TRAFFIC IMPACT REPORT

PROPOSED TITUS WINERY
IN NAPA VALLEY

October 3, 2013

Prepared for: Titus Winery

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I. INTRODUCTION

This report has been prepared at the request of Titus Winery applicant to determine if the proposed winery along Silverado Trail will result in any significant circulation system impacts at the project entrance or at the nearby Silverado Trail intersection with Deer Park Road. Analysis has been provided for harvest Friday and Saturday PM peak hour conditions for existing, year 2015 (first year of full project production) and year 2030 (general plan buildout) horizons.

II. SUMMARY OF FINDINGS

A. "WITHOUT PROJECT" OPERATING CONDITIONS

1. Silverado Trail at the project site now has slightly higher two-way traffic volumes during the Saturday PM peak hour than during the Friday peak traffic hour (about 735 two-way vehicles versus 715 two-way vehicles in September).

2. The Silverado Trail all way stop intersection with Deer Park Road now has unacceptable operation (level of service) during the harvest Friday PM peak traffic hour, but acceptable operation during the Saturday PM peak traffic hour. The intersection also has harvest Friday and Saturday PM peak hour volumes exceeding peak hour signal warrant criteria levels.

3. By 2015, the Silverado Trail intersection with Deer Park Road will be experiencing unacceptable level of service during the harvest Friday PM peak traffic hour, but acceptable operation during the Saturday PM peak traffic hour. In addition, the intersection will continue to have volumes exceeding signal warrant criteria levels during both harvest Friday and Saturday PM peak traffic hours.

4. By 2030, the Silverado Trail intersection with Deer Park Road will be experiencing unacceptable levels of service during both harvest Friday and Saturday PM peak traffic hours. In addition, volumes will be exceeding signal warrant criteria levels during both harvest Friday and Saturday PM peak traffic hours.

B. PROJECT IMPACTS

1. The project will result in 0 inbound and 11 outbound trips during the harvest Friday peak traffic hour along Silverado Trail, with 5 inbound and 6 outbound trips during the Saturday afternoon peak traffic hour. Project trips during the Saturday PM peak hour will primarily be associated with visitors by appointment, while trips during the Friday PM peak hour will be a mix of visitor and employee vehicles.

2. Project traffic during harvest will not produce any significant level of service or signal warrant impacts at the Silverado Trail/Deer Park intersection during Friday or Saturday

afternoon peak traffic conditions for the near term (year 2015) or long term (year 2030) analysis horizons.

3. Sight lines will be adequate at the project's proposed driveway connection to Silverado Trail.

4. The project will provide a left turn lane on the northbound Silverado Trail approach to the project entrance. Volumes will exceed County left turn lane warrant criteria at this location. The turn lane will be built to County standards and will improve safety for northbound vehicles on Silverado Trail making a left turn into the winery. The left turn pocket, taper and transition will also be designed and striped to provide breaks in the striping to accommodate turn movements to/from driveways on the east side of Silverado Trail in the vicinity of the Titus Winery entrance.

C. CONCLUSIONS & RECOMMENDATIONS

The project will result in no significant off-site circulation system operational impacts nor any sight line impacts at the proposed project driveway connection to Silverado Trail. A left turn lane will be provided on the Silverado Trail northbound approach to the project entrance. Therefore, no mitigation measures are required for these issues.

III. PROJECT LOCATION & DESCRIPTION

The Titus Winery will be located on the west side of Silverado Trail about a quarter mile north of the Deer Park Road intersection (see **Figure 1**). A left turn lane designed to County standards will be provided on the northbound Silverado Trail approach to the project entrance. While there are active driveways in the vicinity of the project entrance on the east side of Silverado Trail, the left turn lane will be designed to provide breaks in the striping to allow left turn movements to/from each of these driveways.

The proposed Titus Winery would have the following yearly production and visitor/special event levels.

- 24,000 gallons per year production.
- Bottling on-site.
- 34 percent of the grapes will be transported to site (arriving about equally from the north and south on Silverado Trail).
- Tours and tasting by appointment only – 7 days per week from 10:00 AM to 5:00 PM, 60 visitors/day maximum.
- Food and wine pairing events – 6-8 times per year, maximum 25 visitors per event (between 11:00 AM and 2:00 PM or 3:00 and 5:00 PM on weekends).
- Marketing events – 4 per year, maximum 125 visitors per event (between noon and 5:00 PM on weekends).

- Wine auction – 2 per year, maximum 125 visitors per event (weekend evenings).
- Wine release – 6 per year, maximum 125 visitors per event (between 10:00 AM and 5:00 PM on weekends)

IV. EXISTING CIRCULATION SYSTEM OPERATION

A. ANALYSIS LOCATIONS

The following two locations have been evaluated in this study.

- Silverado Trail/Deer Park Road intersection
- Silverado Trail/Project Driveway intersection

Figure 2 presents approach geometrics and control at each analysis intersection. The Silverado Trail/Deer Park Road intersection is all way stop sign controlled. All four intersection approaches have shared through/left turn lanes and exclusive right turn lanes.

B. VOLUMES

Friday 3:00 to 6:00 PM and Saturday 1:00 to 6:00 PM turn movement counts were conducted by Crane Transportation Group (CTG) in September 2013 at the Silverado Trail/Deer Park Road intersection. The peak traffic hours were 4:30-5:30 PM on Friday and 2:45-3:45 PM on Saturday. Resultant peak hour counts are presented in **Figure 3**. Overall, two-way volumes along Silverado Trail at the project entrance were higher during the Saturday PM peak hour (about 735 vehicles per hour [vph] on Saturday versus 715 vph on Friday). However, along Deer Park Road west of Silverado Trail, two-way PM peak hour volumes were significantly higher on Friday than on Saturday (about 565 vph versus 365 vph). Late September counts reflected harvest conditions, the peak traffic time of the year.

C. ROADWAYS

Silverado Trail provides the only access to the project site. In the project vicinity it has two well-paved 12-foot travel lanes and 4-foot paved shoulders that are signed and striped as Class II bicycle lanes. The posted speed limit is 50 miles per hour and the roadway is level and straight along the majority of the site frontage. However, there is a horizontal curve at the north end of the Titus property.

D. INTERSECTION LEVEL OF SERVICE

1. Analysis Methodology

Transportation engineers and planners commonly use a grading system called level of service (LOS) to measure and describe the operational status of the local roadway network. LOS is a description of the quality of a roadway facility's operation, ranging from LOS A (indicating

free-flow traffic conditions with little or no delay) to LOS F (representing oversaturated conditions where traffic flows exceed design capacity, resulting in long queues and delays). Intersections, rather than roadway segments between intersections, are almost always the capacity controlling locations for any circulation system.

Signalized Intersections. For signalized intersections, the 2010 *Highway Capacity Manual* (Transportation Research Board, National Research Council) methodology was utilized. With this methodology, operations are defined by the level of service and average control delay per vehicle (measured in seconds) for the entire intersection. For a signalized intersection, control delay is the portion of the total delay attributed to traffic signal operation. This includes delay associated with deceleration, acceleration, stopping, and moving up in the queue. **Table 1** summarizes the relationship between delay and LOS for signalized intersections.

Unsignalized Intersections. For unsignalized (all-way stop-controlled and side-street stop-controlled) intersections, the 2010 *Highway Capacity Manual* (Transportation Research Board, National Research Council) methodology for unsignalized intersections was utilized. For side-street stop-controlled intersections, operations are defined by the level of service and average control delay per vehicle (measured in seconds), with delay reported for the stop sign controlled approaches or turn movements, although overall delay is also typically reported for intersections along state highways. For all-way stop-controlled intersections, operations are defined by the average control delay for the entire intersection (measured in seconds per vehicle). The delay at an unsignalized intersection incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. **Table 2** summarizes the relationship between delay and LOS for unsignalized intersections.

2. Minimum Acceptable Operation

Napa County has no published minimum level of service standards for unsignalized public road or private driveway intersections. The County General Plan (Policy CIR-16) states that the County shall seek to maintain an arterial Level of Service D or better on all County roadways except where maintaining this desired level of service would require installation of more travel lanes than shown on the Circulation Map. For this study, LOS D has been used as the poorest acceptable operation for the all way stop Silverado Trail/Deer Park Road intersection.

3. Existing Harvest Operation

Table 3 shows that currently the Silverado Trail/Deer Park Road all way stop intersection is operating at an unacceptable level of service (LOS E) during the Friday PM peak traffic hour, but an acceptable LOS C during the Saturday PM peak traffic hour. Capacity worksheets are provided in the **Appendix**.

E. INTERSECTION PEAK HOUR SIGNAL WARRANT EVALUATION

1. Analysis Methodology

Traffic signals are used to provide an orderly flow of traffic through an intersection. Many times they are needed to offer side street traffic an opportunity to access a major road where high volumes and/or high vehicle speeds block crossing or turn movements. They do not, however, increase the capacity of an intersection (i.e., increase the overall intersection's ability to accommodate additional vehicles) and, in fact, often slightly reduce the number of total vehicles that can pass through an intersection in a given period of time. Signals can also cause an increase in traffic accidents if installed at inappropriate locations.

There are 9 possible tests for determining whether a traffic signal should be considered for installation. These tests, called "warrants", consider criteria such as actual traffic volume, pedestrian volume, presence of school children, and accident history. The intersection volume data together with the available collision histories were compared to warrants contained in the *Manual on Uniform Traffic Control Devices* (MUTCD), Federal Highway Administration, 2010, California Supplement, which has been adopted by the State of California as a replacement for *Caltrans Traffic Manual*. Section 4C of the MUTCD provides guidelines, or warrants, which may indicate need for a traffic signal at an unsignalized intersection. As indicated in the MUTCD, satisfaction of one or more warrants does not necessarily require immediate installation of a traffic signal. It is merely an indication that the local jurisdiction should begin monitoring conditions at that location and that a signal may ultimately be required.

Warrant 3, the peak hour volume warrant, is often used as an initial check of signalization needs since peak hour volume data is typically available and this warrant is usually the first one to be met. Warrant 3 is based on a curve and takes only the hour with the highest volume of the day into account. Please see the **Appendix** for the warrant charts. To meet this warrant, a minimum of 100 vehicles per hour must approach the intersection on one of the side streets.

In areas where there are less than 10,000 people in the immediate vicinity of an intersection or where the travel speeds on the uncontrolled intersection approaches are greater than 40 miles per hour, "rural" warrant criteria apply. They require only 70 percent of the volume levels of "urban" warrant criteria. The Silverado Trail/Deer Park Road intersection has been evaluated using rural warrant criteria.

2. Signalization Needs Based Upon Warrant Criteria

Table 4 shows that currently the Silverado Trail/Deer Park Road intersection has volumes exceeding warrant #3 rural criteria levels during both the Friday and Saturday PM peak traffic hours.

F. PLANNED IMPROVEMENTS

There are no planned and funded improvements at any intersection evaluated in this study.[1]

V. FUTURE HORIZON CIRCULATION SYSTEM OPERATION WITHOUT THE PROJECT

Project traffic impacts have been determined for near and long term horizons. The near term horizon reflects the first year that the project will be at full production. Based upon input from the project applicant, the expected first year of full production will be 2015. The long term horizon reflects the County's general plan buildout year, which is 2030. Future horizon year volumes have been determined based upon traffic modeling projections for the year 2030 from the County's General Plan Circulation Element. This document showed an approximate 125 percent growth in weekday PM peak hour traffic along Silverado Trail just north of Deer Park Road between the years 2000 and 2030, with about a 100 percent growth south of Deer Park Road. On Deer Park Road, the 2000 to 2030 traffic model growth was projected at about 70 percent west of Silverado Trail and about 40 percent east of Silverado Trail. Projecting straight-line traffic growth for analysis purposes, this translated into about a 5 to 6 percent growth in Silverado Trail traffic from 2013 to the year 2015, and about a 40 to 46 percent growth in traffic from 2013 to 2030. Increases in 2013 traffic along Deer Park Road (east and west of Silverado Trail) would be 2 to 4 percent to 2015 and about 20 to 30 percent to 2030.

Since traffic modeling projections were available for a weekday PM peak hour only and not for a Saturday peak hour, north and southbound Saturday volumes on Silverado Trail as well as east and westbound Saturday volumes on Deer Park Road were both uniformly increased by the percentages above. However, due to the greater detail available for weekday volumes which showed much higher increases in southbound versus northbound traffic on Silverado Trail and higher increases in eastbound versus westbound traffic on Deer Park Road, Friday PM peak hour volumes were adjusted directionally, with the guidance that the combined two-way volume percent increases should be as listed above.

A. YEAR 2015 WITHOUT PROJECT EVALUATION

1. Volumes

Year 2015 "Without Project" Friday and Saturday PM peak hour harvest volumes are presented in **Figure 4**.

2. Intersection Level of Service

Table 3 shows that in 2015 during the harvest season, "Without Project" operation of the Silverado Trail/Deer Park Road intersection would be at an unacceptable level of service during

[1] Mr. Paul Wilkinson, Napa County Public Works Department, September 2013.

the Friday PM peak traffic hour (LOS E), and an acceptable level of service during the Saturday PM peak traffic hour (LOS C). Capacity worksheets are provided in the **Appendix**.

3. Intersection Signalization Needs

Table 4 shows that in 2015 during the harvest season, the Silverado Trail/Deer Park Road intersection would have both Friday and Saturday PM peak hour "Without Project" volumes exceeding signal warrant #3 rural criteria levels.

B. YEAR 2030 WITHOUT PROJECT EVALUATION

1. Volumes

Year 2030 "Without Project" Friday and Saturday PM peak hour harvest volumes are presented in **Figure 5**.

2. Intersection Level of Service

Table 3 shows that in 2030 during the harvest season, "Without Project" operation of the Silverado Trail/Deer Park Road intersection would be at unacceptable levels of service during both the Friday and Saturday PM peak traffic hours (LOS F). Capacity worksheets are provided in the **Appendix**.

3. Intersection Signalization Needs

Table 4 shows that in 2030 during the harvest season, the Silverado Trail/Deer Park Road intersection would have both Friday and Saturday PM Peak hour "Without Project" volumes exceeding signal warrant #3 rural criteria levels.

VI. PROJECT IMPACTS

A. SIGNIFICANCE CRITERIA

The following criteria were developed for recent traffic impact analyses in the County. These same criteria have been utilized in this study to determine the significance of impacts due to the project. An impact is considered to be significant if any of the following conditions are met.

- If an all way stop intersection has "Without Project" overall LOS A, B, C or D operation and deteriorates to LOS E or F operation with the addition of project traffic, the impact is considered significant and would require mitigation.

- If an all way stop intersection already has "Without Project" overall LOS E or F operation, an increase in traffic passing through the intersection of 1 percent or more due to the project is considered to be significant and would require mitigation.

- If the addition of project traffic to an unsignalized intersection increases "Without Project" volumes to meet peak hour signal warrant criteria levels, the impact is considered significant and would require mitigation.

- If "Without Project" volumes at an unsignalized intersection already meet peak hour signal warrant criteria levels and the level of service is already at an unacceptable level, an increase in traffic of 1 percent or more due to the project is considered significant and would require mitigation.

- If sight lines at the project entrance do not meet stopping sight distance criteria as detailed in *A Policy on Geometric Design of Highways and Streets*, 2011, 6th Edition, by AASHTO.

B. TRIP GENERATION

Friday and Saturday afternoon trip generation projections were developed with the assistance of the project applicant for all components of employee, visitor and grape delivery activities at the proposed Titus Winery (see worksheets in **Appendix**). Results are presented on an hourly basis in **Table 5** for Friday and Saturday afternoon conditions. As shown, both winery administrative and production employees as well as some visitor vehicles would be expected on the local roadway network during harvest Friday PM peak hour conditions (4:30-5:30 PM). During a harvest Saturday afternoon peak traffic hour (2:45-3:45 PM), winery-related traffic on the local roadway system would be primarily due to visitors. However, one grape delivery per day could be scheduled during a weekday or Saturday as late as 3:00 PM. For analysis purposes, one grape delivery truck leaving the winery has been included in the project's Saturday PM peak hour volumes.

A major component of winery-related traffic expected on the local roadway network during the Friday or Saturday PM peak traffic hours along Silverado Trail would be associated with visitors (by appointment). Assuming an average size group of ± 12 to 13 people leaving the winery about 3:00 PM and a similar size group entering in the same timeframe, with this last group leaving just before 5:00 PM, this would result in about 5 vehicles entering and leaving the winery during the 3:00-4:00 PM hour, and about 5 vehicles leaving the winery near 5:00 PM.

C. TRIP DISTRIBUTION

Project employee and visitor traffic was distributed to Silverado Trail in a pattern reflective of existing distribution patterns at the existing project vineyard driveway and other nearby driveways as well as the ease of accessing SR 29 via Deer Park Road just south of the project site: ± 75 percent to/from the south and 25 percent to/from the north. The applicant projects that grape delivery trucks would be coming about equally from the north and south on Silverado Trail. The Friday and Saturday project traffic increments expected on Silverado Trail during the times of ambient PM peak hour traffic flow are presented in **Figure 6**, while Friday and Saturday "With Project" PM peak hour volumes for the years 2015 and 2030 are presented in **Figures 7** and **8,** respectively.

D. PLANNED ROADWAY IMPROVEMENTS

The Titus Winery is proposing construction of a left turn lane on the northbound Silverado Trail approach to the project access intersection, which would be built to County standards.

E. YEAR 2015 INTERSECTION IMPACTS

1. Level of Service

Table 3 shows that project traffic would not produce a significant level of service impact at the Silverado Trail/Deer Park Road intersection during the year 2015 Friday or Saturday PM peak traffic hours along Silverado Trail. Project traffic would not change acceptable Saturday PM peak hour operation to an acceptable level, and would not increase volumes by 1 percent or more during the Friday PM peak hour when "Without Project" operation would be at an unacceptable level. Volume increases would only be 0.5 to 0.7 percent, which is less than the 1 percent volume increase significance criteria level used by the County.

2. Signalization Needs

Table 4 shows that project traffic would not produce a significant signalization needs impact at the Silverado Trail/Deer Park Road intersection during the year 2015 Friday or Saturday PM peak traffic hours. Project traffic would not increase volumes by 1 percent or more during either the Friday or Saturday PM peak hours, when "Without Project" volumes would already exceed peak hour signal warrant criteria levels. Volume increases would only be 0.5 to 0.7 percent, which is less than the 1 percent volume increase significance criteria level used by the County.

F. YEAR 2030 INTERSECTION IMPACTS

1. Level of Service

Table 3 shows that project traffic would not produce a significant level of service impact at the Silverado Trail/Deer Park Road intersection during the year 2030 Friday or Saturday PM peak traffic hours. Project traffic would not increase volumes by 1 percent or more during either the Friday or Saturday PM peak traffic hours, when "Without Project" operation would be at unacceptable levels during both time periods. Volume increases would only be 0.4 to 0.5 percent, which is less than the 1 percent volume increase significance criteria level used by the County.

2. Signalization Needs

Table 4 shows that project traffic would not produce a significant signalization needs impact at the Silverado Trail/Deer Park Road intersection during the year 2030 Friday or Saturday PM peak traffic hours. Project traffic would not increase volumes by 1 percent or more during either the Friday or Saturday peak hours when "Without Project" volumes would already exceed peak

hour signal warrant criteria levels. Volume increases would only be 0.4 to 0.5 percent, which is less than the 1 percent volume increase significance criteria level used by the County.

G. SIGHT LINE ADEQUACY

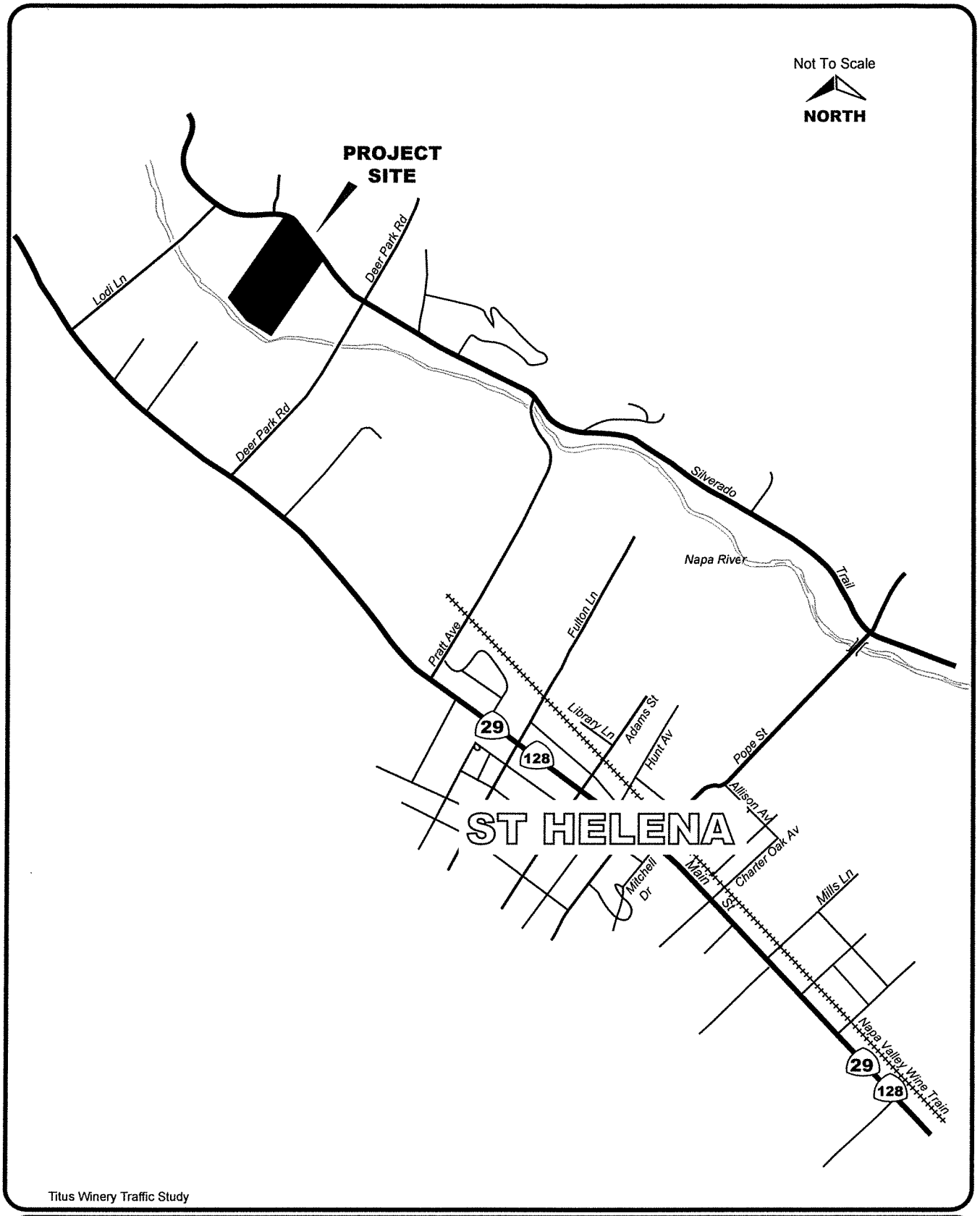
Sight lines would be acceptable for drivers turning from the project driveway to Silverado Trail. Sight lines to the north would be about 620 feet, while sight lines to the south would be about 750 feet. Based upon surveyed travel speeds along Silverado Trail adjacent to the project site of up to 50 to 55 miles per hour, the required stopping sight distance would be at most 495 feet.[2]

VII. CONCLUSIONS & RECOMMENDATIONS

The project would result in no significant off-site circulation system operational impacts nor any sight line impacts at the proposed project driveway connection to Silverado Trail. Therefore, no mitigations are needed. The applicant's proposed left turn lane on the northbound Silverado Trail approach to the project entrance will provide added safety for left turns into the project entrance.

[2] *A Policy on Geometric Design of Highways and Streets*, 2011, AASHTO.

Figures



Titus Winery Traffic Study

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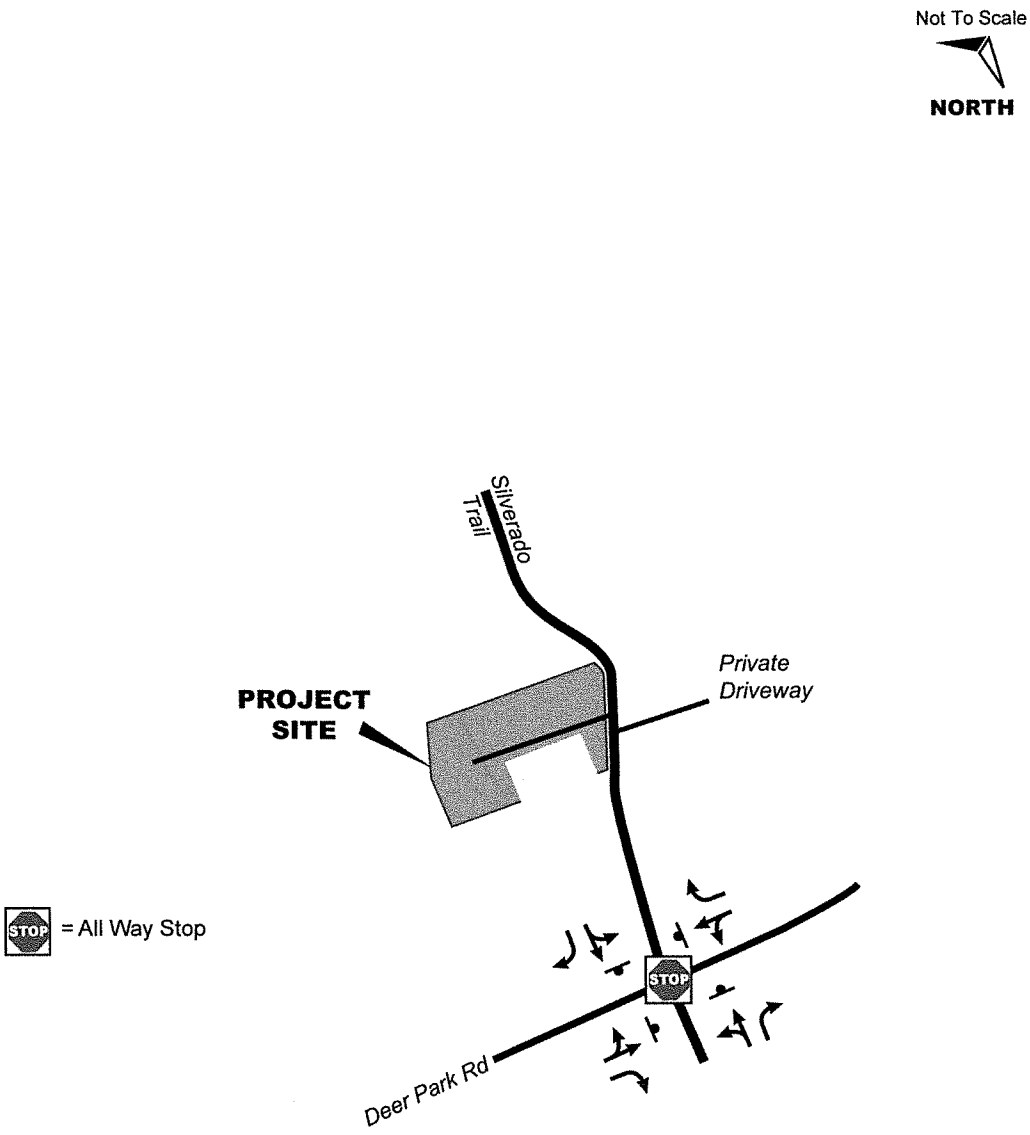
Figure 1
Area Map



Titus Winery Traffic Study

Figure 2
Intersection Control and Lane Geometrics

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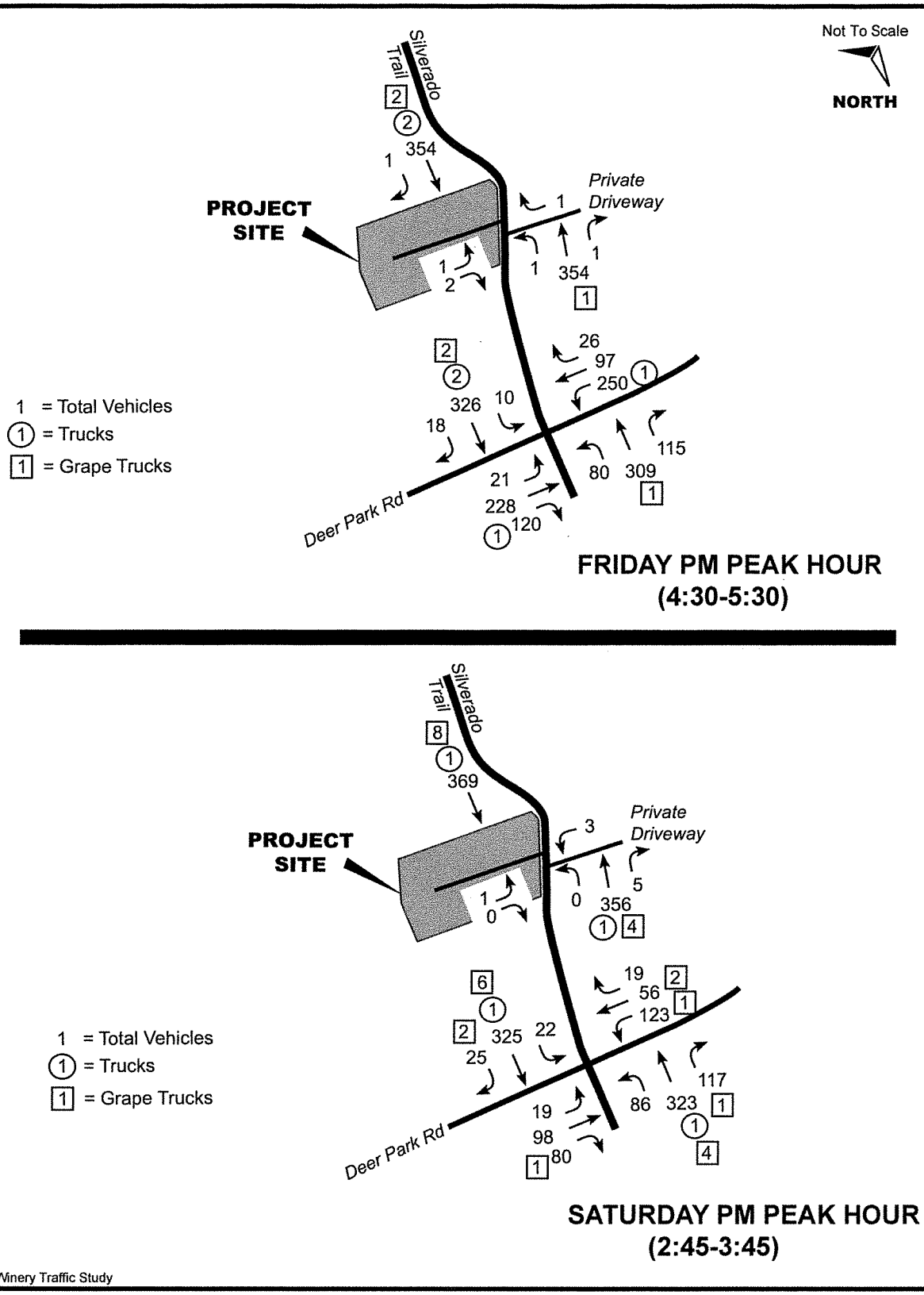

Titus Winery Traffic Study

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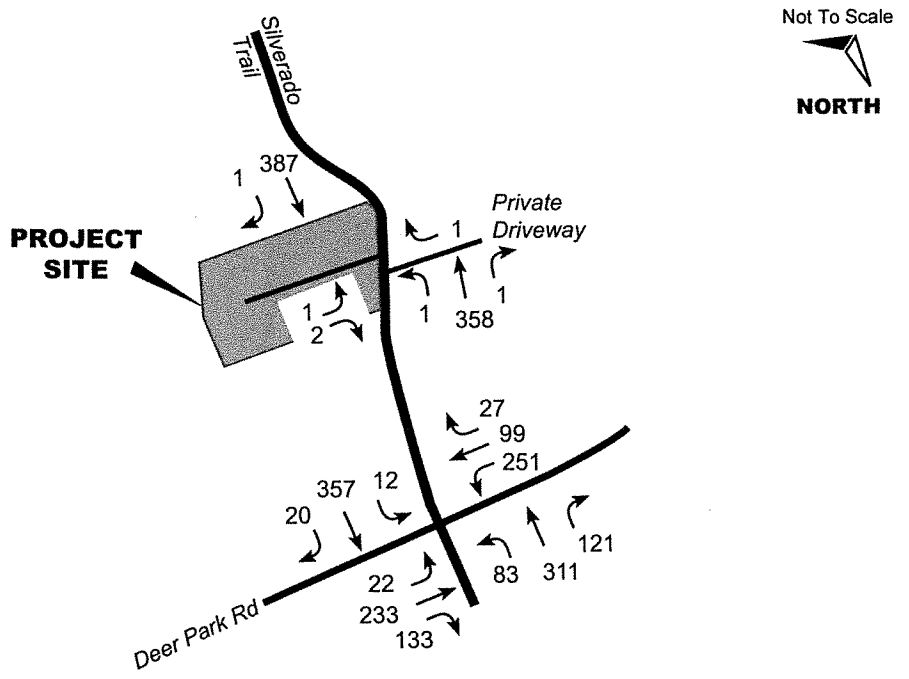
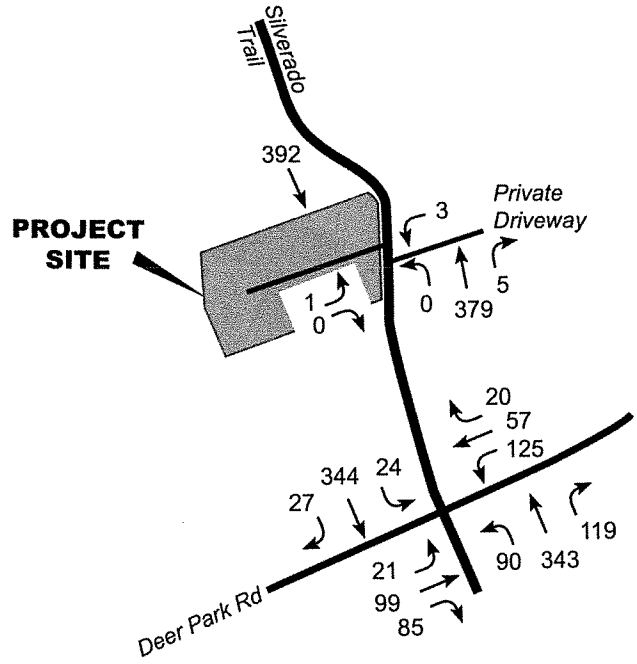
Figure 3
Existing Friday and Saturday (Sept 2013) Peak Hour Volumes



FRIDAY PM PEAK HOUR



SATURDAY PM PEAK HOUR

Titus Winery Traffic Study

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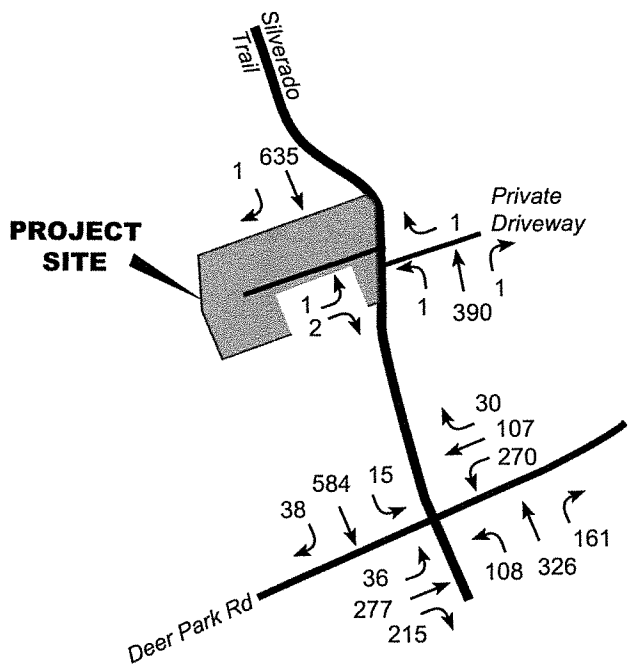
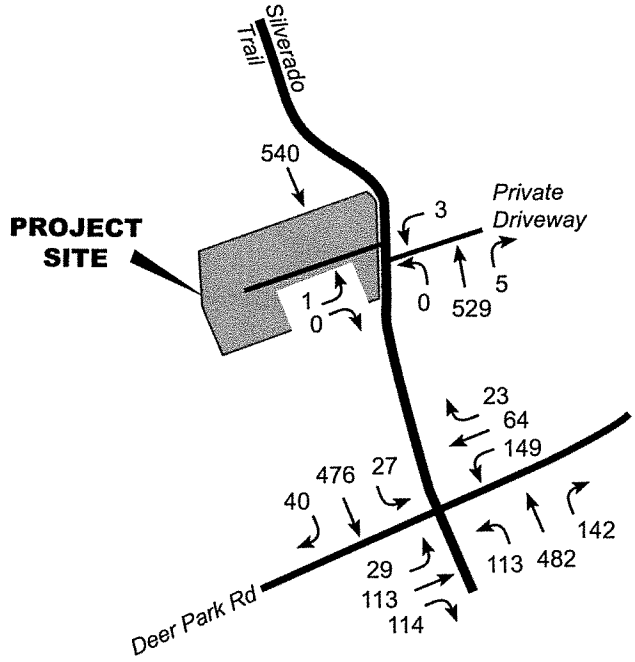
Figure 4
Year 2015 Friday and Saturday Peak Hour Volumes (without Project)



FRIDAY PM PEAK HOUR



SATURDAY PM PEAK HOUR

Titus Winery Traffic Study

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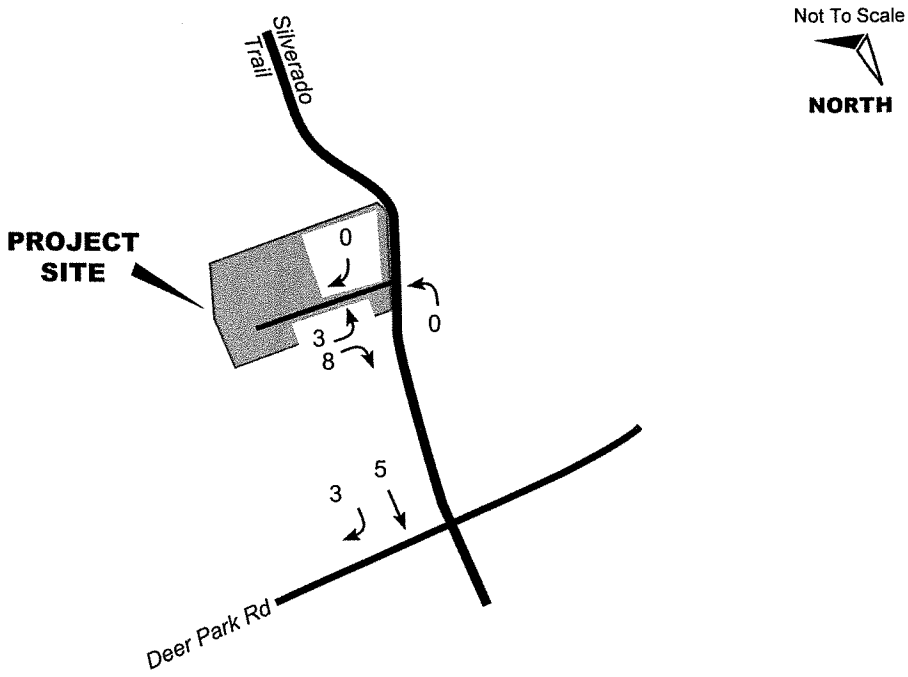
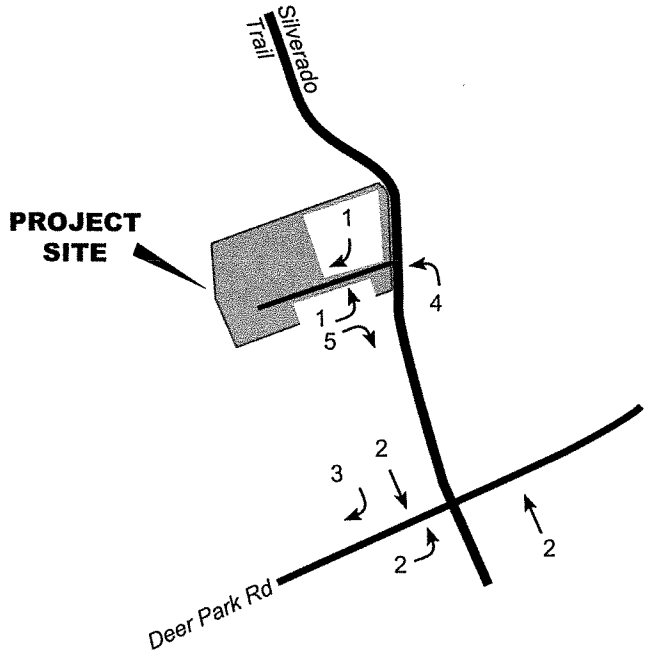
Figure 5
Year 2030 Friday and Saturday Peak Hour Volumes (without Project)



FRIDAY PM PEAK HOUR



SATURDAY PM PEAK HOUR

Titus Winery Traffic Study

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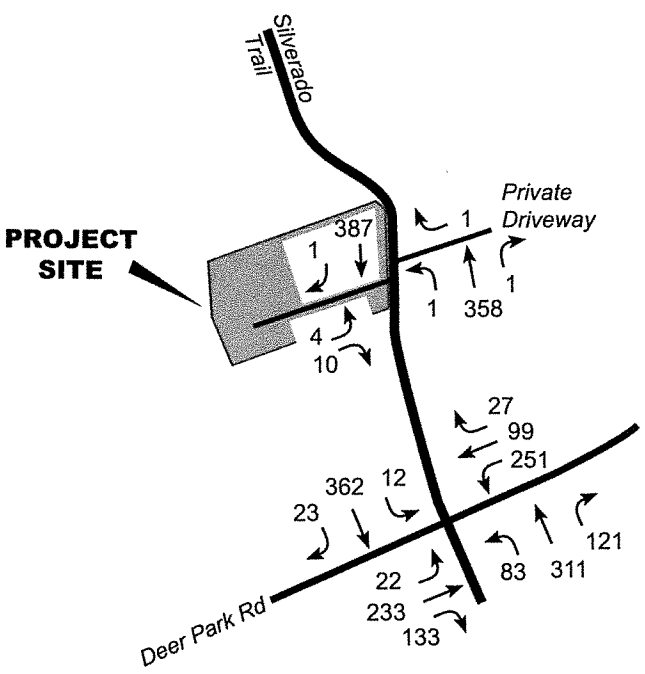
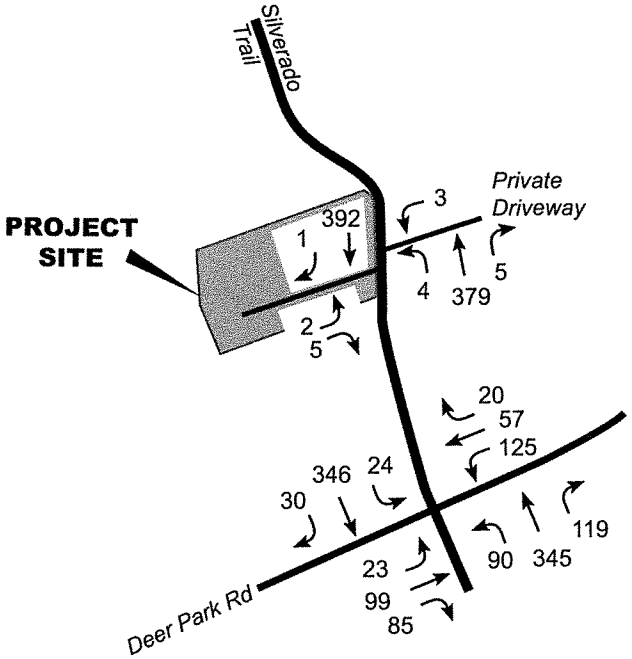
Figure 6
Friday and Saturday Peak Hour
Project Increment



FRIDAY PM PEAK HOUR



SATURDAY PM PEAK HOUR

Titus Winery Traffic Study

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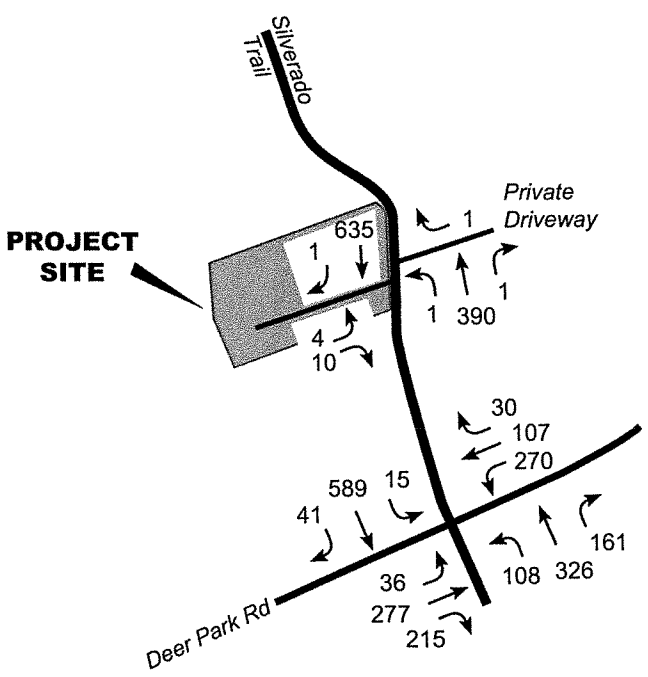
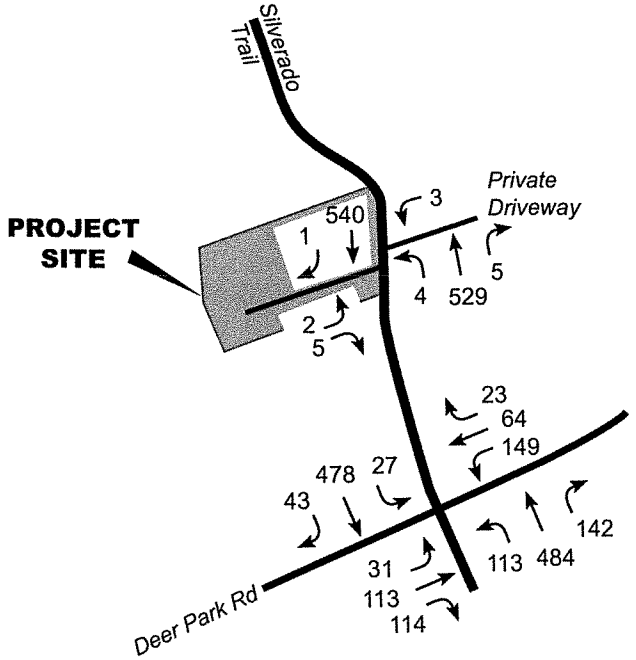
Figure 7
Year 2015 Friday and Saturday Peak Hour Volumes with Project



FRIDAY PM PEAK HOUR



SATURDAY PM PEAK HOUR

Titus Winery Traffic Study

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Figure 8
Year 2030 Friday and Saturday Peak Hour Volumes with Project

Tables

Table 1

SIGNALIZED INTERSECTION LOS CRITERIA

Level of Service	Description	Average Control Delay (Seconds Per Vehicle)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	≤ 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	10.1 to 20.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.1 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and/or high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.1 to 80.0
F	Operation with delays unacceptable to most drivers occurring due to oversaturation, poor progression, or very long cycle lengths.	> 80.0

Source: 2010 Highway Capacity Manual (Transportation Research Board).

Table 2

UNSIGNALIZED INTERSECTION LOS CRITERIA

Level of Service	Description	Average Control Delay (Seconds Per Vehicle)
A	Little or no delays	≤ 10.0
B	Short traffic delays	10.1 to 15.0
C	Average traffic delays	15.1 to 25.0
D	Long traffic delays	25.1 to 35.0
E	Very long traffic delays	35.1 to 50.0
F	Extreme traffic delays with intersection capacity exceeded (for an all-way stop), or with approach/turn movement capacity exceeded (for a side street stop controlled intersection)	> 50.0

Source: 2010 Highway Capacity Manual (Transportation Research Board).

Table 3

INTERSECTION LEVEL OF SERVICE

HARVEST FRIDAY PM PEAK HOUR

INTERSECTION	EXISTING	YEAR 2015		YEAR 2030	
		W/O PROJECT	WITH PROJECT	W/O PROJECT	WITH PROJECT
Silverado Trail/ Deer Park Road (all way stop)	E-37.99[1]	E-46.76	E-47.75 (0.5%)*	F-132.22	F-134.0 (0.4%)*

HARVEST SATURDAY PM PEAK HOUR

INTERSECTION	EXISTING	YEAR 2015		YEAR 2030	
		W/O PROJECT	WITH PROJECT	W/O PROJECT	WITH PROJECT
Silverado Trail/ Deer Park Road (all way stop)	C-20.23[1]	C-23.62	C-24.02 (0.7%)*	F-89.08	F-90.34 (0.5%)*

[1] All way stop level of service – control delay in seconds..
* (Percent project traffic) Less than a 1 percent increase is not considered a significant impact.

Year 2010 Highway Capacity Manual (HCM) Analysis Methodology
Source: Crane Transportation Group

Table 4

INTERSECTION SIGNAL WARRANT EVALUATION

Do volumes meet peak hour signal Warrant #3 rural condition criteria?

FRIDAY PM PEAK HOUR

INTERSECTION	EXISTING	YEAR 2015		YEAR 2030	
		W/O PROJECT	WITH PROJECT	W/O PROJECT	WITH PROJECT
Silverado Trail/ Deer Park Road	Yes	Yes	Yes (0.5%)*	Yes	Yes (0.4%)*

SATURDAY PM PEAK HOUR

INTERSECTION	EXISTING	YEAR 2015		YEAR 2030	
		W/O PROJECT	WITH PROJECT	W/O PROJECT	WITH PROJECT
Silverado Trail/ Deer Park Road	Yes	Yes	Yes (0.7%*)	Yes	Yes (0.5%)

* (Percent project traffic) Less than a 1% increase is not considered a significant impact.

Source: Crane Transportation Group

Table 5

PROJECT TRIP GENERATION
TITUS WINERY

HARVEST FRIDAY

	TOTAL EMPL.	HOURS	TRIPS							
			3-4 PM		4-5 PM		5-6 PM		4:30-5:30	
			IN	OUT	IN	OUT	IN	OUT	IN	OUT
Admin Employees	4	8:30-5PM	0	0	0	0	0	4	0	4
Production Employees – Full Time	3	8AM-8PM	0	0	0	0	0	0	0	0
Production Employees – Part Time	2	8AM-5PM	0	0	0	0	0	2	0	2
Tours/Tasting Employees	3	8:30AM-5:30PM	0	0	0	0	0	3	0	0
Grape Delivery Trucks	1/day	Between 9AM-3PM*	0	0	0	0	0	0	0	0
Visitors	60 total = 23 vehicles**	10AM-5PM	5	5	0	5	0	0	0	5
TOTAL			5	5	0	5	0	9	0	11

* Grapes typically delivered in the morning.
** 2.6 visitors/vehicle average on weekdays per County data.

HARVEST SATURDAY

	TOTAL EMPL.	HOURS	TRIPS									
			2-3 PM		3-4 PM		4-5 PM		5-6 PM		2:45-3:45	
			IN	OUT	IN	OUT	IN	OUT			IN	OUT
Admin Employees	1	8:30AM-5:00PM	0	0	0	0	0	0	0	1	0	0
Production Employees – Full Time	3	8AM-8PM	0	0	0	0	0	0	0	0	0	0
Production Employees – Part Time	2	8AM-5PM	0	0	0	0	0	0	0	2	0	0
Tours/Tasting Employees	4	8:30AM-5:30PM	0	0	0	0	0	0	0	4	0	0
Grape Delivery Trucks	1/day	Between 9AM-3PM*	1	1	0	0	0	0	0	0	0	1
Visitors	60 total = 22 vehicles**	10AM-5PM	5	0	5	5	0	5	0	0	5	5
TOTAL			6	1	5	5	0	5	0	7	5	6

* Grapes typically delivered in the morning, but assumed in afternoon for conservative analysis.
** 2.8 visitors/vehicle average on Saturdays per County data.

Source: Crane Transportation Group

Appendix

Appendix

CRANE TRANSPORTATION GROUP

TITUS WINERY
TRAFFIC GENERATION WORKSHEET

	HARVEST CONDITIONS	NON-HARVEST CONDITIONS
A.	**Full-time admin employees** # on Weekdays __4__ # on Saturday __1__ # on Sunday __1__ Work hours: Weekday 8:30 to 5:00 Saturday 8:30 to 5:00 Sunday 10:00 to 5:00	**Full-time admin employees** # on Weekdays __4__ # on Saturday __1__ # on Sunday __1__ Work hours: Weekday 8:30 to 5:00 Saturday 8:30 to 5:00 Sunday 10:00 to 5:00
B.	**Full-time production employees** # on Weekdays __3__ # on Saturday __3__ # on Sunday __1__ Work hours: Weekday 8:00 to 8:00 Saturday 8:00 to 8:00 Sunday 8:00 to 5:00	**Full-time production employees** # on Weekdays __2__ # on Saturday __0__ # on Sunday __0__ Work hours: Weekday 8:00 to 5:00 Saturday _____ to _____ Sunday _____ to _____
C.	**Part-time production employees** # on Weekdays __2__ # on Saturday __2__ # on Sunday __0__ Work hours: Weekday 8:00 to 5:00 Saturday 8:00 to 5:00 Sunday _____ to _____	**Part-time production employees** # on Weekdays __0__ # on Saturday __0__ # on Sunday __0__ Work hours: Weekday 8:00 to 5:00 Saturday _____ to _____ Sunday _____ to _____
D.	**Tours & tasting employees** # on Weekdays __3__ # on Saturday __4__ # on Sunday __4__ Work hours: Weekday 8:30 to 5:30 Saturday 8:30 to 5:30 Sunday 8:30 to 5:30	**Tours & tasting employees** # on Weekdays __3__ # on Saturday __4__ # on Sunday __4__ Work hours: Weekday 8:30 to 5:30 Saturday 8:30 to 5:30 Sunday 8:30 to 5:30

Appendix

CRANE TRANSPORTATION GROUP

TITUS WINERY
TRAFFIC GENERATION WORKSHEET

	HARVEST CONDITIONS	NON-HARVEST CONDITIONS
E.	**Grape Delivery Trucks** # on Weekdays __1__ # on Saturday __1__ # on Sunday __0__ Delivery hours: Weekday 9:00 to 3:00 Saturday 9:00 to 3:00 Sunday _____ to _____ # days of grape delivery: __7__	No grape delivery
F.	**Maximum tasting visitors (by appointment)** # on Weekdays __60__ # on Saturday __60__ # on Sunday __60__ Hours: Weekday 10:00 to 5:00 Saturday 10:00 to 5:00 Sunday 10:00 to 5:00	**Maximum tasting visitors (by appointment)** # on Weekdays __60__ # on Saturday __60__ # on Sunday __60__ Hours: Weekday 10:00 to 5:00 Saturday 10:00 to 5:00 Sunday 10:00 to 5:00
G.	**Other employees?** # on Weekdays ___ # on Saturday _____ # on Sunday _____ Work hours: Weekday _____ to _____ Saturday _____ to _____ Sunday _____ to _____	**Other employees?** # on Weekdays ____ # on Saturday _____ # on Sunday _____ Work hours: Weekday _____ to _____ Saturday _____ to _____ Sunday _____ to _____
H.	**Other trucks?** # on Weekdays __2__ # on Saturday __0__ # on Sunday __0__ Work hours: Weekday 9:00 to 5:00 Saturday _____ to _____ Sunday _____ to _____	**Other trucks?** # on Weekdays __2__ # on Saturday __0__ # on Sunday __0__ Work hours: Weekday 9:00 to 5:00 Saturday _____ to _____ Sunday _____ to _____

Appendix

CRANE TRANSPORTATION GROUP

TITUS WINERY
TRAFFIC GENERATION WORKSHEET

	HARVEST CONDITIONS	NON-HARVEST CONDITIONS
I.	**Bottling details** N/A	**Bottling traffic activity details** 1 setup/year approx.. 2 trucks/day, 5 days

GRAPE SOURCE

Percent of grapes grown on site – 66%

Percent of grapes imported to the site coming from the north on Silverado Trail – 17%

Percent of grapes imported to the site coming from the south on Silverado Trail – 17%

SPECIAL EVENTS

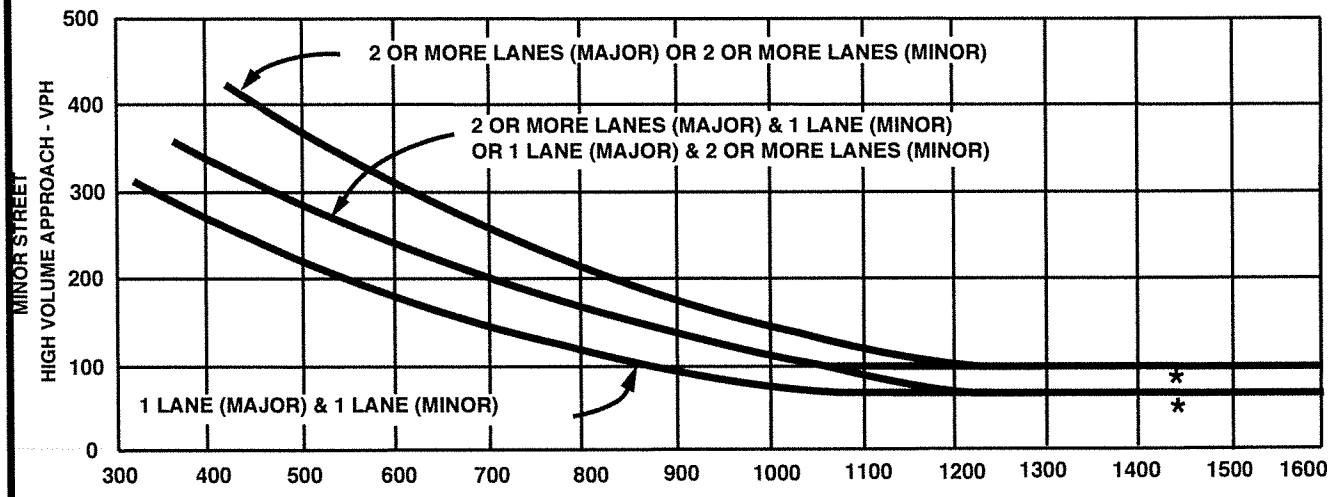
Food & wine pairing – # events/year: 6-8
people/event: 25
typical hours: 11:00 AM to 2:00 PM, 3:00 to 5:00 PM on weekends

Wine auction – # events/year: 2
people/event: 125
typical hours: weekend evenings

Marketing events – # events/year: 4
people/event: 125
typical hours: noon to 5:00 PM on weekends

Wine releases – # events/year: 6
people/event: 125
typical hours: 10:00 AM to 5:00 PM on weekends

Appendix
PEAK HOUR VOLUME WARRANT #3
(Rural Area)



* NOTE

100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE

Source: California Manual on Uniform Traffic Control Devices, 2010

TECHNICAL APPENDIX

Capacity Worksheets

Phone: Fax:
E-Mail:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: DRR
Agency/Co.: CTG
Date Performed: 01/10/2013
Analysis Time Period: Friday PM Peak Hour
Intersection: Silverado-Deer Park
Jurisdiction: Napa Co
Units: U. S. Customary
Analysis Year: Existing
Project ID: Titus Winery
East/West Street: Deer Park Rd
North/South Street: Silverado Trail

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	21	221	120	250	97	26	80	309	115	10	326	18
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT	R	LT	R	LT	R
PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flow Rate	248	123	356	26	400	118	346	18
% Heavy Veh	0	0	0	0	0	0	0	0
No. Lanes	2		2		2		2	
Opposing-Lanes	2		2		2		2	
Conflicting-lanes	2		2		2		2	
Geometry group	5		5		5		5	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	248	123	356	26	400	118	346	18
Left-Turn	21	0	257	0	82	0	10	0
Right-Turn	0	123	0	26	0	118	0	18
Prop. Left-Turns	0.1	0.0	0.7	0.0	0.2	0.0	0.0	0.0
Prop. Right-Turns	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geometry Group	5		5		5		5	
Adjustments Exhibit 17-33:								
hLT-adj	0.5		0.5		0.5		0.5	

hRT-adj		-0.7		-0.7		-0.7		-0.7
hHV-adj		1.7		1.7		1.7		1.7
hadj, computed	0.0	-0.7	0.4	-0.7	0.1	-0.7	0.0	-0.7

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	248	123	356	26	400	118	346	18
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.22	0.11	0.32	0.02	0.36	0.10	0.31	0.02
hd, final value	8.70	7.95	8.77	7.71	8.34	7.54	8.47	7.76
x, final value	0.60	0.27	0.87	0.06	0.93	0.25	0.81	0.04
Move-up time, m		2.3		2.3		2.3		2.3
Service Time	6.4	5.7	6.5	5.4	6.0	5.2	6.2	5.5

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	248	123	356	26	400	118	346	18
Service Time	6.4	5.7	6.5	5.4	6.0	5.2	6.2	5.5
Utilization, x	0.60	0.27	0.87	0.06	0.93	0.25	0.81	0.04
Dep. headway, hd	8.70	7.95	8.77	7.71	8.34	7.54	8.47	7.76
Capacity	399	373	405	276	429	368	417	268
Delay	23.57	13.60	47.29	10.86	55.73	12.69	39.02	10.77
LOS	C	B	E	B	F	B	E	B
Approach:								
Delay		20.26		44.81		45.92		37.63
LOS		C		E		E		E
Intersection Delay	37.99		Intersection LOS		E			

HCS+: Unsignalized Intersections Release 5.6

Phone: Fax:
E-Mail:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: DRR
Agency/Co.: CTG
Date Performed: 01/10/2013
Analysis Time Period: Saturday PM Peak Hour
Intersection: Silverado-Deer Park
Jurisdiction: Napa Co
Units: U. S. Customary
Analysis Year: Existing
Project ID: Titus Winery
East/West Street: Deer Park Rd
North/South Street: Silverado Trail

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	19	98	80	123	56	19	86	323	117	22	325	25
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT	R	LT	R	LT	R
PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flow Rate	120	82	183	19	420	120	357	25
% Heavy Veh	0	0	0	0	0	0	0	0
No. Lanes	2		2		2		2	
Opposing-Lanes	2		2		2		2	
Conflicting-lanes	2		2		2		2	
Geometry group	5		5		5		5	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	120	82	183	19	420	120	357	25
Left-Turn	19	0	126	0	88	0	22	0
Right-Turn	0	82	0	19	0	120	0	25
Prop. Left-Turns	0.2	0.0	0.7	0.0	0.2	0.0	0.1	0.0
Prop. Right-Turns	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geometry Group	5		5		5		5	
Adjustments Exhibit 17-33:								
hLT-adj	0.5		0.5		0.5		0.5	

hRT-adj		-0.7		-0.7		-0.7		-0.7
hHV-adj		1.7		1.7		1.7		1.7
hadj, computed	0.1	-0.7	0.3	-0.7	0.1	-0.7	0.0	-0.7

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	120	82	183	19	420	120	357	25
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.11	0.07	0.16	0.02	0.37	0.11	0.32	0.02
hd, final value	7.60	6.82	7.80	6.76	6.65	5.84	6.77	6.04
x, final value	0.25	0.16	0.40	0.04	0.78	0.19	0.67	0.04
Move-up time, m	2.3		2.3		2.3		2.3	
Service Time	5.3	4.5	5.5	4.5	4.3	3.5	4.5	3.7

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	120	82	183	19	420	120	357	25
Service Time	5.3	4.5	5.5	4.5	4.3	3.5	4.5	3.7
Utilization, x	0.25	0.16	0.40	0.04	0.78	0.19	0.67	0.04
Dep. headway, hd	7.60	6.82	7.80	6.76	6.65	5.84	6.77	6.04
Capacity	370	332	433	269	534	370	519	275
Delay	12.85	10.77	15.53	9.70	28.61	9.95	22.22	9.01
LOS	B	B	C	A	D	A	C	A
Approach:								
Delay	12.01		14.98		24.47		21.35	
LOS	B		B		C		C	
Intersection Delay	20.23		Intersection LOS		C			

Phone: Fax:
E-Mail:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: DRR
Agency/Co.: CTG
Date Performed: 01/10/2013
Analysis Time Period: Friday PM Peak Hour
Intersection: Silverado-Deer Park
Jurisdiction: Napa Co
Units: U. S. Customary
Analysis Year: 2015 w-o Project
Project ID: Titus Winery
East/West Street: Deer Park Rd
North/South Street: Silverado Trail

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	22	233	133	251	99	27	83	311	121	12	357	20
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT	R	LT	R	LT	R
PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flow Rate	262	137	360	27	405	124	380	20
% Heavy Veh	0	0	0	0	0	0	0	0
No. Lanes	2		2		2		2	
Opposing-Lanes	2		2		2		2	
Conflicting-lanes	2		2		2		2	
Geometry group	5		5		5		5	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	262	137	360	27	405	124	380	20
Left-Turn	22	0	258	0	85	0	12	0
Right-Turn	0	137	0	27	0	124	0	20
Prop. Left-Turns	0.1	0.0	0.7	0.0	0.2	0.0	0.0	0.0
Prop. Right-Turns	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geometry Group	5		5		5		5	
Adjustments Exhibit 17-33:								
hLT-adj	0.5		0.5		0.5		0.5	

hRT-adj	-0.7		-0.7		-0.7		-0.7	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.0	-0.7	0.4	-0.7	0.1	-0.7	0.0	-0.7

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	262	137	360	27	405	124	380	20
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.23	0.12	0.32	0.02	0.36	0.11	0.34	0.02
hd, final value	9.01	8.27	9.09	8.03	8.67	7.87	8.72	8.00
x, final value	0.66	0.31	0.91	0.06	0.98	0.27	0.92	0.04
Move-up time, m	2.3		2.3		2.3		2.3	
Service Time	6.7	6.0	6.8	5.7	6.4	5.6	6.4	5.7

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	262	137	360	27	405	124	380	20
Service Time	6.7	6.0	6.8	5.7	6.4	5.6	6.4	5.7
Utilization, x	0.66	0.31	0.91	0.06	0.98	0.27	0.92	0.04
Dep. headway, hd	9.01	8.27	9.09	8.03	8.67	7.87	8.72	8.00
Capacity	391	387	393	277	415	374	410	270
Delay	27.28	14.71	55.65	11.25	67.84	13.47	56.11	11.07
LOS	D	B	F	B	F	B	F	B
Approach:								
Delay	22.97		52.55		55.09		53.86	
LOS	C		F		F		F	
Intersection Delay	46.76		Intersection LOS		E			

Phone: Fax:
E-Mail:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: DRR
Agency/Co.: CTG
Date Performed: 01/10/2013
Analysis Time Period: Friday PM Peak Hour
Intersection: Silverado-Deer Park
Jurisdiction: Napa Co
Units: U. S. Customary
Analysis Year: 2015 with Project
Project ID: Titus Winery
East/West Street: Deer Park Rd
North/South Street: Silverado Trail

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	22	233	133	251	99	27	83	311	121	12	362	23
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT	R	LT	R	LT	R
PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flow Rate	262	137	360	27	405	124	385	23
% Heavy Veh	0	0	0	0	0	0	0	0
No. Lanes	2		2		2		2	
Opposing-Lanes	2		2		2		2	
Conflicting-lanes	2		2		2		2	
Geometry group	5		5		5		5	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	262	137	360	27	405	124	385	23
Left-Turn	22	0	258	0	85	0	12	0
Right-Turn	0	137	0	27	0	124	0	23
Prop. Left-Turns	0.1	0.0	0.7	0.0	0.2	0.0	0.0	0.0
Prop. Right-Turns	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geometry Group	5		5		5		5	
Adjustments Exhibit 17-33:								
hLT-adj	0.5		0.5		0.5		0.5	

hRT-adj	-0.7		-0.7		-0.7		-0.7	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.0	-0.7	0.4	-0.7	0.1	-0.7	0.0	-0.7

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	262	137	360	27	405	124	385	23
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.23	0.12	0.32	0.02	0.36	0.11	0.34	0.02
hd, final value	9.04	8.30	9.12	8.06	8.70	7.90	8.73	8.01
x, final value	0.66	0.32	0.91	0.06	0.98	0.27	0.93	0.05
Move-up time, m	2.3		2.3		2.3		2.3	
Service Time	6.7	6.0	6.8	5.8	6.4	5.6	6.4	5.7

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	262	137	360	27	405	124	385	23
Service Time	6.7	6.0	6.8	5.8	6.4	5.6	6.4	5.7
Utilization, x	0.66	0.32	0.91	0.06	0.98	0.27	0.93	0.05
Dep. headway, hd	9.04	8.30	9.12	8.06	8.70	7.90	8.73	8.01
Capacity	389	387	392	277	413	374	410	273
Delay	27.51	14.78	56.35	11.28	68.81	13.52	58.83	11.14
LOS	D	B	F	B	F	B	F	B
Approach:								
Delay	23.14		53.20		55.85		56.14	
LOS	C		F		F		F	
Intersection Delay	47.75		Intersection LOS		E			

Phone: Fax:
E-Mail:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: DRR
Agency/Co.: CTG
Date Performed: 01/10/2013
Analysis Time Period: Saturday PM Peak Hour
Intersection: Silverado-Deer Park
Jurisdiction: Napa Co
Units: U. S. Customary
Analysis Year: 2015 w-o Project
Project ID: Titus Winery
East/West Street: Deer Park Rd
North/South Street: Silverado Trail

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	21	99	85	125	57	20	90	343	119	24	344	27
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT	R	LT	R	LT	R
PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flow Rate	123	87	186	20	445	122	378	27
% Heavy Veh	0	0	0	0	0	0	0	0
No. Lanes	2		2		2		2	
Opposing-Lanes	2		2		2		2	
Conflicting-lanes	2		2		2		2	
Geometry group	5		5		5		5	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	123	87	186	20	445	122	378	27
Left-Turn	21	0	128	0	92	0	24	0
Right-Turn	0	87	0	20	0	122	0	27
Prop. Left-Turns	0.2	0.0	0.7	0.0	0.2	0.0	0.1	0.0
Prop. Right-Turns	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geometry Group	5		5		5		5	
Adjustments Exhibit 17-33:								
hLT-adj	0.5		0.5		0.5		0.5	

hRT-adj	-0.7		-0.7		-0.7		-0.7	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.1	-0.7	0.3	-0.7	0.1	-0.7	0.0	-0.7

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	123	87	186	20	445	122	378	27
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.11	0.08	0.17	0.02	0.40	0.11	0.34	0.02
hd, final value	7.79	7.01	7.99	6.95	6.78	5.98	6.91	6.18
x, final value	0.27	0.17	0.41	0.04	0.84	0.20	0.73	0.05
Move-up time, m	2.3		2.3		2.3		2.3	
Service Time	5.5	4.7	5.7	4.6	4.5	3.7	4.6	3.9

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	123	87	186	20	445	122	378	27
Service Time	5.5	4.7	5.7	4.6	4.5	3.7	4.6	3.9
Utilization, x	0.27	0.17	0.41	0.04	0.84	0.20	0.73	0.05
Dep. headway, hd	7.79	7.01	7.99	6.95	6.78	5.98	6.91	6.18
Capacity	373	337	424	270	526	372	511	277
Delay	13.30	11.13	16.20	9.93	35.34	10.19	25.79	9.18
LOS	B	B	C	A	E	B	D	A
Approach:								
Delay	12.40		15.59		29.93		24.68	
LOS	B		C		D		C	
Intersection Delay	23.62		Intersection LOS		C			

Phone: Fax:
E-Mail:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: DRR
Agency/Co.: CTG
Date Performed: 01/10/2013
Analysis Time Period: Saturday PM Peak Hour
Intersection: Silverado-Deer Park
Jurisdiction: Napa Co
Units: U. S. Customary
Analysis Year: 2015 with Project
Project ID: Titus Winery
East/West Street: Deer Park Rd
North/South Street: Silverado Trail

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	23	99	85	125	57	20	90	345	119	24	346	30
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT	R	LT	R	LT	R
PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flow Rate	125	87	186	20	447	122	380	30
% Heavy Veh	0	0	0	0	0	0	0	0
No. Lanes	2		2		2		2	
Opposing-Lanes	2		2		2		2	
Conflicting-lanes	2		2		2		2	
Geometry group	5		5		5		5	
Duration, T 0.25 hrs.								

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	125	87	186	20	447	122	380	30
Left-Turn	23	0	128	0	92	0	24	0
Right-Turn	0	87	0	20	0	122	0	30
Prop. Left-Turns	0.2	0.0	0.7	0.0	0.2	0.0	0.1	0.0
Prop. Right-Turns	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geometry Group	5		5		5		5	
Adjustments Exhibit 17-33:								
hLT-adj	0.5		0.5		0.5		0.5	

hRT-adj	-0.7		-0.7		-0.7		-0.7	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.1	-0.7	0.3	-0.7	0.1	-0.7	0.0	-0.7

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	125	87	186	20	447	122	380	30
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.11	0.08	0.17	0.02	0.40	0.11	0.34	0.03
hd, final value	7.82	7.03	8.02	6.98	6.80	6.00	6.93	6.20
x, final value	0.27	0.17	0.41	0.04	0.84	0.20	0.73	0.05
Move-up time, m	2.3		2.3		2.3		2.3	
Service Time	5.5	4.7	5.7	4.7	4.5	3.7	4.6	3.9

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	125	87	186	20	447	122	380	30
Service Time	5.5	4.7	5.7	4.7	4.5	3.7	4.6	3.9
Utilization, x	0.27	0.17	0.41	0.04	0.84	0.20	0.73	0.05
Dep. headway, hd	7.82	7.03	8.02	6.98	6.80	6.00	6.93	6.20
Capacity	375	337	423	270	524	372	510	280
Delay	13.41	11.16	16.28	9.96	36.20	10.22	26.24	9.24
LOS	B	B	C	A	E	B	D	A
Approach:								
Delay	12.49		15.66		30.63		25.00-	
LOS	B		C		D		C	
Intersection Delay 24.02			Intersection LOS C					

HCS+: Unsignalized Intersections Release 5.6

Phone: Fax:
E-Mail:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: DRR
Agency/Co.: CTG
Date Performed: 01/10/2013
Analysis Time Period: Friday PM Peak Hour
Intersection: Silverado-Deer Park
Jurisdiction: Napa Co
Units: U. S. Customary
Analysis Year: 2030 w-o Project
Project ID: Titus Winery
East/West Street: Deer Park Rd
North/South Street: Silverado Trail

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	36	277	215	270	107	30	108	326	161	15	584	38
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT	R	LT	R	LT	R
PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flow Rate	322	221	388	30	447	165	617	39
% Heavy Veh	0	0	0	0	0	0	0	0
No. Lanes	2		2		2		2	
Opposing-Lanes	2		2		2		2	
Conflicting-lanes	2		2		2		2	
Geometry group	5		5		5		5	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	322	221	388	30	447	165	617	39
Left-Turn	37	0	278	0	111	0	15	0
Right-Turn	0	221	0	30	0	165	0	39
Prop. Left-Turns	0.1	0.0	0.7	0.0	0.2	0.0	0.0	0.0
Prop. Right-Turns	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geometry Group	5		5		5		5	
Adjustments Exhibit 17-33:								
hLT-adj	0.5		0.5		0.5		0.5	

hRT-adj	-0.7		-0.7		-0.7		-0.7	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.1	-0.7	0.4	-0.7	0.1	-0.7	0.0	-0.7

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	322	221	388	30	447	165	617	39
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.29	0.20	0.34	0.03	0.40	0.15	0.55	0.03
hd, final value	9.35	8.59	9.58	8.53	9.28	8.46	9.23	8.52
x, final value	0.84	0.53	1.03	0.07	1.15	0.39	1.58	0.09
Move-up time, m	2.3		2.3		2.3		2.3	
Service Time	7.1	6.3	7.3	6.2	7.0	6.2	6.9	6.2

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	322	221	388	30	447	165	617	39
Service Time	7.1	6.3	7.3	6.2	7.0	6.2	6.9	6.2
Utilization, x	0.84	0.53	1.03	0.07	1.15	0.39	1.58	0.09
Dep. headway, hd	9.35	8.59	9.58	8.53	9.28	8.46	9.23	8.52
Capacity	385	419	388	280	447	415	617	289
Delay	45.06	20.49	86.88	11.88	123.70	16.41	296.81	12.08
LOS	E	C	F	B	F	C	F	B
Approach:								
Delay	35.06		81.50		94.78		279.88	
LOS	E		F		F		F	
Intersection Delay	132.22		Intersection LOS F					

Phone: Fax:
E-Mail:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: DRR
Agency/Co.: CTG
Date Performed: 01/10/2013
Analysis Time Period: Friday PM Peak Hour
Intersection: Silverado-Deer Park
Jurisdiction: Napa Co
Units: U. S. Customary
Analysis Year: 2030 with Project
Project ID: Titus Winery
East/West Street: Deer Park Rd
North/South Street: Silverado Trail

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	36	277	215	270	107	30	108	326	161	15	589	41
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT	R	LT	R	LT	R
PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flow Rate	322	221	388	30	447	165	622	42
% Heavy Veh	0	0	0	0	0	0	0	0
No. Lanes	2		2		2		2	
Opposing-Lanes	2		2		2		2	
Conflicting-lanes	2		2		2		2	
Geometry group	5		5		5		5	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	322	221	388	30	447	165	622	42
Left-Turn	37	0	278	0	111	0	15	0
Right-Turn	0	221	0	30	0	165	0	42
Prop. Left-Turns	0.1	0.0	0.7	0.0	0.2	0.0	0.0	0.0
Prop. Right-Turns	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geometry Group	5		5		5		5	
Adjustments Exhibit 17-33:								
hLT-adj	0.5		0.5		0.5		0.5	

hRT-adj	-0.7		-0.7		-0.7		-0.7	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.1	-0.7	0.4	-0.7	0.1	-0.7	0.0	-0.7

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	322	221	388	30	447	165	622	42
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.29	0.20	0.34	0.03	0.40	0.15	0.55	0.04
hd, final value	9.35	8.59	9.59	8.53	9.28	8.46	9.23	8.52
x, final value	0.84	0.53	1.03	0.07	1.15	0.39	1.59	0.10
Move-up time, m	2.3		2.3		2.3		2.3	
Service Time	7.1	6.3	7.3	6.2	7.0	6.2	6.9	6.2

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	322	221	388	30	447	165	622	42
Service Time	7.1	6.3	7.3	6.2	7.0	6.2	6.9	6.2
Utilization, x	0.84	0.53	1.03	0.07	1.15	0.39	1.59	0.10
Dep. headway, hd	9.35	8.59	9.59	8.53	9.28	8.46	9.23	8.52
Capacity	385	419	388	280	447	415	622	292
Delay	45.08	20.50	86.99	11.88	123.78	16.42	302.33	12.15
LOS	E	C	F	B	F	C	F	B
Approach:								
Delay	35.07		81.60		94.83		283.97	
LOS	E		F		F		F	
Intersection Delay	134.00		Intersection LOS		F			

Phone: Fax:
E-Mail:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: DRR
Agency/Co.: CTG
Date Performed: 01/10/2013
Analysis Time Period: Saturday PM Peak Hour
Intersection: Silverado-Deer Park
Jurisdiction: Napa Co
Units: U. S. Customary
Analysis Year: 2030 w-o Project
Project ID: Titus Winery
East/West Street: Deer Park Rd
North/South Street: Silverado Trail

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	29	113	114	149	64	23	113	482	142	27	476	40
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT	R	LT	R	LT	R
PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flow Rate	145	117	218	23	612	146	517	41
% Heavy Veh	0	0	0	0	0	0	0	0
No. Lanes	2		2		2		2	
Opposing-Lanes	2		2		2		2	
Conflicting-lanes	2		2		2		2	
Geometry group	5		5		5		5	
Duration, T 0.25 hrs.								

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	145	117	218	23	612	146	517	41
Left-Turn	29	0	153	0	116	0	27	0
Right-Turn	0	117	0	23	0	146	0	41
Prop. Left-Turns	0.2	0.0	0.7	0.0	0.2	0.0	0.1	0.0
Prop. Right-Turns	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geometry Group	5		5		5		5	
Adjustments Exhibit 17-33:								
hLT-adj	0.5		0.5		0.5		0.5	

hRT-adj	-0.7		-0.7		-0.7		-0.7	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.1	-0.7	0.4	-0.7	0.1	-0.7	0.0	-0.7

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	145	117	218	23	612	146	517	41
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.13	0.10	0.19	0.02	0.54	0.13	0.46	0.04
hd, final value	8.60	7.80	8.79	7.74	7.57	6.77	7.58	6.86
x, final value	0.35	0.25	0.53	0.05	1.29	0.27	1.09	0.08
Move-up time, m	2.3		2.3		2.3		2.3	
Service Time	6.3	5.5	6.5	5.4	5.3	4.5	5.3	4.6

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	145	117	218	23	612	146	517	41
Service Time	6.3	5.5	6.5	5.4	5.3	4.5	5.3	4.6
Utilization, x	0.35	0.25	0.53	0.05	1.29	0.27	1.09	0.08
Dep. headway, hd	8.60	7.80	8.79	7.74	7.57	6.77	7.58	6.86
Capacity	395	367	406	273	612	396	517	291
Delay	15.80	13.13	21.05	10.84	167.18	12.02	94.56	10.14
LOS	C	B	C	B	F	B	F	B
Approach:								
Delay	14.61		20.07		137.29		88.36	
LOS	B		C		F		F	
Intersection Delay	89.08		Intersection LOS		F			

Phone: Fax:
E-Mail:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: DRR
Agency/Co.: CTG
Date Performed: 01/10/2013
Analysis Time Period: Saturday PM Peak Hour
Intersection: Silverado-Deer Park
Jurisdiction: Napa Co
Units: U. S. Customary
Analysis Year: 2030 with Project
Project ID: Titus Winery
East/West Street: Deer Park Rd
North/South Street: Silverado Trail

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	31	113	114	149	64	23	113	484	142	27	478	43
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT	R	LT	R	LT	R
PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flow Rate	147	117	218	23	614	146	519	44
% Heavy Veh	0	0	0	0	0	0	0	0
No. Lanes	2		2		2		2	
Opposing-Lanes	2		2		2		2	
Conflicting-lanes	2		2		2		2	
Geometry group	5		5		5		5	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	147	117	218	23	614	146	519	44
Left-Turn	31	0	153	0	116	0	27	0
Right-Turn	0	117	0	23	0	146	0	44
Prop. Left-Turns	0.2	0.0	0.7	0.0	0.2	0.0	0.1	0.0
Prop. Right-Turns	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geometry Group	5		5		5		5	
Adjustments Exhibit 17-33:								
hLT-adj	0.5		0.5		0.5		0.5	

hRT-adj	-0.7		-0.7		-0.7		-0.7	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.1	-0.7	0.4	-0.7	0.1	-0.7	0.0	-0.7

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	147	117	218	23	614	146	519	44
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.13	0.10	0.19	0.02	0.55	0.13	0.46	0.04
hd, final value	8.61	7.81	8.80	7.75	7.58	6.79	7.59	6.87
x, final value	0.35	0.25	0.53	0.05	1.29	0.28	1.09	0.08
Move-up time, m	2.3		2.3		2.3		2.3	
Service Time	6.3	5.5	6.5	5.4	5.3	4.5	5.3	4.6

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	147	117	218	23	614	146	519	44
Service Time	6.3	5.5	6.5	5.4	5.3	4.5	5.3	4.6
Utilization, x	0.35	0.25	0.53	0.05	1.29	0.28	1.09	0.08
Dep. headway, hd	8.61	7.81	8.80	7.75	7.58	6.79	7.59	6.87
Capacity	397	367	406	273	614	396	519	294
Delay	15.91	13.14	21.08	10.85	169.69	12.04	96.39	10.20
LOS	C	B	C	B	F	B	F	B
Approach:								
Delay	14.68		20.11		139.41		89.66	
LOS	B		C		F		F	
Intersection Delay	90.34		Intersection LOS		F			