

# George W. Nickelson, P.E.

Traffic Engineering • Transportation Planning

June 12, 2007

Mr. Glenn Workman  
General Manager  
Robert Mondavi Winery  
7801 St. Helena Highway  
Oakville, CA 94562

Subject: *Traffic Analysis for Increased Bottling Activity at the Robert Mondavi Oakville Winery (State Route 29 Approximate Postmile 23.1)*

Dear Mr. Workman:

I am pleased to provide this focused traffic study for proposed increased bottling activity at the existing Robert Winery on State Route 29 (SR 29) in Napa County. This study reflects our discussions and project meeting and input from Mr. Larry Bogner of the Napa County Public Works Department.

As outlined in the report, the Winery's north (employee/service vehicle) access on SR 29 would remain acceptable. The existing employee/service vehicle driveway would continue to operate satisfactorily with driveway design features that are consistent with Caltrans standards.

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

Sincerely,



George W. Nickelson, P.E.

## **1. Project Description**

The proposed project would not involve any changes in the Winery production or visitor activity. The project essentially consists of an increase in the bottling production with bulk wine shipments received from other wineries. It is anticipated that most if not all of the bulk wine transported would be crushed and fermented at other wineries owned by Constellation Brands, Inc. (the owner of the Robert Mondavi Winery). On an annual basis, about 1.4 million additional gallons of wine would be delivered to the Robert Mondavi Winery for bottling.

The increased bottling activity would generate additional truck trips – tanker truck deliveries of raw wine, deliveries of bottling supplies and shipments of finished cases of wine. The Winery's authorized employment level would serve the expanded bottling activity. The additional bottling activities would not require added employment beyond what is currently authorized at the winery by the County. The increased truck traffic would be focused at the Winery's north driveway, the access point for all existing employee and production related trips. The bottling activities occur Monday through Thursday of each week – the proposed project would have no effect on weekend conditions.

## **2. Existing Traffic Conditions**

### **a. Traffic Operations**

State Route 29 (SR 29) provides the primary north-south Napa County access and is essentially a two-lane rural road in the area of the Robert Mondavi Winery. Based on Caltrans records, SR 29 has an average weekday traffic volume (south of SR 128 - Rutherford Road) of 24,600 vehicles and a peak month daily volume of 27,000 vehicles.<sup>(1)</sup> These volumes are approaching the roadway's capacity - the operation would be categorized as in the Level of Service (LOS) "D-E" range.

At the Winery access intersections, SR 29 has two travel lanes, paved shoulders and a two-way-left-turn-lane (TWLTL). Southbound SR 29 also has pavement taper areas to enhance right-turns in/out of the Winery. It is noted that on the east side of SR 29, a driveway serving the Nickel & Nickel Winery is located about 60 feet south of the north Robert Mondavi Winery driveway (measured between the centerlines of the driveways).

Traffic counts were conducted at the SR 29/North Winery access intersection during a weekday PM peak commute period (4-6 PM).<sup>(2)</sup> Based on these counts, peak hour volumes were identified and adjusted to reflect higher peak seasonal traffic flows on SR 29. Specifically, the peak month daily volumes are about 10% higher than the average month volumes, and this 10% increase was applied to the peak hour volumes counted for this study. In addition, the volumes in/out of the site driveway were adjusted to reflect the County authorized levels of winery employment. Using these adjusted peak hour volumes, the traffic operations were calculated for the north Winery driveway intersection with SR 29. During the weekday evening peak hour, the delays for vehicles outbound

from the north Winery access are moderate - the outbound traffic operates at LOS "C" (LOS definitions and calculations are attached as appendices).

It is noted that the calculated delays are comparable to randomly sampled actual delays measured for vehicles exiting the site.

#### b. Vehicle Speeds and Sight Distance on SR 29

The primary issues for access design are the vehicle visibility and operation relative to vehicles traveling on SR 29 and vehicles turning out of the Winery access. The required vehicle visibility or "corner sight distance" is a function of the travel speeds on SR 29. 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."<sup>(3)</sup> Based on radar surveys, the "critical" vehicle speed (85% of all surveyed vehicles travel at or below the critical speed) along SR 29 at the Winery were observed to be 54-55 miles per hour (mph) during the weekday PM peak period.<sup>(4)</sup> Based on Caltrans design standards, these vehicle speeds require a sight distance of 500 feet, measured along the travel lanes on SR 29.<sup>(5)</sup>

The Winery's north access intersection is located on a straight section of SR 29. Field observations indicate sight distance to the north and south is well in excess of the 500 feet needed for the measured vehicle speeds.

## **2. Traffic Effects of the Proposed Increased Bottling Activity**

#### a. Changes in Traffic Operations

A key element of this analysis is to clearly differentiate between the Winery's existing visitor and employee/service vehicle traffic flows and the added trips generated by the increased bottling activity. The current Robert Mondavi Winery has a certain amount of existing traffic that reflects visitors, employees, deliveries of equipment and supplies, shipping and other periodic deliveries.

The additional daily traffic generation associated with increased bottling activity has been calculated in Table 1.<sup>(6)</sup> On a typical weekday, 8 truck vehicle trips would be generated. The driveway counts indicate that during the weekday afternoon peak period, Winery traffic is distributed about 30% to/from the north and 70% to/from the south. This additional traffic would only occur Monday through Thursday - there would be no bottling activity during the Friday-Sunday weekend periods.

Of the 8 additional daily truck trips, it is estimated that 2 truck trips would be added during the PM peak hour. These trips were added to the existing driveway volumes and the LOS was recalculated. With the increased traffic, the north driveway operation would remain at LOS "C".

### c. Site Access Design Issues

As noted in the project description, the existing Mondavi north driveway serves employee/service vehicle access. Sight distances to the north and the south are well in excess of the minimum sight distances needed for the measured vehicle speeds.

The driveway is adjacent to the existing TWLTL in SR 29. Thus, employees and service vehicles would continue to have a TWLTL to enhance inbound and outbound left-turn movements.

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

The additional bottling activity would result in only 8 additional daily truck trips at the Winery's north driveway. The PM peak hour operation of this driveway would remain very stable (LOS "C") with the added trips.

The existing north Winery driveway has a very adequate design with ample sight distance and a two-way-left-turn-lane (TWLTL) to enhance left turn movements in/out of the driveway.

**TABLE 1**  
**ADDED DAILY TRIP GENERATION FOR**  
**INCREASED BOTTLING ACTIVITY AT THE**  
**ROBERT MONDAVI WINERY**

Additional Daily Traffic During a Typical Monday-Thursday:

- 4 trucks x 2 one-way trips<sup>(1)</sup> = 8 daily trips

(1) The project's 1.4 million gallon annual bottling increase would equate to 588,235 additional annual cases of bottled product (assuming 2.38 gallons per case). A maximum of 4 daily trucks would be generated, calculated as follows:

- 1.4 million gals/6,000 gallon trucks = 233 wine delivery trucks
- 588,235 cases/2,520 cases per truck = 233 glass delivery trucks
- 588,235 cases/1,236 cases per truck = 476 wine shipment trucks
- 2 miscellaneous weekly deliveries x 52 weeks = 104 miscellaneous trucks

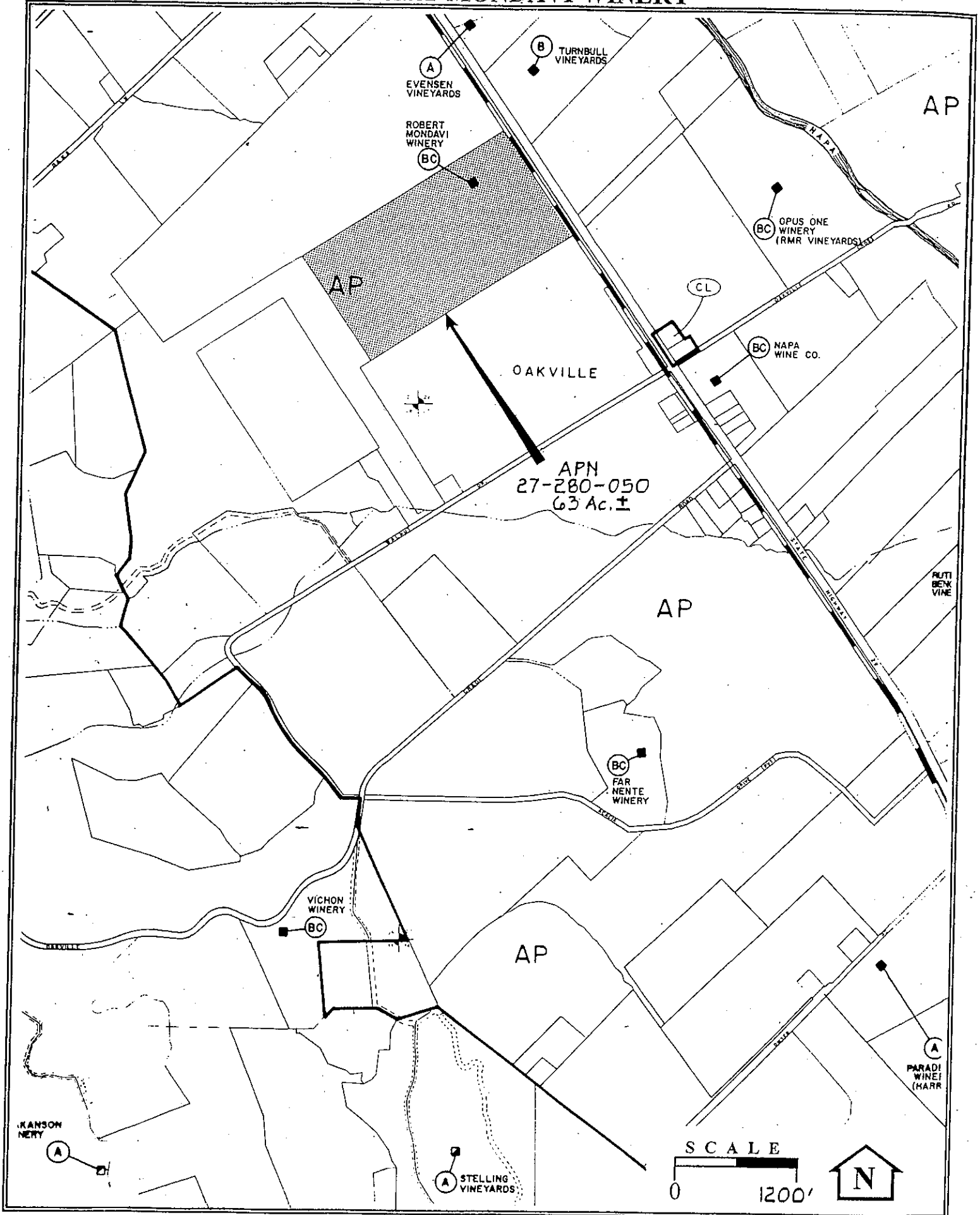
1,046 annual trucks

1,046 annual trucks/250 days = 4 trucks per day.

References:

- (1) Caltrans website, traffic volumes for SR 29 based on 2005 data.
- (2) George W. Nickelson, P.E., traffic counts on Thursday February 1, 2007.
- (3) Caltrans, *Highway Design Manual – Fifth Edition*, July 1, 2004.
- (4) George W. Nickelson, P.E., radar surveys conducted Thursday February 1, 2007.
- (5) Caltrans, *ibid...*
- (6) Employee and visitor data provided by Robert Mondavi Winery, January 22, 2007.

# ROBERT MONDAVI WINERY



## APPENDICES

- Level of Service Definitions
- Level of Service Calculations
  - Radar Speed Surveys



## LEVEL OF SERVICE DEFINITIONS

LEVEL OF SERVICE	SIGNALIZED INTERSECTIONS	UNSIGNALIZED INTERSECTIONS*
"A"	Uncongested operations, all queues clear in a single-signal cycle. (Average stopped delay less than 10 seconds per vehicle; V/C less than or = 0.60).	Little or no delay. (Average delay of $\leq 10$ seconds)
"B"	Uncongested operations, all queues clear in a single cycle. (Average delay of 10-20 seconds; V/C=0.61-0.70).	Short traffic delays. (Average delay of $>10$ and $\leq 15$ secs.)
"C"	Light congestion, occasional backups on critical approaches. (Average delay of 20-35 seconds; V/C=0.71-0.80).	Average traffic delay. (Average delay of $>15$ and $\leq 25$ secs.)
"D"	Significant congestion of critical approaches but intersection functional. Cars required to wait through more than one cycle during short peaks. No long queues formed. (Average delay of 35-55 seconds; V/C=0.81-0.90).	Long traffic delays for some approaches. (Average delay of $>25$ and $\leq 35$ secs.)
"E"	Severe congestion with some long standing queues on critical approaches. Blockage of intersection may occur if traffic signal does not provide for protected turning movements. Traffic queue may block nearby intersection(s) upstream of critical approach(es). (Average delay of 55-80 seconds; V/C=0.91-1.00).	Very long traffic delays for some approaches. (Average delay of $>35$ and $\leq 50$ secs.)
"F"	Total breakdown, stop-and-go operation. (Average delay in excess of 80 seconds; V/C of 1.01 or greater).	Extreme traffic delays for some approaches (intersection may be blocked by external causes--delays $>50$ seconds).

\* Level of Service refers to delays encountered by certain stop sign controlled approaches. Other approaches may operate with little delay.

Source: Transportation Research Board, Highway Capacity Manual, 2000.

# CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

## Analysis Summary

### General Information

### Site Information

Analyst GWN Jurisdiction/Date NAPA COUNTY 6/11/2007  
 Agency or Company MONDAVI Major Street SR 29  
 Analysis Period/Year PM 2007 Minor Street NORTH DRIVEWAY  
 Comment EXISTING WITH FULL EMPLOYMENT

### Input Data

Lane Configuration	NB			SB			WB			EB		
Lane 1 (curb)	TR			TR			R			LTR		
Lane 2	L			L			LT					
Lane 3												
Lane 4												
Lane 5												
Movement	NB			SB			WB			EB		
	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	4	623	2	0	1163	1	9	0	2	11	0	30
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent of heavy vehicles, HV	2	2	2	2	2	2	0	0	0	0	0	0
Flow rate	4	692	2	0	1292	1	10	0	2	12	0	33
Flare storage (# of vehs)												2
Median storage (# of vehs)							3			3		
Signal upstream of Movement 2												
Length of study period (h)	0.25											

### Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	R	2	447	0.004	0	13.1	B	27.4
	2	LT	10	152	0.066	0	30.3	D	
	3								D
EB	1	LTR	45	274	0.164	1	20.7	C	20.7
	2								
	3								C
NB	①		4	536	0.008	0	11.8	B	
SB	④		0	903	0.000	0	9.0	A	

## CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

### Analysis Summary

#### General Information

Analyst GWN  
 Agency or Company MONDAVI  
 Analysis Period/Year PM 2007  
 Comment EXISTING WITH FULL EMPLOYMENT + PROJECT

#### Site Information

Jurisdiction/Date NAPA COUNTY 6/11/2007  
 Major Street SR 29  
 Minor Street NORTH DRIVEWAY

#### Input Data

Lane Configuration	NB			SB			WB			EB		
Lane 1 (curb)	TR			TR			R			LTR		
Lane 2	L			L			LT					
Lane 3												
Lane 4												
Lane 5												
	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	5	623	2	0	1163	1	9	0	2	11	0	31
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent of heavy vehicles, HV	2	2	2	2	2	2	0	0	0	9	0	3
Flow rate	6	692	2	0	1292	1	10	0	2	12	0	34
Flare storage (# of vehs)												2
Median storage (# of vehs)							3			3		
Signal upstream of Movement 2												
Length of study period (h)	0.25											

#### Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	R	2	447	0.004	0	13.1	B	27.8
	2	LT	10	150	0.067	0	30.7	D	
	3								D
EB	1	LTR	46	268	0.172	1	21.2	C	21.2
	2								
	3								C
NB	①		6	536	0.010	0	11.8	B	
SB	④		0	903	0.000	0	9.0	A	

# RADAR SPEED SURVEY

## OMNI-MEANS LTD.

Hwy. 29 approaching Mondavi Employee Access

DATE: 2/1/07      TIME START: various      TIME END: various      WEATHER: clear      ROAD TYPE: 2 lanes with TWLTL

DIRECTION: Northbound

SPEED LIMIT: 50 mph

OBSERVER: gwn assoc.

CALIBRATION TEST: Yes

SPEED	FREQUENCY	ACUM %	PERCENTAGE BREAKDOWN
			0-----10-----20-----30-----40-----50-----60-----70-----80-----90-----100
42	1	1.0	!*
43	1	2.0	!*
44	1	3.0	!*
45	4	7.0	!****5**
46	4	11.0	!****5****1*
47	0	11.0	!****5****1*
48	3	14.0	!****5****!***
49	5	19.0	!****5****!****5****
50	10	29.0	!****5****!****5****2****5****
51	9	38.0	!****5****!****5****2****5****3****5****
52	15	53.0	!****5****!****5****2****5****3****5****4****5****5**
53	14	67.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5**
54	10	77.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5**
55	6	83.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5****8****
56	7	90.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9
57	6	96.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5*
58	3	99.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5****
59	0	99.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5****
60	0	99.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5****
61	1	100.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5****0
			0-----10-----20-----30-----40-----50-----60-----70-----80-----90-----100

100

AVERAGE SPEED = 52  
 50th PERCENTILE = 51.8  
 85th PERCENTILE = 55.2  
 90th PERCENTILE = 56  
 95th PERCENTILE = 56.8

PAGE = 48 - 57  
 % IN PAGE = 85  
 VEHICLES IN PAGE = 85

SAMPLE VARIANCE = 12.98958  
 STANDARD DEVIATION = 3.604107  
 RANGE 1\*8 = 69  
 RANGE 2\*8 = 96  
 RANGE 3\*8 = 100

# RADAR SPEED SURVEY

## OMNI-MEANS LTD.

Hwy. 29 approaching Mondavi Employee Access

DATE: 2/1/97      TIME START: various      TIME END: various      WEATHER: clear      ROAD TYPE: 2 lanes with TWLTL

DIRECTION: Southbound

SPEED LIMIT: 50 mph

OBSERVER: gvn assoc.      CALIBRATION TEST: Yes

SPEED	FREQUENCY	ACUM %	PERCENTAGE BREAKDOWN
43	2	2.0	***
44	2	4.0	****
45	1	5.0	*****5
46	1	6.0	*****5*
47	1	7.0	*****5**
48	10	17.0	*****5*****1*****5**
49	11	28.0	*****5*****1*****5*****2*****5***
50	11	39.0	*****5*****1*****5*****2*****5*****3*****5****
51	8	47.0	*****5*****1*****5*****2*****5*****3*****5*****4*****5**
52	16	63.0	*****5*****1*****5*****2*****5*****3*****5*****4*****5*****5*****6***
53	12	75.0	*****5*****1*****5*****2*****5*****3*****5*****4*****5*****5*****6*****7****5
54	9	84.0	*****5*****1*****5*****2*****5*****3*****5*****4*****5*****5*****6*****7*****8****
55	6	90.0	*****5*****1*****5*****2*****5*****3*****5*****4*****5*****5*****6*****7*****8*****9
56	6	96.0	*****5*****1*****5*****2*****5*****3*****5*****4*****5*****5*****6*****7*****8*****9*****5*
57	2	98.0	*****5*****1*****5*****2*****5*****3*****5*****4*****5*****5*****6*****7*****8*****9*****5***
58	1	99.0	*****5*****1*****5*****2*****5*****3*****5*****4*****5*****5*****6*****7*****8*****9*****5****
59	1	100.0	*****5*****1*****5*****2*****5*****3*****5*****4*****5*****5*****6*****7*****8*****9*****5*****0

AVERAGE SPEED = 51.4  
 50th PERCENTILE = 51.1  
 85th PERCENTILE = 54.1  
 90th PERCENTILE = 55  
 95th PERCENTILE = 55.8

PACE = 48 - 57  
 % IN PACE = 91  
 VEHICLES IN PACE = 91

SAMPLE VARIANCE = 10.18182  
 STANDARD DEVIATION = 3.190896  
 RANGE 1\*5 = 67  
 RANGE 2\*5 = 93  
 RANGE 3\*5 = 100