Traffic Impact Study for the Piazza Del Dotto Winery Use Permit Modification

Prepared for the County of Napa
Permit Number P18-00143

Submitted by
W-Trans

April 21, 2020

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Table of Contents

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Executive Summary

Piazza Del Dotto Winery seeks to modify the existing Use Permit to allow for an increase in the number of daily visitors to a maximum of 125 on weekdays and 130 on weekend days. Increases in production from 48,000 to 100,000 gallons per year and in staffing levels from 13 to 17 full-time employees are also proposed. Further, the Use Permit Modification would adjust the special event allowance to include 19 events with 120 guests and four events with up to 400 attendees annually. The events would be scheduled to avoid generating trips during peak hours, which are between 4:00 and 6:00 p.m. on weekdays and between 1:00 and 3:00 p.m. on weekend days.

Using the County's standard winery trip generation assumptions and site-specific information, the proposed project would be expected to generate an average of 71 new daily trips on weekdays, including 13 weekday p.m. peak hour trips, and seven trips during the weekend midday peak hour. On Crush Saturdays, the project would generate 10 new trips during the midday peak hour.

The study area included the segment of SR 29 between Washington Street and Oakville Grade Road, which is currently operating at LOS E during the weekday p.m. peak hour and weekend midday peak hour and would continue to do so with the addition of project traffic. Under anticipated Future volumes, the segment would drop to LOS F both without and with the project as there are no planned improvements to SR 29 beyond the recent addition of a two-way left-turn lane and bike lanes. Because this segment of SR 29 is allowed to operate at LOS F per the *General Plan*, the project would not have an adverse impact on traffic operation.

While the study area lacks pedestrian facilities and transit service, there is not expected to be a demand, and therefore, the lack of facilities is considered acceptable. Existing bike facilities on SR 29 and Yount Mill Road provide adequate bicycle access. To accommodate cyclists, the project should provide ten bicycle parking spaces on-site.

Access to the site occurs via SR 29 and Yount Mill Road. The driveway on SR 29 is the main entrance and is used by visitors, while the Yount Mill Road access is reserved for employees, agricultural and winery vehicles, emergency response vehicles, and trucks during harvest. The Yount Mill Road access points would also be used by construction vehicles; therefore, there would be no anticipated temporary traffic impacts to SR 29 at the project driveway. Sight lines along SR 29 and Yount Mill Road at the project driveways are adequate to accommodate turns into and out of the site.

The proposed 54-space parking supply is adequate to accommodate the anticipated daily parking demand but is insufficient to accommodate demand for the proposed events. The project applicant should make arrangements for guests to park off-site during events with transportation to and from the site via shuttles.

To meet CEQA requirements and in recognition of the statewide goal to reduce VMT it is recommended that the project implement a TDM Plan that includes measures identified in this report such as carpool/active transportation incentives and a guaranteed ride home program.

Introduction

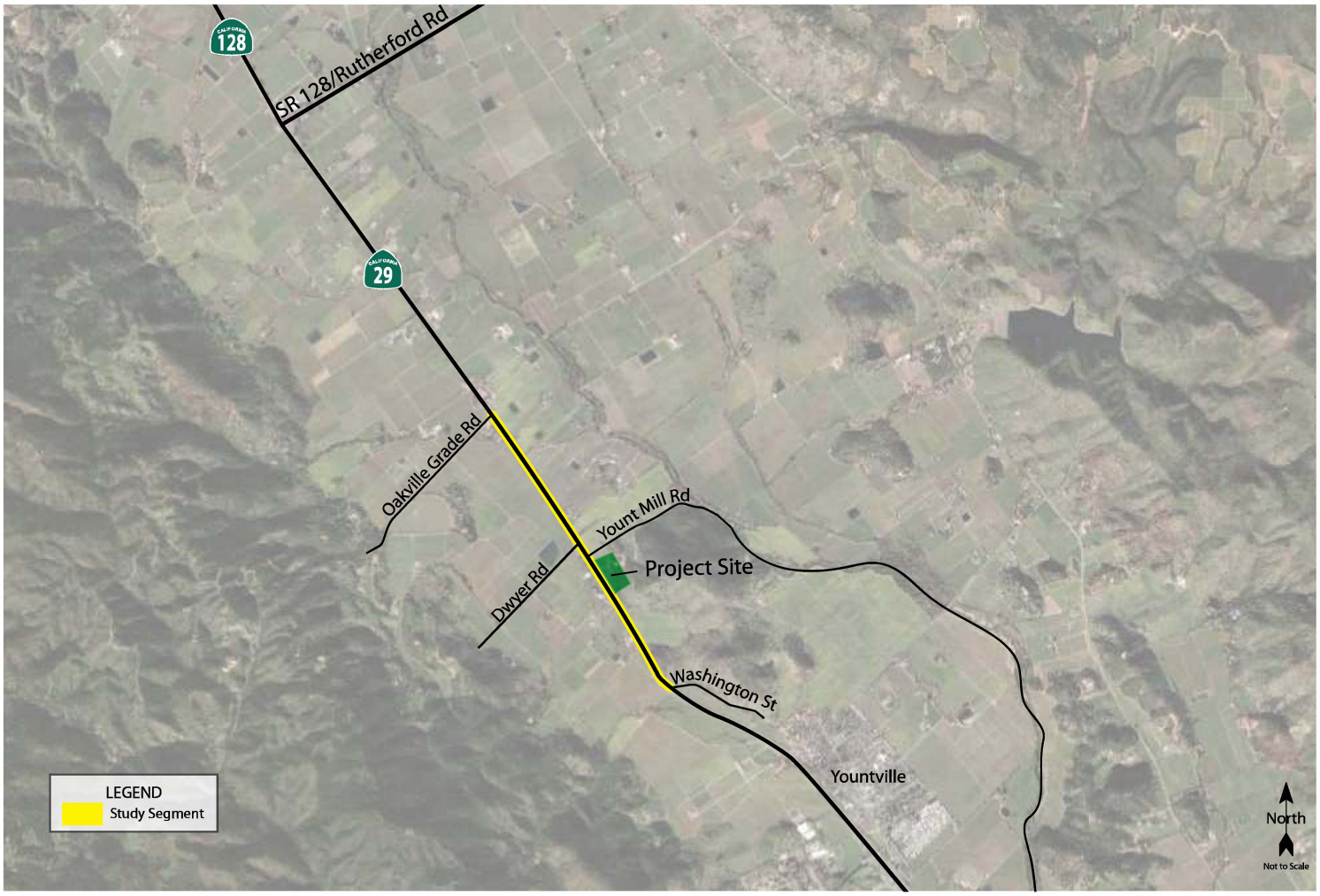
This report presents an analysis of the potential traffic impacts that would be associated with the proposed modifications to the existing Use Permit for Piazza del Dotto Winery (previously known as Ca'Nani Winery) located at 7466 Saint Helena Highway (SR 29) in the County of Napa. The traffic study was completed in accordance with the criteria established by the County of Napa, reflects a scope of work approved by County staff, 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 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 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, bicyclists, and to transit are also addressed.

Project Profile

The proposed project would expand the existing Use Permit to allow for an increase in production from 48,000 to 100,000 gallons per year and an increase in full-time employees from 13 to 17. Additionally, the proposed Use Permit would increase visitation to allow for a maximum of 125 visitors per day on weekdays and 130 visitors per day on weekend days. The existing marketing program would be revised to include 19 events per year for up to 120 guests and four events per year with a maximum of 400 guests; however, these events would be scheduled to neither begin nor end during peak hours. The site is served by four existing driveways, including one on SR 29 and three on Yount Mill Road, all of which would continue to provide access with the Use Permit modification. The project site is located on the east side of SR 29 approximately two miles north of Yountville, as shown in Figure 1.



nax129.ai 4/20

Traffic Impact Study for the Piazza Del Dotto Winery Use Permit Modification

Figure 1 – Project Location and Study Segment

Transportation Setting

Operational Analysis

Study Area and Periods

The study area consists of the section of SR 29 between Washington Street and Oakville Grade Road. Operating conditions during the weekday p.m. and weekend midday peak periods were evaluated as these time periods reflect the highest traffic volumes area wide and for the proposed project. The evening peak hour occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion of the day during the homeward bound commute, while the weekend peak generally occurs between 1:00 and 3:00 p.m. and reflects conditions when tasting rooms tend to be busiest. Four analysis scenarios were evaluated, as is typical for winery analyses, including Existing, Existing plus Project, Future and Future plus Project Conditions.

Consideration was given to the need for an operational analysis of Yount Mill Road as the winery has three secondary driveways on Yount Mill Road. A review of analyses for roadways with similar volumes indicates that they operate at LOS A or B. The project would generate very few trips to the new driveway so it is reasonable to conclude that Yount Mill road would continue to operate acceptably given its current low volumes and the nominal increase in traffic associated with the project.

Study Roadway

Saint Helena Highway (SR 29) runs mostly north to south with a northwest-southeast skew. In the study area, the highway has two 12-foot travel lanes with a 12-foot two-way left-turn lane and eight-foot paved shoulders marked as bicycle lanes. The posted speed limit is 55 miles per hour (mph). Based on count data posted on Caltrans' website, the segment of SR 29 along the project frontage has an average daily traffic (ADT) volume during the peak month of the year of approximately 27,500. During a visit to the project site, traffic was observed for 15 minutes at the existing driveway on SR 29. There were no observed issues with motorists entering or exiting the property. During the field review, a total of two bicyclists were observed on SR 29, one riding in each direction.

Collision History

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue. Collision rates were calculated based on records available from the California Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports. The most current five-year period available is July 1, 2013 through June 30, 2018.

As presented in Table 1, the calculated collision rate for the study road segment was compared to average collision rate for similar facilities statewide, as indicated in *2014 Collision Data on California State Highways*, California Department of Transportation (Caltrans). The study segment experienced a below-average collision rate of 0.59 collisions per million vehicle miles (c/mvm) versus an average rate statewide of 0.83 c/mvm indicating that the roadway is operating acceptably with regards to safety. The collision rate calculations are provided in Appendix A.

Table 1 – Collision Rate for the Study Segment			
Study Roadway Segment	**Number of Collisions (2013-2018)**	**Calculated Collision Rate (c/mvm)**	**Statewide Average Collision Rate (c/mvm)**
1. SR 29: Oakville Grade Rd to Washington St	59	0.59	0.83

Note: c/mvm = collisions per million vehicles miles

Alternative Modes

Pedestrian Facilities

As might be expected given the rural location of the project site, there are no pedestrian facilities in the project vicinity.

Bicycle Facilities

The *Highway Design Manual*, Caltrans, 2017, classifies bikeways into four categories, three of which are applied in the County's Bicycle Plan:

- **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 vicinity, Class II bike lanes exist on SR 29 and the planned Vine Trail would parallel SR 29 along the project frontage. Additionally, Yount Mill Road is a Class III bike route. Bicyclists currently ride in the roadway shoulder along SR 29 and share the travel lane with vehicles on other roads within the project study area. Table 2 summarizes the existing and planned bicycle facilities in the project vicinity, as contained in the *Napa County Bicycle Plan*.

Table 2 – Existing and Planned Bicycle Facilities in the Project Vicinity				
Status **Facility**	**Class**	**Length (miles)**	**Begin Point**	**End Point**
Existing				
SR 29	II	7.63	Madison St	Chaix Ln
Yount Mill Rd	III	2.10	Yountville Town Limit	SR 29
Proposed				
Vine Trail	I	7.67	Madison St	Chaix Ln

Source: *Napa County Bicycle Plan,* W-Trans, 2012

Transit Facilities

There are no existing bus stops within an acceptable walking distance (one-quarter mile) of the project site.

Capacity Analysis

Two-Lane Highway Segment Level of Service Methodology

The roadway segment Level of Service methodology found in Chapter 15, "Two-Lane Highways," of the *Highway Capacity Manual* is the basis of the automobile LOS analysis. The methodology considers traffic volumes, terrain, roadway cross-section, the proportion of heavy vehicles, and the availability of passing zones. The LOS criteria for two-lane highways differs depending on whether the highway is considered "Class I," "Class II," or "Class III." Class I highways are typically long-distance routes connecting major traffic generators or national highway networks where motorists expect to travel at high speeds. Motorists do not necessarily expect to travel at high speeds on Class II highways, which often function as scenic or recreational routes and typically serve shorter trips. Class III highways may be portions of Class I or Class II highways that pass through towns and communities and have a mix of local traffic and through traffic.

The measure of effectiveness by which Level of Service is determined on Class I and II highways is average travel speed (ATS) and percent time spent following (PTSF), or the proportion of time that drivers on the highway are limited in their speed by a driver in front of them. Class III highways are measured by percent of free-flow speed (PFFS), which represents the ability of vehicles to travel at or near the posted speed limit. SR 29 was defined as a Class II highway for the purposes of this analysis. A summary of the ATS, PTSF, and PFFS breakpoints is shown in Table 3.

Table 3 – Automobile Level of Service Criteria

LOS	Class I Highways		Class II Highways	Class III Highways
	ATS (mi/h)	PTSF (%)	PTSF (%)	PFFS (%)
A	>55	≤35	≤40	>91.7
B	>50-55	>35-50	>40-55	>83.3-91.7
C	>45-50	>50-65	>55-70	>75.0-83.3
D	>40-45	>65-80	>70-85	>66.7-75.0
E	≤40	>80	>85	≤66.7

Notes: LOS = Level of Service; ATS = Average Travel Speed; PTSF = Percent Time Spent Following; PFFS = Percent of Free-Flow Speed

Reference: *Highway Capacity Manual*, Transportation Research Board, 2010

Traffic Operation Standards

Napa County

In the Circulation Element of the *Napa County General Plan*, the following policies have been adopted:

- **Policy CIR-31** – *The County seeks to provide a roadway system that maintains current roadway capacities in most locations and is efficient in providing local access.*

- **Policy CIR-38** – *The County seeks to maintain operations of roads and intersections in the unincorporated County area that minimize travel delays and promote safe access for all users. Operational analysis shall be conducted according to the latest version of the Highway Capacity Manual and as described in the current version of the County's Transportation Impact Study Guidelines. In general, the County seeks to maintain Level of Service (LOS) D on arterial roadways and at signalized intersections, as the service level that best aligns with the County's desire to balance its rural character with the needs of supporting economic vitality and growth.*

  In situations where the County determines that achieving LOS D would cause an unacceptable conflict with other goals and objectives, minimizing collisions and the adequacy of local access will be the County's priorities. Mitigating operational impacts should first focus on reducing the project's vehicular trips through modifying the project definition, applying TDM strategies, and/or applying new technologies that could reduce vehicular travel and associated delays; then secondarily should consider physical infrastructure changes. Proposed mitigations will be evaluated for their effect on collisions and local access, and for their effectiveness in achieving the maximum potential reduction in the project's operational impacts (see the County's Transportation Impact Study Guidelines for a list of potential mitigation measures).

  The following roadway segments are exceptions to the LOS D standard described above:
  - *State Route 29 in the unincorporated areas between Yountville and Calistoga: LOS F is acceptable.*
  - *Silverado Trail between State Route 128 and Yountville Cross Road: LOS E is acceptable.*
  - *State Route 12/121 between the Napa/Sonoma county line and Carneros Junction: LOS F is acceptable.*
  - *American Canyon Road from I-80 to American Canyon City Limit: LOS E is acceptable.*

To provide a more quantitative method of adhering to the above standards, the County has recently updated the significance thresholds for intersections as summarized below:

- If an unsignalized intersection is operating acceptably (LOS A though LOS D), and the project would cause the intersection to fall to LOS E or LOS F, the applicant must mitigate the impact to restore to LOS D at a minimum, or the project is considered to adversely impact the intersection.

- If an intersection is already operating at LOS E or F, and the project would increase delay at the intersection by five or more seconds, the applicant must mitigate the impact to lower the increase in delay, or else the project would be considered to adversely impact the intersection. The same standards apply to the analysis of minor approaches to unsignalized intersections.

Existing Conditions

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the weekday p.m. and weekend midday peak periods. This condition does not include project-generated traffic volumes. Volume data was collected in mid-May while local schools were in

session and adjusted to reflect peak summertime conditions using count adjustment factors provided in the *City of Napa Traffic Impact Study Guidelines*, City of Napa, 2004 as this source was determined to have the most accurate seasonal adjustment information. A copy of the policy indicating seasonal adjustment factors is contained in Appendix B.

Roadway Segment Levels of Service

Under Existing Conditions, the study segment operates at LOS D in the northbound direction during the weekday p.m. peak hour and at LOS E in the southbound direction during the p.m. peak hour as well as both directions during the weekend peak hour. Although LOS E is below the County's threshold of LOS D, LOS F is considered acceptable operation on the segment of SR 29 between Yountville and Calistoga, which encompasses the study segment. The Existing traffic volumes are shown in Figure 2. A summary of the roadway segment level of service calculations is shown in Table 4, and copies of the Level of Service calculations for all evaluated scenarios are provided in Appendix C.

Table 4 – Existing Peak Hour Roadway Segment Levels of Service

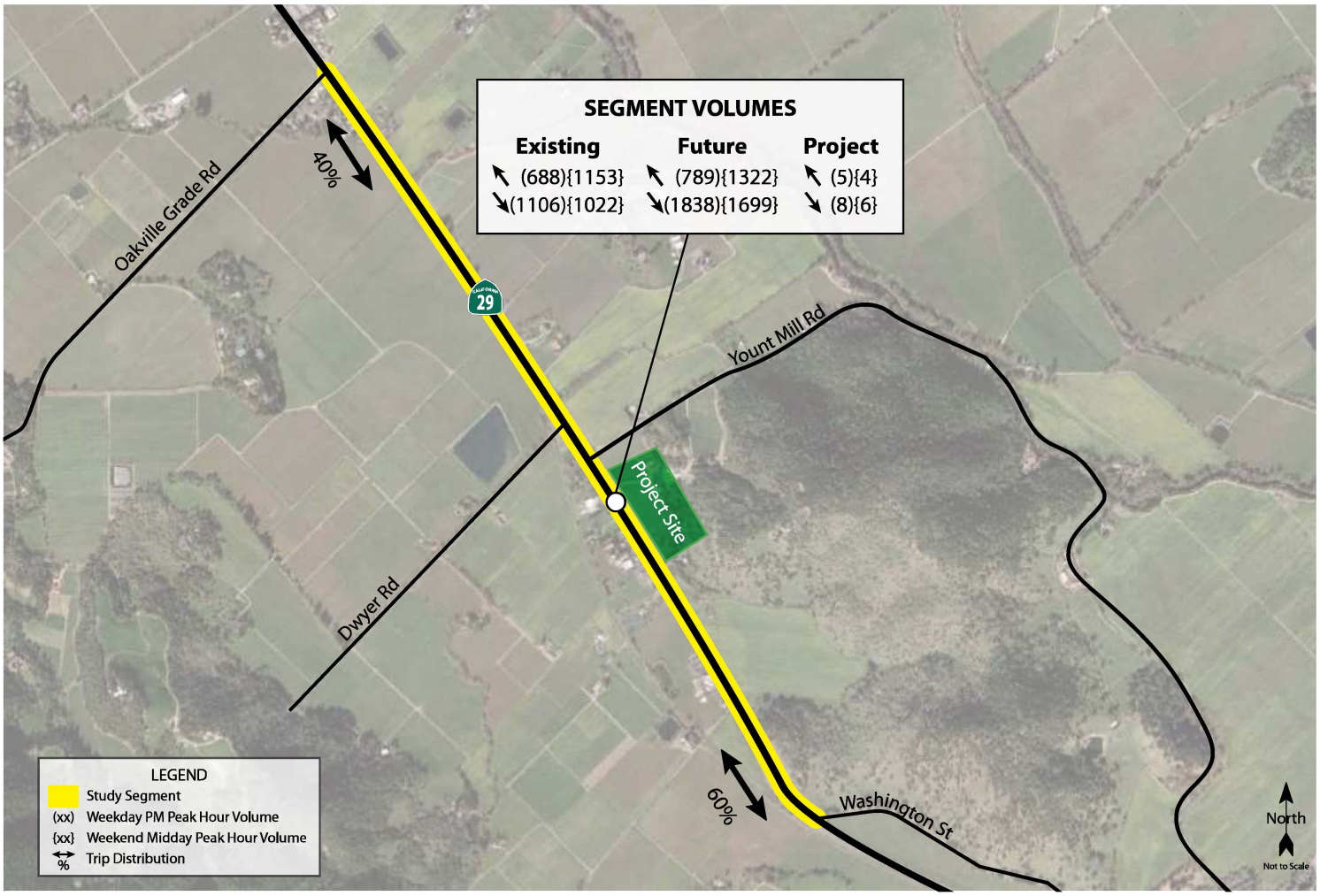
Study Segment Direction	Weekday PM Peak		Weekend Midday Peak	
	PTSF	LOS	PTSF	LOS
Saint Helena Hwy (SR 29)				
NB – Washington St to Oakville Grade Rd	77.5	D	90.6	E
SB – Oakville Grade Rd to Washington St	91.4	E	87.7	E

Notes: PTSF = Percent Time Spent Following; LOS = Level of Service; NB = Northbound; SB = Southbound

Future Conditions

Future volumes for the horizon year 2040 were calculated based on output from the *Napa Solano Travel Demand Model*, maintained by the Solano Transportation Authority (STA). Base year (2015) and future (2040) segment volumes for the weekday p.m. peak period were used to calculate growth factors in each direction for the study roadway segment.

The growth factors projected by the model were then adjusted to account for the three years of growth that have already occurred since 2015 and the Existing volumes were multiplied by the growth factor to project likely Future weekday p.m. peak hour volumes for the study segment. The same growth factors used for the weekday p.m. peak hour were used for the weekend midday peak hour as the model does not contain information for weekend days. It is noted that the model is projecting substantial increases in traffic volumes in the area resulting in a growth factor of 1.66 for the southbound direction of SR 29. The segment of SR 29 between Yountville and Calistoga is classified as a 2-lane Freeway on the Circulation Map (CIR-1) in the *General Plan* and there are no plans to provide additional travel lanes, though the travel demand model is projecting such substantial growth by the year 2040 that the only way to achieve LOS D operation under these projected volumes would be to provide two travel lanes in each direction.



nax129.ai 4/20

Traffic Impact Study for the Piazza Del Dotto Winery Use Permit Modification

Figure 2 – Traffic Volumes and Trip Distribution

Roadway Segment Levels of Service

As might be expected, under the anticipated Future volumes and with no improvements to SR 29 beyond the recent addition of a center two-way left-turn lane, the study segment is expected to deteriorate to LOS F operation in both directions during the weekend midday peak hour and in the southbound direction during the weekday p.m. peak hour. Future volumes are shown in Figure 2 and operating conditions are summarized in Table 5.

Table 5 – Future Peak Hour Roadway Segment Levels of Service

Study Segment Direction	Weekday PM Peak		Weekend Midday Peak	
	PTSF	LOS	PTSF	LOS
Saint Helena Hwy (SR 29)				
NB – Washington St to Oakville Grade Rd	82.4	D	93.2	F
SB – Oakville Grade Rd to Washington St	100.0	F	97.6	F

Notes: PTSF = Percent Time Spent Following; LOS = Level of Service; NB = Northbound; SB = Southbound

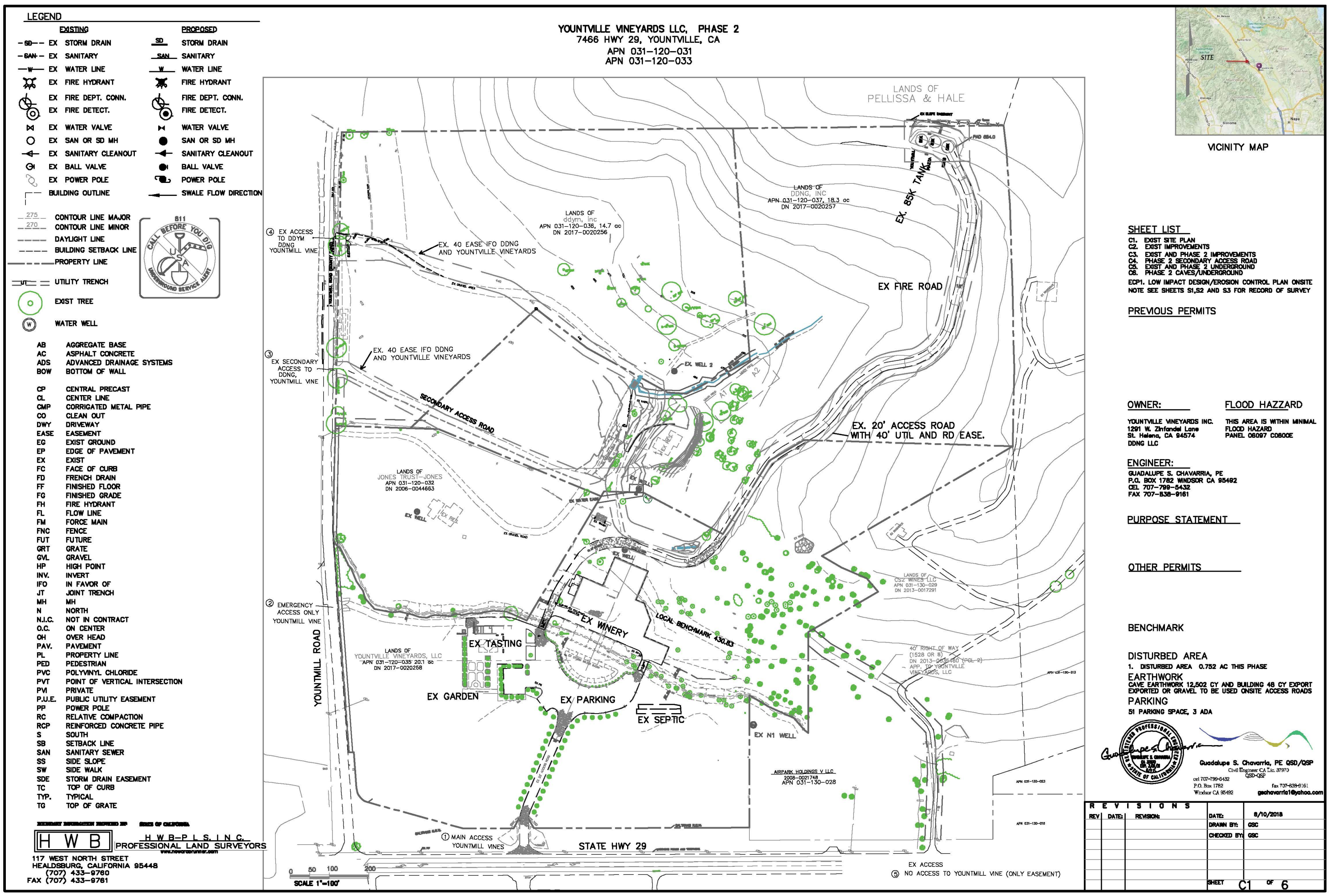
Project Description

The project site is located at 7466 St. Helena Highway (SR 29) in the County of Napa. As proposed, the project would modify the current Use Permit for the Piazza Del Dotto Winery approved in October 2010 to allow for a maximum of 125 visitors per day on weekdays and 130 visitors on weekend days. Additionally, the proposed permit would allow for an increase in production from 48,000 to 100,000 gallons per year and an increase in full-time employees from 13 to 17. The permit would also add 19 events per year for 120 guests and four events per year for up to 400 guests, though it is noted that the proposed events would be scheduled to avoid generating trips during peak hours (between 4:00 and 6:00 p.m. on weekdays and between 1:00 and 3:00 p.m. on weekend days). The proposed project site plan is shown in Figure 3.

Trip Generation

The County of Napa's Winery Traffic Information/Trip Generation Sheet, updated in August 2019, was used to determine the anticipated trip generation for the permitted and proposed conditions. The form estimates the number of daily and peak hour trips for weekdays and Saturdays based on the number of full- and part-time employees, maximum daily visitors, and production. While the form also indicates estimates of the percent of daily traffic that occurs during peak hours (Option A) or allows use of standard ITE rates (Option B), because the winery is already in operation, it was determined that actual, site-specific data would provide a more accurate assessment of the project's potential impacts so Option C was selected.

To determine the peak hour volume as a percent of daily traffic, counts were performed for one week in January 2018. Option A of the Napa County trip generation form assumes 38 percent of weekday trips occur during the weekday p.m. peak hour and 57 percent of Saturday trips occur during the midday peak hour; the data obtained at winery driveway shows much lower ratios.



nax129.ai 4/20

Traffic Impact Study for the Piazza Del Dotto Winery Use Permit Modification

Figure 3 – Site Plan

Piazza Del Dotto makes an effort to schedule tastings so that few conclude during the p.m. peak period, and as a result their tasting trips are generally concentrated during the afternoon hours. Based on actual site data, approximately 18 and 17 percent of the total daily trips occur during the peak hour of the generator on weekdays and weekend days, respectively. The peak hour of the generator for the site typically occurs between 2:00 p.m. and 4:00 p.m. both on weekdays and weekend days.

Although the peak hour of the generator for the site does not coincide with the weekday p.m. peak hour, to provide a conservative estimate of the peak hour trip generation the peak hour of the generator percentages were used to estimate the number of trips generated during both the weekday p.m. and weekend midday peak hours. The inbound versus outbound ratios for both peak hours were also reviewed based on the actual driveway counts, and it was determined that the site experiences a 14/86 split between inbound and outbound trips during the weekday p.m. peak hour and a 45/55 split during the weekend midday peak hour. Copies of the counts and a summary to determine the ratios applied are contained in Appendix D.

It should be noted that some portion of the trips to Piazza Del Dotto would be drawn from existing traffic already on the adjacent street system, as it is typical for tourists to visit multiple wineries on the same trip. These vehicle trips are not considered "new," but are referred to as "pass-by." According to the 2014 *Napa County Travel Behavior Study* prepared by Fehr & Peers for the Napa County Transportation and Planning Agency, the average number of wineries groups planned to visit was 3.1. Therefore, two out of three trips to Piazza Del Dotto Winery are drawn from existing traffic to other nearby wineries, though these "pass-by" trips were not deducted from the trip generation estimated by the Napa County Winery Traffic Information form, which results in a conservative analysis.

Based on application of these assumptions and not taking pass-by trips into consideration, the proposed modification would be expected to generate a maximum of 154 trips during a typical weekday, with 28 trips occurring during the weekday evening peak hour and 23 trips during the weekend midday peak hour. As shown in Table 6, this would result in a net increase of 71 trips per weekday, including 13 trips during the weekday p.m. peak hour, and seven trips during the weekend midday peak hour; these trips represent the increase in traffic associated with the proposed Use Permit compared to permitted conditions. The Winery Traffic Information/Trip Generation Sheets for both permitted and proposed conditions are contained in Appendix E.

Table 6 – Trip Generation Summary

Condition	Weekday	Weekday PM Peak Hour			Weekend MD Peak Hour		
	Trips	Trips	In	Out	Trips	In	Out
Permitted	83	15	2	13	16	7	9
Proposed	154	28	4	24	23	10	13
Net New Trips	**71**	**13**	**2**	**11**	**7**	**3**	**4**

Traffic that would occur during a Crush Saturday was also tabulated based on the same assumptions, as shown in Table 7. The modified Use Permit would be expected to result in a maximum of 58 additional daily trips during a Crush Saturday, including 10 new trips during the peak hour.

Table 7 – Trip Generation Summary – Crush Saturday				
Condition	**Daily**	**Weekend MD Peak Hour**		
	Trips	**Trips**	**In**	**Out**
Permitted	102	17	8	9
Proposed	160	27	12	15
Net New Trips	**58**	**10**	**4**	**6**

Consideration was given to the amount of truck trips that would be associated with the winery's hold and haul system. Per the Wastewater Statement, the system would require one truck load about every five days during harvest. Over the course of a typical 45-day harvest season, this would translate to nine truck loads, or 18 total trips, for an average of about one truck trip every 2.5 days.

Trip Distribution

The pattern used to allocate new project trips to the street network was determined based familiarity with the area and surrounding region as well as likely origins and destinations for patrons of the project. A distribution of 40 and 60 percent to/from the north and south on SR 29, respectively, was applied.

Roadway Segment Operation

Existing plus Project Conditions

Under Existing plus Project volumes, the study roadway segment is expected to continue operating at the same levels of service as without project traffic in both directions during both peak hours. These results are summarized in Table 8 and project traffic volumes are shown in Figure 2.

Table 8 – Existing and Existing plus Project Peak Hour Roadway Segment Levels of Service								
Study Segment Direction	**Existing Conditions**				**Existing plus Project**			
	PM Peak		**Weekend Peak**		**PM Peak**		**Weekend Peak**	
	PTSF	**LOS**	**PTSF**	**LOS**	**PTSF**	**LOS**	**PTSF**	**LOS**
Saint Helena Hwy (SR 29)								
NB – Washington St to Oakville Grade Rd	77.5	D	90.6	E	78.2	D	90.6	E
SB – Oakville Grade Rd to Washington St	91.4	E	87.7	E	91.3	E	88.4	E

Notes: PTSF = Percent Time Spent Following; LOS = Level of Service; NB = Northbound; SB = Southbound

Finding – The study roadway is expected to continue operating at LOS D or E upon the addition of project-generated traffic to existing volumes, which would be considered acceptable per the *General Plan*.

Future plus Project Conditions

With project-generated traffic added to the anticipated Future volumes, the study roadway is expected to continue operating at LOS F in the southbound direction during both peak hours and in the northbound

direction during the weekend peak hour. Future plus Project operating conditions are summarized in Table 9.

Table 9 – Future and Future plus Project Peak Hour Roadway Segment Levels of Service

Study Segment Direction	Future Conditions				Future plus Project			
	PM Peak		Weekend Peak		PM Peak		Weekend Peak	
	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS
Saint Helena Highway (SR 29)								
NB – Washington St to Oakville Grade Rd	82.4	D	93.2	F	82.6	D	93.2	F
SB – Oakville Grade Rd to Washington St	100.0	F	97.6	F	100.0	F	97.8	F

Notes: PTSF = Percent Time Spent Following; LOS = Level of Service; NB = Northbound; SB = Southbound

Finding – Upon the addition of project traffic to Future volumes, the study segment is expected to continue operating at the same levels as service as without project traffic. The study segment of SR 29 is allowed to operate at LOS F per the General Plan so the project would not create any adverse impacts with regards to operation of the surrounding roadway network.

Alternative Modes

Pedestrian Facilities

Consistent with expectations for a rural area, there are no existing pedestrian facilities in the project vicinity except for the roadway shoulders which are approximately eight feet wide on both sides of SR 29 along the project frontage.

Finding – While there are no pedestrian facilities serving the project site, pedestrian trips to and from the site are not expected, so this condition is acceptable.

Bicycle Facilities

The existing Class II bike lanes on SR 29 and Class III bike route on Yount Mill Road together with planned future facilities and the shared use of minor streets, provide adequate access for bicyclists.

Bicycle Storage

The County does not have specific bicycle parking requirements for wineries; however, the project should provide bicycle parking consistent with the requirements outlined in Chapter 18.110.040 of the Napa County Code of Ordinances which states that ten bicycle parking spaces should be provided for all nonresidential uses where ten or more automobile parking spaces are required. With a proposed supply of 54 permanent vehicle parking spaces, the project would need to provide ten bicycle spaces on-site.

Recommendation – The applicant should ensure parking for a minimum of ten bicycles is provided somewhere on-site, preferably near the tasting room.

Transit

While there are no transit facilities serving the project site, there is also no anticipated need for such service.

Finding – The lack of transit access does not result in an impact given the limited potential demand.

Access and Circulation

Site Access

The project site is accessed via four existing driveways, one of which is located on the east side of SR 29 and the other three are located on the south side of Yount Mill Road. The driveway on SR 29 serves as the main entrance while the driveways on Yount Mill Road are reserved for employee use, agriculture and winery vehicles, and trucks during harvest. As indicated on the site plan in Figure 3, Driveway 2 would be reserved for emergency access only. The Yount Mill Road access points would also be used by trucks during the construction phase to keep the main entrance clear for visitor access. Given that trucks will not be pulling into or out of the driveway on SR 29, there are no anticipated temporary traffic impacts to SR 29 because of construction.

Sight Distance

Sight distances along SR 29 and Yount Mill Road at the existing driveways were evaluated based on sight distance criteria contained in the *Highway Design Manual* published by Caltrans. The recommended sight distances for minor street approaches that are driveways are based on stopping sight distance, with approach travel speeds used as the basis for determining the recommended sight distance.

For the posted 55-mph speed limit on SR 29, the recommended sight distance is 500 feet. The speed limit is unposted on Yount Mill Road so for the purposes of assessing adequacy of stopping sight distance a speed of 40 mph was applied based on observations of traffic and roadway geometrics. Based on a review of field conditions, sight distance at the main driveway on SR 29 extends more than 500 feet in both directions, which is more than adequate for the posted speed limit. Additionally, sight lines extend more than 300 feet to both directions of the driveways on Yount Mill Road, which is adequate for speeds of 40 mph. Adequate sight distance is also available for following drivers to see and react to a vehicle stopped to make a turn into any of the driveways, though it is noted that there is a two-way left-turn lane on SR 29 to facilitate left-turn movements at this location and right-turn movements can be made from the shoulder so it is unlikely that there would be a vehicle stopped in the travel lane while waiting to turn into the driveway.

Finding – Sight distances on SR 29 and Yount Mill Road at the project driveway are adequate to meet the applied criteria for both entering and exiting movements.

Site Circulation

The AutoTURN application of AutoCAD was used to evaluate the adequacy of on-site circulation for firetrucks and commercial trucks. As designed, there would be no anticipated issues with either of these types of vehicles accessing the project site. Exhibits showing the expected travel paths are provided in Appendix F.

Finding – On-site circulation is expected to operate acceptably.

Parking

The project was analyzed to determine whether the proposed parking supply would be sufficient for the anticipated daily demand during harvest conditions as well as during events. The project site, as proposed, would have 51 standard parking spaces and three accessible parking spaces for a total of 54 parking spaces. It is understood that rideshare services such as Uber and Lyft as well as shuttles would be used to transport guests to the site during events.

To accommodate the daily parking demand for the tasting room, there should be at least one space provided for every employee on-site, as well as parking stalls for about 25 percent of the expected daily tasting room visitors. During harvest there would be 19 employees and a maximum of 130 visitors per day to the tasting room. Assuming the County's standard occupancy rate of 2.8 guests per vehicle, a total of 47 guest vehicles would visit the site over the course of the day. Therefore, the proposed project would need at least 31 parking spaces, 19 for employees and 12 for guests assuming one-quarter of the guests would be there at any one time. The proposed supply of 54 spaces would be more than adequate to accommodate the approximate day-to-day peak demand of 31 spaces.

The maximum number of parking spaces that would be needed on-site to accommodate employees and visitors during a 400-person marketing event was also estimated using the County's standard vehicle occupancies of one employee or 2.8 visitors per vehicle. Based on these operational parameters, during a 400-person event, a total of 175 parking spaces would be needed, including 143 for guests, 13 for event staff, and 19 for winery employees. Therefore, the total parking supply at the winery is insufficient to meet the anticipated parking demand for the largest event, experiencing a shortfall of 121 spaces. However, with the project's plans to provide shuttles for events, guest parking would not be required on-site.

The second largest event would be a 120-person event. Assuming staffing levels are the same as the largest 400-person event, the parking required for a 120-person event would be 75 spaces, including 43 for guests, 13 for event staff, and 19 for winery employees. Therefore, this event would also require the provision of a shuttle to transport guests to the winery.

Finding – The proposed permanent parking supply is adequate for the anticipated demand during typical harvest operation, but inadequate for 120-person and 400-person events.

Recommendation – As proposed, the applicant should provide a shuttle service and arrange for guests to park off-site during events with 120 or 400 guests.

Transportation Demand Management

Transportation Demand Management (TDM) measures aim to reduce single-occupancy vehicle trips, parking demand, and total vehicle miles traveled (VMT) through use of alternative modes of transportation and more efficiently planned trips. Due to the site's rural location, the project does not have as many options to reduce VMT as one located in an urban environment, but the project would be accessible via bicycle and would have up to 19 full- and part-time employees and 130 visitors on weekend days so there is potential to reduce vehicular trips and parking demand with implementation of a TDM program. Although adoption of a VMT standard is not required for the California Environmental Quality Act (CEQA) review process until July 2020, in recognition of the statewide goal to reduce VMT, measures are suggested for the project.

Vehicle Miles Traveled

In November 2017, the Governor's Office of Planning and Research (OPR) released a technical advisory containing recommendations regarding the assessment of Vehicle Miles Traveled (VMT), proposed thresholds of significance, and potential mitigation measures for lead agencies to use while implementing the required changes contained in Senate Bill 743. Also in November 2017, OPR released the proposed text for Section 15064.3, "Determining the Significance of Transportation Impacts," which summarized the criteria for analyzing transportation impacts for land use projects and transportation projects and directs lead agencies to "choose the most appropriate methodology to evaluate a project's vehicle miles traveled, including whether to express the change in absolute terms, per capita, per household or in any other measure." The current deadline for adopting policies to implement SB 743 is July 2020 and the County of Napa has not yet adopted VMT policies there is no guidance on how to evaluate the proposed project in terms of VMT.

Potential TDM Program Measures

The project's TDM Program should provide information, encouragement, and access to non-motorized travel options to reduce the number of vehicle trips, shifting these trips to other modes and thus reducing VMT. The following TDM measures are examples that could be implemented by the project and are consistent with the goals of Caltrans' *Smart Mobility 2010: A Call to Action for the New Decade*. It is recommended that the incentives offered as part of the program be available for the first two years of operation, after which the effectiveness of the program should be reevaluated and modified, if needed. It should be noted that although the measures described below are mostly intended for employees and can be implemented relatively easily, typically the bulk of vehicle miles traveled (VMT) and greenhouse gas (GHG) emissions associated with tasting rooms are generated by visitors. This group represents a greater opportunity for reductions, but their respective measures can be more challenging to employ in a vehicle-dependent environment.

- **Carpool Incentives:** In non-urban areas, carpooling is often the most effective trip reduction measure. The winery and tasting room would require some employees to work the same shift so there is potential for employees to carpool to work. Financial incentives can be an effective way to encourage employees to do so. The applicant should provide an incentive of $50 per month to employees who

agree to carpool to work a minimum of 75 percent of the time. This program should be offered to all employees of the project.

- **Active Transportation Incentives:** Financial incentives can also be an effective way to encourage employees to use active modes of transportation to reach the site. In addition to those who carpool, the applicant should provide an incentive of $50 per month to employees who agree to bicycle to work a minimum of 75 percent of the time.

- **Guaranteed Ride Home:** One of the reasons that many employees do not carpool or commute via alternative modes is the fear of being stranded should they need to leave in an emergency. Employees who carpool to work should be guaranteed a ride home in the case of an emergency or unique situation. As part of the V-Commute program offered by the Napa Valley Transportation Authority (NVTA), employees who carpool or commute via alternative modes are be able to use a taxi, rental car, Lyft, Uber, or other means to get home in an emergency and are reimbursed for the full cost of the service. The program is available to all who work or attend college in Napa County and is free to join, but registration is required. As part of the project's TDM program, employees should be provided information about V-Commute and encouraged to register for the service.

- **Bicycle Trip-End Facilities:** Employees and visitors are more likely to ride their bicycle to the site if bicycle parking is available. As recommended in the Alternative Modes section of this report, the project should include a minimum of 10 bicycle parking spaces on-site. Additionally, it is recommended that basic bicycle maintenance provisions are available on-site such as spare tubes and tire pumps.

- **Shuttle Service:** As described in the Parking section of the report, shuttles would be used to transport guests to the site during events. This service would reduce trips and parking demand and has the potential to reduce VMT depending on where the shuttle service would originate.

- **Transportation Coordinator:** One person should be designated as the transportation coordinator for the project site. This is not an additional position, but rather should fall under a manager's responsibilities. It is important to select someone to oversee the different TDM measures available, explain the program to new hires, answer questions, pair carpoolers, administer incentives, etc.

VMT Reduction

Based on the California Air Pollution Officers Association (CAPCOA) report *Quantifying Greenhouse Gas Mitigation Measures*, CAPCOA 2010, it is estimated that the inclusion of voluntary commute trip reduction measures with monetary incentives can reduce a project's total VMT by approximately 1.0 to 6.2 percent. According to the CAPCOA report, the provision of bicycle storage has a minimal effect on trip generation but supports the greater trip reduction program by providing opportunities for non-motorized travel. The report does not address VMT reduction associated with connectivity to bike facilities, but because there are existing bike lanes on SR 29 and Yount Mill Road is a Class III bike route, it is reasonable to expect some reduction in VMT due to employees and visitors accessing the site via bicycle, especially when combined with the on-site bicycle parking recommended.

Conclusions and Recommendations

Conclusions

- The proposed change in visitation, production, and employment levels at the winery would be expected to result in an average of 71 new daily trips at the site on weekdays, including 13 trips during the weekday p.m. peak hour and seven trips during the weekend midday peak hour. On Crush Saturdays, the project would be expected to result in 10 new trips during the midday peak hour.
- The study segment of SR 29 between Washington Street and Oakville Grade Road is currently operating at LOS E during both peak hours and would continue to do so with the addition of project-generated traffic. However, as identified in the *General Plan*, LOS F operation is considered acceptable on this segment of SR 29 so the project would not have an adverse impact.
- Under Future and Future plus Project Conditions, the study segment would be expected to deteriorate to LOS F operation in the southbound direction during both peak periods; however, this type of operation is considered acceptable.
- All proposed marketing events would be scheduled such that no trips would be generated during peak hours, so there would not be adverse LOS impacts to SR 29 associated with events.
- The lack of pedestrian facilities serving the project site does not result in an impact given the rural location and type of project.
- Similarly, the lack of transit service does not result in an impact due to the lack of demand for such services.
- The existing bike facilities in the project vicinity including Class II bike lanes on SR 29 and a Class III bike route on Yount Mill Road provide adequate access for bicyclists.
- Stopping sight distances along SR 29 and Yount Mill Road at the project driveways are adequate to meet the applied criteria for both entering and exiting movements.
- There would be no anticipated temporary traffic impacts to SR 29 during construction as trucks would use the driveways on Yount Mill Road to access the site.
- The proposed parking supply is adequate to accommodate the anticipated peak parking demand during daily harvest conditions, but insufficient to accommodate the demand for the proposed 120-person and 400-person events.

Recommendations

- Large events shall be scheduled to start and end outside peak periods for traffic on SR 29 (between 4:00 and 6:00 p.m. on weekdays and between 1:00 and 3:00 p.m. on weekend days), as proposed.
- Secure parking facilities for at least ten bicycles should be provided on-site.

- As proposed, the applicant should provide a shuttle service and arrange for guests to park off-site during events.
- The project should implement a TDM Plan that includes some of the measures identified in this report, such as carpool/active transportation incentives and a guaranteed ride home program.

Study Participants and References

Study Participants

Principal in Charge	Dalene J. Whitlock, PE, PTOE
Associate Engineer	Cameron Nye, EIT
Assistant Engineer	Kevin Rangel, EIT
Graphics	Katia Wolfe
Editing/Formatting	Alex Scrobonia
Report Review	Dalene J. Whitlock, PE, PTOE

References

2014 Collision Data on California State Highways, California Department of Transportation, 2017
City of Napa Traffic Impact Study Guidelines, City of Napa, 2004
Guide for the Preparation of Traffic Impact Studies, California Department of Transportation, 2002
G*uidelines for Interpretation of General Plan Circulation Policies on Significance Criteria*, Fehr & Peers, 2015
Highway Capacity Manual, Transportation Research Board, 2010
Highway Design Manual, 6th Edition, California Department of Transportation, 2017
Napa County Bicycle Plan, W-Trans, 2012
Napa County Code, Municipal Code Corporation, 2017
Napa County General Plan, County of Napa, 2013
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Napa County Travel Behavior Study, Fehr & Peers, 2014
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NAX129

Appendix A

Collision Rate Calculations

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SEGMENT COLLISION RATE CALCULATIONS

Piazza Del Dotto Winery

Location: SR 29 between Oakville Grade Rd and Washington St

Date of Count: Saturday, June 30, 2018
ADT: 27,500

Number of Collisions: 59
Number of Injuries: 25
Number of Fatalities: 3
Start Date: July 1, 2013
End Date: June 30, 2018
Number of Years: 5

Highway Type: Conventional 2 lanes or less
Area: Rural
Design Speed: ≤55
Terrain: Flat

Segment Length: 2.0 miles
Direction: North/South

$$\frac{\text{Number of Collisions x 1 Million}}{\text{ADT x 365 Days per Year x Segment Length x Number of Years}}$$

$$\frac{59 \times 1{,}000{,}000}{27{,}500 \times 365 \times 2 \times 5}$$

	Collision Rate		Fatality Rate	Injury Rate
Study Segment	**0.59**	**c/mvm**	**5.1%**	**42.4%**
Statewide Average*	**0.83**	**c/mvm**	**2.4%**	**40.1%**

ADT = average daily traffic volume
c/mvm = collisions per million vehicle miles
* 2014 Collision Data on California State Highways, Caltrans

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Appendix B

City of Napa Seasonal Adjustment Factors

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Exhibit C: Count Adjustment Factors

Monthly and Daily Factors for Converting Counts
To Average August Thursday Traffic

Day of Week Multiplier

Monday	1.043
Tuesday	1.020
Wednesday	1.010
Thursday	1.000
Friday	0.940

Month of Year Multiplier

January	1.179
February	1.161
March	1.133
April	1.083
May	1.064
June	1.009
July	1.015
August	1.000
September	1.037
October	1.078
November	1.067
December	1.158

Source: Napa Transportation Management Plan (TMP) Traffic Model

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Appendix C

Roadway Segment Level of Service Calculations

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HCS7: Two-Lane Highways Release 7.5

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Kevin Rangel				
Agency/Co.	W-Trans				
Date Performed	10/02/2018				
Analysis Time Period	PM Existing				
Highway	Saint Helena Highway (SR 29)				
From/To	NB				
Jurisdiction	County of Napa				
Analysis Year	2017				
Description	Piazza Del Dotto Winery TIS				

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.94	
Shoulder width	8.0	ft	% Trucks and buses	4	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	91	%
Up/down	-	%	Access point density	14	/mi

Analysis direction volume, Vd 688 veh/h
Opposing direction volume, Vo 1106 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1*		1.0	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.996		1.000	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	735	pc/h	1177	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	65.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.7*	mi/h
Free-flow speed, FFSd	61.3	mi/h
Adjustment for no-passing zones, fnp	1.0*	mi/h
Average travel speed, ATSd	45.5	mi/h
Percent Free Flow Speed, PFFS	74.2	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0*	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	732	pc/h	1177	pc/h
Base percent time-spent-following,(note-4) BPTSFd	70.6	%		
Adjustment for no-passing zones, fnp	18.0			
Percent time-spent-following, PTSFd	77.5	%		

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.43	
Peak 15-min vehicle-miles of travel, VMT15	366	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1376	veh-mi
Peak 15-min total travel time, TT15	8.1	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	2.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lp1	-	mi
Average travel speed, ATSd (from above)	45.5	mi/h
Percent time-spent-following, PTSFd (from above)	77.5	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fp1	-	
Average travel speed including passing lane, ATSp1	-	
Percent free flow speed including passing lane, PFFSp1	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fp1	-	
Percent time-spent-following including passing lane, PTSFp1	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSp1	A	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3

Flow rate in outside lane, vOL	731.9
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.89
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

HCS7: Two-Lane Highways Release 7.5

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Kevin Rangel
Agency/Co.	W-Trans
Date Performed	10/02/2018
Analysis Time Period	PM Existing
Highway	Saint Helena Highway (SR 29)
From/To	SB
Jurisdiction	County of Napa
Analysis Year	2017
Description	Piazza Del Dotto Winery TIS

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.94	
Shoulder width	8.0	ft	% Trucks and buses	4	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	91	%
Up/down	-	%	Access point density	14	/mi

Analysis direction volume, Vd 1106 veh/h
Opposing direction volume, Vo 688 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.1	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	1.000		0.996	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1177	pc/h	735	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	65.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.7*	mi/h
Free-flow speed, FFSd	61.3	mi/h
Adjustment for no-passing zones, fnp	1.7*	mi/h
Average travel speed, ATSd	44.8	mi/h
Percent Free Flow Speed, PFFS	73.0	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0*	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1177	pc/h	732	pc/h
Base percent time-spent-following,(note-4) BPTSFd	80.3	%		
Adjustment for no-passing zones, fnp	18.0			
Percent time-spent-following, PTSFd	91.4	%		

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.69	
Peak 15-min vehicle-miles of travel, VMT15	588	veh-mi
Peak-hour vehicle-miles of travel, VMT60	2212	veh-mi
Peak 15-min total travel time, TT15	13.1	veh-h
Capacity from ATS, CdATS	0	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	2.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lp1	-	mi
Average travel speed, ATSd (from above)	44.8	mi/h
Percent time-spent-following, PTSFd (from above)	91.4	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fp1	-	
Average travel speed including passing lane, ATSp1	-	
Percent free flow speed including passing lane, PFFSp1	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fp1	-	
Percent time-spent-following including passing lane, PTSFp1	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSp1	A	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3

Flow rate in outside lane, vOL	1176.6
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	3.13
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

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Analysis Time Period	MD Existing
Highway	Saint Helena Highway (SR 29)
From/To	NB
Jurisdiction	County of Napa
Analysis Year	2017
Description	Piazza Del Dotto Winery TIS

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.98	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	91	%
Up/down	-	%	Access point density	14	/mi

Analysis direction volume, Vd 1153 veh/h
Opposing direction volume, Vo 1022 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.0	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	1.000		1.000	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1177	pc/h	1043	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	65.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.7*	mi/h
Free-flow speed, FFSd	61.3	mi/h
Adjustment for no-passing zones, fnp	1.0*	mi/h
Average travel speed, ATSd	43.1	mi/h
Percent Free Flow Speed, PFFS	70.3	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0*	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1177	pc/h	1043	pc/h
Base percent time-spent-following,(note-4) BPTSFd	82.5	%		
Adjustment for no-passing zones, fnp	15.2			
Percent time-spent-following, PTSFd	90.6	%		

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.69	
Peak 15-min vehicle-miles of travel, VMT15	588	veh-mi
Peak-hour vehicle-miles of travel, VMT60	2306	veh-mi
Peak 15-min total travel time, TT15	13.7	veh-h
Capacity from ATS, CdATS	0	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	2.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lp1	-	mi
Average travel speed, ATSd (from above)	43.1	mi/h
Percent time-spent-following, PTSFd (from above)	90.6	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fp1	-	
Average travel speed including passing lane, ATSp1	-	
Percent free flow speed including passing lane, PFFSp1	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fp1	-	
Percent time-spent-following including passing lane, PTSFp1	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSp1	A	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3

Flow rate in outside lane, vOL	1176.5
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.61
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

HCS7: Two-Lane Highways Release 7.5

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Kevin Rangel				
Agency/Co.	W-Trans				
Date Performed	10/02/2018				
Analysis Time Period	MD Existing				
Highway	Saint Helena Highway (SR 29)				
From/To	SB				
Jurisdiction	County of Napa				
Analysis Year	2017				
Description	Piazza Del Dotto Winery TIS				

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.98	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	91	%
Up/down	-	%	Access point density	14	/mi

Analysis direction volume, Vd 1022 veh/h
Opposing direction volume, Vo 1153 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	1.000		1.000	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1043	pc/h	1177	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	65.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.7*	mi/h
Free-flow speed, FFSd	61.3	mi/h
Adjustment for no-passing zones, fnp	1.0*	mi/h
Average travel speed, ATSd	43.1	mi/h
Percent Free Flow Speed, PFFS	70.3	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0*	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1043	pc/h	1177	pc/h
Base percent time-spent-following,(note-4) BPTSFd	80.6	%		
Adjustment for no-passing zones, fnp	15.2			
Percent time-spent-following, PTSFd	87.7	%		

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.61	
Peak 15-min vehicle-miles of travel, VMT15	521	veh-mi
Peak-hour vehicle-miles of travel, VMT60	2044	veh-mi
Peak 15-min total travel time, TT15	12.1	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	2.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lp1	-	mi
Average travel speed, ATSd (from above)	43.1	mi/h
Percent time-spent-following, PTSFd (from above)	87.7	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fp1	-	
Average travel speed including passing lane, ATSp1	-	
Percent free flow speed including passing lane, PFFSp1	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fp1	-	
Percent time-spent-following including passing lane, PTSFp1	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSp1	A	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3

Flow rate in outside lane, vOL	1042.9
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.55
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

HCS7: Two-Lane Highways Release 7.5

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Kevin Rangel				
Agency/Co.	W-Trans				
Date Performed	10/02/2018				
Analysis Time Period	PM Future				
Highway	Saint Helena Highway (SR 29)				
From/To	NB				
Jurisdiction	County of Napa				
Analysis Year	2017				
Description	Piazza Del Dotto Winery TIS				

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.94	
Shoulder width	8.0	ft	% Trucks and buses	4	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	91	%
Up/down	-	%	Access point density	14	/mi

Analysis direction volume, Vd 789 veh/h
Opposing direction volume, Vo 1838 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1*		1.0	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.996		1.000	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	843	pc/h	1955	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	65.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.7*	mi/h
Free-flow speed, FFSd	61.3	mi/h
Adjustment for no-passing zones, fnp	0.7*	mi/h
Average travel speed, ATSd	38.9	mi/h
Percent Free Flow Speed, PFFS	63.4	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0*	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	839	pc/h	1955	pc/h
Base percent time-spent-following,(note-4) BPTSFd	78.1	%		
Adjustment for no-passing zones, fnp	14.3			
Percent time-spent-following, PTSFd	82.4	%		

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	0.49	
Peak 15-min vehicle-miles of travel, VMT15	420	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1578	veh-mi
Peak 15-min total travel time, TT15	10.8	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	2.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lp1	-	mi
Average travel speed, ATSd (from above)	38.9	mi/h
Percent time-spent-following, PTSFd (from above)	82.4	
Level of service, LOSd (from above)	F	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fp1	-	
Average travel speed including passing lane, ATSp1	-	
Percent free flow speed including passing lane, PFFSp1	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fp1	-	
Percent time-spent-following including passing lane, PTSFp1	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSp1	A	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3

Flow rate in outside lane, vOL	839.4
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.96
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

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Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Kevin Rangel				
Agency/Co.	W-Trans				
Date Performed	10/02/2018				
Analysis Time Period	PM Future				
Highway	Saint Helena Highway (SR 29)				
From/To	SB				
Jurisdiction	County of Napa				
Analysis Year	2017				
Description	Piazza Del Dotto Winery TIS				

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.94	
Shoulder width	8.0	ft	% Trucks and buses	4	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	91	%
Up/down	-	%	Access point density	14	/mi

Analysis direction volume, Vd 1838 veh/h
Opposing direction volume, Vo 789 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.1	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	1.000		0.996	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1955	pc/h	843	pc/h

Free-Flow Speed from Field Measurement:			
Field measured speed,(note-3) S FM	-	mi/h	
Observed total demand,(note-3) V	-	veh/h	
Estimated Free-Flow Speed:			
Base free-flow speed,(note-3) BFFS	65.0	mi/h	
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h	
Adj. for access point density,(note-3) fA	3.7*	mi/h	
Free-flow speed, FFSd	61.3	mi/h	
Adjustment for no-passing zones, fnp	1.4*	mi/h	
Average travel speed, ATSd	38.2	mi/h	
Percent Free Flow Speed, PFFS	62.3	%	

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0*	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1955	pc/h	839	pc/h
Base percent time-spent-following,(note-4) BPTSFd	91.9	%		
Adjustment for no-passing zones, fnp	14.3			
Percent time-spent-following, PTSFd	100.0	%		

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	1.15	
Peak 15-min vehicle-miles of travel, VMT15	978	veh-mi
Peak-hour vehicle-miles of travel, VMT60	3676	veh-mi
Peak 15-min total travel time, TT15	25.6	veh-h
Capacity from ATS, CdATS	0	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	2.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lp1	-	mi
Average travel speed, ATSd (from above)	38.2	mi/h
Percent time-spent-following, PTSFd (from above)	100.0	
Level of service, LOSd (from above)	F	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fp1	-	
Average travel speed including passing lane, ATSp1	-	
Percent free flow speed including passing lane, PFFSp1	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fp1	-	
Percent time-spent-following including passing lane, PTSFp1	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSp1	A	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3

Flow rate in outside lane, vOL	1955.3
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	3.39
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

HCS7: Two-Lane Highways Release 7.5

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Kevin Rangel				
Agency/Co.	W-Trans				
Date Performed	10/02/2018				
Analysis Time Period	MD Future				
Highway	Saint Helena Highway (SR 29)				
From/To	NB				
Jurisdiction	County of Napa				
Analysis Year	2017				
Description	Piazza Del Dotto Winery TIS				

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.98	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	91	%
Up/down	-	%	Access point density	14	/mi

Analysis direction volume, Vd 1322 veh/h
Opposing direction volume, Vo 1699 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	1.000		1.000	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1349	pc/h	1734	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	65.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.7*	mi/h
Free-flow speed, FFSd	61.3	mi/h
Adjustment for no-passing zones, fnp	0.7*	mi/h
Average travel speed, ATSd	36.7	mi/h
Percent Free Flow Speed, PFFS	59.8	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0*	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1349	pc/h	1734	pc/h
Base percent time-spent-following,(note-4) BPTSFd	89.3	%		
Adjustment for no-passing zones, fnp	8.8			
Percent time-spent-following, PTSFd	93.2	%		

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	0.79	
Peak 15-min vehicle-miles of travel, VMT15	674	veh-mi
Peak-hour vehicle-miles of travel, VMT60	2644	veh-mi
Peak 15-min total travel time, TT15	18.4	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	2.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lp1	-	mi
Average travel speed, ATSd (from above)	36.7	mi/h
Percent time-spent-following, PTSFd (from above)	93.2	
Level of service, LOSd (from above)	F	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fp1	-	
Average travel speed including passing lane, ATSp1	-	
Percent free flow speed including passing lane, PFFSp1	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fp1	-	
Percent time-spent-following including passing lane, PTSFp1	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSp1	A	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3

Flow rate in outside lane, vOL	1349.0
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.68
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

HCS7: Two-Lane Highways Release 7.5

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Kevin Rangel				
Agency/Co.	W-Trans				
Date Performed	10/02/2018				
Analysis Time Period	MD Future				
Highway	Saint Helena Highway (SR 29)				
From/To	SB				
Jurisdiction	County of Napa				
Analysis Year	2017				
Description	Piazza Del Dotto Winery TIS				

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.98	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	91	%
Up/down	-	%	Access point density	14	/mi

Analysis direction volume, Vd	1699	veh/h
Opposing direction volume, Vo	1322	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	1.000		1.000	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1734	pc/h	1349	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	65.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.7*	mi/h
Free-flow speed, FFSd	61.3	mi/h
Adjustment for no-passing zones, fnp	1.0*	mi/h
Average travel speed, ATSd	36.4	mi/h
Percent Free Flow Speed, PFFS	59.3	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0*	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1734	pc/h	1349	pc/h
Base percent time-spent-following,(note-4) BPTSFd	92.7	%		
Adjustment for no-passing zones, fnp	8.8			
Percent time-spent-following, PTSFd	97.6	%		

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	1.02	
Peak 15-min vehicle-miles of travel, VMT15	867	veh-mi
Peak-hour vehicle-miles of travel, VMT60	3398	veh-mi
Peak 15-min total travel time, TT15	23.8	veh-h
Capacity from ATS, CdATS	0	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	2.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lp1	-	mi
Average travel speed, ATSd (from above)	36.4	mi/h
Percent time-spent-following, PTSFd (from above)	97.6	
Level of service, LOSd (from above)	F	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fp1	-	
Average travel speed including passing lane, ATSp1	-	
Percent free flow speed including passing lane, PFFSp1	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fp1	-	
Percent time-spent-following including passing lane, PTSFp1	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSp1	A	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3

Flow rate in outside lane, vOL	1733.7
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.80
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

HCS7: Two-Lane Highways Release 7.5

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Kevin Rangel
Agency/Co.	W-Trans
Date Performed	10/02/2018
Analysis Time Period	PM Existing + Project
Highway	Saint Helena Highway (SR 29)
From/To	NB
Jurisdiction	County of Napa
Analysis Year	2017
Description	Piazza Del Dotto Winery TIS

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.94	
Shoulder width	8.0	ft	% Trucks and buses	4	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	91	%
Up/down	-	%	Access point density	14	/mi

Analysis direction volume, Vd 693 veh/h
Opposing direction volume, Vo 1114 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1*		1.0	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.996		1.000	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	740	pc/h	1185	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	65.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.7*	mi/h
Free-flow speed, FFSd	61.3	mi/h
Adjustment for no-passing zones, fnp	1.0*	mi/h
Average travel speed, ATSd	45.4	mi/h
Percent Free Flow Speed, PFFS	74.0	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0*	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	737	pc/h	1185	pc/h
Base percent time-spent-following,(note-4) BPTSFd	71.4	%		
Adjustment for no-passing zones, fnp	17.8			
Percent time-spent-following, PTSFd	78.2	%		

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.43	
Peak 15-min vehicle-miles of travel, VMT15	369	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1386	veh-mi
Peak 15-min total travel time, TT15	8.1	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	2.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	45.4	mi/h
Percent time-spent-following, PTSFd (from above)	78.2	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	A	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3

Flow rate in outside lane, vOL	737.2
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.89
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

HCS7: Two-Lane Highways Release 7.5

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Kevin Rangel				
Agency/Co.	W-Trans				
Date Performed	10/02/2018				
Analysis Time Period	PM Existing + Project				
Highway	Saint Helena Highway (SR 29)				
From/To	SB				
Jurisdiction	County of Napa				
Analysis Year	2017				
Description	Piazza Del Dotto Winery TIS				

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.94	
Shoulder width	8.0	ft	% Trucks and buses	4	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	91	%
Up/down	-	%	Access point density	14	/mi

Analysis direction volume, Vd 1114 veh/h
Opposing direction volume, Vo 693 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.1	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	1.000		0.996	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1185	pc/h	740	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	65.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.7*	mi/h
Free-flow speed, FFSd	61.3	mi/h
Adjustment for no-passing zones, fnp	1.7*	mi/h
Average travel speed, ATSd	44.7	mi/h
Percent Free Flow Speed, PFFS	72.9	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0*	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1185	pc/h	737	pc/h
Base percent time-spent-following,(note-4) BPTSFd	80.3	%		
Adjustment for no-passing zones, fnp	17.8			
Percent time-spent-following, PTSFd	91.3	%		

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.70	
Peak 15-min vehicle-miles of travel, VMT15	593	veh-mi
Peak-hour vehicle-miles of travel, VMT60	2228	veh-mi
Peak 15-min total travel time, TT15	13.3	veh-h
Capacity from ATS, CdATS	0	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	2.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	44.7	mi/h
Percent time-spent-following, PTSFd (from above)	91.3	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	A	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3

Flow rate in outside lane, vOL	1185.1
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	3.13
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

HCS7: Two-Lane Highways Release 7.5

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Kevin Rangel				
Agency/Co.	W-Trans				
Date Performed	10/02/2018				
Analysis Time Period	MD Existing + Project				
Highway	Saint Helena Highway (SR 29)				
From/To	NB				
Jurisdiction	County of Napa				
Analysis Year	2017				
Description	Piazza Del Dotto Winery TIS				

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.98	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	91	%
Up/down	-	%	Access point density	14	/mi

Analysis direction volume, Vd 1157 veh/h
Opposing direction volume, Vo 1028 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	1.000		1.000	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1181	pc/h	1049	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	65.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.7*	mi/h
Free-flow speed, FFSd	61.3	mi/h
Adjustment for no-passing zones, fnp	1.0*	mi/h
Average travel speed, ATSd	43.0	mi/h
Percent Free Flow Speed, PFFS	70.1	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0*	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1181	pc/h	1049	pc/h
Base percent time-spent-following,(note-4) BPTSFd	82.6	%		
Adjustment for no-passing zones, fnp	15.1			
Percent time-spent-following, PTSFd	90.6	%		

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.69	
Peak 15-min vehicle-miles of travel, VMT15	590	veh-mi
Peak-hour vehicle-miles of travel, VMT60	2314	veh-mi
Peak 15-min total travel time, TT15	13.7	veh-h
Capacity from ATS, CdATS	0	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	2.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lp1	-	mi
Average travel speed, ATSd (from above)	43.0	mi/h
Percent time-spent-following, PTSFd (from above)	90.6	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fp1	-	
Average travel speed including passing lane, ATSp1	-	
Percent free flow speed including passing lane, PFFSp1	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fp1	-	
Percent time-spent-following including passing lane, PTSFp1	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSp1	A	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3

Flow rate in outside lane, vOL	1180.6
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.61
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

HCS7: Two-Lane Highways Release 7.5

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Kevin Rangel				
Agency/Co.	W-Trans				
Date Performed	10/02/2018				
Analysis Time Period	MD Existing + Project				
Highway	Saint Helena Highway (SR 29)				
From/To	SB				
Jurisdiction	County of Napa				
Analysis Year	2017				
Description	Piazza Del Dotto Winery TIS				

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.98	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	91	%
Up/down	-	%	Access point density	14	/mi

Analysis direction volume, Vd 1028 veh/h
Opposing direction volume, Vo 1157 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	1.000		1.000	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1049	pc/h	1181	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	65.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.7*	mi/h
Free-flow speed, FFSd	61.3	mi/h
Adjustment for no-passing zones, fnp	1.0*	mi/h
Average travel speed, ATSd	43.0	mi/h
Percent Free Flow Speed, PFFS	70.1	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0*	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1049	pc/h	1181	pc/h
Base percent time-spent-following,(note-4) BPTSFd	81.3	%		
Adjustment for no-passing zones, fnp	15.1			
Percent time-spent-following, PTSFd	88.4	%		

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.62	
Peak 15-min vehicle-miles of travel, VMT15	524	veh-mi
Peak-hour vehicle-miles of travel, VMT60	2056	veh-mi
Peak 15-min total travel time, TT15	12.2	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	2.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lp1	-	mi
Average travel speed, ATSd (from above)	43.0	mi/h
Percent time-spent-following, PTSFd (from above)	88.4	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fp1	-	
Average travel speed including passing lane, ATSp1	-	
Percent free flow speed including passing lane, PFFSp1	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fp1	-	
Percent time-spent-following including passing lane, PTSFp1	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSp1	A	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3

Flow rate in outside lane, vOL	1049.0
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.55
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

HCS7: Two-Lane Highways Release 7.5

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Kevin Rangel				
Agency/Co.	W-Trans				
Date Performed	10/02/2018				
Analysis Time Period	PM Future + Project				
Highway	Saint Helena Highway (SR 29)				
From/To	NB				
Jurisdiction	County of Napa				
Analysis Year	2017				
Description	Piazza Del Dotto Winery TIS				

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.94	
Shoulder width	8.0	ft	% Trucks and buses	4	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	91	%
Up/down	-	%	Access point density	14	/mi

Analysis direction volume, Vd 794 veh/h
Opposing direction volume, Vo 1846 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1*		1.0	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.996		1.000	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	848	pc/h	1964	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	65.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.7*	mi/h
Free-flow speed, FFSd	61.3	mi/h
Adjustment for no-passing zones, fnp	0.7*	mi/h
Average travel speed, ATSd	38.8	mi/h
Percent Free Flow Speed, PFFS	63.3	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0*	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	845	pc/h	1964	pc/h
Base percent time-spent-following,(note-4) BPTSFd	78.3	%		
Adjustment for no-passing zones, fnp	14.2			
Percent time-spent-following, PTSFd	82.6	%		

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	0.50	
Peak 15-min vehicle-miles of travel, VMT15	422	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1588	veh-mi
Peak 15-min total travel time, TT15	10.9	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	2.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lp1	-	mi
Average travel speed, ATSd (from above)	38.8	mi/h
Percent time-spent-following, PTSFd (from above)	82.6	
Level of service, LOSd (from above)	F	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fp1	-	
Average travel speed including passing lane, ATSp1	-	
Percent free flow speed including passing lane, PFFSp1	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fp1	-	
Percent time-spent-following including passing lane, PTSFp1	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSp1	A	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3

Flow rate in outside lane, vOL	844.7
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.96
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

HCS7: Two-Lane Highways Release 7.5

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Kevin Rangel				
Agency/Co.	W-Trans				
Date Performed	10/02/2018				
Analysis Time Period	PM Future + Project				
Highway	Saint Helena Highway (SR 29)				
From/To	SB				
Jurisdiction	County of Napa				
Analysis Year	2017				
Description	Piazza Del Dotto Winery TIS				

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.94	
Shoulder width	8.0	ft	% Trucks and buses	4	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	91	%
Up/down	-	%	Access point density	14	/mi

Analysis direction volume, Vd 1846 veh/h
Opposing direction volume, Vo 794 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.1	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	1.000		0.996	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1964	pc/h	848	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	65.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.7*	mi/h
Free-flow speed, FFSd	61.3	mi/h
Adjustment for no-passing zones, fnp	1.4*	mi/h
Average travel speed, ATSd	38.1	mi/h
Percent Free Flow Speed, PFFS	62.1	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0*	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1964	pc/h	845	pc/h
Base percent time-spent-following,(note-4) BPTSFd	92.0	%		
Adjustment for no-passing zones, fnp	14.2			
Percent time-spent-following, PTSFd	100.0	%		

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	1.16	
Peak 15-min vehicle-miles of travel, VMT15	982	veh-mi
Peak-hour vehicle-miles of travel, VMT60	3692	veh-mi
Peak 15-min total travel time, TT15	25.8	veh-h
Capacity from ATS, CdATS	0	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	2.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lp1	-	mi
Average travel speed, ATSd (from above)	38.1	mi/h
Percent time-spent-following, PTSFd (from above)	100.0	
Level of service, LOSd (from above)	F	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fp1	-	
Average travel speed including passing lane, ATSp1	-	
Percent free flow speed including passing lane, PFFSp1	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fp1	-	
Percent time-spent-following including passing lane, PTSFp1	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSp1	A	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3

Flow rate in outside lane, vOL	1963.8
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	3.39
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

HCS7: Two-Lane Highways Release 7.5

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Kevin Rangel				
Agency/Co.	W-Trans				
Date Performed	10/02/2018				
Analysis Time Period	MD Future + Project				
Highway	Saint Helena Highway (SR 29)				
From/To	NB				
Jurisdiction	County of Napa				
Analysis Year	2017				
Description	Piazza Del Dotto Winery TIS				

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.98	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	91	%
Up/down	-	%	Access point density	14	/mi

Analysis direction volume, Vd 1326 veh/h
Opposing direction volume, Vo 1705 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	1.000		1.000	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1353	pc/h	1740	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	65.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.7*	mi/h
Free-flow speed, FFSd	61.3	mi/h
Adjustment for no-passing zones, fnp	0.7*	mi/h
Average travel speed, ATSd	36.6	mi/h
Percent Free Flow Speed, PFFS	59.7	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0*	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1353	pc/h	1740	pc/h
Base percent time-spent-following,(note-4) BPTSFd	89.4	%		
Adjustment for no-passing zones, fnp	8.8			
Percent time-spent-following, PTSFd	93.2	%		

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	0.80	
Peak 15-min vehicle-miles of travel, VMT15	677	veh-mi
Peak-hour vehicle-miles of travel, VMT60	2652	veh-mi
Peak 15-min total travel time, TT15	18.5	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	2.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lp1	-	mi
Average travel speed, ATSd (from above)	36.6	mi/h
Percent time-spent-following, PTSFd (from above)	93.2	
Level of service, LOSd (from above)	F	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fp1	-	
Average travel speed including passing lane, ATSp1	-	
Percent free flow speed including passing lane, PFFSp1	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fp1	-	
Percent time-spent-following including passing lane, PTSFp1	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSp1	A	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3

Flow rate in outside lane, vOL	1353.1
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.68
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

HCS7: Two-Lane Highways Release 7.5

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Kevin Rangel				
Agency/Co.	W-Trans				
Date Performed	10/02/2018				
Analysis Time Period	MD Future + Project				
Highway	Saint Helena Highway (SR 29)				
From/To	SB				
Jurisdiction	County of Napa				
Analysis Year	2017				
Description	Piazza Del Dotto Winery TIS				

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.98	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	91	%
Up/down	-	%	Access point density	14	/mi

Analysis direction volume, Vd 1705 veh/h
Opposing direction volume, Vo 1326 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	1.000		1.000	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1740	pc/h	1353	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	65.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.7*	mi/h
Free-flow speed, FFSd	61.3	mi/h
Adjustment for no-passing zones, fnp	1.0*	mi/h
Average travel speed, ATSd	36.3	mi/h
Percent Free Flow Speed, PFFS	59.2	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0*		1.0*	
PCE for RVs, ER	1.0*		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1740	pc/h	1353	pc/h
Base percent time-spent-following,(note-4) BPTSFd	92.8	%		
Adjustment for no-passing zones, fnp	8.8			
Percent time-spent-following, PTSFd	97.8	%		

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	1.02	
Peak 15-min vehicle-miles of travel, VMT15	870	veh-mi
Peak-hour vehicle-miles of travel, VMT60	3410	veh-mi
Peak 15-min total travel time, TT15	24.0	veh-h
Capacity from ATS, CdATS	0	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	2.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	36.3	mi/h
Percent time-spent-following, PTSFd (from above)	97.8	
Level of service, LOSd (from above)	F	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	A	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3

Flow rate in outside lane, vOL	1739.8
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.81
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

Appendix D

Traffic Count Data and Driveway Count Summary

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Prepared by NDS/ATD

VOLUME

7466 SR 29 & Piazza Del Dotto Winery Dwy

Day: Saturday
Date: 1/13/2018

City: Napa
Project #: CA18_8026_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	68	68	136

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			0		0		0		12:00			2		1		3	
00:15			0		0		0		12:15			0		0		0	
00:30			0		0		0		12:30			6		3		9	
00:45			0		0		0		12:45			2	10	1	5	3	15
01:00			0		0		0		13:00			1		1		2	
01:15			0		0		0		13:15			0		1		1	
01:30			0		0		0		13:30			2		2		4	
01:45			0		0		0		13:45			3	6	3	7	6	13
02:00			0		0		0		14:00			4		4		8	
02:15			0		0		0		14:15			2		2		4	
02:30			0		0		0		14:30			1		1		2	
02:45			0		0		0		14:45			3	10	2	9	5	19
03:00			0		0		0		15:00			3		2		5	
03:15			0		0		0		15:15			2		1		3	
03:30			0		0		0		15:30			4		3		7	
03:45			0		0		0		15:45			0	9	1	7	1	16
04:00			0		0		0		16:00			0		1		1	
04:15			0		0		0		16:15			0		2		2	
04:30			0		0		0		16:30			2		4		6	
04:45			0		0		0		16:45			4	6	1	8	5	14
05:00			0		0		0		17:00			1		3		4	
05:15			0		0		0		17:15			0		2		2	
05:30			0		0		0		17:30			1		2		3	
05:45			0		0		0		17:45			1	3	7	14	8	17
06:00			0		0		0		18:00			1		1		2	
06:15			0		0		0		18:15			0		1		1	
06:30			0		0		0		18:30			0		1		1	
06:45			0		0		0		18:45			0	1	1	4	1	5
07:00			0		0		0		19:00			0		0		0	
07:15			0		0		0		19:15			0		0		0	
07:30			0		0		0		19:30			0		1		1	
07:45			0		0		0		19:45			0		0	1	0	1
08:00			0		2		2		20:00			0		0		0	
08:15			0		0		0		20:15			0		0		0	
08:30			0		0		0		20:30			0		0		0	
08:45			0		1	3	1	3	20:45			0		0		0	
09:00			0		0		0		21:00			0		0		0	
09:15			0		0		0		21:15			0		0		0	
09:30			5		1		6		21:30			0		0		0	
09:45			3	8	0	1	3	9	21:45			0		0		0	
10:00			1		1		2		22:00			0		0		0	
10:15			3		1		4		22:15			0		0		0	
10:30			1		2		3		22:30			0		0		0	
10:45			1	6	0	4	1	10	22:45			0		0		0	
11:00			0		0		0		23:00			0		0		0	
11:15			5		4		9		23:15			0		0		0	
11:30			4		1		5		23:30			0		0		0	
11:45			0	9	0	5	0	14	23:45			0		0		0	
TOTALS				23		13		**36**	**TOTALS**				45		55		**100**
SPLIT %				63.9%		36.1%		**26.5%**	**SPLIT %**				45.0%		55.0%		**73.5%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	68	68	136

AM Peak Hour				09:30		10:30		**11:15**	**PM Peak Hour**				14:45		17:00		**13:30**
AM Pk Volume				12		6		**17**	**PM Pk Volume**				12		14		**22**
Pk Hr Factor				0.600		0.375		**0.472**	**Pk Hr Factor**				0.750		0.500		**0.688**
7 - 9 Volume	0	0	0		3			**3**	**4 - 6 Volume**	0	0	9		22			**31**
7 - 9 Peak Hour					08:00			**08:00**	**4 - 6 Peak Hour**				16:15		17:00		**16:15**
7 - 9 Pk Volume	0	0	0		3			**3**	**4 - 6 Pk Volume**	0	0	7		14			**17**
Pk Hr Factor	0.000	0.000	0.000		0.375			**0.375**	**Pk Hr Factor**	0.000	0.000	0.438		0.500			**0.708**

Prepared by NDS/ATD

VOLUME

7466 SR 29 & Piazza Del Dotto Winery Dwy

Day: Sunday
Date: 1/14/2018

City: Napa
Project #: CA18_8026_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	69	75	144

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			0		0		0		12:00			0		1		1	
00:15			0		0		0		12:15			4		0		4	
00:30			0		0		0		12:30			2		2		4	
00:45			0		0		0		12:45			3	9	2	5	5	14
01:00			0		0		0		13:00			3		1		4	
01:15			0		0		0		13:15			3		3		6	
01:30			0		0		0		13:30			6		2		8	
01:45			0		0		0		13:45			2	14	3	9	5	23
02:00			0		0		0		14:00			1		2		3	
02:15			0		0		0		14:15			1		2		3	
02:30			0		0		0		14:30			0		1		1	
02:45			0		0		0		14:45			2	4	1	6	3	10
03:00			0		0		0		15:00			2		5		7	
03:15			0		0		0		15:15			4		4		8	
03:30			0		0		0		15:30			2		5		7	
03:45			0		0		0		15:45			2	10	0	14	2	24
04:00			0		0		0		16:00			1		2		3	
04:15			0		0		0		16:15			1		0		1	
04:30			0		0		0		16:30			0		2		2	
04:45			0		0		0		16:45			1	3	2	6	3	9
05:00			0		0		0		17:00			1		0		1	
05:15			0		0		0		17:15			0		2		2	
05:30			0		0		0		17:30			0		2		2	
05:45			0		0		0		17:45			1	2	5	9	6	11
06:00			0		0		0		18:00			0		4		4	
06:15			0		0		0		18:15			0		1		1	
06:30			0		0		0		18:30			0		1		1	
06:45			0		0		0		18:45			1	1	6	12	7	13
07:00			0		0		0		19:00			0		2		2	
07:15			0		0		0		19:15			0		0		0	
07:30			0		0		0		19:30			0		0		0	
07:45			0		0		0		19:45			0		0	2	0	2
08:00			0		0		0		20:00			0		0		0	
08:15			0		0		0		20:15			0		0		0	
08:30			0		0		0		20:30			0		0		0	
08:45			0		0		0		20:45			0		0		0	
09:00			0		0		0		21:00			0		0		0	
09:15			1		2		3		21:15			0		0		0	
09:30			4		2		6		21:30			0		0		0	
09:45			4	9	1	5	5	14	21:45			0		0		0	
10:00			1		1		2		22:00			0		0		0	
10:15			1		1		2		22:15			0		0		0	
10:30			1		0		1		22:30			0		0		0	
10:45			2	5	0	2	2	7	22:45			0		0		0	
11:00			1		0		1		23:00			0		0		0	
11:15			4		3		7		23:15			0		0		0	
11:30			3		1		4		23:30			0		0		0	
11:45			4	12	1	5	5	17	23:45			0		0		0	
TOTALS				26		12		**38**	**TOTALS**				43		63		**106**
SPLIT %				68.4%		31.6%		**26.4%**	**SPLIT %**				40.6%		59.4%		**73.6%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	69	75	144

AM Peak Hour				11:00		09:15		**11:00**	**PM Peak Hour**				12:45		14:45		**14:45**
AM Pk Volume				12		6		**17**	**PM Pk Volume**				15		15		**25**
Pk Hr Factor				0.750		0.750		**0.607**	**Pk Hr Factor**				0.625		0.750		**0.781**
7 - 9 Volume	0	0	0		0		0		**4 - 6 Volume**	0	0	5		15		**20**	
7 - 9 Peak Hour									**4 - 6 Peak Hour**				16:00		17:00		**17:00**
7 - 9 Pk Volume	0	0	0		0		0		**4 - 6 Pk Volume**	0	0	3		9		**11**	
Pk Hr Factor	0.000	0.000	0.000		0.000		0.000		**Pk Hr Factor**	0.000	0.000	0.750		0.450		**0.458**	

Prepared by NDS/ATD

VOLUME

7466 SR 29 & Piazza Del Dotto Winery Dwy

Day: Monday
Date: 1/15/2018

City: Napa
Project #: CA18_8026_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	23	28	51

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			0		0		0		12:00			0		1		1	
00:15			0		0		0		12:15			1		0		1	
00:30			0		0		0		12:30			2		1		3	
00:45			0		0		0		12:45			1	4	1	3	2	7
01:00			0		0		0		13:00			1		1		2	
01:15			0		0		0		13:15			0		0		0	
01:30			0		0		0		13:30			0		0		0	
01:45			0		0		0		13:45			0	1	0	1	0	2
02:00			0		0		0		14:00			2		2		4	
02:15			0		0		0		14:15			1		1		2	
02:30			0		0		0		14:30			0		0		0	
02:45			0		0		0		14:45			0	3	0	3	0	6
03:00			0		0		0		15:00			0		0		0	
03:15			0		0		0		15:15			1		6		7	
03:30			0		0		0		15:30			1		2		3	
03:45			0		0		0		15:45			2	4	0	8	2	12
04:00			0		0		0		16:00			0		3		3	
04:15			0		0		0		16:15			1		0		1	
04:30			0		0		0		16:30			0		1		1	
04:45			0		0		0		16:45			0	1	0	4	0	5
05:00			0		0		0		17:00			0		2		2	
05:15			0		0		0		17:15			0		2		2	
05:30			1		0		1		17:30			0		0		0	
05:45			0	1	0		0	1	17:45			0		1	5	1	5
06:00			0		0		0		18:00			0		2		2	
06:15			0		1		1		18:15			0		0		0	
06:30			0		0		0		18:30			0		0		0	
06:45			0		0	1	0	1	18:45			0		0	2	0	2
07:00			0		0		0		19:00			0		0		0	
07:15			0		0		0		19:15			1		0		1	
07:30			0		0		0		19:30			0		0		0	
07:45			0		0		0		19:45			0	1	0		0	1
08:00			0		0		0		20:00			0		0		0	
08:15			0		0		0		20:15			0		0		0	
08:30			0		0		0		20:30			0		0		0	
08:45			0		0		0		20:45			0		0		0	
09:00			0		0		0		21:00			0		0		0	
09:15			0		0		0		21:15			0		0		0	
09:30			0		1		1		21:30			0		0		0	
09:45			3	3	0	1	3	4	21:45			0		0		0	
10:00			0		0		0		22:00			0		0		0	
10:15			1		0		1		22:15			0		0		0	
10:30			1		0		1		22:30			0		0		0	
10:45			0	2	0		0	2	22:45			0		0		0	
11:00			1		0		1		23:00			0		0		0	
11:15			0		0		0		23:15			0		0		0	
11:30			1		0		1		23:30			0		0		0	
11:45			1	3	0		1	3	23:45			0		0		0	
TOTALS				9		2		**11**	**TOTALS**				14		26		**40**
SPLIT %				81.8%		18.2%		**21.6%**	**SPLIT %**				35.0%		65.0%		**78.4%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	23	28	51

AM Peak Hour			09:45	11:45	**11:45**	**PM Peak Hour**			12:15	15:15	**15:15**
AM Pk Volume			5	2	**6**	**PM Pk Volume**			5	11	**15**
Pk Hr Factor			0.417	0.500	**0.500**	**Pk Hr Factor**			0.625	0.458	**0.536**
7 - 9 Volume	0	0	0	0	0	**4 - 6 Volume**	0	0	1	9	**10**
7 - 9 Peak Hour						**4 - 6 Peak Hour**			16:00	16:30	**16:00**
7 - 9 Pk Volume	0	0	0	0	0	**4 - 6 Pk Volume**	0	0	1	5	**5**
Pk Hr Factor	0.000	0.000	0.000	0.000	0.000	**Pk Hr Factor**	0.000	0.000	0.250	0.625	**0.417**

Prepared by NDS/ATD

VOLUME

7466 SR 29 & Piazza Del Dotto Winery Dwy

Day: Tuesday
Date: 1/16/2018

City: Napa
Project #: CA18_8026_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	31	36	67

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			0		0		0		12:00			1		2		3	
00:15			0		0		0		12:15			0		1		1	
00:30			0		0		0		12:30			1		2		3	
00:45			0		0		0		12:45			0	2	0	5	0	7
01:00			0		0		0		13:00			0		0		0	
01:15			0		0		0		13:15			0		0		0	
01:30			0		0		0		13:30			0		0		0	
01:45			0		0		0		13:45			0		0		0	
02:00			0		0		0		14:00			2		3		5	
02:15			0		0		0		14:15			0		1		1	
02:30			0		0		0		14:30			0		1		1	
02:45			0		0		0		14:45			1	3	0	5	1	8
03:00			0		0		0		15:00			1		4		5	
03:15			0		0		0		15:15			0		0		0	
03:30			0		0		0		15:30			0		0		0	
03:45			0		0		0		15:45			0	1	1	5	1	6
04:00			0		0		0		16:00			0		0		0	
04:15			0		0		0		16:15			1		0		1	
04:30			0		0		0		16:30			0		0		0	
04:45			0		0		0		16:45			0	1	0		0	1
05:00			0		0		0		17:00			0		0		0	
05:15			0		0		0		17:15			0		2		2	
05:30			0		0		0		17:30			0		1		1	
05:45			0		0		0		17:45			0		0	3	0	3
06:00			0		1		1		18:00			0		1		1	
06:15			0		0		0		18:15			0		0		0	
06:30			0		0		0		18:30			0		0		0	
06:45			1	1	0	1	1	2	18:45			0		0	1	0	1
07:00			0		0		0		19:00			0		0		0	
07:15			0		0		0		19:15			0		0		0	
07:30			0		1		1		19:30			0		0		0	
07:45			0		0	1	0	1	19:45			0		0		0	
08:00			0		0		0		20:00			0		0		0	
08:15			0		1		1		20:15			0		0		0	
08:30			0		0		0		20:30			0		0		0	
08:45			0		0	1	0	1	20:45			0		0		0	
09:00			0		0		0		21:00			0		0		0	
09:15			0		1		1		21:15			0		0		0	
09:30			2		1		3		21:30			0		0		0	
09:45			7	9	1	3	8	12	21:45			0		0		0	
10:00			1		0		1		22:00			0		0		0	
10:15			1		0		1		22:15			0		0		0	
10:30			1		3		4		22:30			0		0		0	
10:45			2	5	2	5	4	10	22:45			0		0		0	
11:00			4		0		4		23:00			0		0		0	
11:15			1		1		2		23:15			0		0		0	
11:30			3		3		6		23:30			0		0		0	
11:45			1	9	2	6	3	15	23:45			0		0		0	
TOTALS				24		17		**41**	**TOTALS**				7		19		**26**
SPLIT %				58.5%		41.5%		**61.2%**	**SPLIT %**				26.9%		73.1%		**38.8%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	31	36	67

AM Peak Hour				09:30		11:15		**10:45**	**PM Peak Hour**				14:00		14:15		**14:00**
AM Pk Volume				11		8		**16**	**PM Pk Volume**				3		6		**8**
Pk Hr Factor				0.393		0.667		**0.667**	**Pk Hr Factor**				0.375		0.375		**0.400**
7 - 9 Volume	0	0	0		2			**2**	**4 - 6 Volume**	0	0	1		3			**4**
7 - 9 Peak Hour					07:30			**07:30**	**4 - 6 Peak Hour**				16:00		16:45		**16:45**
7 - 9 Pk Volume	0	0	0		2			**2**	**4 - 6 Pk Volume**	0	0	1		3			**3**
Pk Hr Factor	0.000	0.000	0.000		0.500			**0.500**	**Pk Hr Factor**	0.000	0.000	0.250		0.375			**0.375**

Prepared by NDS/ATD

VOLUME

7466 SR 29 & Piazza Del Dotto Winery Dwy

Day: Wednesday
Date: 1/17/2018

City: Napa
Project #: CA18_8026_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	34	38	72

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			0		0		0		12:00			2		0		2	
00:15			0		0		0		12:15			1		1		2	
00:30			0		0		0		12:30			1		0		1	
00:45			0		0		0		12:45			1	5	2	3	3	8
01:00			0		0		0		13:00			0		0		0	
01:15			0		0		0		13:15			0		1		1	
01:30			0		0		0		13:30			0		0		0	
01:45			0		0		0		13:45			0		0	1	0	1
02:00			0		0		0		14:00			0		2		2	
02:15			0		0		0		14:15			0		1		1	
02:30			0		0		0		14:30			1		0		1	
02:45			0		0		0		14:45			3	4	6	9	9	13
03:00			0		0		0		15:00			1		3		4	
03:15			0		0		0		15:15			1		1		2	
03:30			0		0		0		15:30			1		2		3	
03:45			0		0		0		15:45			0	3	0	6	0	9
04:00			0		0		0		16:00			0		1		1	
04:15			0		0		0		16:15			0		0		0	
04:30			0		0		0		16:30			0		0		0	
04:45			0		0		0		16:45			1	1	2	3	3	4
05:00			0		0		0		17:00			0		1		1	
05:15			0		0		0		17:15			1		3		4	
05:30			0		0		0		17:30			0		1		1	
05:45			0		0		0		17:45			0	1	1	6	1	7
06:00			1		1		2		18:00			0		1		1	
06:15			0		0		0		18:15			0		0		0	
06:30			0		0		0		18:30			0		0		0	
06:45			0	1	0	1	0	2	18:45			0		0	1	0	1
07:00			0		0		0		19:00			0		0		0	
07:15			0		1		1		19:15			0		0		0	
07:30			0		0		0		19:30			0		0		0	
07:45			0		0	1	0	1	19:45			0		0		0	
08:00			0		0		0		20:00			0		0		0	
08:15			0		1		1		20:15			0		0		0	
08:30			1		0		1		20:30			0		0		0	
08:45			0	1	0	1	0	2	20:45			0		0		0	
09:00			0		0		0		21:00			0		0		0	
09:15			0		0		0		21:15			0		0		0	
09:30			1		1		2		21:30			0		0		0	
09:45			2	3	0	1	2	4	21:45			0		0		0	
10:00			3		0		3		22:00			0		0		0	
10:15			3		0		3		22:15			0		0		0	
10:30			3		1		4		22:30			0		0		0	
10:45			2	11	1	2	3	13	22:45			0		0		0	
11:00			0		0		0		23:00			0		0		0	
11:15			0		0		0		23:15			0		0		0	
11:30			0		1		1		23:30			0		0		0	
11:45			4	4	2	3	6	7	23:45			0		0		0	
TOTALS				20		9		**29**	**TOTALS**				14		29		**43**
SPLIT %				69.0%		31.0%		**40.3%**	**SPLIT %**				32.6%		67.4%		**59.7%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	34	38	72

AM Peak Hour			09:45	11:30	**10:00**	**PM Peak Hour**			14:30	14:45	**14:45**
AM Pk Volume			11	4	**13**	**PM Pk Volume**			6	12	**18**
Pk Hr Factor			0.917	0.500	**0.813**	**Pk Hr Factor**			0.500	0.500	**0.500**
7 - 9 Volume	0	0	1	2	**3**	**4 - 6 Volume**	0	0	2	9	**11**
7 - 9 Peak Hour			07:45	07:00	**07:45**	**4 - 6 Peak Hour**			16:30	16:45	**16:45**
7 - 9 Pk Volume	0	0	1	1	**2**	**4 - 6 Pk Volume**	0	0	2	7	**9**
Pk Hr Factor	0.000	0.000	0.250	0.250	**0.500**	**Pk Hr Factor**	0.000	0.000	0.500	0.583	**0.563**

Prepared by NDS/ATD

VOLUME

7466 SR 29 & Piazza Del Dotto Winery Dwy

Day: Thursday
Date: 1/18/2018

City: Napa
Project #: CA18_8026_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	41	48	89

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			0		0		0		12:00			2		0		2	
00:15			0		0		0		12:15			1		4		5	
00:30			0		0		0		12:30			1		0		1	
00:45			0		0		0		12:45			1	5	4	8	5	13
01:00			0		0		0		13:00			1		0		1	
01:15			0		0		0		13:15			2		0		2	
01:30			0		0		0		13:30			2		1		3	
01:45			0		0		0		13:45			1	6	1	2	2	8
02:00			0		0		0		14:00			1		2		3	
02:15			0		0		0		14:15			0		0		0	
02:30			0		0		0		14:30			0		0		0	
02:45			0		0		0		14:45			0	1	0	2	0	3
03:00			0		0		0		15:00			1		3		4	
03:15			0		0		0		15:15			0		4		4	
03:30			0		0		0		15:30			0		3		3	
03:45			0		0		0		15:45			1	2	1	11	2	13
04:00			0		0		0		16:00			1		0		1	
04:15			0		0		0		16:15			1		1		2	
04:30			0		0		0		16:30			0		1		1	
04:45			0		0		0		16:45			0	2	1	3	1	5
05:00			0		0		0		17:00			0		5		5	
05:15			0		0		0		17:15			0		4		4	
05:30			0		0		0		17:30			0		0		0	
05:45			0		0		0		17:45			0		0	9	0	9
06:00			0		0		0		18:00			0		0		0	
06:15			0		1		1		18:15			0		0		0	
06:30			0		0		0		18:30			1		1		2	
06:45			1	1	0	1	1	2	18:45			0	1	0	1	0	2
07:00			0		0		0		19:00			0		0		0	
07:15			0		0		0		19:15			0		0		0	
07:30			0		0		0		19:30			0		0		0	
07:45			0		0		0		19:45			0		0		0	
08:00			0		0		0		20:00			0		0		0	
08:15			0		0		0		20:15			0		0		0	
08:30			1		0		1		20:30			0		0		0	
08:45			0	1	3	3	3	4	20:45			0		0		0	
09:00			0		0		0		21:00			0		0		0	
09:15			0		1		1		21:15			0		0		0	
09:30			2		2		4		21:30			0		0		0	
09:45			6	8	2	5	8	13	21:45			0		0		0	
10:00			2		0		2		22:00			0		0		0	
10:15			2		0		2		22:15			0		0		0	
10:30			1		0		1		22:30			0		0		0	
10:45			0	5	0		0	5	22:45			0		0		0	
11:00			4		0		4		23:00			0		0		0	
11:15			2		2		4		23:15			0		0		0	
11:30			2		1		3		23:30			0		0		0	
11:45			1	9	0	3	1	12	23:45			0		0		0	
TOTALS				24		12		**36**	**TOTALS**				17		36		**53**
SPLIT %				66.7%		33.3%		**40.4%**	**SPLIT %**				32.1%		67.9%		**59.6%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	41	48	89

AM Peak Hour			09:30	08:45	**09:30**	**PM Peak Hour**			12:45	15:00	**12:00**
AM Pk Volume			12	6	**16**	**PM Pk Volume**			6	11	**13**
Pk Hr Factor			0.500	0.500	**0.500**	**Pk Hr Factor**			0.750	0.688	**0.650**
7 - 9 Volume	0	0	1	3	**4**	**4 - 6 Volume**	0	0	2	12	**14**
7 - 9 Peak Hour			07:45	08:00	**08:00**	**4 - 6 Peak Hour**			16:00	16:30	**16:30**
7 - 9 Pk Volume	0	0	1	3	**4**	**4 - 6 Pk Volume**	0	0	2	11	**11**
Pk Hr Factor	0.000	0.000	0.250	0.250	**0.333**	**Pk Hr Factor**	0.000	0.000	0.500	0.550	**0.550**

Prepared by NDS/ATD

VOLUME

7466 SR 29 & Piazza Del Dotto Winery Dwy

Day: Friday
Date: 1/19/2018

City: Napa
Project #: CA18_8026_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	47	53	100

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			0		0		0		12:00			2		1		3	
00:15			0		0		0		12:15			2		1		3	
00:30			0		0		0		12:30			1		1		2	
00:45			0		0		0		12:45			2	7	2	5	4	12
01:00			0		0		0		13:00			1		1		2	
01:15			0		0		0		13:15			2		0		2	
01:30			0		0		0		13:30			2		2		4	
01:45			0		0		0		13:45			1	6	1	4	2	10
02:00			0		0		0		14:00			0		3		3	
02:15			0		0		0		14:15			2		1		3	
02:30			0		0		0		14:30			0		1		1	
02:45			0		0		0		14:45			1	3	2	7	3	10
03:00			0		0		0		15:00			0		2		2	
03:15			0		0		0		15:15			4		3		7	
03:30			0		0		0		15:30			0		3		3	
03:45			0		0		0		15:45			0	4	0	8	0	12
04:00			0		0		0		16:00			1		0		1	
04:15			0		0		0		16:15			0		0		0	
04:30			0		0		0		16:30			0		2		2	
04:45			0		0		0		16:45			1	2	1	3	2	5
05:00			0		0		0		17:00			0		1		1	
05:15			1		1		2		17:15			1		1		2	
05:30			2		2		4		17:30			0		0		0	
05:45			0	3	0	3	0	6	17:45			0	1	3	5	3	6
06:00			0		0		0		18:00			0		3		3	
06:15			0		0		0		18:15			0		2		2	
06:30			0		0		0		18:30			0		0		0	
06:45			0		0		0		18:45			0		0	5	0	5
07:00			0		1		1		19:00			0		0		0	
07:15			0		1		1		19:15			0		0		0	
07:30			0		1		1		19:30			0		0		0	
07:45			0		1	4	1	4	19:45			0		0		0	
08:00			0		0		0		20:00			0		0		0	
08:15			0		0		0		20:15			0		0		0	
08:30			0		0		0		20:30			0		0		0	
08:45			0		0		0		20:45			0		0		0	
09:00			1		0		1		21:00			0		0		0	
09:15			0		0		0		21:15			0		0		0	
09:30			5		0		5		21:30			0		0		0	
09:45			1	7	0		1	7	21:45			0		0		0	
10:00			1		0		1		22:00			0		0		0	
10:15			2		2		4		22:15			0		0		0	
10:30			1		1		2		22:30			0		0		0	
10:45			1	5	1	4	2	9	22:45			0		0		0	
11:00			2		1		3		23:00			0		0		0	
11:15			2		0		2		23:15			0		0		0	
11:30			2		1		3		23:30			0		0		0	
11:45			3	9	3	5	6	14	23:45			0		0		0	
TOTALS				24		16		**40**	**TOTALS**				23		37		**60**
SPLIT %				60.0%		40.0%		**40.0%**	**SPLIT %**				38.3%		61.7%		**60.0%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	47	53	100

AM Peak Hour				09:30		11:30	**11:30**	**PM Peak Hour**				12:00		14:45	**14:45**
AM Pk Volume				9		6	**15**	**PM Pk Volume**				7		10	**15**
Pk Hr Factor				0.450		0.500	**0.625**	**Pk Hr Factor**				0.875		0.833	**0.536**
7 - 9 Volume	0	0		0		4	**4**	**4 - 6 Volume**	0	0		3		8	**11**
7 - 9 Peak Hour						07:00	**07:00**	**4 - 6 Peak Hour**				16:00		16:30	**16:30**
7 - 9 Pk Volume	0	0		0		4	**4**	**4 - 6 Pk Volume**	0	0		2		5	**7**
Pk Hr Factor	0.000	0.000		0.000		1.000	**1.000**	**Pk Hr Factor**	0.000	0.000		0.500		0.625	**0.875**

Piazza Del Dotto Winery
Driveway Count Summary

Weekday - Peak Hour of Generator

Day	Date	Peak Hour	Peak Hour Vol		Daily Vol	Peak Hour % of Daily
			In	Out		
Monday	1/15/2018	3:15-4:15	4	9	51	25.49%
Tuesday	1/16/2018	2:00-3:00	3	5	67	11.94%
Wednesday	1/17/2018	2:45-3:45	6	12	72	25.00%
Thursday	1/18/2018	12:00-1:00	5	8	89	14.61%
Friday	1/19/2018	2:45-3:45	5	10	100	15.00%
Average			5	9	76	**18.41%**
			36%	64%		

Weekend - Peak Hour of Generator

Day	Date	Peak Hour	Peak Hour Vol		Daily Vol	Peak Hour % of Daily
			In	Out		
Saturday	1/13/2018	1:30-2:30	11	11	136	16.18%
Sunday	1/14/2018	2:45-3:45	10	15	144	17.36%
Average			11	13	140	**16.77%**
			45.8%	54.2%		

Weekly - Peak Hour of Generator

Day	Date	Peak Hour	Peak Hour Vol		Daily Vol	Peak Hour % of Daily
			In	Out		
Saturday	1/13/2018	1:30-2:30	11	11	136	16.18%
Sunday	1/14/2018	2:45-3:45	10	15	144	17.36%
Monday	1/15/2018	3:15-4:15	4	9	51	25.49%
Tuesday	1/16/2018	2:00-3:00	3	5	67	11.94%
Wednesday	1/17/2018	2:45-3:45	6	12	72	25.00%
Thursday	1/18/2018	12:00-1:00	5	8	89	14.61%
Friday	1/19/2018	2:45-3:45	5	10	100	15.00%
Average			6	10	94	**17.94%**
			38%	63%		

Weekday - PM Peak Hour (4-6 PM)

Day	Date	Peak Hour	Peak Hour Vol		Daily Vol	Peak Hour % of Daily
			In	Out		
Monday	1/15/2018	4:00-5:00	1	4	51	9.80%
Tuesday	1/16/2018	4:45-5:45	0	3	67	4.48%
Wednesday	1/17/2018	4:45-5:46	2	7	72	12.50%
Thursday	1/18/2018	4:30-5:30	0	11	89	12.36%
Friday	1/19/2018	4:30-5:30	2	5	100	7.00%
Average			1	6	76	**9.23%**
			14%	86%		

Weekend - Midday Peak Hour (2-4 PM)

Day	Date	Peak Hour	Peak Hour Vol		Daily Vol	Peak Hour % of Daily
			In	Out		
Saturday	1/13/2018	2:00-3:00	10	9	136	13.97%
Sunday	1/14/2018	2:45-3:45	10	15	144	17.36%
Average			10	12	140	**15.67%**
			45%	55%		

Appendix E

Napa County Winery Traffic Information/Trip Generation Forms

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Existing Conditions Winery Traffic Information / Trip Generation

Determine Winery Daily Trips. ***Complete Sections A through H below to determine your winery project's estimated baseline daily and peak hour trips.***

Project Name: Piazza Del Dotto Winery **Project Scenario:** **Permitted**

Section A. Maximum Daily Weekday Traffic (Friday, non-harvest season)

1.	Total number of FT employees:	13	x 3.05 one-way trips per employee	=	39.7	daily trips
2.	Total number of PT employees:	2	x 1.90 one-way trips per employee	=	3.8	daily trips
3.	Maximum weekday visitors:	50	/2.6 visitors per vehicle x 2 one-way trips	=	38.5	daily trips
4.	Gallons of production: 48000		/1,000 x 0.009 daily truck trips2 x 2 one-way trips	=	0.9	daily trips
5.			TOTAL	=	83	daily trips

Section B. Maximum Daily Weekday Traffic (Friday, harvest season)

6.	Total number of FT employees:	13	x 3.05 one-way trips per employee	=	39.7	daily trips
7.	Total number of PT employees:	2	x 1.90 one-way trips per employee	=	3.8	daily trips
8.	Maximum weekday visitors:	50	/2.6 visitors per vehicle x 2 one-way trips	=	38.5	daily trips
9.	Gallons of production: 48000		/1,000 x 0.009 daily truck trips2 x 2 one-way trips	=	0.9	daily trips
10.	Avg. annual tons of grape on-haul:	320	/ 144 truck trips x 2 one-way trips	=	4.4	daily trips
11.			TOTAL	=	87	daily trips

Section C. Maximum Daily Weekend Traffic (Saturday, non-harvest season)

12.	Total number of FT Sat. employees:	13	x 3.05 one-way trips per employee	=	39.7	daily trips
13.	Total number of PT Sat. employees:	0	x 1.90 one-way trips per employee	=	0.0	daily trips
14.	Maximum Saturday visitors:	75	/2.8 visitors per vehicle x 2 one-way trips	=	53.6	daily trips
15.			TOTAL	=	93	daily trips

Section D. Maximum Daily Weekend Traffic (Saturday, harvest season)

16.	Total number of FT Sat. employees:	13	x 3.05 one-way trips per employee	=	39.7	daily trips
17.	Total number of PT Sat. employees:	2	x 1.90 one-way trips per employee	=	3.8	daily trips
18.	Maximum Saturday visitors:	75	/2.8 visitors per vehicle x 2 one-way trips	=	53.6	daily trips
19.	Gallons of production: 48000		/1,000 x 0.009 daily truck trips2 x 2 one-way trips	=	0.9	daily trips
20.	Avg. annual tons of grape on-haul:	320	/ 144 truck trips x 2 one-way trips	=	4.4	daily trips
21.			TOTAL	=	102	daily trips

Section E. PM Peak Hour Trip Generation (Friday, non-harvest season)

(Sum of daily trips from Sec. A, lines 3 and 4) x 0.38 + (No. of FTE) + (No. of PTE / 2) = 29 PM peak trips

Section F. PM Peak Hour Trip Generation (Friday, harvest season)

(Sum of daily trips, Sec. B, lines 8, 9, 10) x 0.38 + (No. of FTE) + (No. of PTE / 2) = 31 PM peak trips

Section G. PM Peak Hour Trip Generation (Friday, non-harvest season)

(Daily trips from Sec. C, line 14) x 0.57 + (No. of FTE) + (No. of PTE / 2) = 44 PM peak trips

Section H. PM Peak Hour Trip Generation (Saturday, harvest season)

(Sum of daily trips Sec. D, lines 18, 19, 20) x 0.57 + (No. of FTE) + (No. of PTE / 2) = 48 PM peak trips

Proposed Project Winery Traffic Information / Trip Generation

Determine Winery Daily Trips. ***Complete Sections I through L below to determine your winery project's estimated future and peak hour trips.***

Section I. Maximum Daily Weekday Traffic (Friday, non-harvest season)

1.	Total number of FT employees:	17	x 3.05 one-way trips per employee	=	51.9	daily trips
2.	Total number of PT employees:	2	x 1.90 one-way trips per employee	=	3.8	daily trips
3.	Maximum weekday visitors:	125	/2.6 visitors per vehicle x 2 one-way trips	=	96.2	daily trips
4.	Gallons of production:	100000	/1,000 x 0.009 daily truck trips2 x 2 one-way trips	=	1.8	daily trips
5.			TOTAL	=	154	daily trips

Section J. Maximum Daily Weekday Traffic (Friday, harvest season)

6.	Total number of FT employees:	17	x 3.05 one-way trips per employee	=	51.9	daily trips
7.	Total number of PT employees:	2	x 1.90 one-way trips per employee	=	3.8	daily trips
8.	Maximum weekday visitors:	125	/2.6 visitors per vehicle x 2 one-way trips	=	96.2	daily trips
9.	Gallons of production:	100000	/1,000 x 0.009 daily truck trips2 x 2 one-way trips	=	1.8	daily trips
10.	Avg. annual tons of grape on-haul:	667	/ 144 truck trips x 2 one-way trips	=	9.3	daily trips
11.			TOTAL	=	163	daily trips

Section K. Maximum Daily Weekend Traffic (Saturday, non-harvest season)

12.	Total number of FT Sat. employees:	13	x 3.05 one-way trips per employee	=	39.7	daily trips
13.	Total number of PT Sat. employees:	0	x 1.90 one-way trips per employee	=	0.0	daily trips
14.	Maximum Saturday visitors:	130	/2.8 visitors per vehicle x 2 one-way trips	=	92.9	daily trips
15.			TOTAL	=	133	daily trips

Section L. Maximum Daily Weekend Traffic (Saturday, harvest season)

16.	Total number of FT Sat. employees:	17	x 3.05 one-way trips per employee	=	51.9	daily trips
17.	Total number of PT Sat. employees:	2	x 1.90 one-way trips per employee	=	3.8	daily trips
18.	Maximum Saturday visitors:	130	/2.8 visitors per vehicle x 2 one-way trips	=	92.9	daily trips
19.	Gallons of production:	100000	/1,000 x 0.009 daily truck trips2 x 2 one-way trips	=	1.8	daily trips
20.	Avg. annual tons of grape on-haul:	667	/ 144 truck trips x 2 one-way trips	=	9.3	daily trips
21.			TOTAL	=	160	daily trips

Section M. PM Peak Hour Trip Generation (Friday, non-harvest season)

(Sum of daily trips from Sec. I, lines 3 and 4) x 0.38 + (No. of FTE) + (No. of PTE / 2) = 55 PM peak trips

Section N. PM Peak Hour Trip Generation (Friday, harvest season)

(Sum of daily trips, Sec. J, lines 8, 9, 10) x 0.38 + (No. of FTE) + (No. of PTE / 2) = 59 PM peak trips

Section O. PM Peak Hour Trip Generation (Friday, non-harvest season)

(Daily trips from Sec. K, line 14) x 0.57 + (No. of FTE) + (No. of PTE / 2) = 66 PM peak trips

Section P. PM Peak Hour Trip Generation (Saturday, harvest season)

(Sum of daily trips Sec. L, lines 18, 19, 20) x 0.57 + (No. of FTE) + (No. of PTE / 2) = 77 PM peak trips

Appendix F

AutoTURN Exhibits

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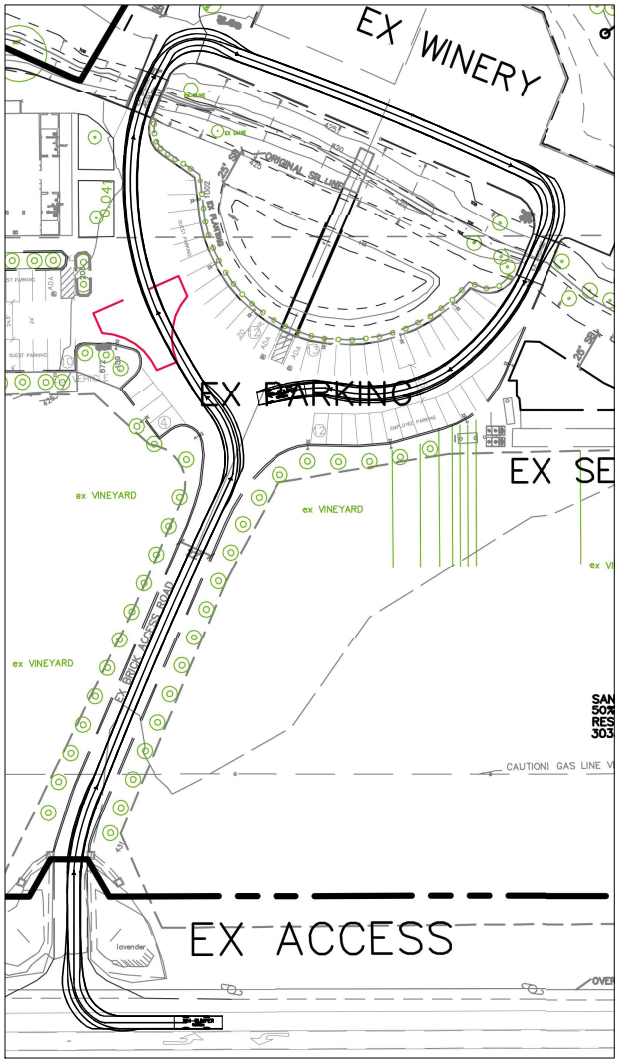

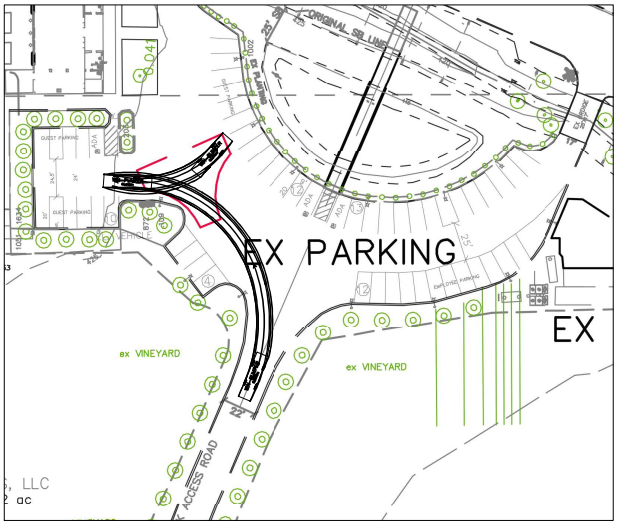

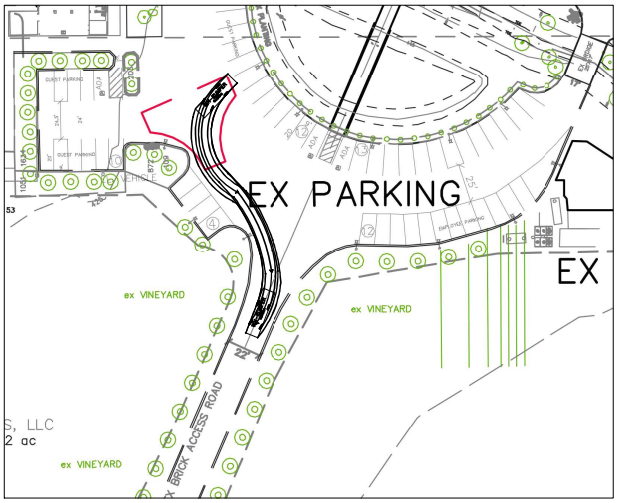

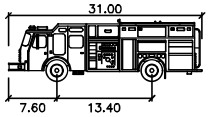

WIN–PUMPER

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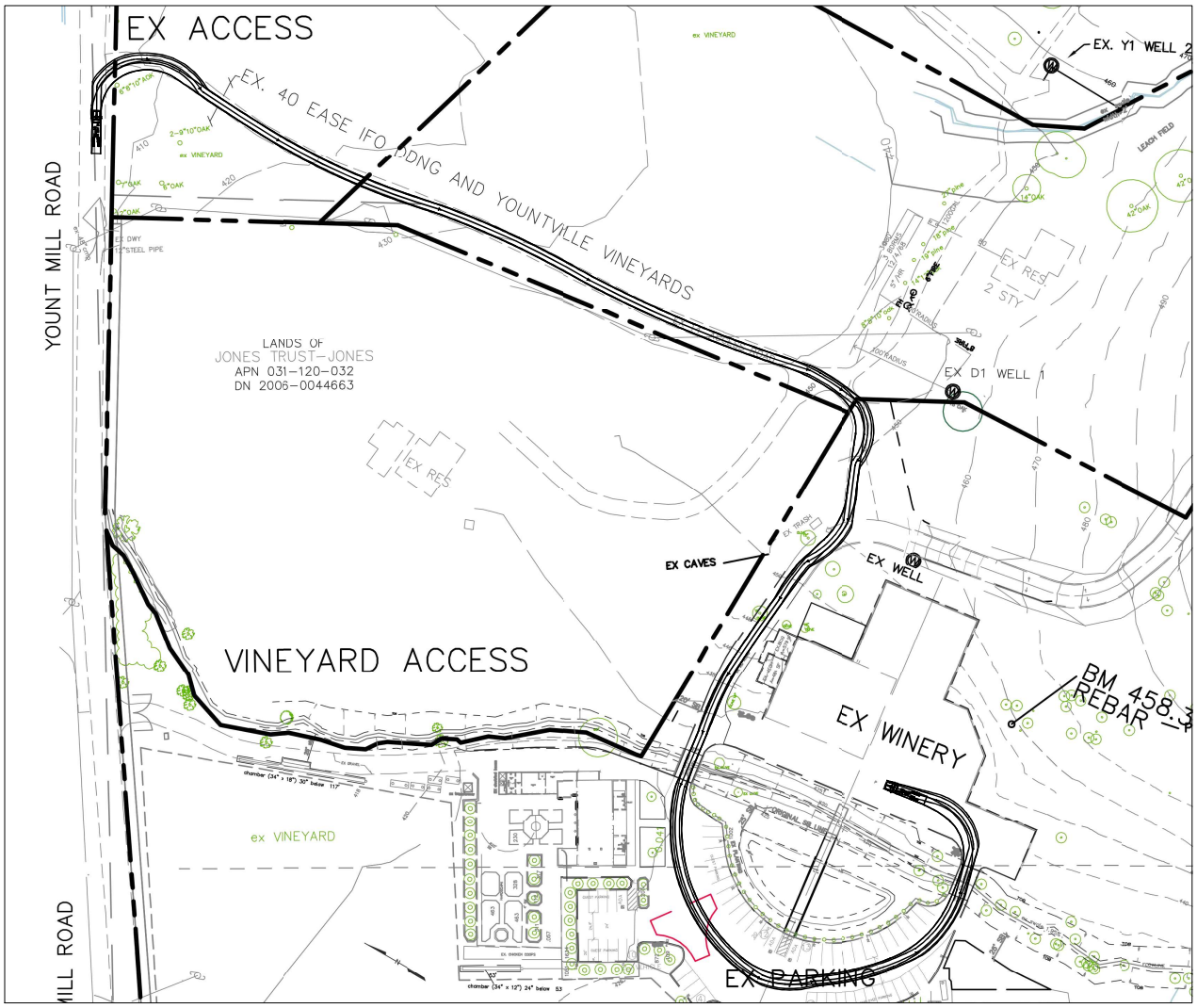
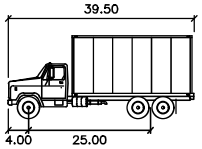
Track	: 8.20
Lock to Lock Time	: 6.0
Steering Angle	: 26.4



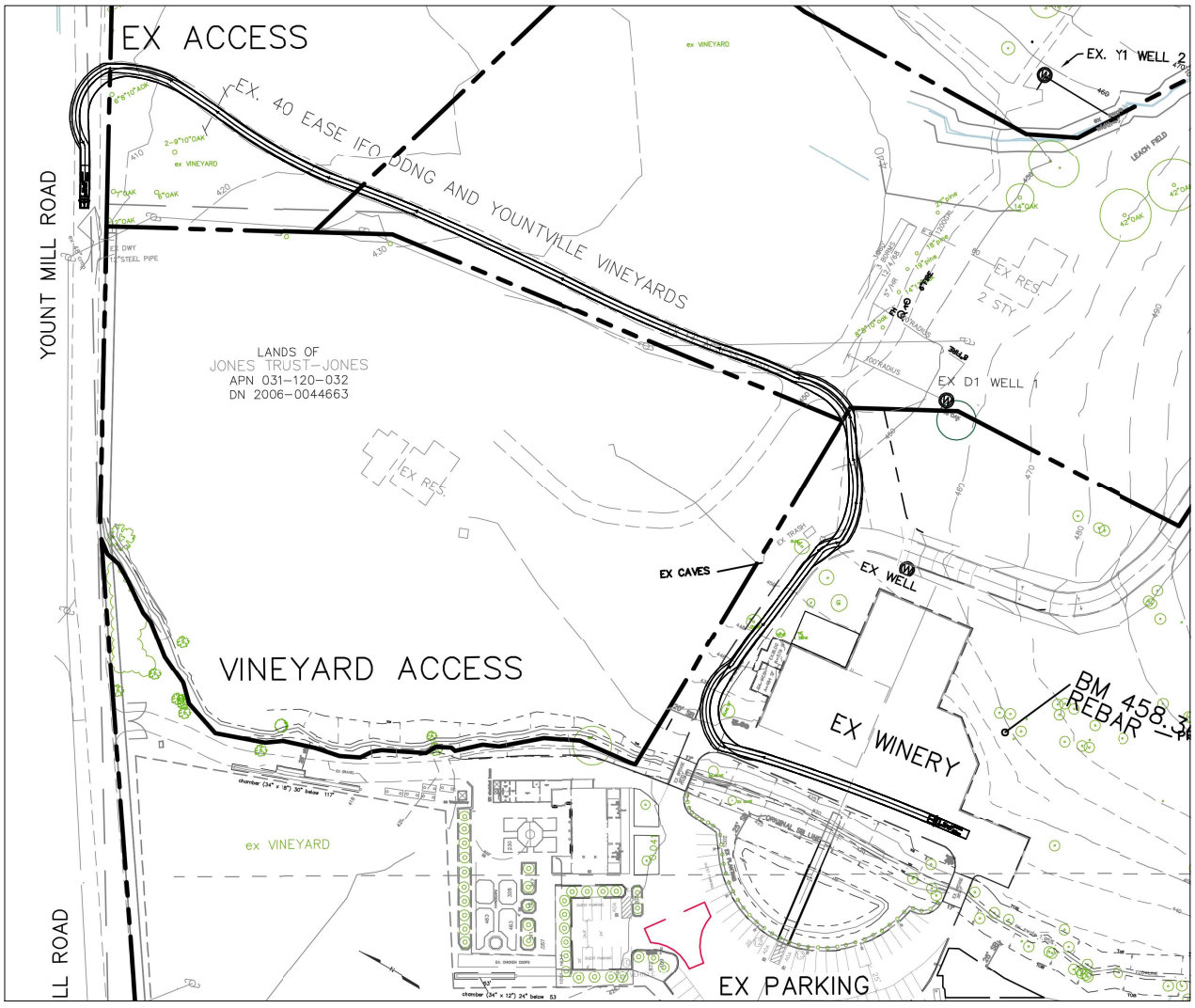


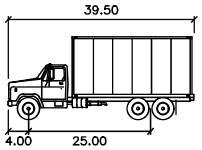
SU–40

	feet
Width	: 8.00
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 31.8

Piazza Del Dotto Winery TIS — Inbound Commercial Truck Access

NAX129 — October 2018





SU–40

	feet
Width	: 8.00
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 31.8

Piazza Del Dotto Winery TIS — Outbound Commercial Truck Access

NAX129 — October 2018