



May 25, 2023

Ms. Amy Christopherson Bolten
 Christopherson Builders LLC
 565 W. College Avenue
 Santa Rosa, CA 95401

Transportation Operations Analysis Study for the Fir Ridge Meadows Project

Dear Ms. Christopherson Bolten;

As required in conjunction with the entitlement review process for the Fir Ridge Meadows project proposed to be located on Fir Ridge Drive in the City of Santa Rosa, we have prepared an evaluation of the potential effects on transportation operation associated with the Fir Ridge Meadows project. The purpose of this letter is to present the project's anticipated trip generation and results of the analysis of the adequacy of transportation facilities under the City's policies, including its *Guidance for the Preparation of Traffic Operational Analysis* dated July 2019. It is noted that California Environmental Quality Act (CEQA) documentation is being prepared separately, including support for potential streamlining and exemptions. Accordingly, this document does not address CEQA issues but instead is focused on City policy issues.

Existing Conditions

The study area consists of Fir Ridge Drive, which fronts the project site, and extends north and south of the project site from Thomas Lake Harris Drive to Fountaingrove Parkway. Fir Ridge Drive has one 18-foot lane in each direction with a posted speed limit of 25 miles per hour (mph). Street parking is allowed on the northbound side of Fir Ridge Drive, including along the project frontage, and prohibited in the southbound direction. There are sidewalks on both sides of the road. Based on traffic counts obtained on October 25th, 2022, Fir Ridge Drive has a daily traffic volume of about 400 vehicles.

Project Description

The project as proposed would result in the construction of 13 single-family houses and a new public road that ends in a cul-de-sac connecting to Fir Ridge Drive at Fir Ridge Drive/Fumay Road, adding a fourth leg to the east side of this tee intersection. Sidewalks are proposed to be included along both sides of this new road.

Trip Generation

The anticipated trip generation for the proposed project was estimated using standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 11th Edition, 2021, for "Single Family Detached Housing" (ITE LU 210). Based on the application of these rates, the proposed project is expected to generate an average of 123 trips per day, including nine a.m. peak hour trips and 12 trips during the p.m. peak hour. These results are summarized in Table 1.

Table 1 – Trip Generation Summary

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
SF Detached Housing	13 du	9.43	123	0.70	9	2	7	0.94	12	8	4

Note: SF = Single Family; du = dwelling unit

Because the project would be expected to generate fewer than 250 daily trips and fewer than 50 peak hour trips, an operational analysis is not required per the City of Santa Rosa's *Guidance for the Preparation of Traffic Operational Analysis*.

Trip Distribution

Given the location of the project site in the northwest quadrant of the city, it is anticipated that the majority of trips to and from the site would be routed west toward US 101. A distribution of 80 percent to/from the west and 20 percent to/from the east was assumed.

Alternative Mode Facilities

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 continuous sidewalks on both sides of Fir Ridge Drive and a generally complete sidewalk network in the area with curb ramps on most corners, some with tactile domes. The existing sidewalk meanders around a tree on the project site. The project site plan shows a continuous sidewalk network along the proposed street. The existing tree and sidewalk are planned to be removed for the construction of the new street. The sidewalk on the proposed road will need to be continuous, adjacent to the curb and gutter, and connect to the existing sidewalk network. The lack of curb ramps and tactile domes on the northeast and southeast corners of Fir Ridge Drive/Fumay Drive-Project Street may restrict access to pedestrians with mobility impairments. The site plan should be updated to show curb ramps and tactile domes on these corners in order to provide an accessible pedestrian network for all users.

Bicycle Facilities

Fountaingrove Parkway has a Class I bike trail on its south side. On Parker Hill Road, there is a Class I bike trail between Stagecoach Road and Leete Avenue, and Class II bike lanes between Leete Avenue and Chanate Road. There are no planned cyclist facilities near the project site in the City of Santa's *Bicycle and Pedestrian Master Plan Update 2018*.

The Santa Rosa Municipal Code, Section 20-36.040, requires that one bike parking space be provided per four units if units do not have a private garage to store their bikes. As this project would have private garages for all units, no other bike storage is required.

Transit Facilities

There are no transit facilities within a half mile, which is considered a comfortable walking distance, of the project site.

Finding - Existing pedestrian and bicycle facilities provide adequate access to and from the project site; however, new sidewalk facilities proposed as part of the project should include curb ramps and tactile domes on the corners of the new street connection with Fir Ridge Drive. While there are no transit stops within a comfortable walking distance of the project site, this is consistent with the Fountaingrove area in general as there are no routes serving this area.

Recommendation – The site plan should be updated to include curb ramps and tactile domes on the northeast and southeast corners of Fir Ridge Drive/Fumay Drive-Project Street and connect the proposed continuous sidewalks to the existing sidewalk network.

Safety Considerations

The collision history for Fir Ridge Drive was reviewed to determine any trends or patterns that may indicate a safety issue based on records available from the California Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports. For the most current five-year period available of May 1, 2017, through April 30, 2022, there were no collisions reported along the study segment.

Finding – As there were no reported collisions on Fir Ridge Drive the roadway is operating adequately from a safety perspective.

Sight Distance

The site would be accessed via a new public road connecting to Fir Ridge Drive opposite Fumay Drive. Sight distance at this access point was evaluated based on sight distance criteria contained in the *Highway Design Manual* published by Caltrans. Recommended sight distances for minor street approaches that are a public street are based on corner sight distance, which uses the major street approach travel speed as the basis for determining the recommended sight distance. Given the posted speed limit of 25 mph on Fir Ridge Drive, the recommended corner sight distance to the left for drivers approaching on the minor street is 275 feet while it is 240 feet to the right.

The corner sight distance at the location of the proposed street connection to Fir Ridge Drive was field measured as 320 feet to the left and over 290 feet to the right which is more than adequate for the posted speed limit.

Finding – Sight distance is adequate for the new project street.

Left-Turn Lane Warrant

The need for a left-turn lane on Fir Ridge Drive 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. Under Existing plus Project volumes a left-turn lane is not warranted on Fir Ridge Drive at the proposed project street during either of the peak periods evaluated. With only two inbound trips during the morning peak hour no left turns would be expected. A copy of the spreadsheet indicating the warrant analysis for the p.m. peak hour is enclosed.

Finding – A left-turn lane would not be warranted at the proposed project street.

Parking

According to the City of Santa Rosa's Municipal Code Section 20-36.040, each residential unit with two or more bedrooms requires one covered parking space and 1.5 visitor parking spaces. As this project will result in the construction of two- to three-car garages for each unit, a driveway that residents may park on, and a new public road which will allow for on-street parking, this requirement is satisfied.

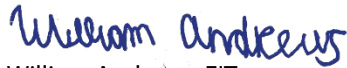
Finding – Parking would be adequate for the project.

Conclusions and Recommendations

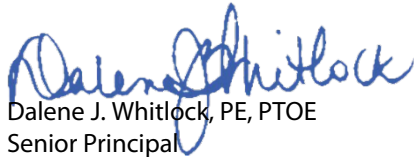
- The proposed project would be expected to generate an average of 123 trips per day, including nine during the morning peak hour and 12 during the evening peak hour.
- Existing pedestrian and bicycle facilities are adequate though the project should include curb ramps and tactile domes on the northeast and northwest corners of the project street connection to Fir Ridge Drive and connect the proposed sidewalks to the existing sidewalks. The lack of transit facilities is consistent with the Fountaingrove area in which the project site is located.
- The sight distances at the proposed new street location are adequate.
- A left-turn lane would not be warranted on Fir Ridge Drive at the proposed new street.
- The proposed project would provide adequate parking.

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

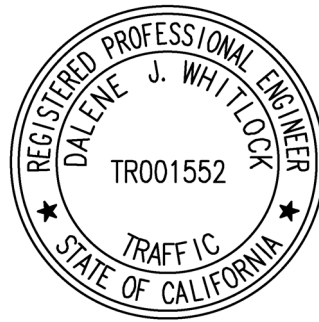
Sincerely,



William Andrews, EIT
Assistant Engineer



Dalene J. Whitlock, PE, PTOE
Senior Principal



DJW/wia/SRO619.L1

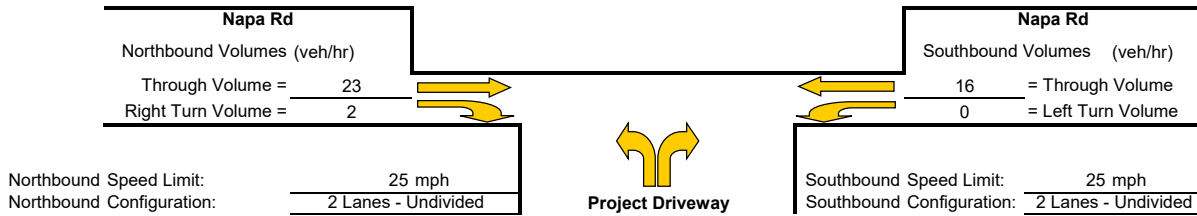
Enclosures: Left-Turn Lane Warrant Spreadsheet

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Fir Ridge Drive/Proposed Road
 Study Scenario: AM Peak Hour

Direction of Analysis Street: North/South

Cross Street Intersects: From the East



Northbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold AV = 1035.1
 Advancing Volume Va = 25
 If $AV < Va$ then warrant is met No

Right Turn Lane Warranted: NO

Northbound 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 = 25
 If $AV < Va$ then warrant is met -

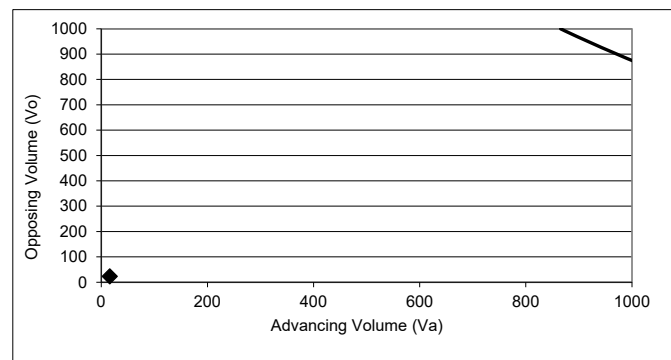
Right Turn Taper Warranted: NO

Southbound Left Turn Lane Warrants

Percentage Left Turns %lt 0.0 %

Advancing Volume Threshold AV 2665 veh/hr

If $AV < Va$ then warrant is met



◆ Study Intersection

Two lane roadway warrant threshold for: 25 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.

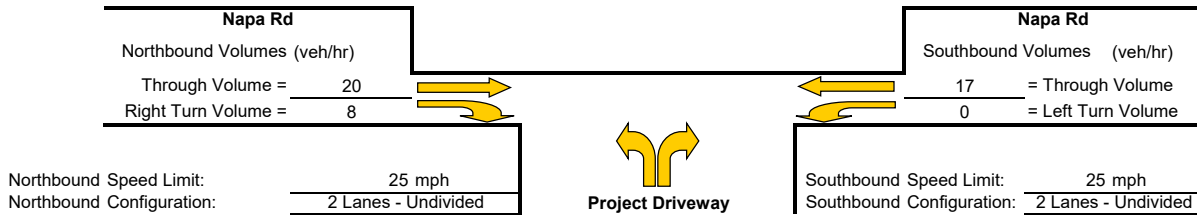
The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Fir Ridge Drive/Proposed Road
 Study Scenario: PM Peak Hour

Direction of Analysis Street: North/South

Cross Street Intersects: From the East



Northbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold AV = 990.1
 Advancing Volume Va = 28
 If $AV < Va$ then warrant is met No

Right Turn Lane Warranted: NO

Northbound 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 = 28
 If $AV < Va$ then warrant is met -

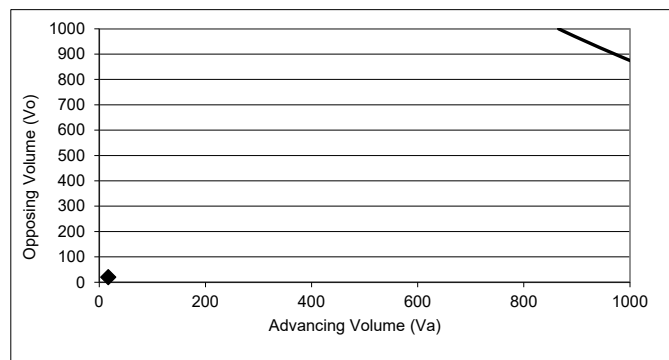
Right Turn Taper Warranted: NO

Southbound Left Turn Lane Warrants

Percentage Left Turns %lt 0.0 %

Advancing Volume Threshold AV 2674 veh/hr

If $AV < Va$ then warrant is met



◆ Study Intersection

Two lane roadway warrant threshold for: 25 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.

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