



November 29, 2021

Mr. Kamal Azari  
Azari Winery  
1321 Spring Hill Road  
Petaluma, CA 94952

## **Focused Traffic Study for the Azari Tasting Room Project**

Dear Mr. Azari;

As requested, W-Trans has prepared a focused transportation analysis for the proposed Azari Tasting Room project to be located at 1321 Spring Hill Road in the unincorporated part of Sonoma County. The purpose of this letter is to present the project's trip generation as well as an analysis of the transportation-related issues required under the California Environmental Quality Act (CEQA). The following analysis is consistent with standard traffic engineering techniques.

### **Project Description**

The proposed Azari Tasting Room Project includes a total of 3,111 square feet of building space to house a 2,409 square foot tasting room, 400 square feet for food preparation, and a 302 square foot restroom. It is noted that two employees are proposed for the tasting room to accommodate up to 20 visitors a day during the operating hours of 11:00 a.m. to 5:00 p.m. Ten special events per year are also proposed, including five pick-up events for winery members, four vineyard tour events, and one barrel tasting event. All the proposed events would be held at the tasting room on the second Saturday of the month from March to December with a maximum of 200 guests accommodated by three employees, which includes the two tasting room employees. The anticipated schedule for winery events is enclosed.

A total of 83 parking spaces are proposed on the project site including 30 parking spaces adjacent to the tasting room and 53 spaces in an overflow parking lot on the east of the proposed buildings. The project would be accessed via two proposed driveways on Spring Hill Road. The site plan is enclosed.

- File Number: UPE19-0072
- Address: 1321 Spring Hill Road, Petaluma, CA 94952
- APN: 020-050-026
- Project Name: Azari Tasting Room Project
- Applicant Name: Kamal Azari
- Property Owner Name: Kamal Azari

### **Trip Generation**

Sonoma County's Winery Trip Generation form was used to determine the potential trip generation for the proposed conditions since standard trip generation rates include trips related to production as well as visitation and this project does not include that component. For employees, an average of three trips per day were assumed, including one each during the evening weekday and weekend midday peak hours.

Per County policy, assuming an average of 2.5 persons per vehicle, the tasting room operation would generate up to 20 visitors and 16 trips on peak days. For the purpose of estimating peak hour traffic on a typical day, it was assumed that 10 percent of visitor traffic would occur during the weekday p.m. peak hour and 12 percent would occur during the weekend peak hour.

The County of Sonoma's Winery Traffic Information/Trip Generation Sheet does not include guidance on inbound versus outbound trips, so it was assumed that all trips would be outbound during the weekday p.m. peak hour

due to employees and customers leaving at closure of the winery. For the weekend midday peak hour, it was assumed that inbound and outbound trips would be evenly split.

Based on application of these assumptions, the proposed project would be expected to generate an average of 22 trips on a daily basis with four trips each during the evening and weekend midday peak hours. These results are summarized in Table 1.

Generator	Units	Daily		PM Peak Hour			MD Peak Hour		
		Rate	Trips	Trips	In	Out	Trips	In	Out
Tasting Room Employees	2	3	6	2	0	2	2	1	1
Tasting Room Visitors	20	0.8	16	2	0	2	2	1	1
<b>Total Trips</b>			<b>22</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>4</b>	<b>2</b>	<b>2</b>

The anticipated trip generations for 200-person events were also estimated, as shown in Table 2. Using an occupancy rate of 2.5 persons per vehicle for visitors and solo occupancy for the three staff members, a 200-person event would be expected to generate 166 trip ends at the driveway. As all events are proposed to be on weekends, no event trips would occur on weekdays. For weekend events, it was assumed that guests would arrive over an extended period of time, though for analysis purposes it was conservatively assumed that half of the total visitors would arrive or depart during the midday peak hour. Event employees would travel outside of the arrival and departure hours of the guests as they would be on-site for set-up prior to guest arrival and would remain to clean up. These trips are therefore not included in the peak hour analysis. These assumptions are summarized in Table 2.

Trip Generator	Units	Daily		MD Peak Hour		
		Rate	Trips	Trips	In	Out
Event Employees	3	2	6	0	0	0
Event Guests	200	0.8	160	80	40	40
<b>200-Person Event Total</b>			<b>166</b>	<b>80</b>	40	40

Because the proposed winery events are expected to generate more than County's threshold of 25 peak hour trips, based on direction from County staff a segment analysis was prepared for Spring Hill Road to assess the impacts of the proposed events on the surrounding transportation network.

## Trip Distribution

The pattern used to allocate new project trips to the street network was based on knowledge of the area and surrounding region. To be conservative, 100 percent of trips were assumed to be to/from the east on Spring Hill Road as the City of Petaluma as well as access to highways are located to the east.

## Alternative Modes

Given the rural location of the project site, all trips to and from the site for events are anticipated to be vehicle trips. The project would be expected to generate no new walking, bicycling, or transit trips for project patrons and employees to reach the project site.

### **Pedestrian Facilities**

Pedestrian facilities include sidewalks, crosswalks, pedestrian signal phases, curb ramps, curb extensions, and various streetscape amenities such as lighting, benches, etc. There are no sidewalks along the project frontage on Spring Hill Road. However, given the rural character of the area, a limited amount of pedestrian traffic occurs and the condition wherein pedestrians are expected to walk on the grass shoulders on each side of the roadway is considered acceptable for the rural setting and low traffic volumes.

### **Bicycle Facilities**

There are no existing bicycle lanes along the project frontage on Spring Hill Road. However, as contained in the updated project list 2019 of *Countywide Bicycle & Pedestrian Master Plan*, Sonoma County Transportation Authority (SCTA), a Class III bicycle route is planned on Spring Hill Road to be connected to the existing Class II bicycle lanes on Western Avenue on the east and planned Class II bicycle lanes along Valley Ford Road-Bodega Avenue on the west. As a Class III route consists of signing only, the existing physical facilities provide adequate bicycle access to the site, though the planned future signing would provide additional notification to drivers of the potential for encountering bicycle traffic.

### **Transit Facilities**

There are no bus stops within a walkable distance of the project site; the nearest bus stop is located 2.7 miles east of the project site near the intersection of Western Avenue/Keller Street in the City of Petaluma. While there are no adequate transit facilities within the walkable distance from the project site, low demand for transit to and from the project site is anticipated given the rural nature of the project area so this condition is considered acceptable.

### **Vehicle Miles Traveled**

Senate Bill (SB) 743 established a change in the metric to be applied to determining transportation impacts associated with development projects. Rather than the delay-based criteria associated with a Level of Service (LOS) analysis, the change in Vehicle Miles Traveled (VMT) as a result of a project is now the basis for determining impacts with respect to transportation and traffic under CEQA.

As of the date of this analysis, Sonoma County has not yet adopted thresholds of significance related to VMT. As a result, project-related VMT impacts were assessed based on guidance published by the California Governor's Office of Planning and Research (OPR) in the publication *Transportation Impacts (SB 743) CEQA Guidelines Update and Technical Advisory*, 2018. The OPR guidelines identify several criteria that may be used by jurisdictions to identify certain types of projects that are unlikely to have a significant VMT impact and can be "screened" from further analysis. One of these screening criteria pertains to "small projects," which OPR identifies as generating fewer than 110 new vehicle trips per typical weekday.

As shown in Table 1, the tasting room would be expected to generate an average of 22 trips per day on a typical weekday. Further, the proposed ten event days per year with an average of 110 daily trips translates to an average of 21 daily trips for the 52 Saturdays in a year. Altogether, the project would generate an annual average of 43 daily trips which falls well below the OPR threshold. It is noted that trips associated with events were added to provide a conservative analysis although events are planned to be held only on Saturdays and weekend traffic is not relevant to VMT analyses. As a result, it is reasonable to conclude that the project can be presumed to have a less-than-significant impact on VMT.

## Promotional Event Sensitivity Analysis

### Existing Conditions

#### *Study Area and Periods*

The study area for the proposed project consists of the one-mile section of Spring Hill Road fronting the proposed project access points. The Promotional Event Sensitivity Analysis (PESA) requires analysis of any intersections with all legs being a collector or higher functional classified road within one-half mile of the project site. As there are no intersections satisfying this criterion no intersection analysis was completed, though operation of Spring Hill Road was assessed.

Operating conditions during the Saturday p.m. peak period were evaluated as proposed events are planned to be held only on Saturdays. It is noted that based on a traffic count collected on June 19, 2021, the daily traffic volume is about 500 vehicles with the afternoon peak hour for westbound traffic between 12:30 p.m. and 1:00 p.m. and the eastbound peak hour between 2:30 p.m. and 3:30 p.m. Copies of the counts are enclosed for reference.

#### *Study Roadway*

**Spring Hill Road** is a two-lane local road and generally runs east-west in the rural area of Sonoma County. The roadway has a width of nearly 20 feet without any paved shoulders. While Spring Hill Road has a *prima facie* speed limit of 55 mph, there is a 30 mph speed advisory sign along the project frontage due to a horizontal curve.

### Two-Lane Highway Segment Level of Service Methodology

The roadway segment Level of Service methodology found in Chapter 15, "Two-Lane Highways," of the *Highway Capacity Manual* (HCM) is the basis of the automobile LOS analysis. The methodology considers traffic volumes, terrain, roadway cross-section, the proportion of heavy vehicles, and the availability of passing zones. The LOS criteria for two-lane highways differs depending on whether the highway is considered "Class I," "Class II," or "Class III." Class III highways are those that generally carry less traffic, pass through towns and communities, and have a mix of local traffic and through traffic. For the analysis, Spring Hill Road was defined as a Class III highway.

The measure of effectiveness by which the Level of Service is determined on Class II highways is the percent time spent following (PTSF), or the proportion of time that drivers on the highway are limited in their speed by a driver in front of them. Based on the methodology, a base free-flow speed must be determined from either field data or an estimation based on knowledge of similar facilities or guidance from the HCM. For the purposes of this analysis in accordance with guidance from the HCM, the base free-flow speed of 54.3 mph for eastbound and 55.8 mph for westbound movement were estimated for the study segment.

### Traffic Operation Standards

The Level of Service Standard for County roadway operations is to maintain a Level of Service C per Policy CT-4.1. Per County standards, if a roadway is already operating unacceptably at LOS D, a project is determined to have an adverse effect if the addition of project trips results in a reduction of the average travel speed by two mph or more.

### Existing and Existing plus Project Conditions

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the Saturday p.m. peak periods.

Count data were collected between June 18, 2021, and June 20, 2021, on Spring Hill Road. Based on the Saturday data collected on June 19, 2021, peak hour factors (PHFs) were calculated based on the counts obtained and used in the LOS calculations.

Under Existing Conditions, Spring Hill Road operates acceptably at LOS A for both westbound and eastbound directions. With the addition of event-related traffic, Spring Hill Road would be expected to continue operating at the same service level. A summary of the roadway segment level of service calculations is shown in Table 3, and copies of the Level of Service calculations are enclosed.

<b>Study Segment Direction</b>	<b>Existing PM Peak</b>			<b>Existing plus Event PM Peak</b>		
	<b>PTSF</b>	<b>Speed</b>	<b>LOS</b>	<b>PTSF</b>	<b>Speed</b>	<b>LOS</b>
Spring Hill Rd						
<i>Westbound</i>	11.8	55.8	A	19.0	55.8	A
<i>Eastbound</i>	11.2	54.3	A	20.0	54.3	A

Notes: PTSF = Percent Time Spent Following; Speed is measured in miles per hour; LOS = Level of Service

It should be noted that the analysis is based on peak hour volumes even though the events may not generate traffic during the peak hour. To address the potential effects of event trips regardless of the time of day when they might occur, this conservative approach was taken using volumes that represent the worst-case condition for adding event trips to the study segment. The finding that Spring Hill Road would continue to operate acceptably during the peak hour with event traffic added indicates that the roadway would operate acceptably regardless of the start/end times for the proposed event.

## Vehicle Access

The project as proposed would have two driveways on Spring Hill Road. The parking lot is proposed with a one-way circulation scheme that would include traffic entering at the westerly driveway and right-turn-only exiting at the easterly driveway. Based on the brief speed survey taken on June 29, 2021, the westbound traffic on Spring Hill Road had an average speed of 21 mph near the curve to the east of the easterly driveway and increased to 32 mph along the project frontage near the westerly driveway. For eastbound traffic, the average speed was 30 mph along the project frontage. The speed survey results indicate that the average speeds for both directions on Spring Hill Road are consistent with the advisory speed of 30 mph, though the roadway has a *prima facie* speed limit of 55 mph.

## Sight Distance

Sight distance along Spring Hill Road at the location for the project driveways was evaluated based on sight distance criteria contained in *A Policy on Geometric Design of Highways and Streets* published by the American Association of State Highway and Transportation Officials (AASHTO). The recommended sight distances for driveway approaches are based on stopping sight distance with approach travel speed used as the basis for determining the recommended sight distance.

Based on the approach speed of approximately 30-mph measured on Spring Hill Road, the minimum stopping sight distance needed is 200 feet. Based on a review of field conditions, sight lines for the easterly driveway on Spring Hill Road extend to nearly 350 feet to the west and 250 to the east, which is adequate for the measured approach speed, though sight lines to the east are not required as left-turn from the driveway is prohibited. Additionally, adequate stopping sight distances are available for a following driver to notice and react to a preceding motorist slowing to turn right or stopped to turn left into the western driveway.

## Emergency Access

The parking lot should be designed to meet Sonoma County design criteria, including the width of the drive aisle and the radii of the curves at the entry and exit. Assuming these criteria are met, emergency access would be adequate.

## Left-Turn Warrant

The need for a left-turn lane on Spring Hill Road at the proposed project entry (westerly) driveway was evaluated based on criteria contained in the *Intersection Channelization Design Guide*, National Cooperative Highway Research Program (NCHRP) Report No. 279, Transportation Research Board, 1985, as well as an update of the methodology developed by the Washington State Department of Transportation and published in the *Method For Prioritizing Intersection Improvements*, January 1997. The NCHRP report references a methodology developed by M. D. Harmelink that includes equations that can be applied to expected or actual traffic volumes to determine the need for a left-turn pocket based on safety issues.

Based on Existing Saturday p.m. peak hour volumes, including event trips, a left-turn lane is not warranted on Spring Hill Road at the proposed project driveway. It should be noted that to take a conservative approach, the analysis includes event trips added to the existing volumes as this condition would represent the worst-case scenario. Further, a left-turn lane is not warranted even if all the event trips arrive at the project site during the peak hour as Spring Hill Road has fewer than 100 trips during peak hours based on the collected traffic count. A copy of the turn lane warrant spreadsheet is enclosed.

## Parking

The project was analyzed to determine if the parking supply proposed for the site is adequate to accommodate both the anticipated daily parking demand and the demand during events. The proposed project would supply 83 parking spaces around the site, including 30 spaces for the tasting room and 53 overflow parking spaces.

To accommodate the daily parking demand during typical tasting room operations, there should be at least one space provided for every employee on-site as well as about one space per 2.5 tasting room guests. Two tasting room employees and a maximum of 20 tasting room visitors translate to ten parking spaces, including two for employees and eight for tasting room visitors. Therefore, the proposed 30 permanent parking spaces near the tasting room would be more than adequate to accommodate the parking demand during a typical operation with a surplus of 20 parking spaces.

The maximum number of parking spaces needed on-site would be during a 200-person event, for which there would typically be about three staff including the two tasting room employees. Assuming one vehicle per staff and 2.5 guests per vehicle, a maximum of 83 vehicles would be needed during an event, which is equal to the total parking supply including the permanent and overflow parking. Therefore, the proposed parking supply would be adequate to accommodate the anticipated parking demand.

## Conclusions and Recommendations

- The proposed tasting room would be expected to generate 22 daily trips on average, including four trips each during the weekday evening peak hour and weekend midday peak hours. The proposed 200-person events would all be on Saturdays and would be expected to generate an average of 166 trip ends at the driveway, including 80 trips during the weekend midday peak hour.
- The lack of existing dedicated facilities for pedestrians in the project vicinity is consistent with the rural setting and adequate given that no pedestrian or transit trips are anticipated.

- Bicycle facilities are absent in the project vicinity, but the existing facilities provide adequate access for bicyclists and would be enhanced with the completion of planned bike facilities outlined in the Countywide Bicycle & Pedestrian Master Plan.
- The project is anticipated to result in a less-than-significant transportation impact on VMT based on the OPR Guidelines.
- Under Existing conditions, Spring Hill Road is operating acceptably at LOS A and would be expected to continue doing so upon adding trips associated with proposed events.
- Adequate sight distances for the advisory speed are available for trips to and from the proposed project driveways.
- The parking lot should be designed to meet Sonoma County Design criteria to achieve adequate access and circulation for emergency response vehicles.
- A left-turn lane is not warranted at the proposed project driveway based on existing plus event volumes.
- The proposed vehicle parking supply is adequate to meet the anticipated parking demand during typical operations and winery events.

Thank you for giving W-Trans the opportunity to provide these services. Please call if you have any questions.

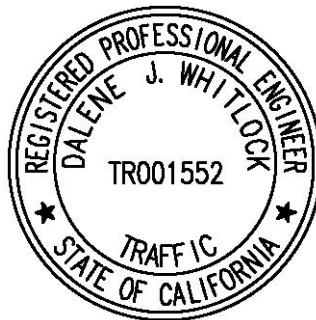
Sincerely,



Jade Kim  
Assistant Planner



Dalene J. Whitlock, PE, PTOE  
Senior Principal



DJW/jk/SOX717.L1

Enclosures: Winery Event Schedule, Site Plan, Traffic Count, Level of Service Calculations, Turn Lane Warrant

## Winery Event Matrix

**Winery: Azari Wine Tasting Room**  
**Location: 1321 Spring Hill Rd, Petaluma, CA 94952**  
**Condition: Proposed**

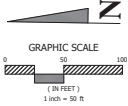
Event	Number of Guests	Number of event days this size annually	Estimated Month(s) during which events will occur	Day of Week when Events will occur	Time of Day (start and end)	No. of Employees	No. of Guest Vehicles	No. of Employee Vehicles	Total Vehicles
Barrel tasting	200	1	March	2nd Saturday of the Month	11:00 AM - 5:00 PM	3	80	3	83
Pick-up events for members	200	5	April, June, July, August, September	2nd Saturday of the Month	1:00 PM-7:00 PM	3	80	3	83
Vineyard tours, demonstration of cultivation methods	200	4	October, November, December	2nd Saturday of the Month	11:00 AM - 5:00 PM	3	80	3	83



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- NOTE:**
1. PROPERTY LINES ARE APPROXIMATE AND PER SONOMA COUNTY GIS DATA. PROPERTY LINES DO NOT REPRESENT A BOUNDARY SURVEY.
  2. ALL EXISTING AND PROPOSED FEATURES SHOWN ARE APPROXIMATE.



NOT FOR CONSTRUCTION

<b>SITE PLAN</b>	<p><b>BC ENGINEERING GROUP, INC.</b>  <b>CIVIL ENGINEERING &amp; LAND PLANNING</b>                  www.bceengineering.com                  Phone: 707.542.4321                  2800 Cleveland Ave., Suite C, Santa Rosa, CA 95403                  URBAN OFFICE                  603 S. State Street, Ukiah, CA 95482</p>
<p><b>KAMAL AZART</b>                  1321 SPRING HILL ROAD,                  PETALUMA, CA 94972</p>	<p><b>PRELIMINARY</b></p>
Date: 11/1/21	Job: 1103-18
Drawn: TSL	Scale: AS SHOWN
APN: 020-050-026	Permit #:
Sheet: <b>C1.0</b>	1 of 1

# VOLUME

1321 Spring Hill Rd

Day: Friday  
Date: 6/18/2021

City: Petaluma  
Project #: CA21\_080123\_001

DAILY TOTALS					NB	SB	EB	WB	Total					
					0	0	343	309	652					
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL			
00:00			0	0	0	12:00			5	1	6			
00:15			0	0	0	12:15			10	5	15			
00:30			0	0	0	12:30			6	8	14			
00:45			1	1	0	12:45			7	28	5	19	12	47
01:00			1	1	2	13:00			5	9	14			
01:15			0	0	0	13:15			9	11	20			
01:30			0	0	0	13:30			4	4	8			
01:45			0	1	0	13:45			2	20	5	29	7	49
02:00			1	0	1	14:00			8	7	15			
02:15			0	0	0	14:15			0	3	3			
02:30			0	0	0	14:30			6	14	20			
02:45			0	1	0	14:45			9	23	13	37	22	60
03:00			0	0	0	15:00			9	9	18			
03:15			0	1	1	15:15			6	6	12			
03:30			1	0	1	15:30			12	10	22			
03:45			0	1	0	15:45			4	31	13	38	17	69
04:00			0	0	0	16:00			6	5	11			
04:15			0	0	0	16:15			4	9	13			
04:30			0	0	0	16:30			7	0	7			
04:45			0	0	0	16:45			10	27	0	14	10	41
05:00			0	0	0	17:00			7	0	7			
05:15			1	1	2	17:15			9	0	9			
05:30			1	6	7	17:30			6	0	6			
05:45			1	3	2	17:45			11	33	7	7	18	40
06:00			0	2	2	18:00			6	4	10			
06:15			1	2	3	18:15			7	6	13			
06:30			5	1	6	18:30			4	5	9			
06:45			1	7	4	18:45			4	21	2	17	6	38
07:00			2	3	5	19:00			6	5	11			
07:15			6	2	8	19:15			0	8	8			
07:30			7	3	10	19:30			8	2	10			
07:45			5	20	2	19:45			1	15	0	15	1	30
08:00			6	4	10	20:00			1	0	1			
08:15			4	9	13	20:15			3	9	12			
08:30			8	0	8	20:30			4	6	10			
08:45			7	25	3	20:45			1	9	2	17	3	26
09:00			4	0	4	21:00			1	0	1			
09:15			2	4	6	21:15			3	3	6			
09:30			7	7	14	21:30			0	2	2			
09:45			8	21	5	21:45			3	7	2	7	5	14
10:00			3	6	9	22:00			0	2	2			
10:15			5	5	10	22:15			0	0	0			
10:30			3	7	10	22:30			1	1	2			
10:45			6	17	6	22:45			1	2	1	4	2	6
11:00			8	4	12	23:00			0	0	0			
11:15			6	1	7	23:15			0	0	0			
11:30			8	3	11	23:30			0	0	0			
11:45			8	30	11	23:45			0	0	0			
<b>TOTALS</b>			127	105	232	<b>TOTALS</b>			216	204	420			
<b>SPLIT %</b>			54.7%	45.3%	35.6%	<b>SPLIT %</b>			51.4%	48.6%	64.4%			

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	343	309	652		
AM Peak Hour			11:30	11:45	11:45	PM Peak Hour			14:45	14:30	14:45
AM Pk Volume			31	25	54	PM Pk Volume			36	42	74
Pk Hr Factor			0.775	0.568	0.711	Pk Hr Factor			0.750	0.750	0.841
7 - 9 Volume	0	0	45	26	71	4 - 6 Volume	0	0	60	21	81
7 - 9 Peak Hour			08:00	07:30	08:00	4 - 6 Peak Hour			16:30	16:00	16:00
7 - 9 Pk Volume	0	0	25	18	41	4 - 6 Pk Volume	0	0	33	14	41
Pk Hr Factor	0.000	0.000	0.781	0.500	0.788	Pk Hr Factor	0.000	0.000	0.825	0.389	0.788

# VOLUME

1321 Spring Hill Rd

Day: Saturday  
Date: 6/19/2021

City: Petaluma  
Project #: CA21\_080123\_001

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	249	255	504		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00			0	0	0	12:00			5	7	12
00:15			1	1	2	12:15			6	4	10
00:30			1	0	1	12:30			7	10	17
00:45			0	2	2	12:45			11	29	19
01:00			0	2	2	12:45			8	29	58
01:15			0	0	0	13:00			4	9	13
01:30			0	0	0	13:15			6	9	15
01:45			0	0	0	13:30			3	7	10
02:00			0	0	0	13:45			8	21	16
02:15			0	0	0	14:00			4	10	14
02:30			0	0	0	14:15			3	6	9
02:45			0	0	0	14:30			9	3	12
03:00			0	0	0	14:45			6	22	15
03:15			0	0	0	15:00			8	3	11
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04:00			0	0	0	15:45			3	21	7
04:15			1	0	1	16:00			4	6	10
04:30			0	0	0	16:15			3	6	9
04:45			0	1	0	16:30			1	3	4
05:00			1	1	2	16:45			4	12	6
05:15			0	0	0	17:00			3	2	5
05:30			0	3	3	17:15			6	5	11
05:45			0	1	2	17:30			1	1	2
06:00			0	2	2	17:45			5	15	7
06:15			0	1	1	18:00			5	2	7
06:30			1	4	5	18:15			4	5	9
06:45			0	1	2	18:30			4	3	7
07:00			7	0	7	18:45			2	15	4
07:15			3	2	5	19:00			2	3	5
07:30			1	1	2	19:15			4	1	5
07:45			2	13	6	19:30			4	2	6
08:00			3	0	3	19:45			3	13	4
08:15			3	1	4	20:00			2	2	4
08:30			2	5	7	20:15			0	2	2
08:45			4	12	2	20:30			2	2	4
09:00			3	3	6	20:45			0	4	3
09:15			3	2	5	21:00			1	1	2
09:30			7	4	11	21:15			0	2	2
09:45			1	14	0	21:30			1	2	3
10:00			3	3	6	21:45			1	3	3
10:15			4	1	5	22:00			3	0	3
10:30			5	5	10	22:15			0	0	0
10:45			4	16	5	22:30			1	1	2
11:00			2	7	9	22:45			1	5	1
11:15			8	2	10	23:00			0	0	0
11:30			12	9	21	23:15			2	2	4
11:45			5	27	8	23:30			0	0	0
TOTALS			87	82	169	TOTALS			162	173	335
SPLIT %			51.5%	48.5%	33.5%	SPLIT %			48.4%	51.6%	66.5%

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	249	255	504		
AM Peak Hour			11:15	11:45	11:15	PM Peak Hour			14:30	12:30	12:30
AM Pk Volume			30	29	56	PM Pk Volume			30	36	64
Pk Hr Factor			0.625	0.725	0.667	Pk Hr Factor			0.833	0.900	0.842
7 - 9 Volume	0	0	25	17	42	4 - 6 Volume	0	0	27	27	54
7 - 9 Peak Hour			07:00	07:45	07:00	4 - 6 Peak Hour			17:00	16:00	16:00
7 - 9 Pk Volume	0	0	13	12	22	4 - 6 Pk Volume	0	0	15	17	29
Pk Hr Factor	0.000	0.000	0.464	0.500	0.688	Pk Hr Factor	0.000	0.000	0.625	0.708	0.725



**VOLUME**  
1321 Spring Hill Rd

Day: Sunday  
Date: 6/20/2021

City: Petaluma  
Project #: CA21\_080123\_001

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	246	221	467		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00			0	1	1	12:00			7	4	11
00:15			0	1	1	12:15			2	4	6
00:30			0	0	0	12:30			5	4	9
00:45			1	1	2	12:45			11	25	22
01:00			0	0	0	13:00			9	6	15
01:15			1	0	1	13:15			11	2	13
01:30			0	1	1	13:30			3	4	7
01:45			0	1	0	13:45			4	27	10
02:00			0	1	1	14:00			5	10	15
02:15			1	0	1	14:15			4	8	12
02:30			0	0	0	14:30			7	3	10
02:45			0	1	0	14:45			3	19	4
03:00			0	0	0	15:00			4	6	10
03:15			0	0	0	15:15			6	8	14
03:30			0	0	0	15:30			3	1	4
03:45			0	0	0	15:45			5	18	8
04:00			0	0	0	16:00			3	5	8
04:15			1	0	1	16:15			4	3	7
04:30			0	0	0	16:30			4	2	6
04:45			0	1	0	16:45			1	12	3
05:00			0	0	0	17:00			4	3	7
05:15			0	0	0	17:15			2	2	4
05:30			1	0	1	17:30			6	4	10
05:45			0	1	0	17:45			6	18	12
06:00			0	0	0	18:00			5	2	7
06:15			0	0	0	18:15			8	4	12
06:30			0	0	0	18:30			9	14	23
06:45			1	1	0	18:45			5	27	6
07:00			1	1	2	19:00			3	3	6
07:15			4	1	5	19:15			7	8	15
07:30			2	0	2	19:30			4	1	5
07:45			2	9	0	19:45			0	14	1
08:00			0	0	0	20:00			3	0	3
08:15			3	1	4	20:15			2	3	5
08:30			5	2	7	20:30			1	2	3
08:45			3	11	1	20:45			3	9	7
09:00			4	1	5	21:00			1	1	2
09:15			1	2	3	21:15			0	0	0
09:30			6	1	7	21:30			1	2	3
09:45			3	14	6	21:45			0	2	2
10:00			1	6	7	22:00			0	1	1
10:15			2	4	6	22:15			0	1	1
10:30			2	1	3	22:30			1	0	1
10:45			2	7	7	22:45			0	1	1
11:00			5	7	12	23:00			2	0	2
11:15			8	4	12	23:15			0	0	0
11:30			10	7	17	23:30			0	0	0
11:45			2	25	4	23:45			0	2	0
<b>TOTALS</b>			72	62	134	<b>TOTALS</b>			174	159	333
<b>SPLIT %</b>			53.7%	46.3%	28.7%	<b>SPLIT %</b>			52.3%	47.7%	71.3%

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	246	221	467		
AM Peak Hour			11:15	10:45	10:45	PM Peak Hour			12:30	13:30	12:30
AM Pk Volume			27	25	50	PM Pk Volume			36	28	59
Pk Hr Factor			0.675	0.893	0.735	Pk Hr Factor			0.818	0.700	0.670
7 - 9 Volume	0	0	20	6	26	4 - 6 Volume	0	0	30	27	57
7 - 9 Peak Hour			08:00	08:00	08:00	4 - 6 Peak Hour			17:00	17:00	17:00
7 - 9 Pk Volume	0	0	11	4	15	4 - 6 Pk Volume	0	0	18	15	33
Pk Hr Factor	0.000	0.000	0.550	0.500	0.536	Pk Hr Factor	0.000	0.000	0.750	0.625	0.688

# HCS7 Two-Lane Highway Report

## Project Information

Analyst	Jade Kim	Date	6/24/2021
Agency	W-Trans	Analysis Year	2021
Jurisdiction	Sonoma County	Time Analyzed	Saturday Existing PM
Project Description	Spring Hill Road WB	Units	U.S. Customary

## Segment 1

### Vehicle Inputs

Segment Type	Passing Constrained	Length, ft	5280
Lane Width, ft	10	Shoulder Width, ft	0
Speed Limit, mi/h	55	Access Point Density, pts/mi	6.0

### Demand and Capacity

Directional Demand Flow Rate, veh/h	43	Opposing Demand Flow Rate, veh/h	-
Peak Hour Factor	0.84	Total Trucks, %	0.00
Segment Capacity, veh/h	1700	Demand/Capacity (D/C)	0.03

### Intermediate Results

Segment Vertical Class	1	Free-Flow Speed, mi/h	55.8
Speed Slope Coefficient	3.58453	Speed Power Coefficient	0.41674
PF Slope Coefficient	-1.33081	PF Power Coefficient	0.74924
In Passing Lane Effective Length?	No	Total Segment Density, veh/mi/ln	0.1
%Improved % Followers	0.0	% Improved Avg Speed	0.0

### Subsegment Data

#	Segment Type	Length, ft	Radius, ft	Superelevation, %	Average Speed, mi/h
1	Tangent	5280	-	-	55.8

### Vehicle Results

Average Speed, mi/h	55.8	Percent Followers, %	11.8
Segment Travel Time, minutes	1.08	Follower Density, followers/mi/ln	0.1
Vehicle LOS	A		

### Facility Results

T	Follower Density, followers/mi/ln	LOS
1	0.1	A

# HCS7 Two-Lane Highway Report

## Project Information

Analyst	Jade Kim	Date	6/29/2021
Agency	W-Trans	Analysis Year	2021
Jurisdiction	Sonoma County	Time Analyzed	Saturday Existing PM
Project Description	Spring Hill Road EB	Units	U.S. Customary

## Segment 1

### Vehicle Inputs

Segment Type	Passing Constrained	Length, ft	5280
Lane Width, ft	10	Shoulder Width, ft	0
Speed Limit, mi/h	55	Access Point Density, pts/mi	12.0

### Demand and Capacity

Directional Demand Flow Rate, veh/h	38	Opposing Demand Flow Rate, veh/h	-
Peak Hour Factor	0.78	Total Trucks, %	0.00
Segment Capacity, veh/h	1700	Demand/Capacity (D/C)	0.02

### Intermediate Results

Segment Vertical Class	1	Free-Flow Speed, mi/h	54.3
Speed Slope Coefficient	3.50323	Speed Power Coefficient	0.41674
PF Slope Coefficient	-1.34142	PF Power Coefficient	0.74509
In Passing Lane Effective Length?	No	Total Segment Density, veh/mi/ln	0.1
%Improved % Followers	0.0	% Improved Avg Speed	0.0

### Subsegment Data

#	Segment Type	Length, ft	Radius, ft	Superelevation, %	Average Speed, mi/h
1	Tangent	5280	-	-	54.3

### Vehicle Results

Average Speed, mi/h	54.3	Percent Followers, %	11.2
Segment Travel Time, minutes	1.10	Follower Density, followers/mi/ln	0.1
Vehicle LOS	A		

### Facility Results

T	Follower Density, followers/mi/ln	LOS
1	0.1	A

# HCS7 Two-Lane Highway Report

## Project Information

Analyst	Jade Kim	Date	6/24/2021
Agency	W-Trans	Analysis Year	2021
Jurisdiction	Napa County	Time Analyzed	Saturday Existing plus Event PM
Project Description	Spring Hill Rod WB	Units	U.S. Customary

## Segment 1

### Vehicle Inputs

Segment Type	Passing Constrained	Length, ft	5280
Lane Width, ft	10	Shoulder Width, ft	0
Speed Limit, mi/h	55	Access Point Density, pts/mi	6.0

### Demand and Capacity

Directional Demand Flow Rate, veh/h	86	Opposing Demand Flow Rate, veh/h	-
Peak Hour Factor	0.84	Total Trucks, %	0.00
Segment Capacity, veh/h	1700	Demand/Capacity (D/C)	0.05

### Intermediate Results

Segment Vertical Class	1	Free-Flow Speed, mi/h	55.8
Speed Slope Coefficient	3.58453	Speed Power Coefficient	0.41674
PF Slope Coefficient	-1.33081	PF Power Coefficient	0.74924
In Passing Lane Effective Length?	No	Total Segment Density, veh/mi/ln	0.3
%Improved % Followers	0.0	% Improved Avg Speed	0.0

### Subsegment Data

#	Segment Type	Length, ft	Radius, ft	Superelevation, %	Average Speed, mi/h
1	Tangent	5280	-	-	55.8

### Vehicle Results

Average Speed, mi/h	55.8	Percent Followers, %	19.0
Segment Travel Time, minutes	1.08	Follower Density, followers/mi/ln	0.3
Vehicle LOS	A		

### Facility Results

T	Follower Density, followers/mi/ln	LOS
1	0.3	A

# HCS7 Two-Lane Highway Report

## Project Information

Analyst	Jade Kim	Date	6/29/2021
Agency	W-Trans	Analysis Year	2021
Jurisdiction	Sonoma County	Time Analyzed	Saturday Existing plus Event PM
Project Description	Spring Hill Road EB	Units	U.S. Customary

## Segment 1

### Vehicle Inputs

Segment Type	Passing Constrained	Length, ft	5280
Lane Width, ft	10	Shoulder Width, ft	0
Speed Limit, mi/h	55	Access Point Density, pts/mi	12.0

### Demand and Capacity

Directional Demand Flow Rate, veh/h	90	Opposing Demand Flow Rate, veh/h	-
Peak Hour Factor	0.78	Total Trucks, %	0.00
Segment Capacity, veh/h	1700	Demand/Capacity (D/C)	0.05

### Intermediate Results

Segment Vertical Class	1	Free-Flow Speed, mi/h	54.3
Speed Slope Coefficient	3.50323	Speed Power Coefficient	0.41674
PF Slope Coefficient	-1.34142	PF Power Coefficient	0.74509
In Passing Lane Effective Length?	No	Total Segment Density, veh/mi/ln	0.3
%Improved % Followers	0.0	% Improved Avg Speed	0.0

### Subsegment Data

#	Segment Type	Length, ft	Radius, ft	Superelevation, %	Average Speed, mi/h
1	Tangent	5280	-	-	54.3

### Vehicle Results

Average Speed, mi/h	54.3	Percent Followers, %	20.0
Segment Travel Time, minutes	1.10	Follower Density, followers/mi/ln	0.3
Vehicle LOS	A		

### Facility Results

T	Follower Density, followers/mi/ln	LOS
1	0.3	A



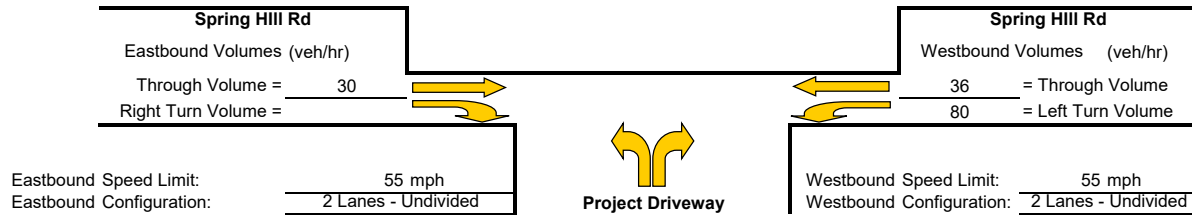
# Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Spring Hill Road/Project Driveway

Study Scenario: Saturday Existing plus Events PM

Direction of Analysis Street: East/West

Cross Street Intersects: From the South



## Eastbound Right Turn Lane Warrants

1. Check for right turn volume criteria

**NOT WARRANTED Less than 40 vehicles**

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold AV = -  
 Advancing Volume Va = 30  
 If  $AV < Va$  then warrant is met -

**Right Turn Lane Warranted: NO**

## Eastbound Right Turn Taper Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

**NOT WARRANTED - Less than 20 vehicles**

2. Check advance volume threshold criteria for taper

Advancing Volume Threshold AV = -  
 Advancing Volume Va = 30  
 If  $AV < Va$  then warrant is met -

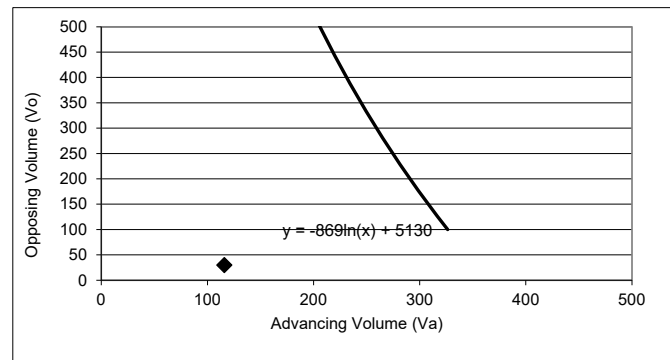
**Right Turn Taper Warranted: NO**

## Westbound Left Turn Lane Warrants

Percentage Left Turns %lt 69.0 %

Advancing Volume Threshold AV 354 veh/hr

If  $AV < Va$  then warrant is met



◆ Study Intersection

Two lane roadway warrant threshold for: 55 mph

Turn lane warranted if point falls to right of warrant threshold line

**Left Turn Lane Warranted: NO**

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.

The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.

The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroorty in 1991.