

TRAFFIC IMPACT STUDY

JOSEPH CELLARS WINERY

November 20, 2009

Prepared for: Joseph Cellars Winery

**Prepared by: CRANE TRANSPORTATION GROUP
(510) 236-9375**

I. INTRODUCTION

This report has been prepared by Crane Transportation Group (CTG) at the request of Joseph Cellars Winery, to detail the circulation-related impacts from construction of a 30,000 gallon per year winery along State Route (S.R.) 29 in Napa County just south of the City of Calistoga (see the **Area Map, Figure 1**). The winery is proposed to have caves and a two-story building with viewing deck. The winery would have private tours, tastings and marketing events. The project would include provision of a new left turn lane on the S.R. 29 approach to Quail Mountain Lane, the site access road. Quail Mountain Lane would be improved as needed to meet the county-required minimum for private driveways, and the winery access driveway would be newly paved. Twelve parking spaces would be provided adjacent (southeast of) the winery building, and parking for marketing events would be located northwest of the winery (see the **Site Plan, Figure 2**). All events would be scheduled to avoid peak traffic hours.

Evaluation has been conducted of winery traffic impacts for typical weekday and weekend conditions, on days when a wine and food pairing event could be scheduled with as many as 40 persons attending, within a total maximum of 75 visitors per day.¹ The study has evaluated four intersections: S.R.29/S.R. 128 (Foothill Boulevard)/ Lincoln Avenue/Kortum Canyon Road, S.R.29/ Diamond Mountain Road, S.R. 29/ Quail Mountain Lane (Site Access), and S.R. 29/Dunaweal Lane. September (harvest season) traffic counts were conducted at these intersections during a Friday PM commute period and during a Saturday afternoon. A conservative 2 percent per year growth rate was then applied to existing volumes to project year 2012 traffic volumes at the four study intersections. Year 2012 is the expected year of project completion and full operation. The increase in traffic due to the proposed new winery was then determined and Base Case (without project) as well as Base Case + Project operating conditions were determined on the local circulation network. Traffic and circulation impacts due to winery traffic have been identified, including signal warrant evaluation, sight line evaluation at the Quail Mountain Lane/S.R. 29 intersection and improvements to Quail Mountain Lane (the site access driveway).

For purposes of this study, S.R. 29 is referenced as oriented “east-west.”

¹ Major events of 200 attendees, which would occur two times per year, have not been included in this evaluation, as they are not representative of typical conditions.

II. SUMMARY OF FINDINGS

1. The proposed Joseph Cellars Winery would be expected to generate, at most, the following volumes at peak operation during the hours of peak traffic along State Route 29.

JOSEPH CELLARS WINERY NET NEW TRIP GENERATION DURING
HOURS OF PEAK TRAFFIC ALONG STATE ROUTE 29

SEASON	FRIDAY PM PEAK HOUR TRIPS		SATURDAY AFTERNOON PEAK HOUR TRIPS	
	INBOUND	OUTBOUND	INBOUND	OUTBOUND
Harvest	3	6	6	4

Source: Joseph Cellars Winery/Crane Transportation Group

2. The four study intersections currently operate at acceptable levels of service during the harvest season Friday PM peak traffic hour along S.R.29, and should continue to operate acceptably through the year 2012 (without the proposed project). All but one of the four study intersections currently operate at acceptable levels of service during the harvest season Saturday peak traffic hour along S.R.29, and should continue to operate acceptably through the year 2012 (without the proposed project). Southbound Dunaweal Lane left turns to eastbound S.R. 29 currently operate unacceptably at LOS F, and overall intersection operation is an unacceptable LOS F. It should be noted, however, that the count day appears to reflect harvest activities that may occur on only one Saturday of the season; it is expected that a more typical level of service for a Saturday peak hour would be in line with current Friday PM peak hour operation (LOS B). Additionally, volumes at the S.R. 29/Dunaweal Lane intersection meet signal warrant (Warrant #3 criteria) during the Saturday afternoon peak traffic hour.
3. The four study intersections would continue to operate acceptably through the year 2012 harvest season Friday PM peak traffic hour along S.R.29 with the addition of project traffic. All but one of the four study intersections would continue to operate acceptably through the year 2012 harvest season Saturday peak traffic hour along S.R.29 with the addition of project traffic: year 2012 Saturday afternoon peak hour operation of the southbound Dunaweal Lane left turns to S.R. 29 would remain unacceptable with the addition of project traffic, and overall intersection operation would remain an unacceptable LOS F. Additionally, 2012 volumes would add to volumes that would meet the signal warrant (Warrant #3 criteria) during both analysis time periods. The impact would not be considered significant as project traffic would increase background volumes by less than one percent.
4. Provision of a 75-foot-long left turn lane on the westbound S.R.29 approach to Quail Mountain Lane would more than accommodate the 95th percentile queuing demand in 2012 with the addition of project traffic.

5. Sight lines currently meet AASHTO standards for drivers exiting Quail Mountain Lane to turn onto S.R. 29; this would not change with the proposed project.
6. The project would not be expected to result in significant impacts to traffic or circulation at any analyzed location. It would improve conditions at the S.R. 29/Quail Mountain Lane intersection by providing a left turn lane on the S.R. 29 intersection approach where there is none today.
7. The project would avoid impacts to the weekday and weekend peak traffic hours on S.R. 29 by scheduling its events during off-peak time periods. For example, during weekdays this could mean starting an event after 9:30 AM, and ending an event no later than 2:30 PM, or starting an evening event after 6:30 PM. During Saturdays this could mean ending an event on Saturday afternoon no later than 2:00 PM or starting an event no earlier than 7:00 PM. Alternatively, events could start before 1:00 PM and end after 6:00 PM.

III. PROJECT DESCRIPTION

The Joseph Cellars Winery project site is located on the south side of State Route 29 (S.R.29) (see **Area Map, Figure 1**). Existing site access is via Quail Mountain Lane, a two-lane roadway serving the project site and several other properties. The project site has existing vineyards and a house sometimes in use as a lodge by the owners of the site. These features of the site would be retained. The new winery would be set back 600 feet from the S.R 29 highway, and would not be in view from S.R. 29. It would have an annual production capacity of 30,000 gallons. It would have 15,789 square feet of caves and a two-story building with 4,702 square feet of interior space and a 2,009 square-foot viewing deck. The winery would have private tours, tastings and marketing events. The project would include provision of a new left turn lane on the S.R. 29 approach to Quail Mountain Lane, the site access road. Quail Mountain Lane would be improved as needed to meet the county-required minimum for private “common driveways” (18-foot width pavement with 1-foot gravel shoulders), and the winery access driveway would be newly paved. Twelve parking spaces would be provided adjacent (southeast of) the winery building, and parking for marketing events would be located northwest of the winery (see the **Site Plan, Figure 2**). All events would be scheduled to avoid peak traffic hours.

The winery would result in employees and visitor totals at the following levels:

Employee totals would be four full-time and four part-time, and would consist of two winery managers: one full time and one part time; two winemakers: one full time and one intern (part-time); tasting room: one full time and one part time; and vineyard managers: one full time and one part time.

- Weekday hours of operation for employees would be 8:00 AM to 6:00 PM.

- The winery proposes one private tasting room in the caves and additional tasting areas in the winery building. Hours of operation for the tasting rooms would be 10:00 AM to 6:00 PM, seven days a week.
- Marketing events would include the following:
 - Two private wine and food pairing activities per week with a maximum forty (40) person attendance.

One wine auction event per year with a maximum of two hundred (200) guests and one wine release event per year with a maximum of two hundred (200) guests) - these events will have portable toilets and shuttles to the site, when necessary.

- The maximum number of guests by appointment would be 75 per day. For all wine and food pairing events, the wine auction event and wine release event held Monday through Friday before 6:00 PM, all guests shall be counted against the maximum number of 75 guests per day allowed for private tours and tastings by appointment only.
- All evening special events would begin after 6:30 PM, well after peak traffic conditions. Events would conclude by 10:00 PM, with clean-ups completed no later than 11:00 PM.
- Special events on weekend afternoons would be scheduled to finish no later than 2:00 PM, or end after 5:00 PM.

Joseph Cellars Winery trip generation projections for peak harvest conditions during the Friday PM peak traffic hour on S.R.29 as well as during the Saturday afternoon peak traffic hour on S.R.29 are summarized below. Vehicles are assumed to have a maximum occupancy of 2.8, consistent with *Napa County Winery Traffic Generation Characteristics*.

**PROJECTED WINERY TRIP GENERATION DURING
HOURS OF PEAK TRAFFIC ALONG STATE ROUTE 29**

SEASON	FRIDAY PM PEAK HOUR TRIPS (4:00 – 5:00)		SATURDAY AFTERNOON PEAK HOUR TRIPS (3:45 – 4:45)	
	INBOUND	OUTBOUND	INBOUND	OUTBOUND
Harvest	3	6	6	4

Source: Joseph Cellars Winery/Crane Transportation Group

IV. EXISTING CONDITIONS

A. ROADWAYS

Regional access to the project site is provided by the State Route 29 highway, while direct access to the project site is provided by Quail Mountain Lane. Affected nearby locations for which analysis has been requested include the State Route 29 highway intersections with Diamond Mountain Road, Dunaweal Lane and Lincoln Avenue/State Route 128 (Foothill Boulevard)/Kortum Canyon Road. Each roadway is briefly described below, while a schematic presentation of intersection approach lanes and control is shown in **Figure 3**.

State Route 29 (S.R.29) is a state highway that extends from Interstate 80 in Vallejo north into Lake County. In the project site vicinity, it has two lanes, wide paved shoulders and left turn lanes are provided at major intersections. In the project site vicinity it is level and traverses a broad curve. The posted speed through this section is 55 miles per hour (mph). There is no existing left turn lane on S.R. 29 at Quail Mountain Lane.

Quail Mountain Lane is a two-lane private driveway extending south of S.R.29 for approximately 600 feet before branching into driveways serving the project site and neighboring properties. It is 18 feet wide between S.R.29 and the project site entrance. Pavement condition is good to fair, with some areas of cracking. Quail Mountain Lane is stop sign controlled on its approach to S.R.29. On the S.R. 29 intersection approach the driveway is level and straight and pavement condition is adequate; the driveway is flared to accommodate turns to and from S.R. 29. Sight lines from Quail Mountain Lane viewing east and west on S.R. 29 extend well over 1,000 feet in each direction.

Diamond Mountain Road is a rural, two-lane, winding road extending south of S.R.29 into the hills; it ends at Heidi Ranch Road (also a two-lane rural road). It provides access to rural residential uses and vineyards. Diamond Mountain Road is stop sign controlled on its approach to S.R.29. At this intersection it is level and straight and pavement condition is adequate to poor, with many areas showing signs of cracking.

Dunaweal Lane is a two-lane roadway extending north south of S.R.29. It serves rural properties and provides access to two major wineries: Clos Pegase and Sterling Vineyards. North of S.R. 29, Dunaweal Lane ends at an intersection with Silverado Trail, and serves as a cut-through route between the two major routes serving the north (west) part of the Napa Valley (S.R. 29 and Silverado Trail). Mid-way between its intersections with S.R. 29 and Silverado Trail, Dunaweal Lane has an intersection with Washington Street, a road providing access into downtown Calistoga. Dunaweal Lane is stop sign controlled on both approaches to S.R. 29.

Lincoln Avenue (S.R.29) in Calistoga is a north-south arterial roadway named Lincoln Avenue with all-way stop intersections with Foothill Boulevard/Kortum Canyon Road at the south end of the city and at Silverado Trail/Lake Street at the north end of the city.

Kortum Canyon Road is a rural two-lane roadway extending south of S.R.29 into the hills, changing name to Studt Road before ending at an intersection with Heidi Ranch Road.

State Route 128 (Foothill Boulevard west of Lincoln Avenue) is a two-lane, primarily east-west state highway that provides access through Calistoga to Geyserville on the west. Foothill Boulevard (S.R. 128) has an all-way stop intersection with Lincoln Avenue. Left turn lanes are not provided on any approaches to this intersection, however a right turn lane is provided on the westbound intersection approach and there is room for separate right turns on the southbound intersection approach.

B. VOLUMES

Friday PM peak period (4:00-6:00) and Saturday afternoon (noon to 5:00) traffic counts were conducted for Crane Transportation Group at the four study intersections during the fall harvest season in Napa County, on September 18 and 19, 2009. The weather was clear and mild on both days. The harvest Friday peak hour was determined to be 4:00-5:00 PM, while the harvest Saturday afternoon peak hour was determined to be 3:45-4:45. Resultant 2009 Friday PM peak hour and Saturday afternoon peak hour traffic counts are presented in **Figures 4 and 5.**²

C. 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.

Unsignalized Intersections. For unsignalized (all-way stop-controlled and side-street stop-controlled) intersections, the 2000 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 typically represented for the stop sign controlled approaches or turn movements. 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 1** summarizes the relationship between delay and LOS for unsignalized intersections.

² Saturday count results for Dunaweal Lane were found to be unusually high when compared to historic counts on file with the county. This may have been due to harvest activities at the nearby wineries, as well as activities in the nearby communities of Calistoga and St. Helena on the count day. Since Dunaweal Lane is increasingly used as a cut-through route between S.R. 29 and Silverado Trail, seasonally high levels of activity in the surrounding areas would all contribute to higher volumes on Dunaweal Lane.

2. Minimum Acceptable Operation

a. Napa County

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 overall operation for an unsignalized intersection, with LOS E as the poorest acceptable operation for a side street stop sign controlled intersection approach.

b. Caltrans

Caltrans' Guide for the Preparation of Traffic Impacts Studies (December 2002) is intended to provide a consistent basis for evaluating traffic impacts to state facilities. Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D. On state highway facilities; however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS.³ Since Napa County is the lead agency for this project, the above-listed Napa County standard (LOS D) has been applied.

3. Existing Operation

Table 2 shows:

- the stop sign controlled Diamond Mountain Road approach to S.R.29 is operating acceptably at LOS A conditions during harvest peak traffic hours on a Friday and Saturday afternoon.
- the stop sign controlled Quail Mountain Lane approach to S.R.29 is operating acceptably at LOS B or C conditions during harvest peak traffic hours on a Friday and Saturday afternoon.
- the stop sign controlled Dunaweal Lane northbound and southbound approaches to S.R.29 are operating acceptably at LOS B conditions during the harvest peak traffic hours on a Friday afternoon; during the harvest peak traffic hour on a Saturday afternoon, the northbound approach is operating acceptably at LOS C, however, the southbound approach is operating *unacceptably at LOS F conditions*. Overall intersection operation is an unacceptable LOS F. It should be noted, however, that the count day appears to reflect harvest activities that may occur on only one Saturday of the season; it is expected that a more typical Saturday peak hour level of service would be in line with current Friday PM peak hour operation (LOS B).

³ California Department of Transportation, December 2002, *Caltrans Guide for the Preparation of Traffic Impact Studies*.

- the all-way stop sign controlled Lincoln Avenue/S.R. 128 (Foothill Boulevard)/S.R.29 intersection is operating acceptably at LOS C conditions during harvest peak traffic hours on a Friday or Saturday afternoon.

D. SIGNALIZATION NEEDS

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 8 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, 2003, 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. For intersections in rural locations (with local area population less than 10,000 people or where the posted speed limit or 85th percentile speed on the uncontrolled intersection approaches is greater than 40 miles per hour) a 70 percent warrant is applied. The 70 percent warrant is typically referred to as the rural peak hour warrant. Please see the **Appendix** for the warrant charts.

2. Existing Signalization Needs

Table 3 shows that currently the S.R.29/Dunaweal Lane intersection has volumes during the Saturday afternoon peak traffic hour exceeding the rural Warrant #3 criteria levels. It should be noted, however, that the count day appears to reflect harvest activities that may occur on only one Saturday of the season; it is expected that a more typical Saturday peak hour level of service would be more in line with current Friday PM peak hour operation (LOS B). See the **Appendix** for signal warrant charts.

V. NEAR TERM HORIZON BASE CASE (WITHOUT PROJECT) CONDITIONS

Evaluation has been conducted of Base Case operating conditions for the year 2012 horizon. Year 2012 reflects the likely near term year of project completion and full operation.

A. YEAR 2012 (NEAR TERM HORIZON)

1. Base Case 2012 (Without Project) Volumes

Year 2012 harvest season, Friday and Saturday Base Case peak hour volumes were projected by using a conservative 2 percent per year grow rate applied to volumes along S.R. 29. Resultant year 2012 harvest season Friday PM peak hour and Saturday afternoon peak hour Base Case (without project) projections are presented in **Figures 6 and 7**.

2. Base Case (Without Project) 2012 Intersection Level of Service

Table 2 shows that in 2012 all of the four unsignalized study intersections would operate acceptably at LOS B, C or D conditions during the harvest Friday PM peak hour; during harvest Saturday afternoon peak hour conditions, all but one of the study intersections would operate acceptably at LOS B, C or D conditions: the Dunaweal Lane southbound approach to S.R. 29 would operate unacceptably at LOS F, and overall intersection operation would be an acceptable LOS F.

3. Intersection Signalization Needs

Table 3 shows that by 2012, the S.R.29/Dunaweal Lane intersection would be expected to have volumes during the Friday PM peak traffic hour as well as during the Saturday afternoon peak traffic hour meeting or exceeding rural Warrant #3 criteria levels. See the **Appendix** for signal warrant charts.

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 unsignalized intersection with Base Case (without project) volumes in the County has overall LOS A, B, C or D operation and deteriorates to LOS E or F

operation with the addition of project traffic – or – has a stop sign controlled movement operating at LOS A, B, C, D or E and deteriorates to LOS F operation with the additional project traffic, the impact is considered significant and would require mitigation.

- If the Base Case overall LOS at an unsignalized intersection in the County is already LOS E or F – or – if Base Case operation of a stop sign controlled movement is already LOS F, 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 volumes to meet peak hour signal warrant criteria levels, the impact is considered significant and would require mitigation.
- If Base Case 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, in the opinion of the registered traffic engineer conducting this study, certain project-related traffic changes would substantially increase safety or operational concerns, the impact is considered significant and would require mitigation.

B. PROJECT TRIP GENERATION

The added traffic that would be expected due to the Joseph Cellars Winery construction and full operation is detailed in **Table 4** for Friday PM peak hour conditions and in **Table 5** for Saturday afternoon peak hour conditions. Projections have been developed by Joseph Cellars Winery management and Crane Transportation Group. Projected increases are summarized below for Harvest conditions.

- Friday PM Peak Hour (one hour between 4:00 and 6:00 PM)
There would be a maximum of three inbound and six outbound trips, all due to visitor vehicles at a *maximum* occupancy rate of 2.8 persons per vehicle.⁴
- Saturday Afternoon Peak Hour (3:45 – 4:45)
There would be a maximum of six inbound and four outbound trips, all due to visitor vehicles at a *maximum* occupancy rate of 2.8 persons per vehicle.⁵

Since all visitors would arrive by appointment only, all are evaluated as being newly added to the local roadway system.

⁴ Per Joseph Cellars *Marketing Event Day Traffic Characteristics*, referencing *Napa County Winery Traffic Generation Characteristics*.

⁵ Ibid.

C. PROJECT TRIP DISTRIBUTION

The increment of project traffic is shown distributed to the local roadway network in **Figures 6 and 7** (for Friday and Saturday afternoon peak hour conditions, respectively). Slightly more trips were distributed to and from the east (St. Helena direction), than to and from the west (Calistoga direction), as indicated by existing count patterns at nearby intersections.

D. YEAR 2012 PROJECT IMPACTS TO STUDY INTERSECTIONS

1. Intersection Level of Service

Table 2 shows that

- the four study intersections would continue to operate acceptably through the year 2012 with the addition of project traffic during the harvest season Friday PM peak traffic hour along S.R.29;
- all but one of the four study intersections would continue to operate acceptably through the year 2012 harvest season with the addition of project traffic during the harvest season Saturday peak traffic hours along S.R.29; year 2012 Saturday afternoon peak hour operation of the southbound Dunaweal Lane left turns to S.R. 29 would remain unacceptable, and overall intersection operation would remain an unacceptable LOS F.

This would be a less-than-significant impact during the analyzed peak hours, as the project contribution of traffic would be less than one percent of overall intersection traffic volumes.

3. Intersection Signalization Needs

a. Year 2012

Table 3 shows that the S.R.29/Dunaweal Lane intersection would continue to have volumes meeting peak hour volume signal Warrant #3 criteria with traffic from the project.

This would be a less-than-significant impact during the analyzed peak hours, as the project contribution of traffic would be less than one percent of overall intersection traffic volumes.

4. Vehicle Queuing on Westbound S.R.29 Approach to Quail Mountain Lane

Analysis has been conducted of the projected 95th percentile vehicle queuing in the proposed left turn lane on the westbound S.R.29 approach to Quail Mountain Lane. Evaluation has utilized formula contained in *Estimation of Maximum Queue Lengths at Unsignalized Intersections*, by John T. Gard, *ITE Journal*, November 2001 (see Appendix).

Table 6 shows that the 95th percentile vehicle queue in a new westbound S.R.29 left turn lane approaching Quail Mountain Lane would be one vehicle during the 2012 harvest Friday PM and

Saturday afternoon peak hours. This number of vehicles could be accommodated in the proposed left turn lane. At most, Napa County and Caltrans would likely require a 75-foot long left turn lane, which could accommodate one grape truck and one passenger vehicle queuing to turn left from S.R. 29 to Quail Mountain Lane. The project would improve conditions at the S.R. 29/Quail Mountain Lane intersection by providing a left turn lane on the S.R. 29 intersection approach where there is none today, plus providing a right turn flare on the Quail Mountain Lane approach to S.R. 29.

These would be less than significant impacts.

E. SIGHT LINE EVALUATION - QUAIL MOUNTAIN LANE

Field measurements by Crane Transportation Group indicate that from Quail Mountain Lane viewing east and west from a vehicle waiting to turn onto S.R. 29, sight lines exceed 1,000 feet.

Design Speed and Stopping Sight Distance. Caltrans uses a term called “Design Speed” in determining appropriate sight lines. The posted speed limit southbound along S.R. 29 east and west of Quail Mountain Lane is 55 mph. Based upon field measurements conducted by CTG at the proposed driveway location, the measured 85th percentile speed through this location was 61 mph eastbound and 57 mph westbound.⁶ For purposes of this analysis a 65 mph speed limit is used as the “design speed”.

The Caltrans Highway Design Manual indicates that for Private Road Intersections “the minimum corner sight distance shall be equal to the stopping sight distance.” (Section 405.1(c)—January 4, 2007). Caltrans Table 201.1 provides Stopping Sight Distance (speed/stopping sight distance relationships) for private driveways – these relationships are shown on **Table 7**. At a design speed of 65 miles per hour, 645 feet of sight distance would be required, viewed from the position of a vehicle waiting to turn onto S.R. 29 from Quail Mountain Lane. Field measurements indicate that the available sight distances (over 1,000 feet) for right or left turns from Quail Mountain Lane to S.R. 29 exceed the AASHTO recommended sight distance (minimum 645 feet) at this location.

These would be less than significant impacts.

F. IMPROVEMENTS TO QUAIL MOUNTAIN LANE

The site plan shows the applicant’s intention to widen Quail Mountain Lane. However, its existing paved section (18-foot paved travelway) meets the minimum County standard for “common driveways.”⁷ The County may, however, recommend that a consistent 1-foot shoulder be provided, as well as repaving. Due to the indication on the site plan that the road would be widened, this study has assumed that the Quail Mountain Lane approach to S.R. 29

⁶ The “85th percentile speed” refers to the speed of traffic at or below which 85 percent of the vehicles are moving. As described in *A Policy on Geometric Design of Highways and Streets*, American Association of State Highway and Transportation Officials (AASHTO), 2004, the 85th percentile measurement would represent the “pace” or “speed range” used by most drivers.

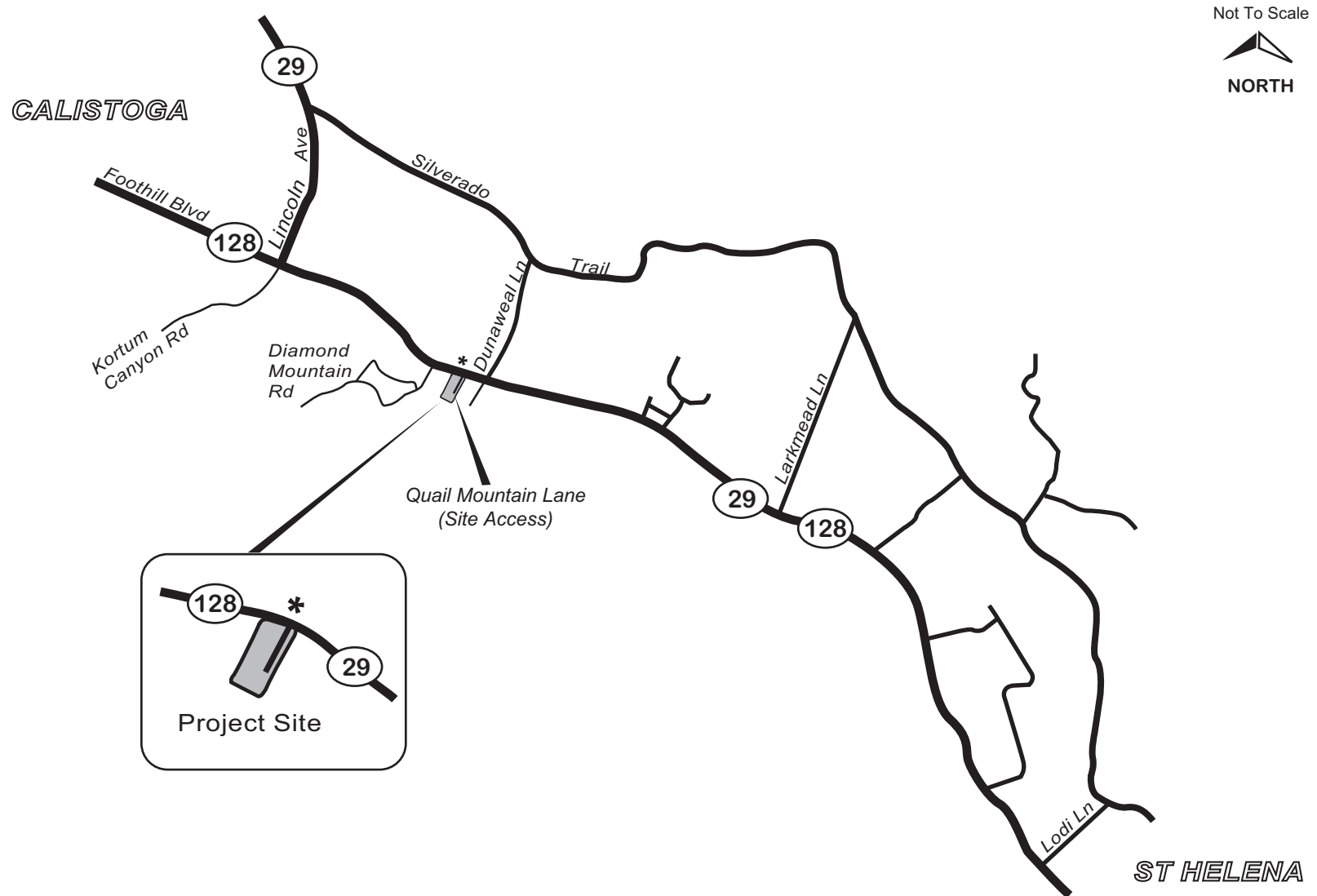
⁷ Rick Marshall, P.E., Napa County Public Works Department, personal communication, October 16, 2009.

would be flared in order to allow a right-turning vehicle to separate. It has also assumed that Quail Mountain Lane would be improved as needed to meet the county-required minimum for private “common driveways” (18-foot width pavement with 1-foot gravel shoulders), and the winery access driveway would be newly paved, as shown on the site plan.

These would be less than significant impacts.

This Report is intended for presentation and use in its entirety, together with all of its supporting exhibits, schedules, and appendices. Crane Transportation Group will have no liability for any use of the Report other than in its entirety, such as providing an excerpt to a third party or quoting a portion of the Report. If you provide a portion of the Report to a third party, you agree to hold CTG harmless against any liability to such third parties based upon their use of or reliance upon a less than complete version of the Report.

Figures

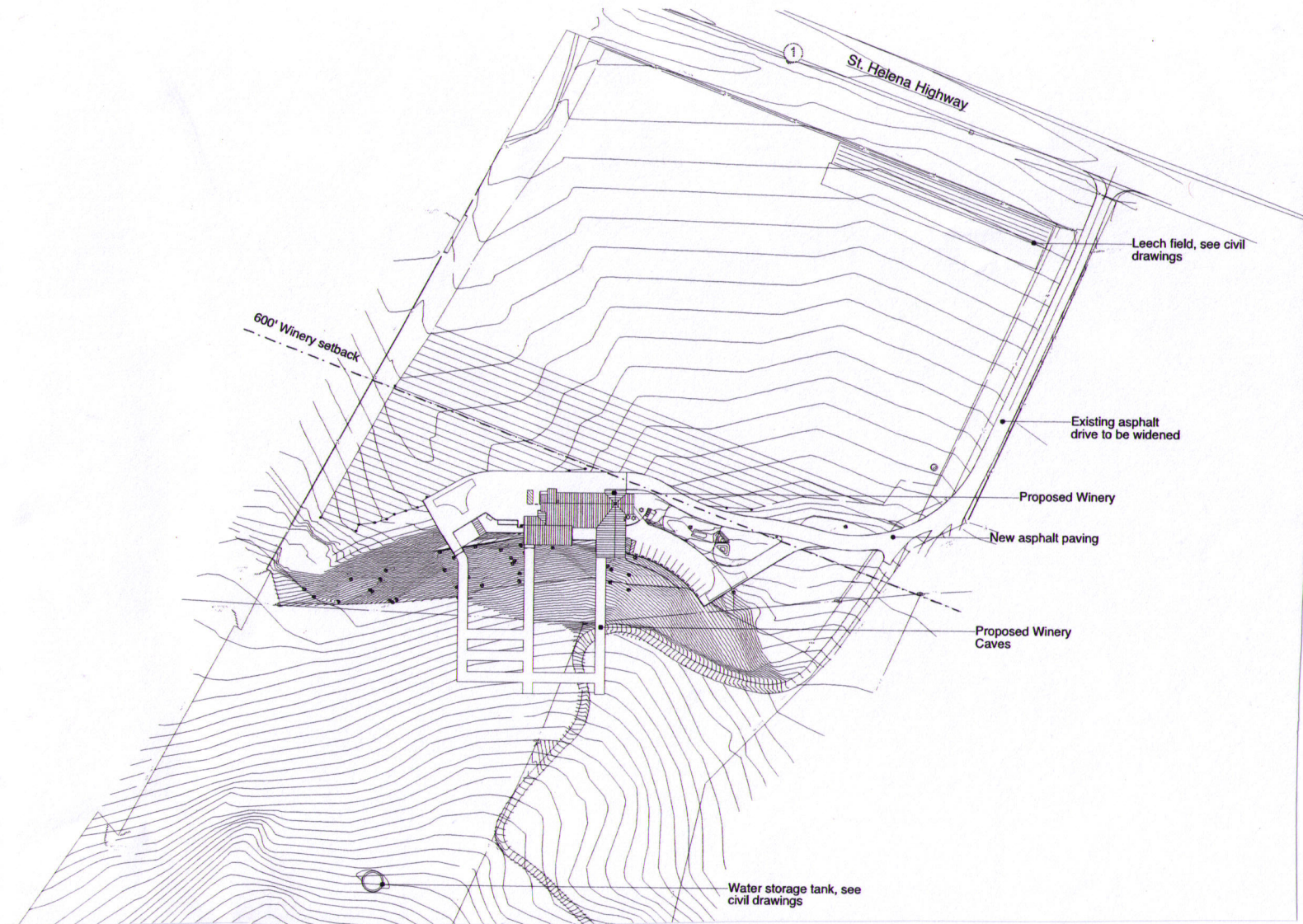


Joseph Cellars Winery Traffic Study



CRANE TRANSPORTATION GROUP

Figure 1
Area Map



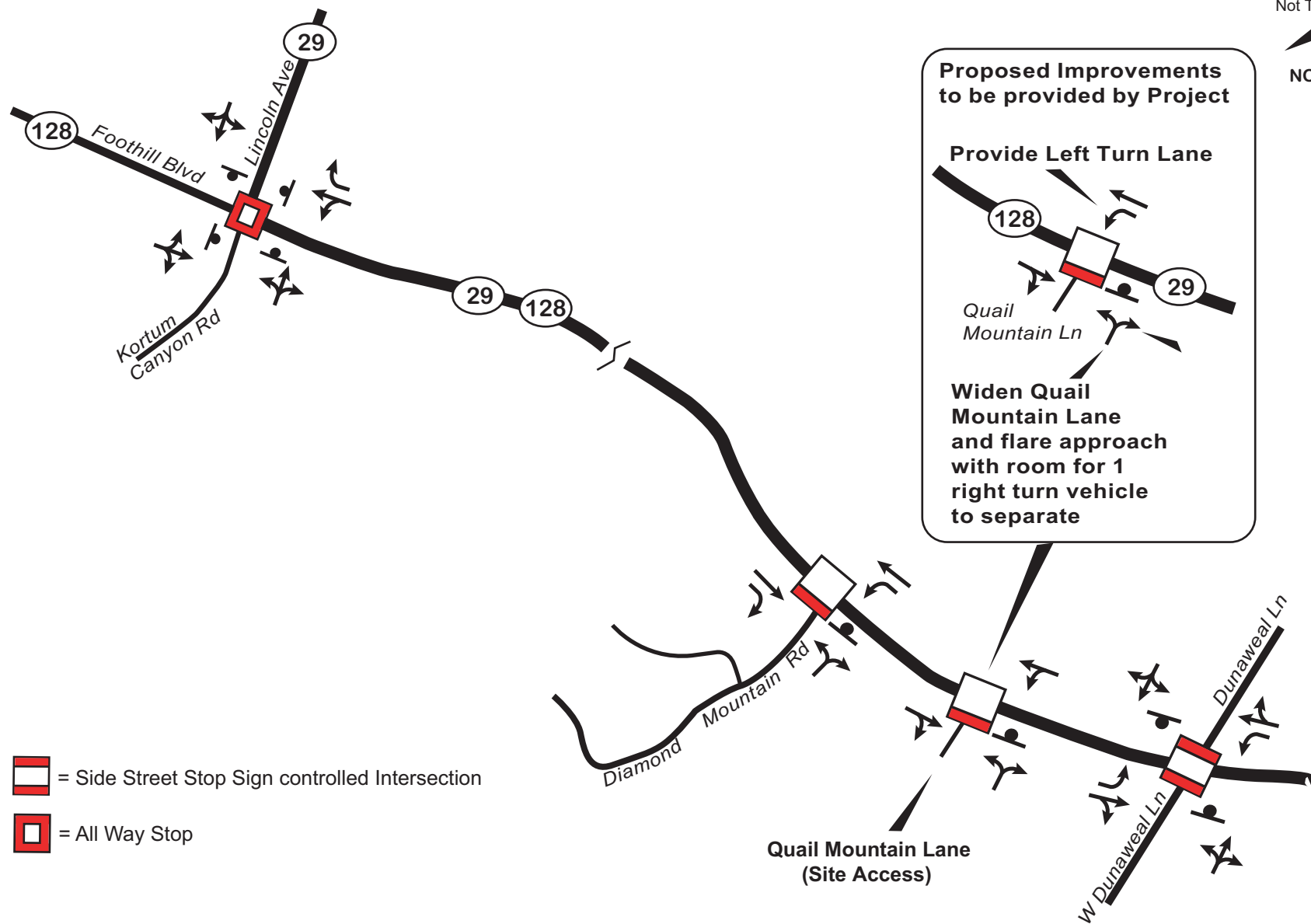
Joseph Cellars Winery Traffic Study



CRANE TRANSPORTATION GROUP

Figure 2
Site Plan

Not To Scale



Joseph Cellars Winery Traffic Study



CRANE TRANSPORTATION GROUP

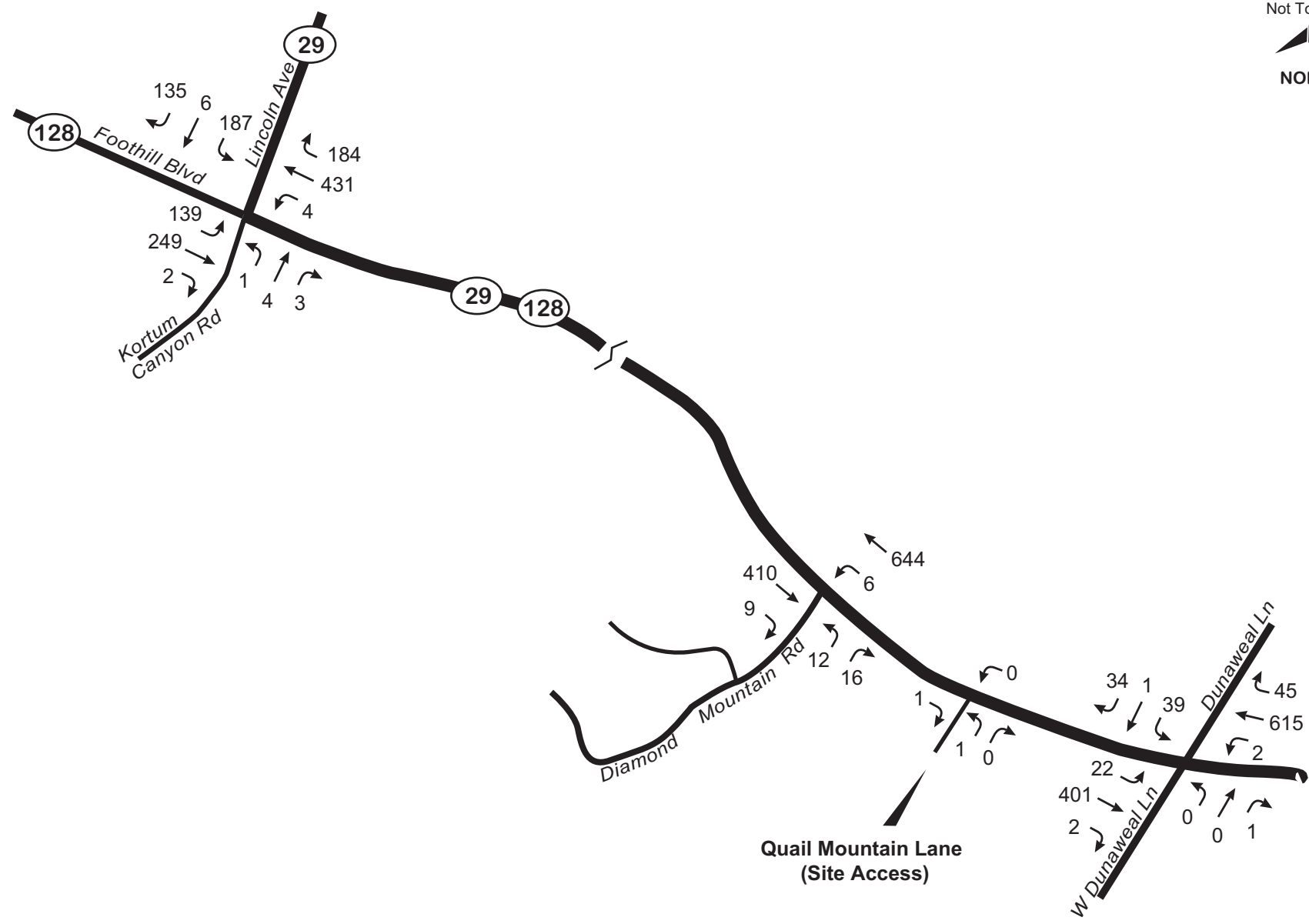
Figure 3

Existing & Proposed Lane Geometrics and Intersection Control

Not To Scale



NORTH



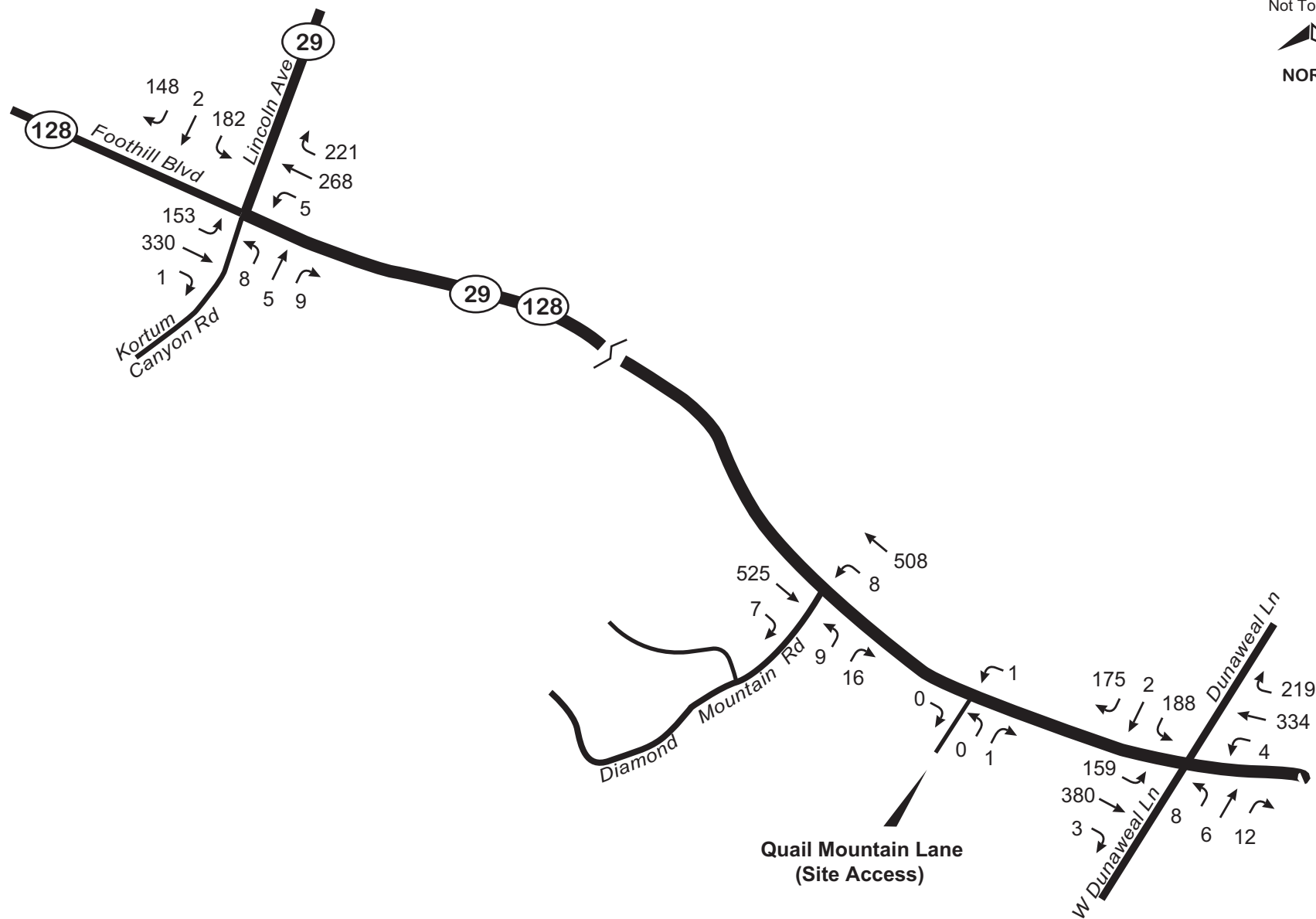
Joseph Cellars Winery Traffic Study



CRANE TRANSPORTATION GROUP

Figure 4
Existing Friday Harvest
PM Peak Hour Volumes (4:00-5:00)

Not To Scale



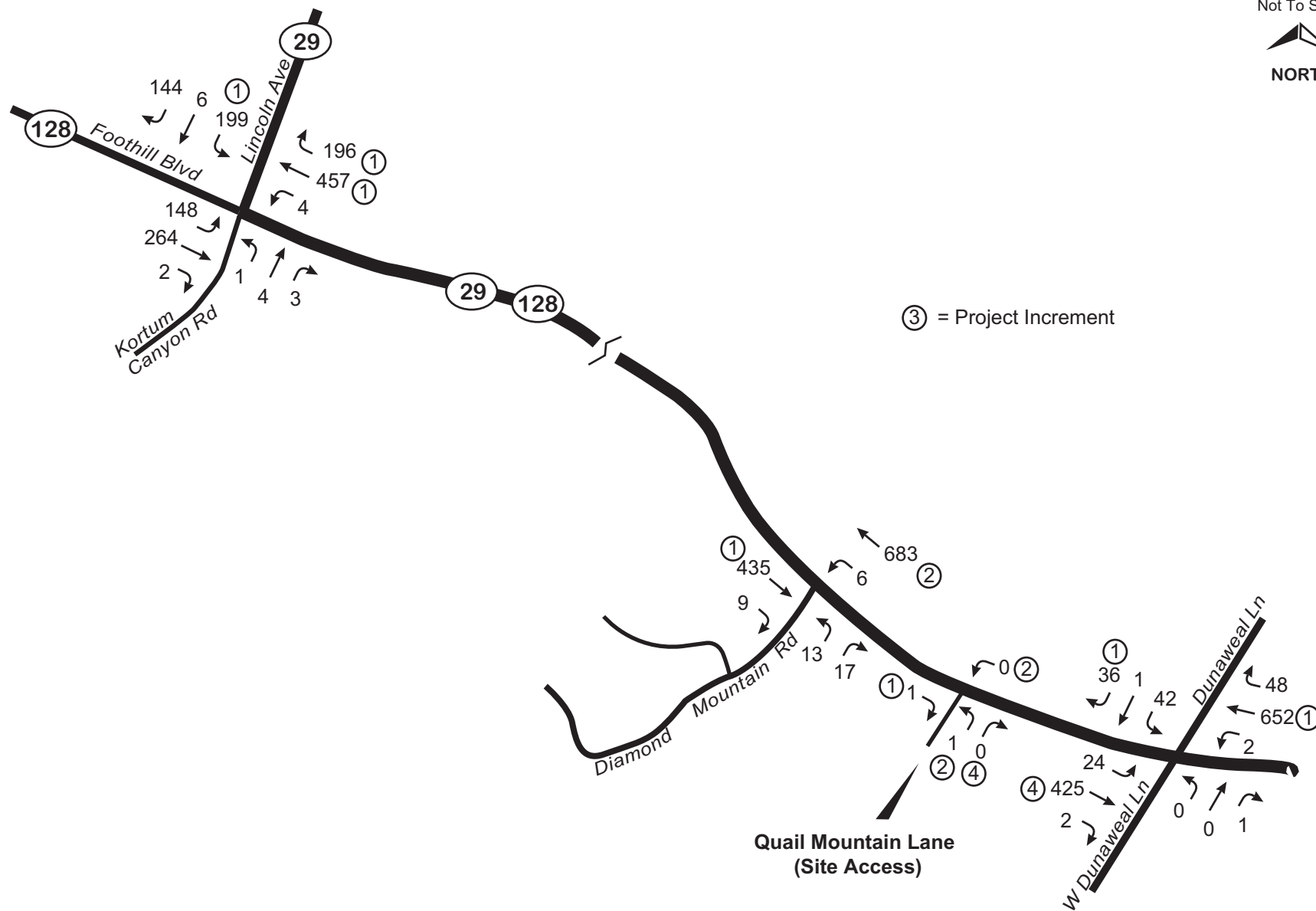
Joseph Cellars Winery Traffic Study



CRANE TRANSPORTATION GROUP

Figure 5
Existing Harvest Saturday
Peak Hour Volumes (3:45-4:45 PM)

Not To Scale



Joseph Cellars Winery Traffic Study

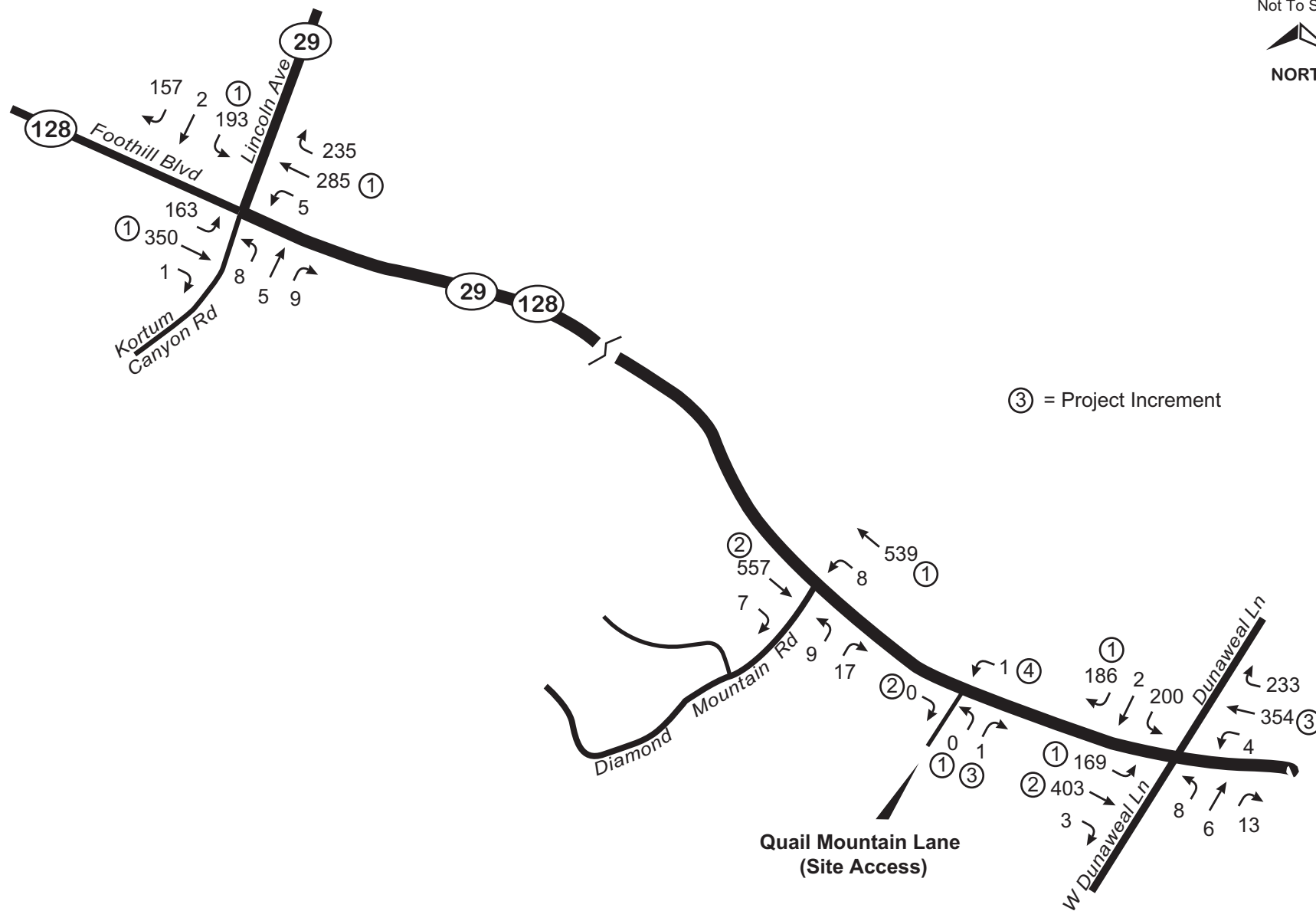


CRANE TRANSPORTATION GROUP

Figure 6

**Year 2012 Harvest Friday PM Peak Hour
Base Case & Project Volumes**

Not To Scale



Joseph Cellars Winery Traffic Study

Figure 7

**Year 2012 Harvest Saturday Peak Hour
Base Case & Project Volumes**



CRANE TRANSPORTATION GROUP

Tables

Table 1

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: 2000 Highway Capacity Manual (Transportation Research Board, 2000).

Table 2

INTERSECTION LEVEL OF SERVICE

TIME	EXISTING HARVEST SEASON	YEAR 2012 HARVEST SEASON	
		BASE CASE	BASE CASE + PROJECT
<i>Friday PM Peak Hour</i>			
Diamond Mountain Road/ S.R. 29	A-8.7 (1)	A-9.1 (1)	A-9.2 (1)
Quail Mtn. Ln (Site Access)/ S.R. 29	C-21.2 (1)	C-22.8 (1)	A-9.1 / A-8.3 (4)
Dunaweal Lane/S.R. 29	B-10.7/ B- 11.1 (2)	B-10.9/ B- 12.0 (2)	B-10.9/ B-12.0 (2)
Lincoln Avenue/ S.R. 128 (Foothill Boulevard)/ Kortum Canyon Road/ S.R. 29	C-24.0(3)	D-30.2 (3)	D-30.4 (3)
<i>Saturday Afternoon Peak Hour</i>			
Diamond Mountain Road/ S.R. 29	A-9.5 (1)	A-9.8 (1)	A-9.8 (1)
Quail Mtn. Ln (Site Access)/ S.R. 29	B-11.9 (1)	B-12.2 (1)	B-10.8/ A 8.7 (4)
Dunaweal Lane/S.R. 29	C-15.1/ F- > 80 (2)	C-16.5/ F- > 80 (2)	C-16.7/ F- > 80 (2)
Lincoln Avenue/ S.R. 128 (Foothill Boulevard)/ Kortum Canyon Road/ S.R. 29	C-23.1 (3)	D-29.2 (3)	D-29.5 (3)

- (1) Unsignalized level of service – average vehicle control delay in seconds.
 (2) Unsignalized level of service – average vehicle control delay in seconds. Northbound approach./Southbound approach.
 (3) All-Way Stop level of service - average vehicle control delay in seconds. Northbound approach.
 (4) Unsignalized level of service – average vehicle control delay in seconds. Northbound approach./Westbound left.

Year 2000 Highway Capacity Manual Analysis Methodology

Source: Crane Transportation Group

Table 3

INTERSECTION SIGNALIZATION NEEDS

S.R.29/Dunaweal Lane Intersection

**Do Volumes Meet Warrant #3 Peak Hour Volume Criteria⁽¹⁾ Levels?
Peak Tourist Season (Harvest) Conditions**

TIME PERIOD	EXISTING*	YEAR 2012	
		BASE CASE*	BASE CASE + PROJECT**
Friday PM Peak Hour	No	Yes	Yes
Saturday PM Peak Hour	Yes	Yes	Yes

⁽¹⁾ Rural warrant criteria.

Source: Crane Transportation Group

Table 4
JOSEPH CELLARS WINERY
TRIP GENERATION DURING THE FRIDAY AMBIENT
PM COMMUTE PEAK TRAFFIC HOURS ON S.R.29

STAFF/VISITOR CATEGORIES	4:00 – 5:00 PM PEAK HOUR VEHICLE TRIPS	
	IN	OUT
<i>Harvest</i>		
STAFF VEHICLES		
Management & Administrative (4)	0	0
Winemaking (2)	0	0
Tasting Room (1 Full Time)	0	0
Tasting Room (1 Part Time)	0	0
VISITOR VEHICLES	3*	6*
TRUCKS (INCLUDING GRAPE HAUL TRUCKS)	0	0
HARVEST TOTAL	3	6

* Represents a very conservative 6 vehicles (up to 17 people) leaving the winery during an hour when 3 vehicles (up to 8 people) arrive at the winery. The larger groups of 40 (for food and wine pairings) would not be scheduled during the peak traffic hours.

Source: Joseph Cellars Winery

Compiled by: Crane Transportation Group

Table 5
JOSEPH CELLARS WINERY
TRIP GENERATION DURING A SATURDAY AFTERNOON HOUR OF
PEAK
AMBIENT TRAFFIC ON S.R.29

STAFF/VISITOR CATEGORIES	3:45-4:45 VEHICLE TRIPS	
	IN	OUT
<i>Harvest</i>		
STAFF VEHICLES		
Management & Administrative (4)	0	0
Winemaking (2)	0	0
Tasting Room (1 Full Time)	0	0
Tasting Room (1 Part Time)	0	0
VISITOR VEHICLES	6*	4*
TRUCKS	0	0
HARVEST TOTAL	6	4

* Represents 4 vehicles (up to 11 people) leaving the winery during an hour when a conservative 6 vehicles (up to 17 people) arrive at the winery. The larger groups of 40 (for food and wine pairings) would not be scheduled during the peak traffic hours.

Source: Joseph Cellars Winery

Compiled by: Crane Transportation Group

Table 6

**95TH PERCENTILE VEHICLE QUEUING
S.R.29 WESTBOUND LEFT TURN LANE APPROACH
TO QUAIL MOUNTAIN LANE**

	NUMBER OF VEHICLES	
	FRIDAY	SATURDAY
	PM Peak Hour	Afternoon Peak Hour
Existing Harvest Season	1	1
2012 Harvest Season Base Case	1	1
2012 Harvest Season Base Case + Project	1	1

Source: Crane Transportation Group; Estimation of Maximum Queue Lengths at Unsignalized Intersections, by John T. Gard, ITE Journal, November 2001

Table 7

STOPPING SIGHT DISTANCE- WET CONDITIONS

Design Speed miles/hr	Stopping Sight Distance in Feet*
45	360
50	425
55	495
60	570
65	645
70	730
75	820

Bold type indicates design speed and stopping sight distance (in feet) in evaluation of the project access driveway.

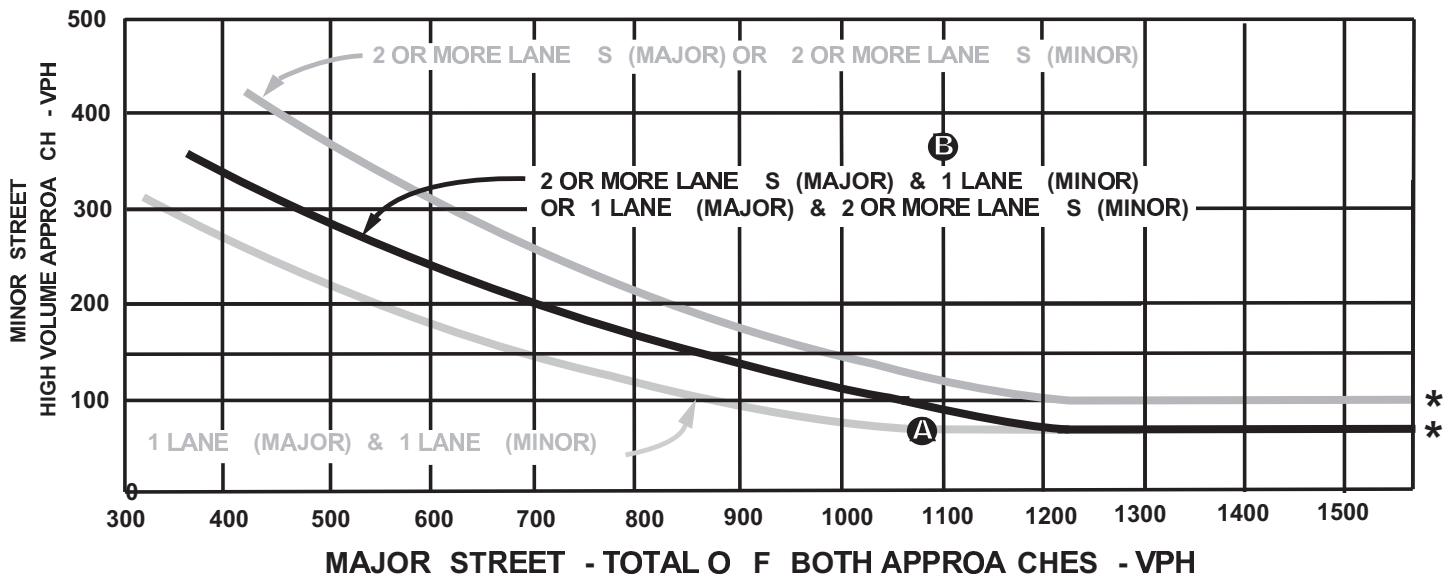
* Distances are interpolated from design speeds provided in Exhibit 3-2. Stopping Sight Distance on Grades, from *A Policy on Geometric Design of Highways and Streets*, American Association of State Highway and Transportation Officials (AASHTO), Fifth Edition, 2004.

Compiled by: Crane Transportation Group

APPENDIX A
JOSEPH CELLARS WINERY

State Route 29/Dunaweal Lane Intersection

PEAK HOUR VOLUME WARRANT #3 (Rural Area)



A = Existing Friday Peak Hour
74 vehicles minor approach
1087 vehicles major approaches

B = Existing Saturday Peak Hour
365 vehicles minor approach
1099 vehicles major approaches

Existing Friday and Saturday Peak Hour

* 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: Year 2003 Manual on Uniform Traffic Control Devices, Federal Highway Administration

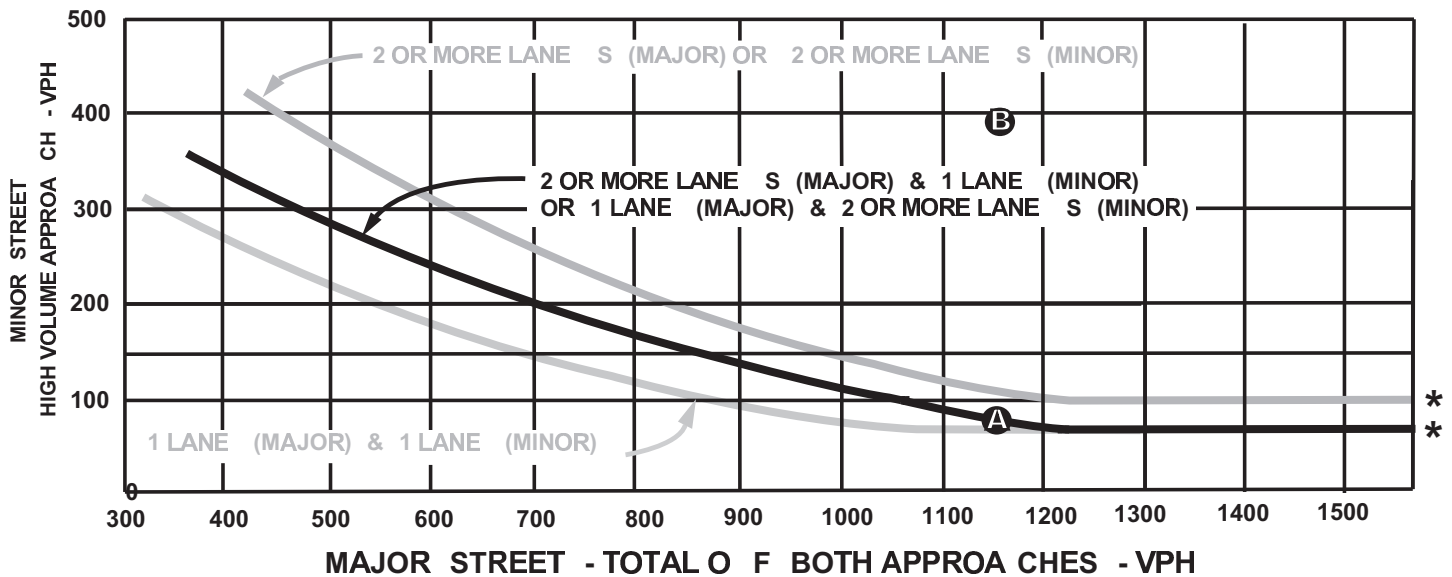
Figure A-1
Existing Friday and Saturday
PM Peak Hour Warrant (#3)



CRANE TRANSPORTATION GROUP

State Route 29/Dunaweal Lane Intersection

PEAK HOUR VOLUME WARRANT #3 (Rural Area)



A = 2012 Base Case Friday Peak Hour
79 vehicles minor approach
1153 vehicles major approaches

B = 2012 Base Case Saturday Peak Hour
388 vehicles minor approach
1166 vehicles major approaches

Year 2012 Base Case Friday and Saturday Peak Hour

* 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: Year 2003 Manual on Uniform Traffic Control Devices, Federal Highway Administration

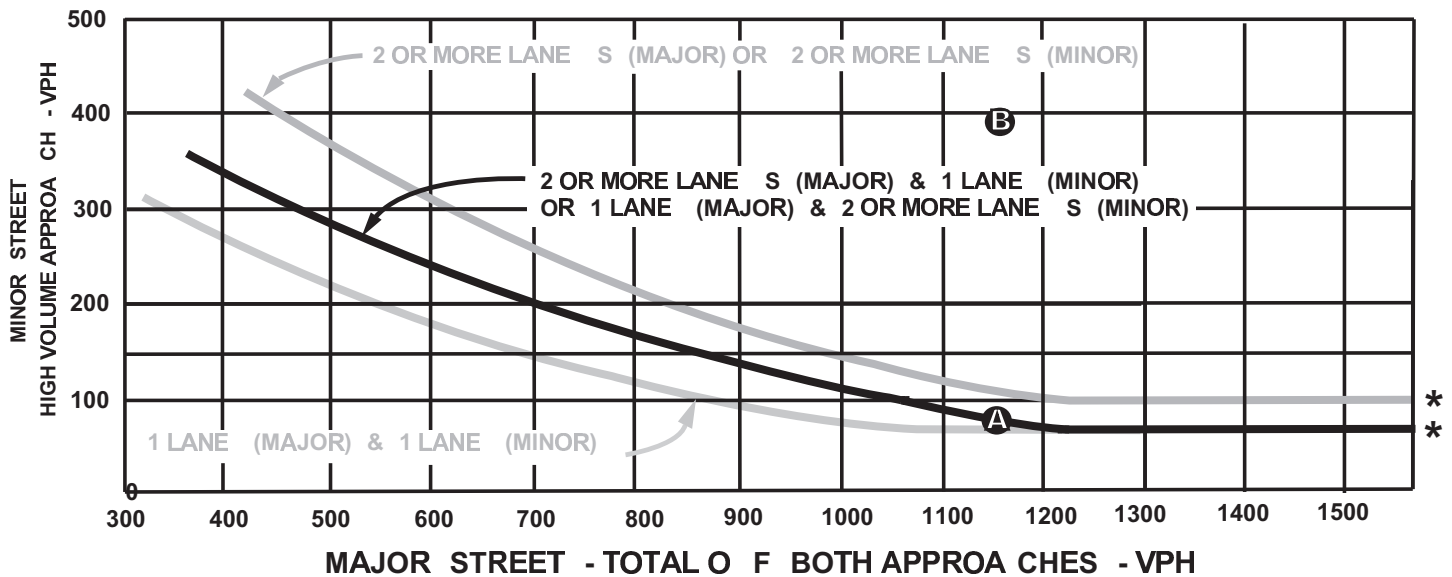


CRANE TRANSPORTATION GROUP

Figure A-2
Year 2012 Base Case (Without Project)
Friday and Saturday
PM Peak Hour Warrant (#3)

State Route 29/Dunaweal Lane Intersection

PEAK HOUR VOLUME WARRANT #3 (Rural Area)



A = 2012 Base Case + Project Friday Peak Hour
80 vehicles minor approach
1158 vehicles major approaches

B = 2012 Base Case + Project Saturday Peak Hour
389 vehicles minor approach
1172 vehicles major approaches

Year 2012 Base Case + Project Friday and Saturday Peak Hour

* 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: Year 2003 Manual on Uniform Traffic Control Devices, Federal Highway Administration

Figure A-3
Year 2012 Base Case + Project
Friday and Saturday
PM Peak Hour Warrant (#3)



CRANE TRANSPORTATION GROUP