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NAPA CO. CONSERVATION  
DEVELOPMENT & PLANNING DEPT.

December 6th, 2011

Kirsty Shelton, Planner III  
Department of Conservation, Development and Planning  
County of Napa  
1195 Third Street, Room 210  
Napa, California 94559

Re: Project Status Report, Raymond Vineyards and Cellar Use Permit  
Modification #P11-00156. APN 030-270-013 & 030-050-031

Dear Ms. Shelton:

Attached to this letter please find the November 16, 2011 traffic analysis for the Raymond Vineyards winery expansion project as you requested in your letter of June 6, 2011. I am also enclosing two (2) copies of a preliminary design for the left turn lane that we proposed to construction at the intersection of Zinfandel Lane and the winery driveway (aka Wheeler Lane). I would appreciate if you would forward copies of the traffic analysis and left turn lane design to the Public Works Department. These documents together with the information we submitted to your office on October 18, 2011 complete the information that you requested in your letter of June 6, 2011.

Ms. Shelton, would you please advise us of the status of our application and timeline for completing the environmental review process as soon as convenient.

Thank you for your assistance with our project. I look forward to meeting you in person. Please direct future correspondence to the undersigned.

Sincerely,



Tom Blackwood  
Director of Retail Operations  
Raymond Vineyards  
849 Zinfandel Lane  
St. Helena, CA 94574

CC: John McDowell, Deputy Planning Director  
Paul Wilkinson, Public Works Director  
John Taft, Backen Gillam Kroeger Architects  
Jeffrey Redding AICP



November 16, 2011

Raymond Vineyards  
c/o Mr. Jeff Redding, AICP  
2423 Renfrew Street  
Napa, CA 94558

Subject: *Traffic Analysis for the Raymond Vineyards Winery Expansion Project*

Dear Mr. Redding:

The attached report presents our findings of the traffic analysis conducted for the Raymond Vineyards Winery at 849 Zinfandel Lane in Napa County (see Figure 1 for site location map). The study examined potential traffic issues associated with the proposed increases to production, employees, and visitor operations. The report reflects our analysis of the project application in conjunction with vehicle counts and field surveys of the winery traffic conditions.

Our analysis has determined that the winery expansion would not significantly impact traffic conditions at the project access intersection of Zinfandel Lane/Wheeler Lane. Levels-of-service and delays would be satisfactory (LOS 'B' or better) for the stopped outbound and left turn inbound turning movements. The available sight distance along Zinfandel Lane is adequate and the site's internal access road is consistent with Napa County standards. However, a westbound left turn lane on Zinfandel Lane to accommodate inbound traffic would be warranted based on Napa County volume standards.

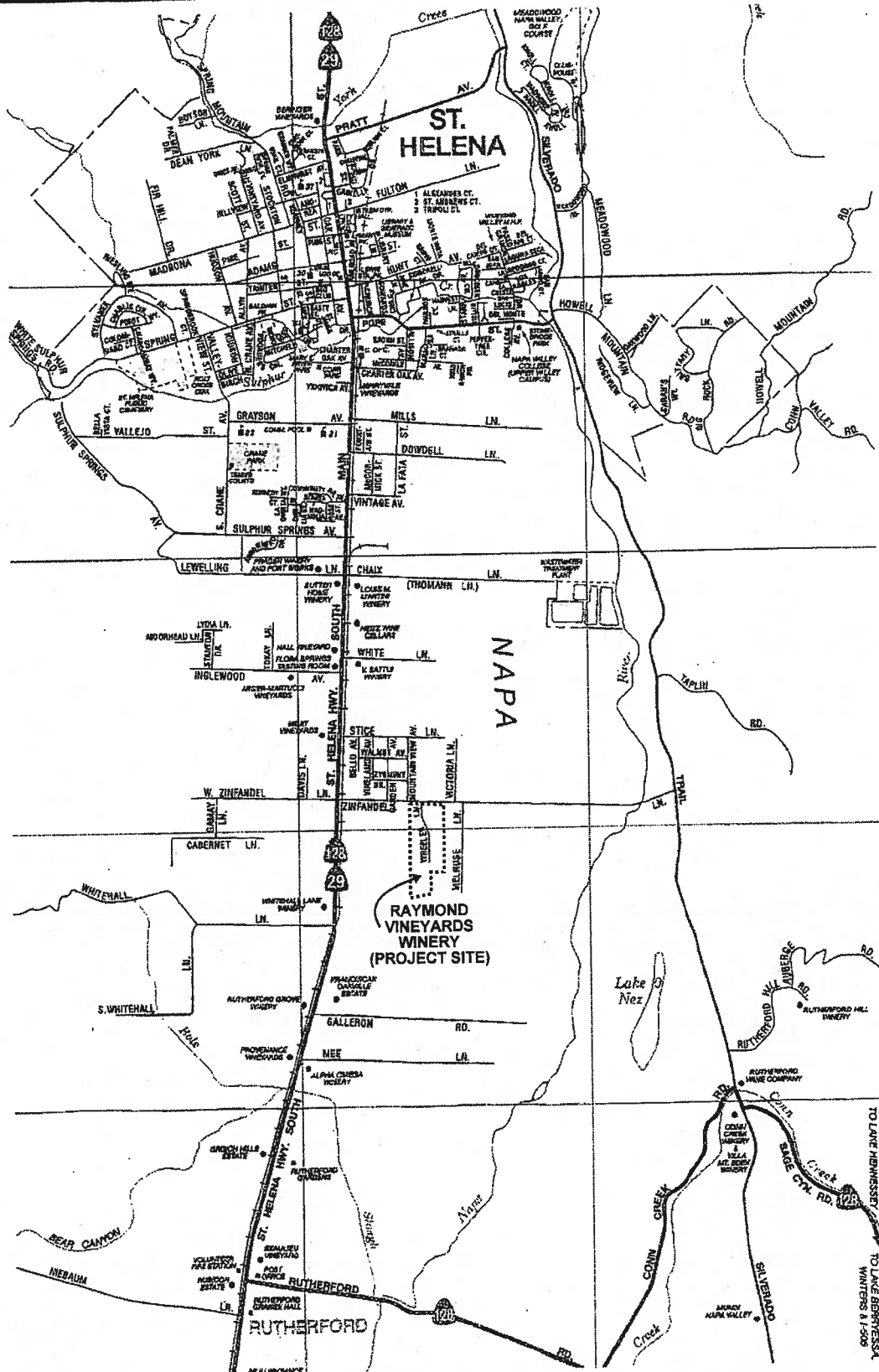
The State Route 29/Zinfandel Lane intersection operates at LOS 'F' for Zinfandel Lane under existing, baseline, and baseline plus project conditions during weekday and weekend peak hours. The intersection qualifies for signalization using the California Manual on Uniform Traffic Control Devices peak hour volume warrants for existing, baseline, and baseline plus project conditions as well. If future installation of a traffic signal is considered necessary, the winery could pay a share of the costs based on the proportion of winery trips to the overall volumes at the intersection.

I trust that this report responds to your needs. Please review this information and call me with any questions or comments.

Sincerely,

A handwritten signature in black ink, appearing to read "George W. Nickelson". The signature is fluid and cursive, with a large initial "G" and "W".

George W. Nickelson, P.E.  
OMNI-MEANS, Ltd.  
Engineers & Planners



omni-means

Project Vicinity Map



figure 1

## **1. Existing Traffic Conditions**

### **a. Existing Traffic Operations at Zinfandel Lane/Wheeler Lane (Site Access)**

The Zinfandel Lane/Wheeler Lane (winery access road) intersection is located approximately 1/3 mile (1,700 ft.) east of State Route 29. Zinfandel Lane is oriented in an east-west direction across the Napa Valley connecting State Route 29 and Silverado Trail. Zinfandel Lane is a straight, flat, two-lane rural road with unpaved shoulders in the vicinity of the winery. The Zinfandel Lane/Wheeler Lane intersection consists of single lane approaches with stop sign control for Wheeler Lane which forms the south leg of the intersection. There is a private residence driveway that forms the north leg of the intersection.

Daily traffic volume counts conducted in January 2011 found a weekday average volume of 2,665 vehicles and a weekend average of 1,342 vehicles on Zinfandel Lane west of the project site.<sup>(1)</sup> Volumes are likely somewhat higher during the summer travel season. Based on Caltrans State Route 29 volume data, peak month volumes are about 106% of an average month.<sup>(2)</sup> Thus peak month daily volumes are likely closer to 2,825 on weekdays and 1,425 on weekends. The existing daily volumes are well within the roadway's carrying capacity.

In order to identify peak hour conditions, traffic counts were conducted at the Zinfandel Lane/Wheeler Lane and Zinfandel Lane/State Route 29 intersections during a weekday PM commute period and a Saturday afternoon<sup>(3)</sup>. The counts were conducted in October 2011. As noted above, volumes are typically highest during the summer season. However, these counts occurred during the harvest season when there are increased employee and production vehicle trips (which were clearly noticed during the counts).

Wheeler Lane serves the winery and three residences that would be expected to generate one trip each during the peak hour. Deducting the three residential trips, the winery generated 27 weekday and 34 Saturday peak hour trips. Existing daily winery trips would be expected to be approximately 108 weekday trips and 136 Saturday trips (given peak hours are typically about 25% of the daily volumes).

Peak hour intersection conditions are measured by Level of Service (LOS), which applies a letter ranking to successive levels of intersection performance. LOS 'A' represents optimum conditions with free-flow travel and no congestion. LOS 'F' represents severe congestion with long delays at the approaches. For intersections with minor street stop control, the LOS reflects the delays experienced by the minor street approach. (LOS calculation worksheets are attached.)

With existing volumes, the Zinfandel Lane/Wheeler Lane intersection operates at LOS 'B' during weekday and Saturday peak hours for the stopped northbound approach (with 10 seconds of delay on weekdays and Saturdays). The intersection operates very efficiently with minimal delays and no vehicle queuing.

### **b. Existing Traffic Operations at State Route 29**

The Zinfandel Lane/State Route 29 intersection has single lane approaches on Zinfandel Lane which are stop sign controlled and there are separate left turn lanes on State Route 29. Based on Caltrans records, State Route 29 near Zinfandel Lane has an average daily traffic volume of 22,700 vehicles and a peak month daily traffic volume of 24,000 vehicles.<sup>(4)</sup> These volumes are approaching the roadway's capacity and would be categorized in the LOS 'E-F' range for a two lane highway with left turn lanes.

The Zinfandel Lane/State Route 29 intersection has peak hour conditions of LOS 'E-F' for the side street approaches on weekdays and Saturdays. (LOS 'F' westbound, with 54 seconds of delay weekday and 58



seconds of delay Saturday. LOS 'E' eastbound, with 38 seconds of delay weekday and 45 seconds of delay Saturday.) The high through volumes on State Route 29 limit turning opportunities from Zinfandel Lane. Field observations confirm the calculated peak hour conditions, where westbound queues averaged five vehicles and reached a maximum of nine vehicles. Congestion on State Route 29 can also be substantial. At times on Saturday, northbound vehicle queues extended from St. Helena south to and beyond Zinfandel Lane, creating "stop-and-go" conditions.

The existing volumes were applied to California Manual on Uniform Traffic Control Devices (CAMUTCD) peak hour signal warrants.<sup>(5)</sup> The peak hour warrants are one of several standards to help determine if installation of a traffic signal is appropriate. Qualifying for signalization using the peak hour warrants does not necessarily mean signals should be installed. The intersection does qualify for signalization using the peak hour warrants and existing counted Saturday volumes (the warrant graphs are attached).

## **2. Traffic Conditions With The Baseline Permitted Uses**

### **a. Current Use Permit Trip Generation**

The current permitted uses allow for the following operations at the winery:

- 750,000 gallons of production (averaged over a three year period; with no single year exceeding 900,000 gallons);
- 28 employees (26 full time and 2 part time);
- 400 daily visitors without an appointment
- Marketing events: Daily = 1-10 guests; Twice weekly = 10-30 guests; Twice monthly = 30-100 guests. (Events for 80 or more guests conducted when tours & visitor center is closed.)
- 75 parking spaces.

The number of daily trips generated with the baseline permitted uses is outlined in Table 1. It was assumed that the maximum 400 daily visitors would occur on a weekend. Existing visitor statistics were used to estimate weekday visitors. As shown, the current use permit generates 195 daily trips on a typical weekday and 354 trips on a Saturday. During the harvest season, additional truck trips result in 400 daily trips. These calculations are somewhat conservative in that no employee ridesharing was assumed.

Daily baseline volumes with the current use permit on Zinfandel Lane west of the site access road are approximately 3,000 vehicles on weekdays and 1,600 vehicles on Saturdays. These volumes are well within the road's capacity and are equivalent to LOS 'A' conditions.

### **b. Baseline Peak Hour Traffic Conditions**

By comparing the surveyed winery trips and visitation numbers with the maximums allowed under the current use permit, peak hour winery volumes for the permitted use were extrapolated. On this basis, the winery would be expected to generate 69 weekend peak hour trips and 55 weekday peak hour trips assuming complete utilization of the current use permit.

The State Route 29 peak hour volumes counted for this study (1,400 vehicles) were compared to published Caltrans volume data.<sup>(6)</sup> Caltrans identifies the single highest peak hour observed for Year 2010 (1,950 vehicles). In order to provide a conservative analysis of peak hour conditions, the counted volumes on Highway 29 and Zinfandel Lane were proportionally increased to match the peak Caltrans volume.



The Zinfandel Lane/Wheeler Lane intersection continues to operate at LOS 'B' (12 seconds of delay) for the northbound approach during weekday and weekend peak hours. The westbound approach operates at LOS 'A' (1 second of delay).

The State Route 29/Zinfandel Lane intersection operates at LOS 'F' for the Zinfandel Lane approaches. The northbound and southbound left-turn lane movements on State Route 29 operate at LOS 'B' (12 seconds of delay) or better. This intersection would qualify for signalization using the CAMUTCD peak hour warrants.

### **3. Traffic Effects of the Proposed Project**

#### **a. Project Description**

The proposed winery operations are summarized as follows:

- Increase annual wine production to 1.5 million gallons;
- Increase the number of employees to 90;
- Increase the number of daily visitors to 800 (by appointment only).
- Amend marketing events to the following: (Food for events > 50 people will be catered.)
  - 12 annually for 250 people max.; 12 annually for 150 people max.;
  - 24 annually for 100 people max.; 104 annually for 50 people max.
- Increase parking to 130 + 100 overflow spaces. (Valet parking to be utilized for events larger than 150 people.)

#### **b. Traffic Operations With The Project**

The Winery's daily traffic generated by the proposed project has been calculated in Table 2. On a typical Saturday 768 daily trips would be expected and on weekdays 450 daily trips would be expected. During harvest season, 832 daily trips would be expected.

**DAILY TRAFFIC COMPARISON BETWEEN CURRENT USE PERMIT  
AND PROPOSED USE PERMIT**

Condition	Average Weekday	Average Saturday	Harvest Season Saturday
Current (1991) Use Permit	195 trips	354 trips	400 trips
Proposed Use Permit	450 trips	768 trips	832 trips

As shown in the above chart, the proposed project would roughly double the number of winery trips compared to the current use permit. Daily volumes on Zinfandel Lane west of the site access would be expected to be approximately 3,200 vehicles on weekdays and 1,900 vehicles on Saturdays. The daily volumes would remain well within the capacity of a two lane rural road with conditions equivalent to LOS 'A'.

Peak hour intersection levels of service were evaluated. Using a conservative assumption that peak hour volumes represent 25% of daily volumes, the proposed project would generate 192 Saturday peak hour trips and 113 weekday peak hour trips.



768  
- 354  
-----  
414

450  
- 195  
-----  
255

At the Zinfandel Lane/Wheeler Lane intersection, the northbound approach would remain LOS 'B' (12-14 seconds of delay) and the westbound left turn approach would remain at LOS 'A' (1 second of delay). LOS are shown in Table 3.

At the State Route 29/Zinfandel Lane intersection, delays for the Zinfandel Lane approaches (LOS 'F') would increase. The northbound and southbound left-turn lane movements would operate at LOS 'B' (13 seconds of delay) or better during the weekday and weekend peak hours. The intersection volumes would further qualify for signalization based on the peak hour warrants (attached).

#### c. Site Access

The winery would continue to use Wheeler Lane as the access road, serving all employee, delivery and visitor trips.

The Winery access intersection was evaluated for a potential left turn lane based on Napa County daily volume warrants.<sup>(7)</sup> With the project, daily volumes on Zinfandel Lane west of the site would be approximately 3,200 weekday vehicles and 1,900 weekend vehicles adjusted for the summer season. Daily volumes on Wheeler Lane would range from 480-800 trips accounting for the project and residential trips. As shown on the warrant graphs (attached), the volumes would warrant a left turn lane. Based on Caltrans design standards, only one vehicle would be expected to queue in the left turn lane. However, Caltrans recommends a minimum 50-foot left turn storage lane.<sup>(8)</sup>

Vehicle queuing conflicts are not anticipated at the Wheeler Lane access intersection due to the relatively low volumes on Wheeler Lane and the long distance (1,700 feet) from State Route 29. At State Route 29, vehicle queues on Zinfandel Lane from the stopped westbound approach would remain far west of Wheeler Lane. (The nearest cross-street to State Route 29, Garden Avenue, is 700 feet away. Existing westbound queues of 100-150 feet could increase to 200 feet with the project, but would remain well west of any cross-streets.)

Vehicle site distance at Zinfandel Lane/Wheeler Lane was evaluated. The required vehicle visibility or "corner sight distance" is a function of travel speeds on Zinfandel Lane. Caltrans design standards indicate that for appropriate corner sight distance, "a substantially clear line of sight should be maintained between the driver of a vehicle waiting at the cross road and the driver of an approaching vehicle in the right lane of the main highway". Caltrans design guidelines also indicate that at private access intersections the minimum corner sight distance "shall be equal to the stopping sight distance".

With a posted speed limit of 55 mph on Zinfandel Lane, Caltrans' design standards indicate that a stopping sight distance of about 500 feet is required along Zinfandel Lane.<sup>(9)</sup> Field measurements indicate the sight distance substantially exceeds the minimum standards.

#### d. Internal Circulation

The Wheeler Lane road width is 18-20 feet. This satisfies the Napa County standard of 18 feet. The access road would continue to adequately accommodate the expected volumes.

#### e. Special Events

The winery would host events of varying magnitude. On a weekly basis events of 50-100 persons are planned. Up to two monthly events would have a maximum of 250 persons in attendance.





The monthly events would be scheduled on non-peak days, and as such, would not generate daily trips beyond the maximum visitor traffic levels calculated in Table 2. It is also expected that events would be scheduled so that traffic flows would be outside the peak periods.

The winery's parking would be designed to meet peak visitor day demand and lesser event demand. For the largest (250-person) events, valet parking would be employed to accommodate all visitor vehicles in striped spaces and other ancillary paved areas.

### **3. Summary and Conclusions**

The winery access intersection of Zinfandel Lane/Wheeler Lane would continue to operate at satisfactory levels-of-service with the proposed expansion. The stopped Wheeler Lane approach would operate at LOS 'B' and the inbound left turn movement would operate at LOS 'A' during weekday and weekend peak hours.

The winery's daily volumes would warrant a left turn lane on Zinfandel Lane based on Napa County standards.

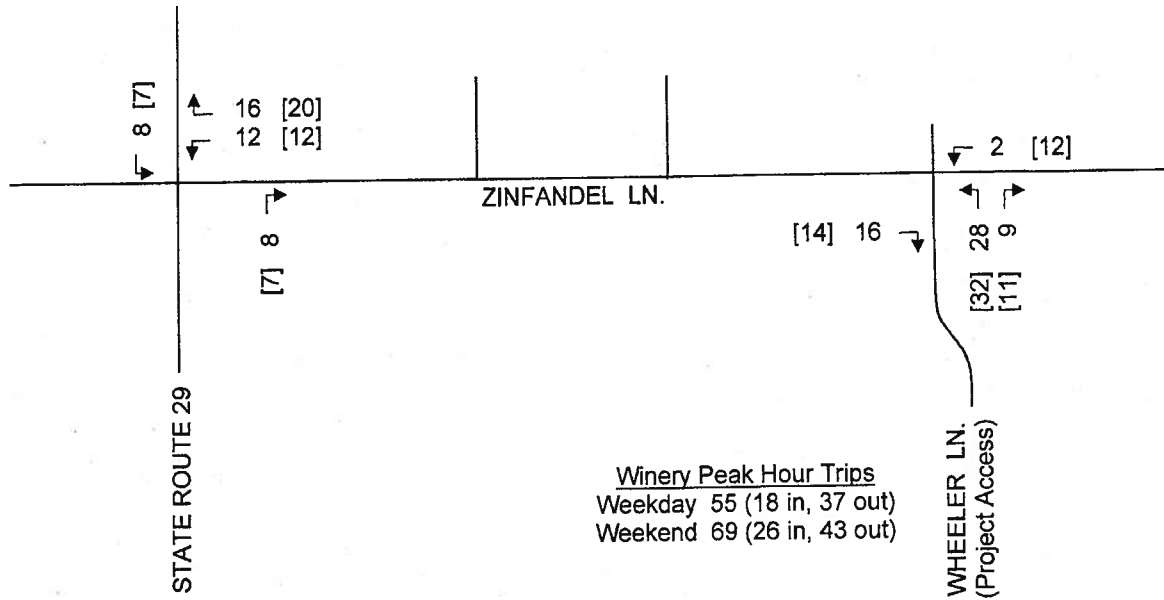
Based on field measurements, the available site distance along Zinfandel Lane would be adequate. (The project's Civil Engineer should confirm the adequacy of sight distances along Zinfandel Lane.)

The winery is served by an 18-20 foot wide access road, which meets the Napa County standard of 18 feet. The access road would reflect an appropriate design (as determined by Napa County) to accommodate the existing and projected traffic flows. The actual design should accommodate truck turns to/from Zinfandel Lane.

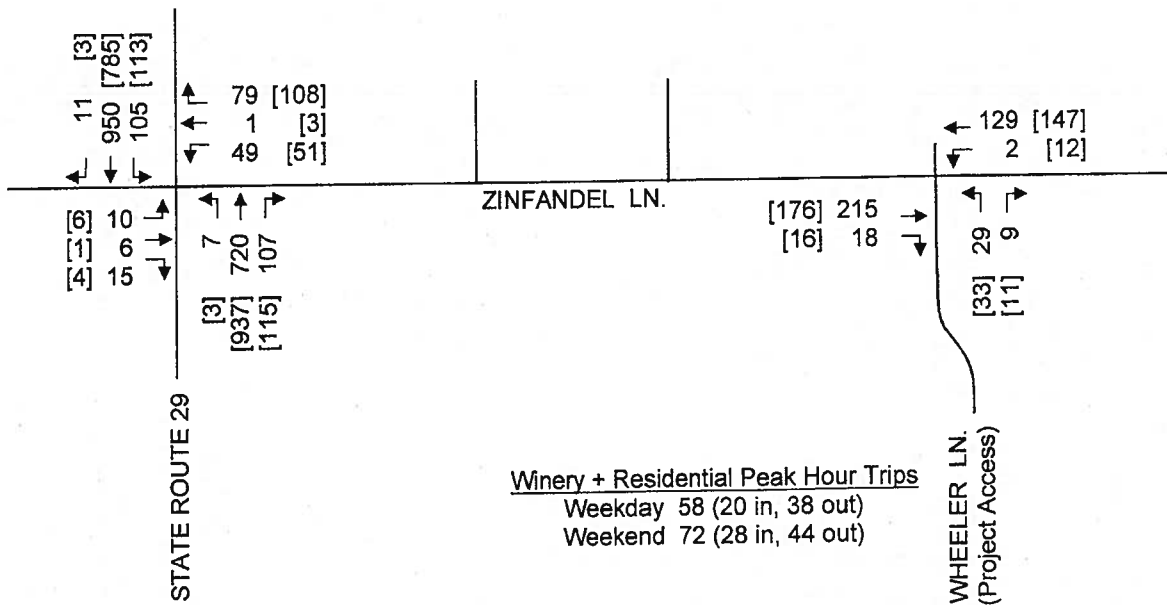
The State Route 29/Zinfandel Lane intersection operates at LOS 'F' for Zinfandel Lane during peak hours under existing, baseline, and "baseline with project" conditions. The intersection also qualifies for signalization using CAMUTCD peak hour volume warrants for all three scenarios.



# CURRENT USE PERMIT TRIPS



# BASELINE VOLUMES WITH CURRENT USE PERMIT



NOT TO SCALE

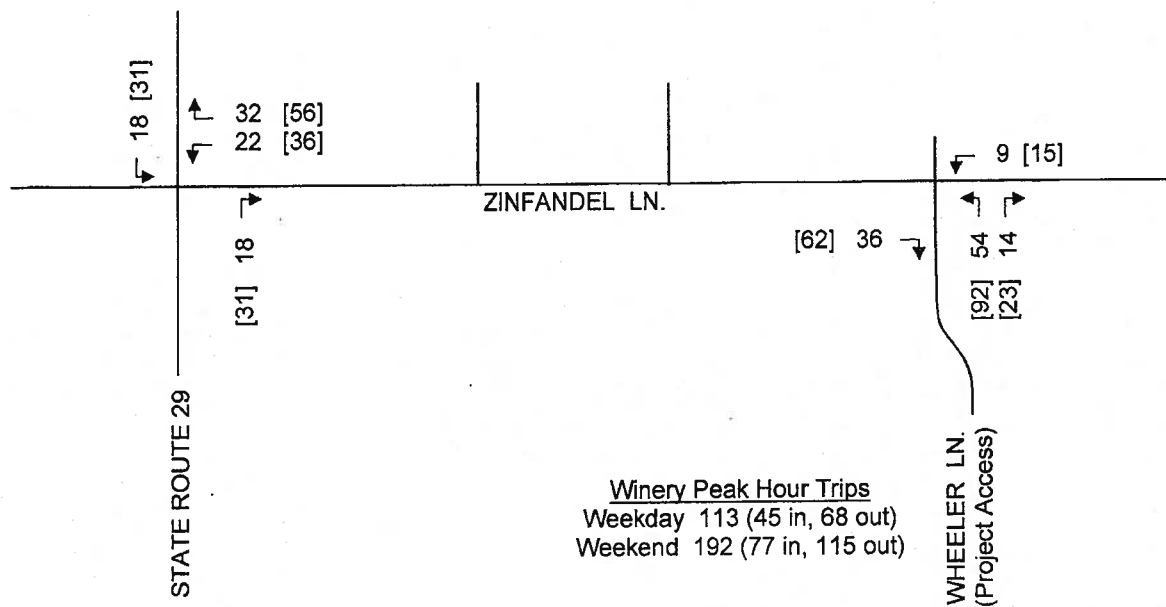


Peak Hour Current Use Permit Trips and Intersection Volumes  
 Summer Weekday P.M. Peak and [Saturday Afternoon Peak]

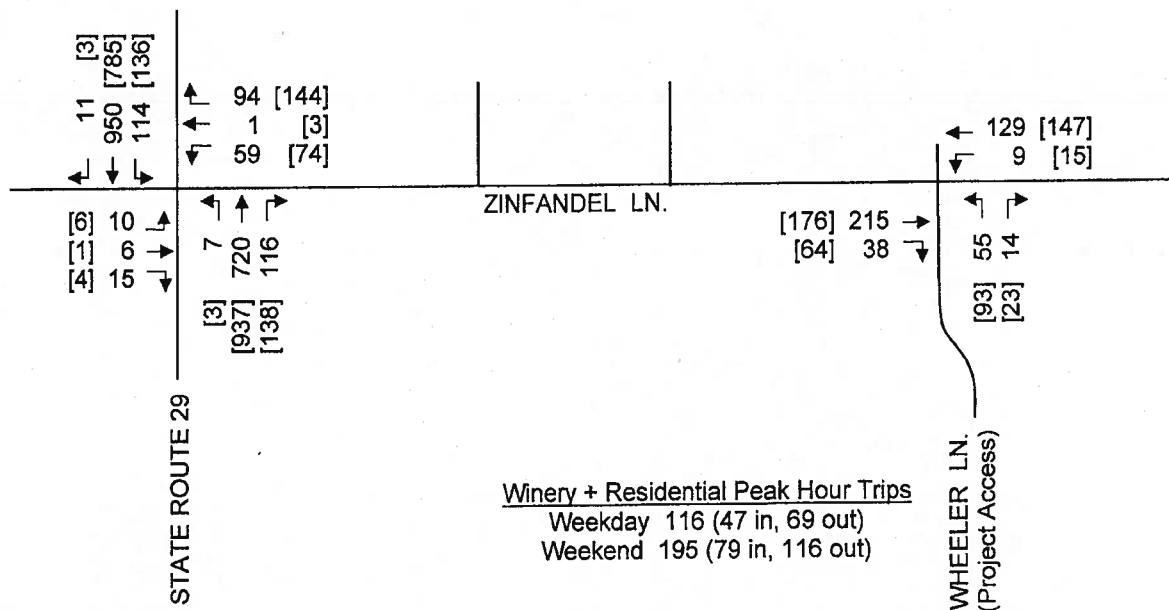


figure 2

# PROPOSED PERMIT TRIPS



# VOLUMES WITH PROPOSED USE PERMIT



NOT TO SCALE



Peak Hour Proposed Permit Trips and Intersection Volumes  
 Summer Weekday P.M. Peak and [Saturday Afternoon Peak]



omni-means

figure 3

**TABLE 1**  
**DAILY BASELINE TRIP GENERATION OF THE**  
**RAYMOND VINEYARDS WINERY**  
**AS PER THE CURRENT USE PERMIT**

Daily Traffic During a Typical Saturday:

• 400 visitors/2.8 per vehicle x 2 one-way trips	=	286 daily trips
• 28 employees x 2 one-way trips per employee	=	56 daily trips
• 6 trucks x 2 one-way trips per truck <sup>(1)</sup>	=	<u>12 daily trips</u>
		354 daily trips

Daily Traffic During a Typical Weekday:

• 165 visitors/2.6 per vehicle x 2 one-way trips	=	127 daily trips
• 28 employees x 2 one-way trips per employee	=	56 daily trips
• 6 trucks x 2 one-way trips per truck <sup>(1)</sup>	=	<u>12 daily trips</u>
		195 daily trips

Daily Saturday Traffic During Harvest Season (6 weeks):

• 400 visitors/2.8 per vehicle x 2 one-way trips	=	286 daily trips
• 40 employees x 2 one-way trips per employee	=	80 daily trips
• 17 trucks x 2 one-way trips per truck <sup>(2)</sup>	=	<u>34 daily trips</u>
		400 daily trips

- (1) During the 46-week non-harvest season, a maximum of 6 daily trucks would be generated related to routine deliveries associated with the winery production (750,000 gallons/2.38 gallons per case = 315,126 cases).

• 315,126 cases/2,310 cases per truck	=	136 glass delivery trucks
• 315,216 cases/1,232 cases per truck	=	256 wine shipment trucks
• 28 miscellaneous weekly deliveries	=	<u>1,288 miscellaneous trucks</u>
		1,680 annual trucks

1680 trucks/46 weeks = 37 weekly trucks or about 6 trucks per day.

- (2) During the 6-week harvest season, a maximum of 11 additional daily grape delivery trucks would be generated, calculated as follows:

- 750,000 gallons/165 gallons per ton = 4,545 tons of off-site grapes.
- 4,545 tons of off-site grapes/10 tons per truck/6 weeks = 76 trucks/week or about 11 trucks per day (assume truck would also pick up an empty bin).



**TABLE 2**  
**DAILY TRIP GENERATION WITH THE**  
**PROPOSED RAYMOND VINEYARDS USE PERMIT**

Daily Traffic During a Typical Saturday:

• 800 daily visitors/2.8 per vehicle x 2 one-way trips	=	572 daily trips
• 90 employees x 2 one-way trips per employee	=	180 daily trips
• 8 trucks x 2 one-way trips per truck <sup>(1)</sup>	=	<u>16 daily trips</u>
		768 daily trips

Daily Traffic During a Typical Weekday:

• 330 daily visitors/2.6 per vehicle x 2 one-way trips	=	254 daily trips
• 90 employees x 2 one-way trips per employee	=	180 daily trips
• 8 trucks x 2 one-way trips per truck <sup>(1)</sup>	=	<u>16 daily trips</u>
		450 daily trips

Daily Saturday Traffic During Harvest Season (6 weeks):

• 800 visitors/2.8 per vehicle x 2 one-way trips	=	572 daily trips
• 100 employees x 2 one-way trips per employee	=	200 daily trips
• 30 trucks x 2 one-way trips per truck <sup>(2)</sup>	=	<u>60 daily trips</u>
		832 daily trips

- (1) During the 46-week non-harvest season, a maximum of 8 daily trucks would be generated related to routine deliveries associated with the expanded winery production (1,500,000 gallons/2.38 gallons per case = 630,252 cases).

• 630,252 cases/2,310 cases per truck	=	273 glass delivery trucks
• 630,252 cases/1,232 cases per truck	=	512 wine shipment trucks
• 36 miscellaneous weekly deliveries	=	<u>1,656 miscellaneous trucks</u>
		2,441 annual trucks

2,441 trucks/46 weeks = 53 weekly trucks or about 8 trucks per day.

- (2) During the 6-week harvest season, a maximum of 22 additional daily grape delivery trucks would be generated, calculated as follows:

- 1,500,000 gallons/165 gallons per ton = 9,091 tons of off-site grapes.
- 9,091 tons of off-site grapes/10 tons per truck/6 weeks = 152 trucks/week or about 22 trucks per day (assume truck would also pick up an empty bin).



**TABLE 3**  
**PEAK HOUR OPERATIONS AT**  
**ZINFANDEL LANE/WHEELER LANE**  
**(RAYMOND VINEYARDS ACCESS )**  
**LOS AND SECONDS OF DELAY**

<u>Current Permit:</u>	<u>Weekday</u>	<u>Saturday</u>
Wheeler Lane northbound approach	B / 12 sec.	B / 12 sec.
Zinfandel Lane westbound approach	A / 1 sec.	A / 1 sec.
<u>Proposed Permit:</u>	<u>Weekday</u>	<u>Saturday</u>
Wheeler Lane northbound approach	B / 12 sec.	B / 14 sec.
Zinfandel Lane westbound approach	A / 1 sec.	A / 1 sec.



References:

- (1) Baymetrics Data Services, Daily traffic counts on Zinfandel Lane between Mountain View Avenue and Wheeler Lane, January 28, 2011 – February 3, 2011.
- (2) Caltrans, *2010 Volumes on the California State Highway System*, (on-line data base).
- (3) Omni-Means Engineers & Planners, traffic counts on October 29, 2011 (1-5 PM) & November 2, 2011 (3-6 PM).
- (4) Caltrans, *ibid.*
- (5) Caltrans, *Highway Design Manual – Fifth Edition*, July 1, 2004.
- (6) Caltrans, *ibid.*
- (7) Napa County, *Adopted Road and Street Standards*, revised August 31, 2004.
- (8) Caltrans, *Guidelines for Reconstruction of Intersections*, August 1985.
- (9) Caltrans, *Highway Design Manual – Fifth Edition*, July 1, 2004.



## **APPENDICES**

- Level of Service Definitions
- Level of Service Calculations
- Left Turn Lane Warrant Graphs
- Peak Hour Signal Warrants
  - Existing Counts





















# LEVELS-OF-SERVICE (LOS) CRITERIA FOR INTERSECTIONS

LEVEL OF SERVICE	TYPE OF FLOW	DELAY	MANEUVERABILITY	CONTROL DELAY (SECONDS/VEHICLE)		
				SIGNALIZED	UNSIGNALIZED	STOP
A	Stable Flow	Very slight delay. Progression is very favorable, with most vehicles arriving during the green phase not stopping at all.	Turning movements are easily made, and nearly all drivers find freedom of operation.	$< 10.0$ secs.	$< 10.0$	$< 10.0$
				$\leq 0.60$ v/c		
B	Stable Flow	Good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles.	$> 10$ and $\leq 20.0$ secs.	$> 10$ and $\leq 15.0$	$> 10$ and $\leq 15.0$
				$0.61 - 0.70$ v/c		
C	Stable Flow	Higher delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, although many still pass through the intersection without stopping.	Back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted.	$> 20$ and $\leq 35.0$ secs.	$> 15$ and $\leq 25.0$	$> 15$ and $\leq 25.0$
				$0.71 - 0.80$ v/c		
D	Approaching Unstable Flow	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop, and the proportion of vehicles of stopping declines. Individual cycle failures are noticeable.	Maneuverability is severely limited during short periods due to temporary back-ups.	$> 35$ and $\leq 55.0$ secs.	$> 25$ and $\leq 35.0$	$> 25$ and $\leq 35.0$
				$0.81 - 0.90$ v/c		
E	Unstable Flow	Generally considered to be the limit of acceptable delay. Indicative of poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences.	There are typically long queues of vehicles waiting upstream of the intersection.	$> 55$ and $\leq 80.0$ secs.	$> 35$ and $\leq 50.0$	$> 35$ and $\leq 50.0$
				$0.91 - 1.00$ v/c		
F	Forced Flow	Generally considered to be unacceptable to most drivers. Often occurs with over saturation. May also occur at high volume-to-capacity ratios. There are many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors.	Jammed conditions. Back-ups from other locations restrict or prevent movement. Volumes may vary widely, depending principally on the downstream back-up conditions.	$> 80.0$ secs.	$> 50.0$	$> 50.0$
				$> 1.00$ v/c		

References: 1. Highway Capacity Manual, Fourth Edition, Transportation Research Board, 2000, Contra Costa Transportation Authority (CCTA), Technical Procedures Update, Final, July 9, 2006













Raymond Vineyards Winery Project  
1: Zinfandel Lane & Wheeler Lane

Existing Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Signal Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	0	155	10	1	93	0	15	0	4	0	0	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	174	11	1	104	0	17	0	4	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	104			185			287	287	180	291	292	104
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	104			185			287	287	180	291	292	104
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			97	100	99	100	100	100
cM capacity (veh/h)	1487			1389			665	623	863	657	618	950
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	185	106	21	0								
Volume Left	0	1	17	0								
Volume Right	11	0	4	0								
cSH	1487	1389	699	1700								
Volume to Capacity	0.00	0.00	0.03	0.00								
Queue Length 95th (ft)	0	0	2	0								
Control Delay (s)	0.0	0.1	10.3	0.0								
Lane LOS		A	B	A								
Approach Delay (s)	0.0	0.1	10.3	0.0								
Approach LOS			B	A								
Intersection Summary												
Average Delay			0.7									
Intersection Capacity Utilization			18.8%	ICU Level of Service					A			
Analysis Period (min)			15									













Raymond Vineyards Winery Project  
2: West Zinfandel Lane & Hwy. 29

Existing Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SEL	SBT	SBR
Lane Configurations	↕			↕			↗			↗		
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Volume (veh/h)	7	4	11	32	1	50	5	518	74	73	684	8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	8	4	12	36	1	56	6	576	82	81	760	9
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1569	1596	764	1564	1559	617	769				658	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1569	1596	764	1564	1559	617	769				658	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	89	95	97	55	99	89	99				91	
cM capacity (veh/h)	73	97	404	79	102	490	845				930	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	24	92	6	658	81	769						
Volume Left	8	36	6	0	81	0						
Volume Right	12	56	0	82	0	9						
cSH	134	160	845	1700	930	1700						
Volume to Capacity	0.18	0.58	0.01	0.39	0.09	0.45						
Queue Length 95th (ft)	16	75	0	0	7	0						
Control Delay (s)	37.7	54.3	9.3	0.0	9.2	0.0						
Lane LOS	E	F	A		A							
Approach Delay (s)	37.7	54.3	0.1		0.9							
Approach LOS	E	F										
Intersection Summary												
Average Delay	4.1											
Intersection Capacity Utilization	56.8%			ICU Level of Service			B					
Analysis Period (min)	15											

Raymond Vineyards Winery Project  
1: Zinfandel Lane & Wheeler Lane




















Existing Saturday Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	0	127	9	6	106	0	17	0	5	0	0	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	148	10	7	123	0	20	0	6	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	123			158			290	290	153	296	295	123
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	123			158			290	290	153	296	295	123
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			97	100	99	100	100	100
cM capacity (veh/h)	1464			1421			660	617	893	650	613	928
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	158	130	26	0								
Volume Left	0	7	20	0								
Volume Right	10	0	6	0								
cSH	1464	1421	701	1700								
Volume to Capacity	0.00	0.00	0.04	0.00								
Queue Length 95th (ft)	0	0	3	0								
Control Delay (s)	0.0	0.4	10.3	0.0								
Lane LOS		A	B	A								
Approach Delay (s)	0.0	0.4	10.3	0.0								
Approach LOS			B	A								
Intersection Summary												
Average Delay				1.0								
Intersection Capacity Utilization				20.5%	ICU Level of Service			A				
Analysis Period (min)				15								



















Raymond Vineyards Winery Project  
2: West Zinfandel Lane & Hwy. 29

Existing Saturday Peak Hour

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Sign Control	Stop			Stop			Free		Free		Free		Free	
Grade	0%			0%			0%		0%		0%		0%	
Volume (veh/h)	4	1	3	33	2	70	2	674	80	79	565	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flowrate (vph)	4	1	3	36	2	76	2	733	87	86	614	2		
Pedestrians														
Lane Width (ft)														
Walking Speed (ft/s)														
Percent Blockage														
Right turn flare (veh)														
Median type	None			None										
Median storage (veh)														
Upstream signal (ft)														
pX, platoon unblocked														
vC, conflicting volume	1601	1611	615	1570	1568	776	616					820		
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	1601	1611	615	1570	1568	776	616					820		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1					4.1		
tC, 2 stage (s)														
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					2.2		
p0 queue free %	93	99	99	56	98	81	100					89		
cM capacity (veh/h)	62	93	491	81	99	397	964					809		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2								
Volume Total	9	114	2	820	86	616								
Volume Left	4	36	2	0	86	0								
Volume Right	3	76	0	87	0	2								
cSH	99	174	964	1700	809	1700								
Volume to Capacity	0.09	0.66	0.00	0.48	0.11	0.36								
Queue Length 95th (ft)	7	95	0	0	9	0								
Control Delay (s)	45.0	58.3	8.7	0.0	10.0	0.0								
Lane LOS	E	F	A		A									
Approach Delay (s)	45.0	58.3	0.0		1.2									
Approach LOS	E	F												
Intersection Summary														
Average Delay				4.8										
Intersection Capacity Utilization				61.6%	ICU Level of Service			B						
Analysis Period (min)				15										



















Raymond Vineyards Winery Project  
1: Zinfandel Lane & Wheeler Lane

Baseline Weekday PM Peak Hour

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control		Free			Free			Stop			Stop		
Grade		0%			0%			0%			0%		
Volume (veh/h)	0	215	18	2	129	0	29	0	9	0	0	0	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	
Hourly flow rate (vph)	0	242	20	2	145	0	33	0	10	0	0	0	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type							None			None			
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	145			262				401	401	252	411	411	145
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	145			262				401	401	252	411	411	145
tC, single (s)	4.1			4.1				7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)													
tF (s)	2.2			2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100				94	100	99	100	100	100
cM capacity (veh/h)	1437			1302				559	537	787	543	530	902
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	262	147	43	0									
Volume Left	0	2	33	0									
Volume Right	20	0	10	0									
cSH	1437	1302	600	1700									
Volume to Capacity	0.00	0.00	0.07	0.00									
Queue Length 95th (ft)	0	0	6	0									
Control Delay (s)	0.0	0.1	11.5	0.0									
Lane LOS		A	B	A									
Approach Delay (s)	0.0	0.1	11.5	0.0									
Approach LOS			B	A									
Intersection Summary													
Average Delay			1.1										
Intersection Capacity Utilization			22.4%		ICU Level of Service		A						
Analysis Period (min)			15										













Raymond Vineyards Winery Project  
2: West Zinfandel Lane & Hwy. 29

Baseline Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign/Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	6	15	49	1	79	7	720	107	105	950	11
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	11	7	17	54	1	88	8	800	119	117	1056	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2199	2229	1062	2184	2176	859	1068			919		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2199	2229	1062	2184	2176	859	1068			919		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	46	81	94	0	97	75	99			84		
cM capacity (veh/h)	21	36	272	23	39	356	653			743		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	34	143	8	919	117	1068						
Volume Left	11	54	8	0	117	0						
Volume Right	17	88	0	119	0	12						
cSH	44	55	653	1700	743	1700						
Volume to Capacity	0.79	2.62	0.01	0.54	0.16	0.63						
Queue Length 95th (ft)	76	368	1	0	14	0						
Control Delay (s)	215.9	894.8	10.6	0.0	10.7	0.0						
Lane LOS	F	F	B		B							
Approach Delay (s)	215.9	894.8	0.1		1.1							
Approach LOS	F	F										
Intersection Summary												
Average Delay	59.9											
Intersection Capacity Utilization	74.7%											
ICU Level of Service	D											
Analysis Period (min)	15											

Raymond Vineyards Winery Project  
1: Zinfandel Lane & Wheeler Lane













Baseline Saturday Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	0	176	16	12	147	0	33	0	11	0	0	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	205	19	14	171	0	38	0	13	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	171			223			413	413	214	426	422	171
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	171			223			413	413	214	426	422	171
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tE (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			93	100	98	100	100	100
cM capacity (veh/h)	1406			1346			545	524	826	527	518	873
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	223	185	51	0								
Volume Left	0	14	38	0								
Volume Right	19	0	13	0								
cSH	1406	1346	596	1700								
Volume to Capacity	0.00	0.01	0.09	0.00								
Queue Length 95th (ft)	0	1	7	0								
Control Delay (s)	0.0	0.7	11.6	0.0								
Lane LOS		A	B	A								
Approach Delay (s)	0.0	0.7	11.6	0.0								
Approach LOS			B	A								
Intersection Summary												
Average Delay			1.6									
Intersection Capacity Utilization			27.6%	ICU Level of Service					A			
Analysis Period (min)			15									



















Raymond Vineyards Winery Project  
2: West Zinfandel Lane & Hwy. 29

Baseline Saturday Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	6	1	4	51	3	108	3	937	115	113	785	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	1	4	55	3	117	3	1018	125	123	853	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2245	2251	855	2191	2190	1081	857			1143		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2245	2251	855	2191	2190	1081	857			1143		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tP (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	50	97	99	0	91	56	100			80		
cM capacity (veh/h)	13	33	358	26	36	265	784			611		
Direction Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	12	176	3	1143	123	857						
Volume Left	7	55	3	0	123	0						
Volume Right	4	117	0	125	0	3						
cSH	22	67	784	1700	611	1700						
Volume to Capacity	0.54	2.63	0.00	0.67	0.20	0.50						
Queue Length 95th (ft)	40	436	0	0	19	0						
Control Delay (s)	291.5	870.1	9.6	0.0	12.4	0.0						
Lane LOS	F	F	A		B							
Approach Delay (s)	291.5	870.1	0.0		1.6							
Approach LOS	F	F										
Intersection Summary												
Average Delay			68.4									
Intersection Capacity Utilization			82.9%	IGU Level of Service						E		
Analysis Period (min)			15									













Raymond Vineyards Winery Project  
1: Zinfandel Lane & Wheeler Lane

Baseline+Project Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	215	38	9	129	0	55	0	14	0	0	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	242	43	10	145	0	62	0	16	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None				None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	145			284			428	428	263	444	449	145
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	145			284			428	428	263	444	449	145
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF(s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			88	100	98	100	100	100
cM capacity (veh/h)	1437			1278			534	515	776	511	501	902
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	284	155	78	0								
Volume Left	0	10	62	0								
Volume Right	43	0	16	0								
cSH	1437	1278	570	1700								
Volume to Capacity	0.00	0.01	0.14	0.00								
Queue Length 95th (ft)	0	1	12	0								
Control Delay (s)	0.0	0.6	12.3	0.0								
Lane LOS		A	B	A								
Approach Delay (s)	0.0	0.6	12.3	0.0								
Approach LOS			B	A								
Intersection Summary												
Average Delay			2.0									
Intersection Capacity Utilization			24.8%	ICU Level of Service						A		
Analysis Period (min)			15									













Raymond Vineyards Winery Project  
2: West Zinfandel Lane & Hwy. 29

Baseline+Project Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↙	↘		↙	↘	
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Volume (veh/h)	10	6	15	59	1	94	7	720	116	114	950	11
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	11	7	17	66	1	104	8	800	129	127	1056	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2236	2259	1062	2209	2201	864	1068			929		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2236	2259	1062	2209	2201	864	1068			929		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	38	80	94	0	97	70	99			83		
CM capacity (veh/h)	18	34	272	22	37	353	653			736		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	34	171	8	929	127	1068						
Volume Left	11	66	8	0	127	0						
Volume Right	17	104	0	129	0	12						
cSH	39	51	653	1700	736	1700						
Volume to Capacity	0.88	3.34	0.01	0.55	0.17	0.63						
Queue Length 95th (ft)	83	Err	1	0	15	0						
Control Delay (s)	262.5	Err	10.6	0.0	10.9	0.0						
Lane LOS	F	F	B		B							
Approach Delay (s)	262.5	Err	0.1		1.2							
Approach LOS	F	F										
Intersection Summary												
Average Delay	736.7											
Intersection Capacity Utilization	76.8%											
ICU Level of Service	D											
Analysis Period (min)	15											

Raymond Vineyards Winery Project  
1: Zinfandel Lane & Wheeler Lane













Baseline+Project Saturday Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	0	176	64	15	147	0	93	0	23	0	0	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	205	74	17	171	0	108	0	27	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	171			279			448	448	242	474	485	171
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	171			279			448	448	242	474	485	171
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tE (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			79	100	97	100	100	100
cM capacity (veh/h)	1406			1284			516	499	797	479	476	873
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	279	188	135	0								
Volume Left	0	17	108	0								
Volume Right	74	0	27	0								
cSH	1406	1284	555	1700								
Volume to Capacity	0.00	0.01	0.24	0.00								
Queue Length 95th (ft)	0	1	24	0								
Control Delay (s)	0.0	0.8	13.6	0.0								
Lane LOS		A	B	A								
Approach Delay (s)	0.0	0.8	13.6	0.0								
Approach LOS			B	A								
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization			33.4%	ICU Level of Service					A			
Analysis Period (min)			15									



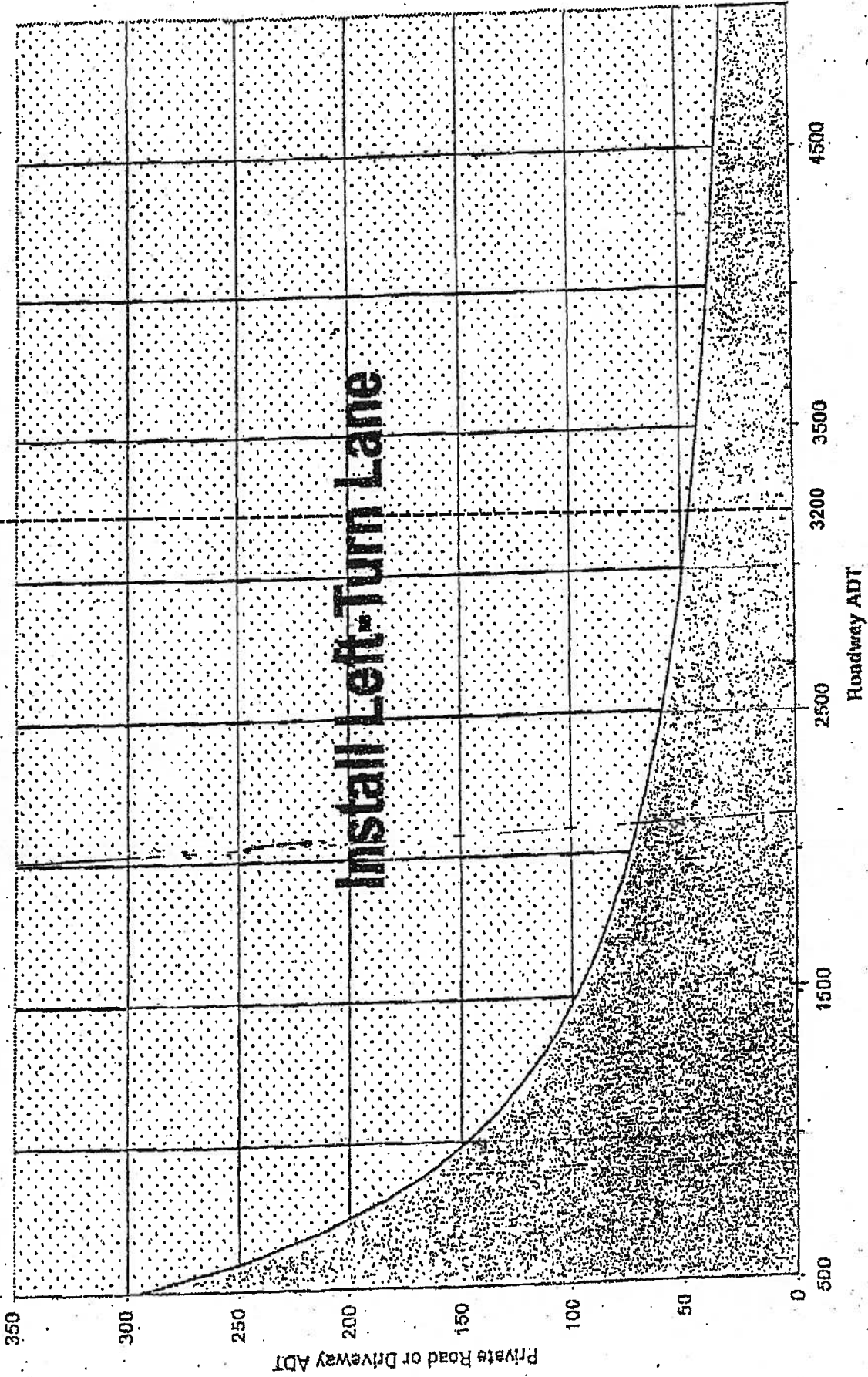
Raymond Vineyards Winery Project  
2: West Zinfandel Lane & Hwy. 29

Baseline+Project Saturday Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↗		↗	↗	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	6	1	4	74	3	144	3	937	138	136	785	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	1	4	80	3	157	3	1018	150	148	853	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
VC conflicting volume	2334	2326	855	2254	2252	1093	857			1168		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2334	2326	855	2254	2252	1093	857			1168		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	15	96	99	0	90	40	100			75		
cM capacity (veh/h)	8	28	358	23	31	260	784			598		
Direction Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	12	240	3	1168	148	857						
Volume Left	7	80	3	0	148	0						
Volume Right	4	157	0	150	0	3						
cSH	13	57	784	1700	598	1700						
Volume to Capacity	0.90	4.24	0.00	0.69	0.25	0.50						
Queue Length 95th (ft)	51	Err	0	0	24	0						
Control Delay (s)	589.5	Err	9.6	0.0	13.0	0.0						
Lane LOS	F	F	A		B							
Approach Delay (s)	589.5	Err	0.0		1.9							
Approach LOS	F	F										
Intersection Summary												
Average Delay			992.9									
Intersection Capacity Utilization			89.4%		ICU Level of Service						E	
Analysis Period (min)			15									

**Left-Turn Lane Warrant \***

480 (450 Project + 30 Residential)

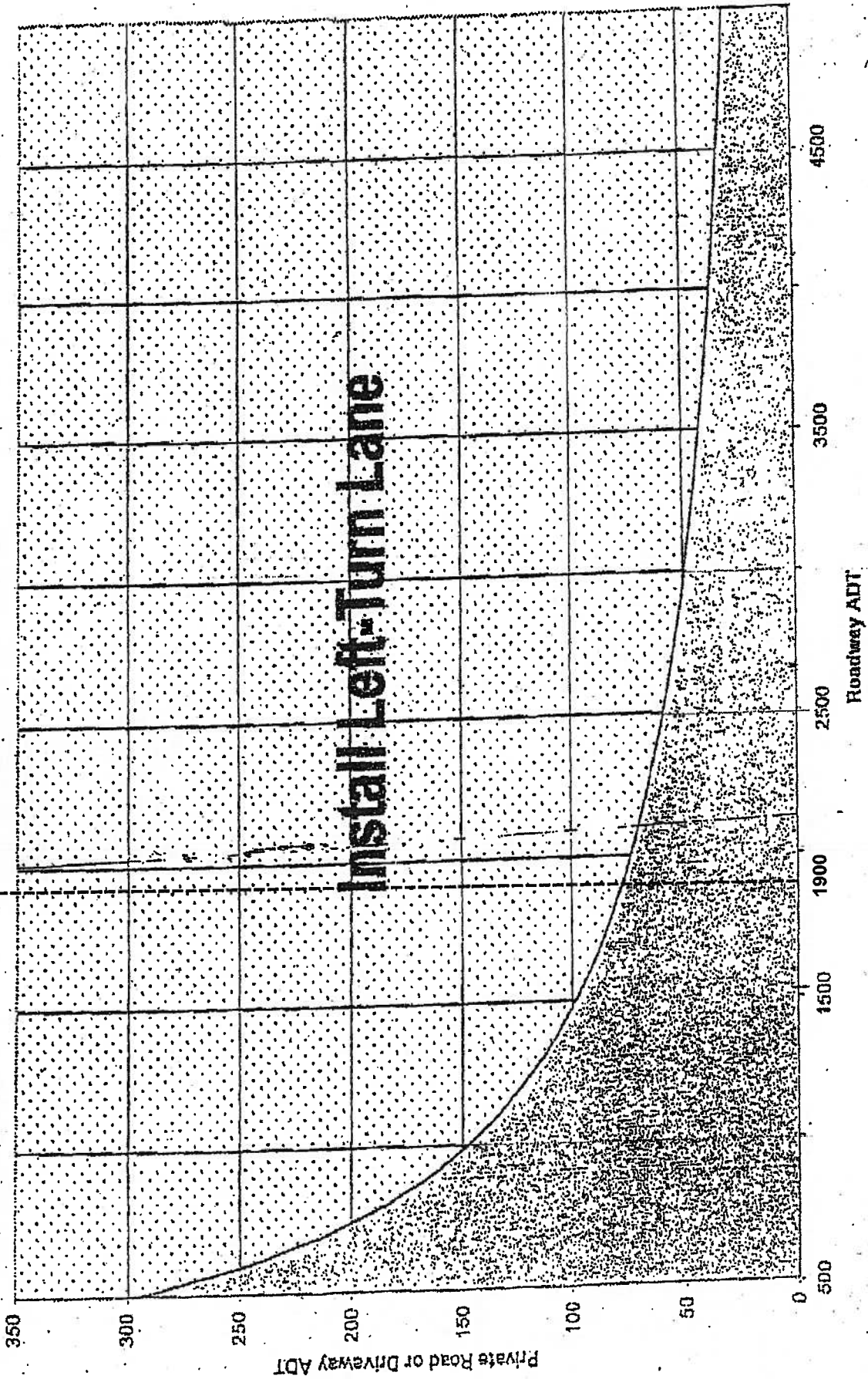


☐ No Left-Turn Lane Necessary

ZINFANDEL LANE / WHEELER LANE:  
WEEKDAY WITH PROPOSED PROJECT VOLUMES  
LEFT TURN LANE WARRANTED?: YES

# Left-Turn Lane Warrant

800 (768 Project + 30 Residential)



☐ No Left-Turn Lane Necessary

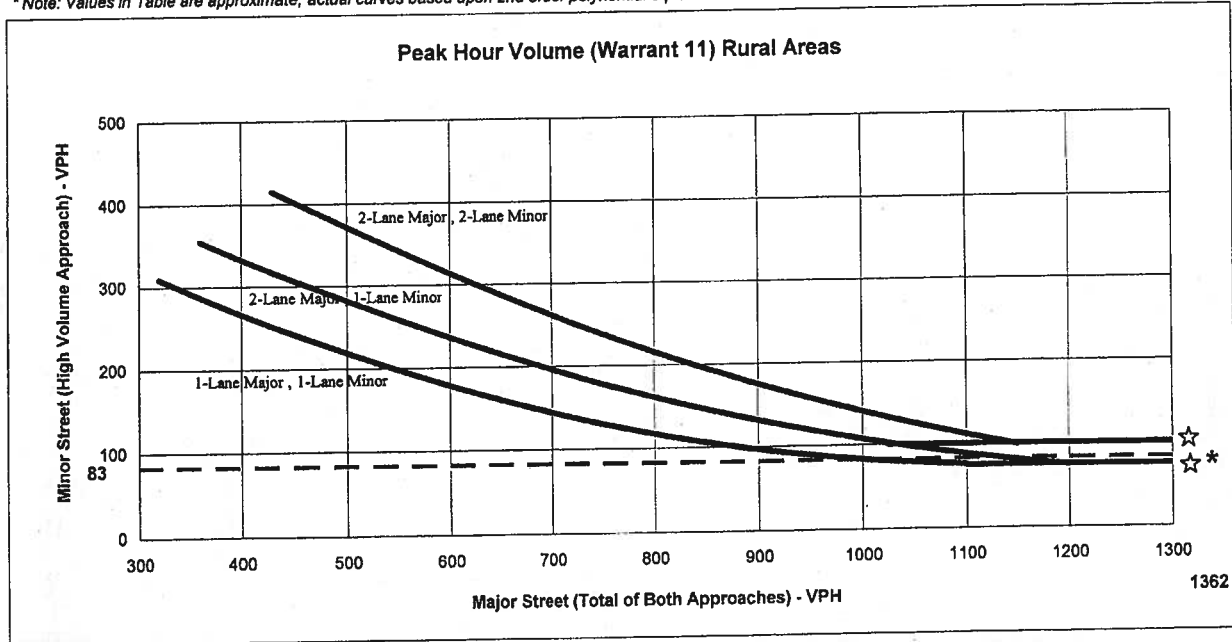
ZINFANDEL LANE / WHEELER LANE:

SATURDAY WITH PROPOSED PROJECT VOLUMES

LEFT TURN LANE WARRANTED?: YES

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
370	280				
400	270	460	297	430	410
500	215	500	290	500	380
600	185	600	230	600	310
700	140	700	198	700	265
800	115	800	170	800	210
900	99	900	125	900	180
1000	85	1000	105	1000	140
1100	75	1100	90	1100	110
1200	75	1200	75	1150	100
1300	75	1300	75	1300	100

\* Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation



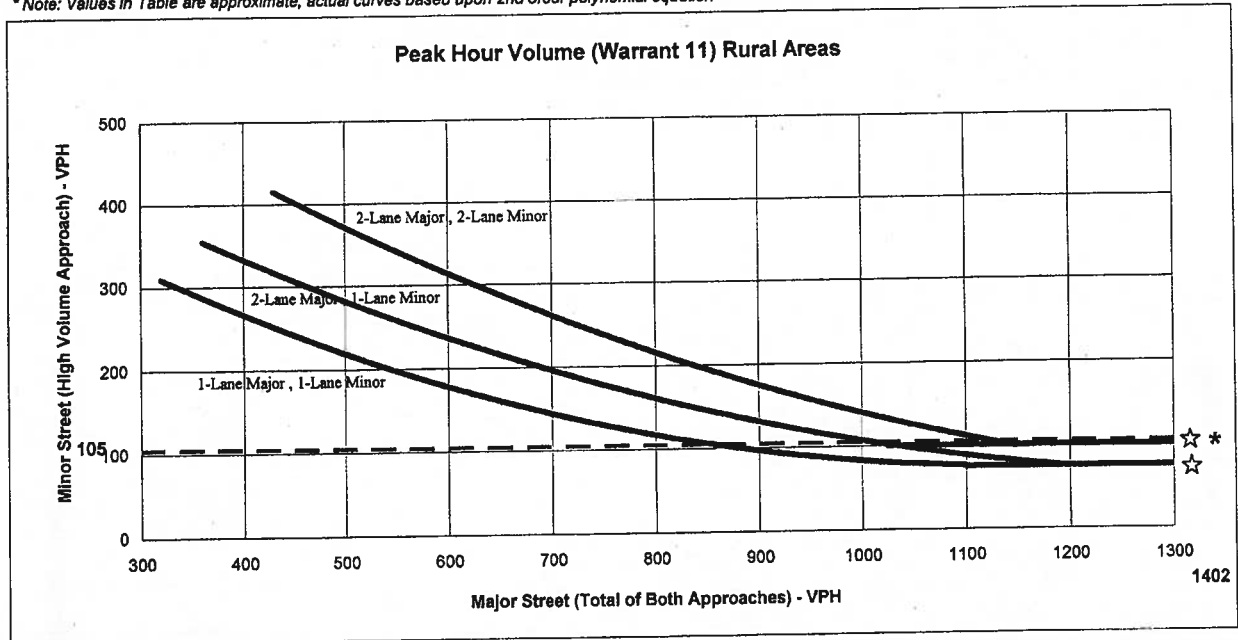
NOTE:  
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET  
APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER  
THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Intersection: Hwy. 29 / Zinfandel Lane  
Scenario: Existing Weekday Peak Hour Conditions  
Minor St. Volume: 83  
Major St. Volume: 1362  
Warrant Met?: Yes



Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
370	280				
400	270	460	297	430	410
500	215	500	290	500	380
600	185	600	230	600	310
700	140	700	198	700	265
800	115	800	170	800	210
900	99	900	125	900	180
1000	85	1000	105	1000	140
1100	75	1100	90	1100	110
1200	75	1200	75	1150	100
1300	75	1300	75	1300	100

\* Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation

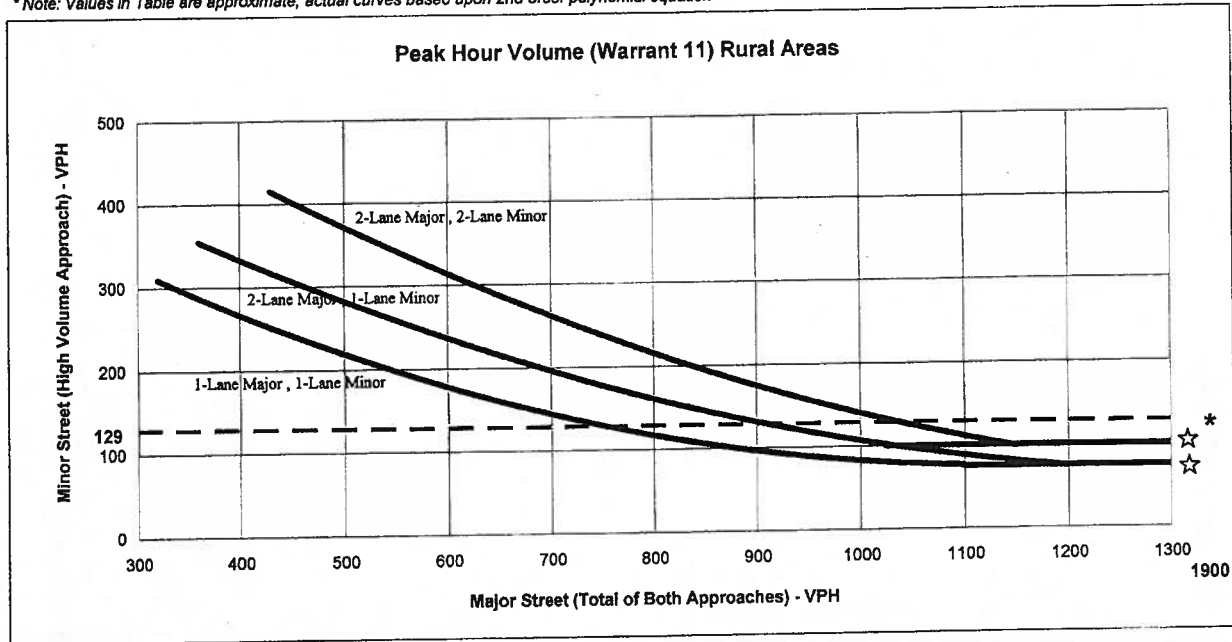


☆ NOTE:  
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Intersection: Hwy. 29 / Zinfandel Lane  
 Scenario: Existing Saturday Peak Hour Conditions  
 Minor St. Volume: 105  
 Major St. Volume: 1402  
 Warrant Met?: Yes

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
370	280				
400	270	460	297	430	410
500	215	500	290	500	380
600	185	600	230	600	310
700	140	700	198	700	265
800	115	800	170	800	210
900	99	900	125	900	180
1000	85	1000	105	1000	140
1100	75	1100	90	1100	110
1200	75	1200	75	1150	100
1300	75	1300	75	1300	100

\* Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation

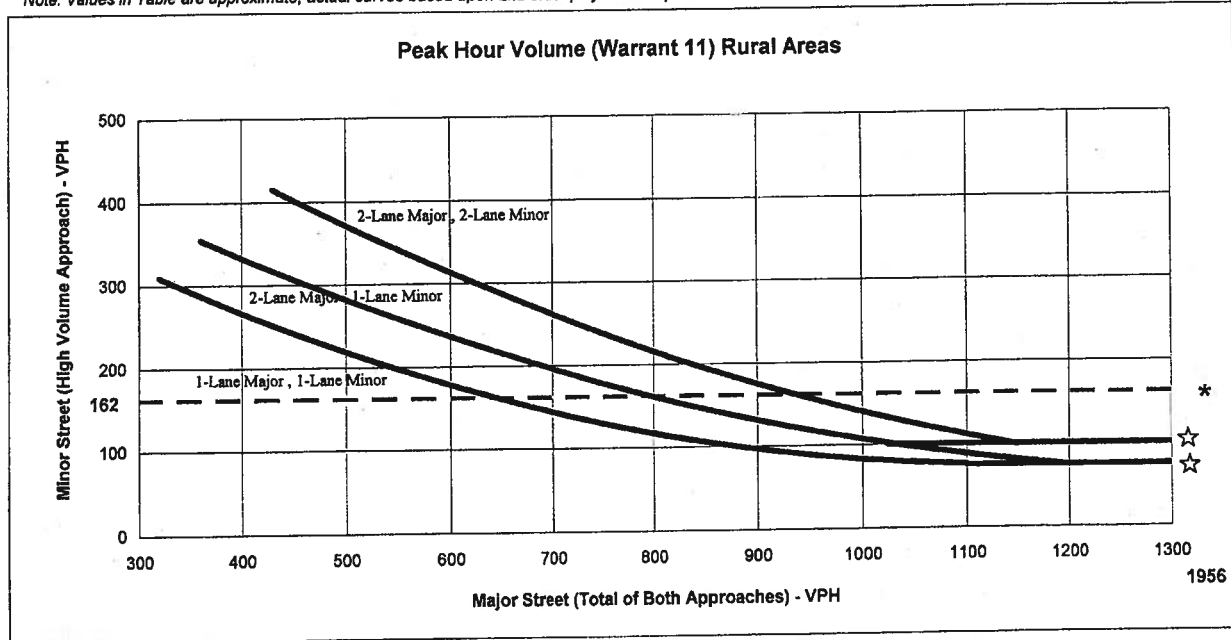


☆ NOTE:  
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET  
APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER  
THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Intersection: Hwy. 29 / Zinfandel Lane  
Scenario: Baseline (Permitted Use) Weekday Peak Hour Conditions  
Minor St. Volume: 129  
Major St. Volume: 1900  
Warrant Met?: Yes

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
370	280				
400	270	460	297	430	410
500	215	500	290	500	380
600	185	600	230	600	310
700	140	700	198	700	265
800	115	800	170	800	210
900	99	900	125	900	180
1000	85	1000	105	1000	140
1100	75	1100	90	1100	110
1200	75	1200	75	1150	100
1300	75	1300	75	1300	100

\* Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation

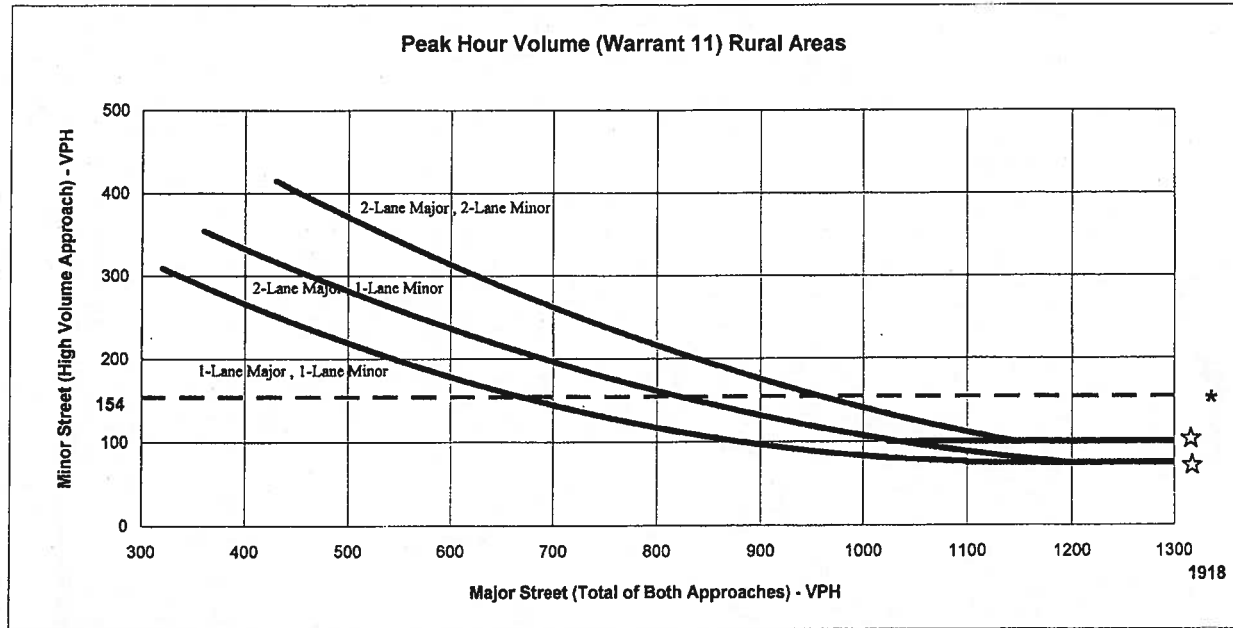


NOTE:  
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Intersection: Hwy. 29 / Zinfandel Lane  
 Scenario: Baseline (Permitted Use) Saturday Peak Hour Conditions  
 Minor St. Volume: 162  
 Major St. Volume: 1956  
 Warrant Met?: Yes

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
370	280				
400	270	460	297	430	410
500	215	500	290	500	380
600	185	600	230	600	310
700	140	700	198	700	265
800	115	800	170	800	210
900	99	900	125	900	180
1000	85	1000	105	1000	140
1100	75	1100	90	1100	110
1200	75	1200	75	1150	100
1300	75	1300	75	1300	100

\* Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation

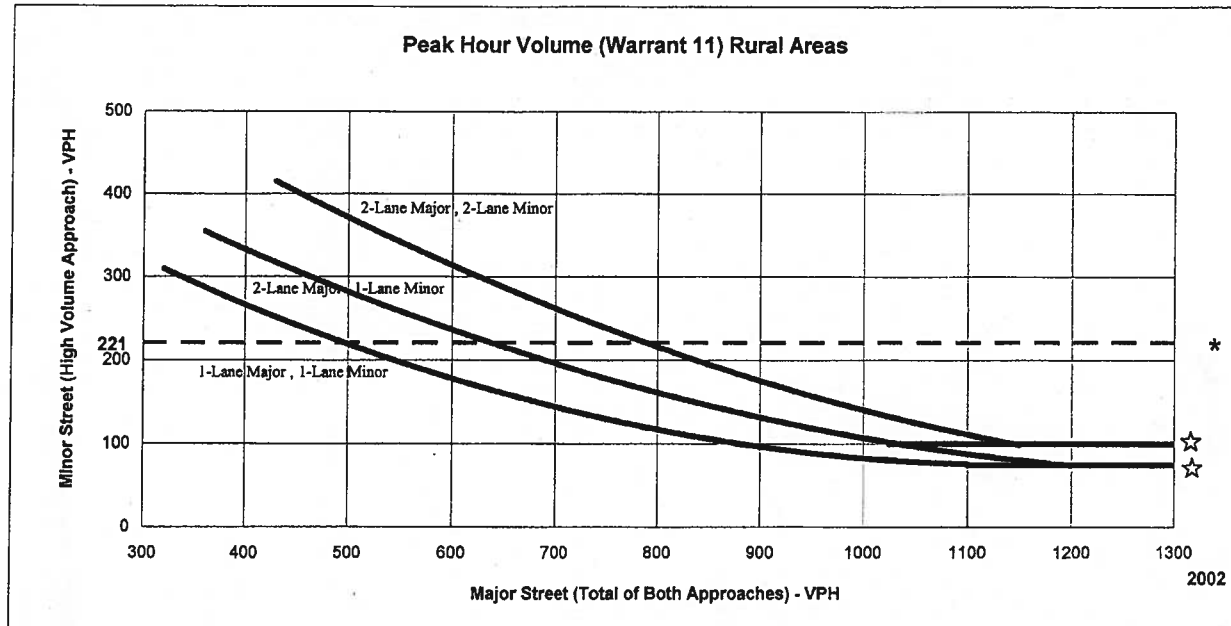


☆ NOTE:  
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET  
APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER  
THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Intersection: Hwy. 29 / Zinfandel Lane  
Scenario: With Proposed Project Weekday Peak Hour Conditions  
Minor St. Volume: 154  
Major St. Volume: 1918  
Warrant Met?: Yes

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
370	280				
400	270	460	297	430	410
500	215	500	290	500	380
600	185	600	230	600	310
700	140	700	198	700	265
800	115	800	170	800	210
900	99	900	125	900	180
1000	85	1000	105	1000	140
1100	75	1100	90	1100	110
1200	75	1200	75	1150	100
1300	75	1300	75	1300	100

\* Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation



☆ NOTE:  
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR 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.

Intersection: Hwy. 29 / Zinfandel Lane  
 Scenario: With Proposed Project Saturday Peak Hour Conditions  
 Minor St. Volume: 221  
 Major St. Volume: 2002  
 Warrant Met?: Yes



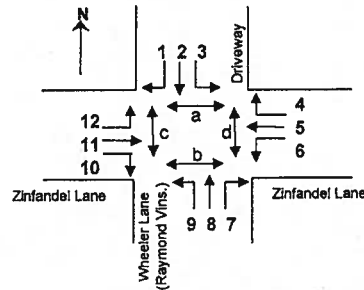
# Intersection Volume Worksheet

Raymond Vineyards Winery

Zinfandel Lane / Wheeler Lane (Raymond Vnyrds. Winery Access)

11/2/11 Wed. & 10/29/11 Sat.

Weather: Clear



Weekday PM	1	2	3	4	5	6	7	8	9	10	11	12	15 MIN.	60 MIN.	Pds&Bicy a-b/c-d	Site Access IN	OUT
3:00-3:15					21	0	2		6	3	32		64		0	3	8
3:15-3:30					26	0	1		3	0	42		72		0	0	4
3:30-3:45					21	0	1		4	3	36		65		0	3	5
3:45-4:00					11	1	0		2	4	39		57	258	0	5	2
4:00-4:15					26	0	2		6	2	40		76	270	0	2	8
4:15-4:30					21	0	1		2	0	32		56	254	0	0	3
4:30-4:45					25	0	1		4	3	38		71	260	0 - 1AB / 0 - 0	3	5
4:45-5:00					21	0	2		1	0	45		69	272	0 - 1AB / 0 - 0	0	3
5:00-5:15					19	0	3		3	0	34		59	255	0	0	6
5:15-5:30					12	0	5		2	0	36		55	254	0	0	7
5:30-5:45					21	0	2		3	0	29		55	238	0	0	5
5:45-6:00					22	1	2		4	1	27		57	226	0	2	6
<b>PeakHour:</b>																	
4:00-5:00					93	0	6		13	5	155		272	272	0 - 2AB / 0 - 0	5	19
3:00-4:00					79	1	4		15	10	149	phf = 0.89				11	19
Balanced					93	1	4		15	10	155						

Saturday Mid-day	1	2	3	4	5	6	7	8	9	10	11	12	15 MIN.	60 MIN.	Pds&Bicy a-b/c-d	Site Access IN	OUT
1:00-1:15					17	2	0		5	6	21		51			8	5
1:15-1:30					21	0	0		0	3	32		56			3	0
1:30-1:45					25	3	1		1	5	20		55			8	2
1:45-2:00					26	1	1		1	5	33		67	229		6	2
2:00-2:15					18	0	2		3	6	38		67	245		6	5
2:15-2:30					30	1	0		1	1	44		77	266		2	1
3:30-3:45					20	0	1		4	1	40		66			1	5
3:45-4:00					23	2	2		3	5	29		64			7	5
4:00-4:15					23	2	1		6	1	23		56			3	7
4:15-4:30					20	0	1		4	2	15		42	228		2	5
<b>PeakHour:</b>																	
3:30-4:30					86	4	5		17	9	107		228				
Balanced					106	6	5		17	9	127	phf = 0.86		270	266	15	22

wkday in 0  
wkday out 0

AB = Adult Bike

wkend in 0  
wkend out 0

