 630 xxxxx xxxx xxxx xxxxx xxxx xxxx xxxxx
SharedQueue: xxxxx 0.0 xxxxx xxxxx 0.4 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx
Shrd ConDel: xxxxx 9.7 xxxxx xxxxx 11.5 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx
Shared LOS: * A * * * * *
ApproachDel: 9.7 11.5 xxxxxx
ApproachLOS: A *

Note: Queue reported is the number of cars per lane.

Appendix B

Napa Trip Generation Spreadsheet



Winery Traffic Information / Trip Generation Sheet

Project Name: Canard Winery

Project Scenario:

Proposed

Traffic during a Typical Weekday

Number of FT employees: <u>3</u> x 3.05 one-way trips per employee	=	<u>9</u> daily trips.
Number of PT employees: <u>0</u> x 1.90 one-way trips per employee	=	<u>0</u> daily trips.
Average number of weekday visitors: <u>4</u> / 2.6 visitors per vehicle x 2 one-way trips	=	<u>3</u> daily trips.
Gallons of production: <u>10000</u> / 1,000 x .009 truck trips daily ³ x 2 one-way trips	=	<u>0</u> daily trips.
Total	=	<u>12</u> daily trips.
Number of total weekday trips x .38	=	<u>5</u> PM peak trips.

Traffic during a Typical Saturday

Number of FT employees (on Saturdays): <u>3</u> x 3.05 one-way trips per employee	=	<u>9</u> daily trips.
Number of PT employees (on Saturdays): <u>0</u> x 1.90 one-way trips per employee	=	<u>0</u> daily trips.
Average number of weekend visitors: <u>6</u> / 2.8 visitors per vehicle x 2 one-way trips	=	<u>4</u> daily trips.
Total	=	<u>13</u> daily trips.
Number of total Saturday trips x .57	=	<u>7</u> PM peak trips.

Traffic during a Crush Saturday

Number of FT employees (during crush): <u>3</u> x 3.05 one-way trips per employee	=	<u>9</u> daily trips.
Number of PT employees (during crush): <u>1</u> x 1.90 one-way trips per employee	=	<u>2</u> daily trips.
Average number of weekend visitors: <u>6</u> / 2.8 visitors per vehicle x 2 one-way trips	=	<u>4</u> daily trips.
Gallons of production: <u>10000</u> / 1,000 x .009 truck trips daily x 2 one-way trips	=	<u>0</u> daily trips.
Avg. annual tons of grape on-haul: <u>7</u> x .11 truck trips daily ⁴ x 2 one-way trips	=	<u>0</u> daily trips.
Total	=	<u>16</u> daily trips.
Number of total Saturday trips x .57	=	<u>9</u> PM peak trips.

Largest Marketing Event- Additional Traffic

Number of event staff (largest event): <u>8</u> x 2 one-way trips per staff person	=	<u>16</u> trips.
Number of visitors (largest event): <u>100</u> / 2.8 visitors per vehicle x 2 one-way trips	=	<u>71</u> trips.
Number of special event truck trips (largest event): <u>2</u> x 2 one-way trips	=	<u>4</u> trips.

³ Assumes 1.47 materials & supplies trips + 0.8 case goods trips per 1,000 gallons of production / 250 days per year (see *Traffic Information Sheet Addendum* for reference).

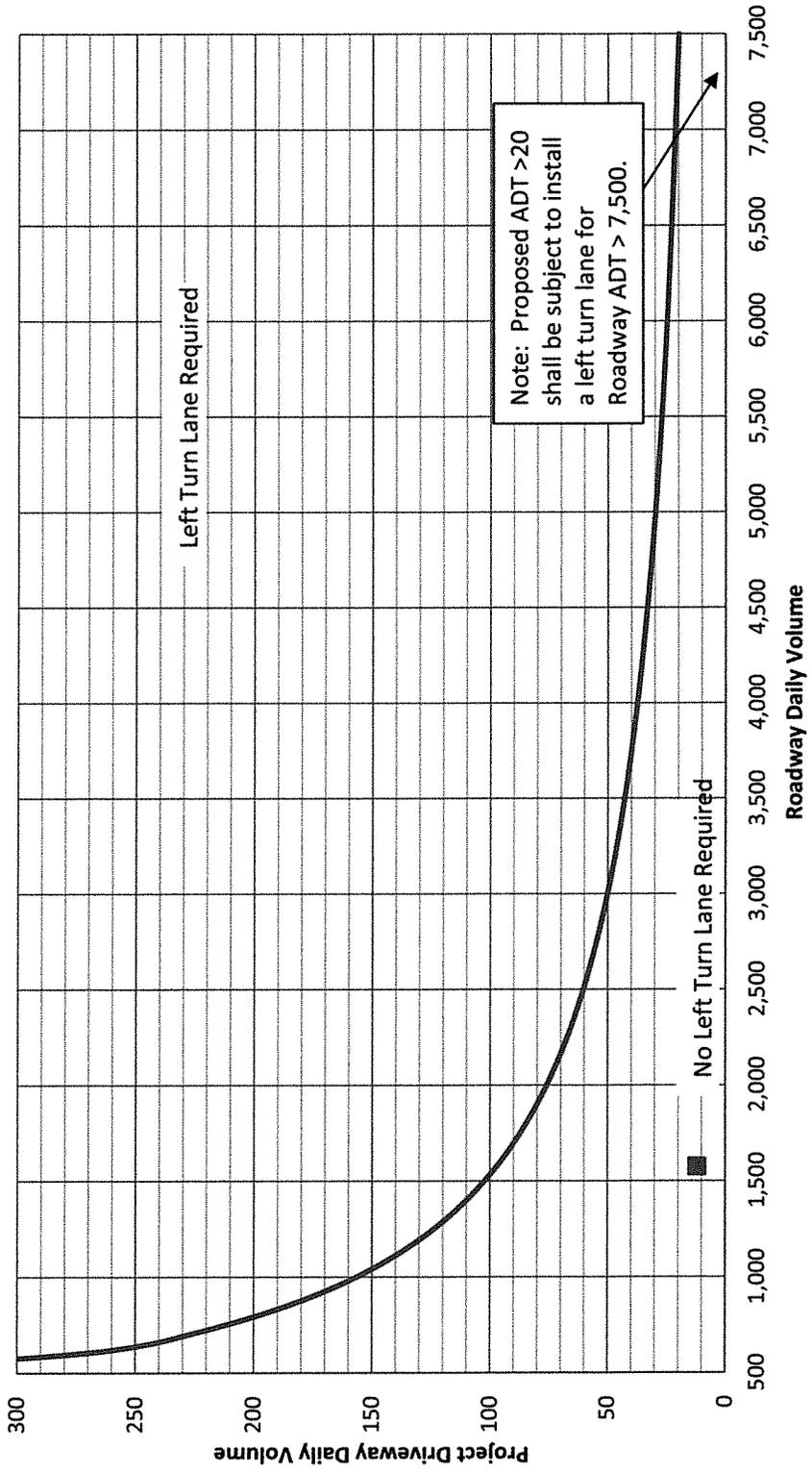
⁴ Assumes 4 tons per trip / 36 crush days per year (see *Traffic Information Sheet Addendum* for reference).

Appendix C

Left-turn Lane Warrant



Napa County Left Turn Lane Warrant Graph



Note: Proposed ADT > 20 shall be subject to install a left turn lane for Roadway ADT > 7,500.

