Appendix I:
Transportation Impact Study

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Transportation Impact Study for the St. Helena Resort Project

Prepared for the City of St. Helena

Submitted by
W-Trans

March 22, 2024

TRAFFIC ENGINEERING
TRANSPORTATION PLANNING
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Executive Summary

The St. Helena Resort Project would be located at 2800 Main Street in the City of St. Helena and involves the development of a proposed 56-room resort with a 150-seat restaurant. The project as proposed includes 67 parking spaces on-site together with an agreement to share parking with the adjacent Charles Krug Winery. The proposed project is expected to generate an average of 576 trips per weekday, including 55 a.m. peak hour trips and 78 p.m. peak hour trips.

There are generally no pedestrian facilities in the vicinity of the project site; the surrounding area is rural and so pedestrian trips are not anticipated. However, this is consistent with City and County policy, so pedestrian facilities are considered adequate for the anticipated demand. Off-site bicycle facilities serving the project site, including the nearby Vine Trail, are adequate and the project would not include any frontage improvements that would preclude installation of planned future facilities. Transit facilities serving the site are adequate for the anticipated demand.

The project is presumed to have a less-than-significant impact on vehicle miles traveled (VMT) since the project would be considered a local-serving retail facility for visitor trips and employee trip lengths would be below the significance threshold. A Transportation Demand Management (TDM) program would be implemented as part of the project to further reduce VMT and support the City's trip reduction and climate policies.

Vehicles would access the site via a new driveway on Deer Park Road as well as via the existing Charles Krug Winery site to the southeast of the proposed project site. Sight lines along Deer Park Road are adequate to accommodate all turning movements into and out of the project site. A left-turn lane on Deer Park Road at the proposed project driveway is warranted using the County of Napa's criterion and would be provided as part of the project. The project would not cause any queues to exceed available storage, so it has a less-than-significant impact on queuing.

Proposed site access and on-site circulation are expected to function acceptably for emergency response vehicles and the addition of project-generated traffic would have a less-than-significant impact on emergency access and emergency response times.

The westbound Deer Park Road left-turn movement onto SR 29 is expected to function at LOS F under Existing and Existing plus Project weekday peak hour volumes and LOS E under Existing plus Project weekend peak hour volumes. This is considered acceptable since overall operation would remain at LOS A or B. However, signing is proposed as part of the project to direct traffic leaving the site to use Silverado Trail to go south and SR 29 to go north to reduce the number of left turns onto SR 29.

Under Future and Future plus Project volumes, both intersections are expected to function unacceptably at LOS F overall during the weekday peak hour but acceptably during the weekend peak hour. Installation of a traffic signal at SR 29/Deer Park Road would be expected to improve operation to LOS C or better during both peak hours. If the City of St. Helena decides to pursue this improvement, the project would contribute a proportional share of the cost to the City. Additionally, conversion of the existing traffic signal at Silverado Trail/Deer Park Road from flashing red operation to normal signal operation and modification of the westbound through/left-turn lane to a dedicated left-turn lane and the westbound right-turn lane to a through/right-turn lane would result in acceptable LOS C operation during the weekday peak hour with project-generated trips. If the County of Napa decides to pursue this improvement, funds would be deposited with the County to cover the cost of the striping improvements as part of the project and would also pay traffic impact fees based on the City's Master Fee Schedule.

The existing parking supply on-site does not meet City requirements or the anticipated demand. However, there would be an adequate parking supply with the use of existing parking spaces at Charles Krug Winery.

Introduction

This report presents an analysis of the potential traffic impacts and adverse operational effects that would be associated with development of a proposed 56-room resort with a 150-seat restaurant to be located at 2800 Main Street in the City of St. Helena. The traffic study was completed in accordance with the criteria established by the City and is consistent with standard traffic engineering techniques.

Prelude

The purpose of this traffic impact study is to provide the applicants with data that they can use to make an informed decision regarding the potential transportation impacts of their proposed project, and any associated improvements that would be required to mitigate these impacts to an acceptable level under CEQA, the City's General Plan, or other policies. This report provides an analysis of those items that are identified as areas of environmental concern under the California Environmental Quality Act (CEQA) and that, if significant, require an EIR. Impacts associated with facilities for pedestrians, bicyclists, and transit; the vehicle miles traveled (VMT) generated by the project; potential safety concerns such as increased queuing in dedicated turn lanes, adequacy of sight distance, need for turn lanes, and need for additional right-of-way controls; and emergency access are addressed in the context of the CEQA criteria. While no longer a part of the CEQA review process, vehicular traffic service levels at key intersections were evaluated for consistency with General Plan policies by determining the number of new trips that the proposed use would be expected to generate, distributing these trips to the surrounding street system based on anticipated travel patterns specific to the proposed project, then analyzing the effect the new traffic would be expected to have on the study intersections and need for improvements to maintain acceptable operation. The adequacy of the proposed parking supply is also addressed as a policy issue.

Applied Standards and Criteria

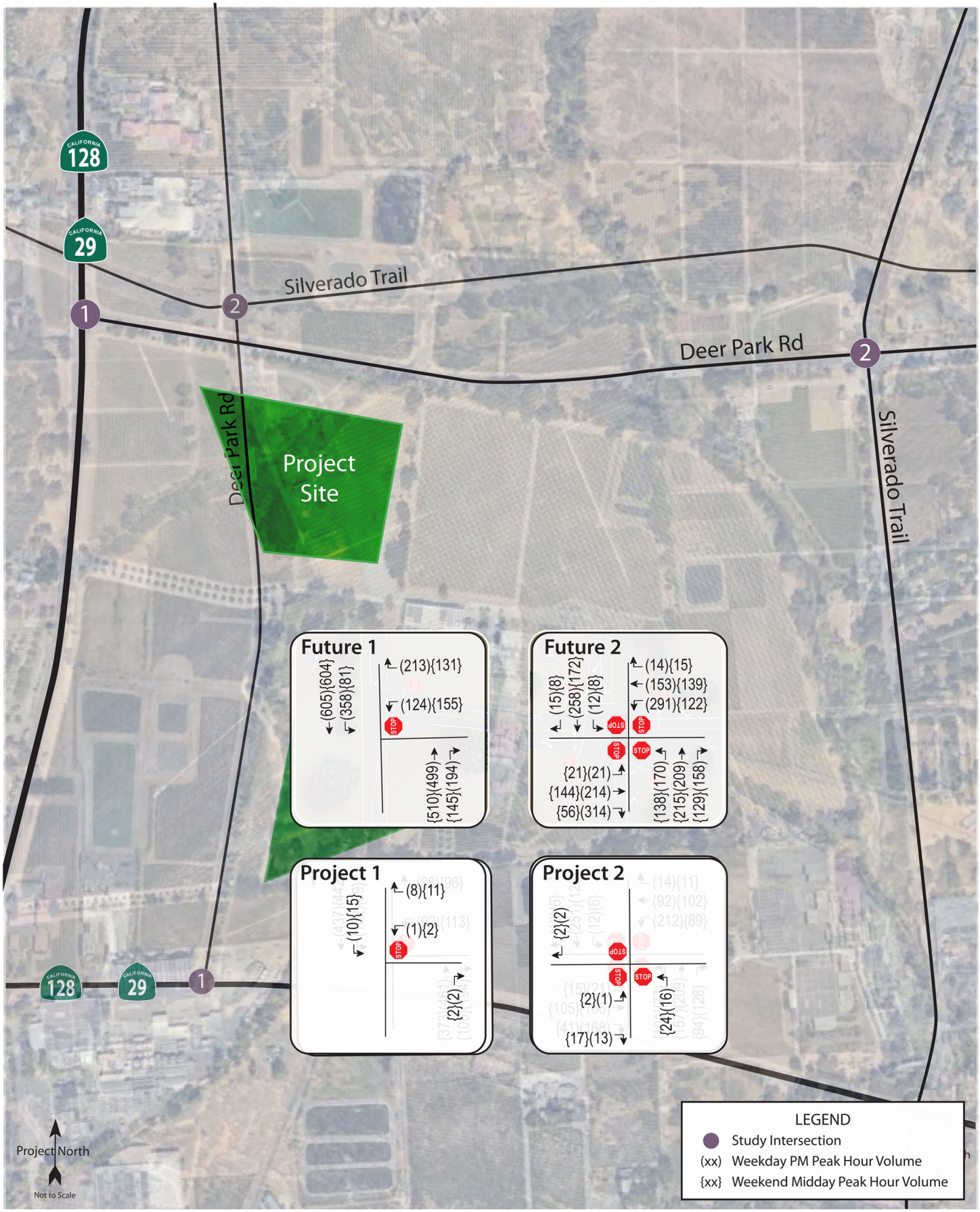
The report is organized to provide background data that supports the various aspects of the analysis, followed by the assessment of CEQA issues and then evaluation of policy-related issues. The CEQA criteria evaluated are as follows.

Would the project:

a. Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?
b. Conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b)?
c. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?
d. Result in inadequate emergency access?

Project Profile

The proposed 56-room resort facility would be located on the same property as the Charles Krug Winery. The project would include visitor-serving amenities such as event spaces, swimming pools, a spa, and a restaurant with an estimated capacity of 150 seats. The site would be accessed primarily from Deer Park Road, as well as the Charles Krug Winery site and the Napa Valley Wine Train. Bicycles would be provided on-site for the use of guests. Parking for a minimum of six bicycles would be provided as well. A total of 67 parking spaces would be provided on-site and there would be an agreement to share parking with the adjacent Charles Krug Winery. The location of the project site is shown in Figure 1.



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Transportation Impact Study for the St. Helena Resort Project

Figure 2 – Study Intersections, Project Configurations, and Existing Traffic Volumes

Transportation Setting

Study Area and Periods

The study area varies depending on the topic. For pedestrian trips it normally consists of all streets within a half-mile of the project site that would lie along primary routes of pedestrian travel, or those leading to nearby attractions. For bicycle trips it consists of all streets within one mile of the project site that would lie along primary routes of bicycle travel. For the safety and operational analyses, it consists of the project frontage and the following intersections:

1. SR-29/Deer Park Road
2. Silverado Trail/Deer Park Road

It is noted that the project driveway on Deer Park Road was not considered as a study intersection. The *California Vehicle Code* defines an intersection as "the area embraced within the prolongation of the lateral curb lines, or, if none, then the lateral boundary lines of the roadways, of two highways which join one another at approximately right angles or the area within which vehicles traveling upon different highways joining at any other angle may come in conflict." This definition specifies that intersections are created where two "highways," or public streets, intersect. As driveways are not public streets, where they connect with a public road is not an intersection, so the driveway was not evaluated as such. It was, however, evaluated for issues such as adequacy of sight distance and need for turn lanes. Further, delay may be relevant in some cases, though it would not be associated with a Level of Service.

Operating conditions during the weekday and weekend p.m. peak periods were evaluated as these time periods reflect the highest traffic volumes areawide and for the proposed project. The evening peak hour occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion of the day during the homeward bound commute. The weekend peak also occurs between 4:00 p.m. and 6:00 p.m. Counts for the study intersections were obtained on Friday, January 26, and Saturday, January 27, 2024.

Study Intersections

SR-29/Deer Park Road is a tee intersection with the terminating westbound Deer Park Road approach stop-controlled. There is sufficient space for right-turning vehicles to queue up beside vehicles waiting to turn left.

Silverado Trail/Deer Park Road is an all-way stop-controlled intersection with stop signs on all four approaches. It is noted that a full traffic signal has been installed at this location, though it is not operational as a signal; rather, it currently operates with only the red indications flashing.

The locations of the study intersections and the existing lane configurations and controls are shown in Figure 1.

Study Roadway

Deer Park Road is a two-lane roadway with one twelve-foot vehicle travel lane and an eight-foot Class II bike lane in each direction. Deer Park Road has a posted speed limit of 50 mph and carries approximately 5,200 vehicles on Fridays and 3,800 vehicles on Saturdays.

Collision History

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue. Collision rates were calculated based on records available from the California Highway Patrol as published

in their Statewide Integrated Traffic Records System (SWITRS) reports. The most current five-year period available is January 1, 2018, through December 31, 2022.

As presented in Table 1, the calculated collision rates for the study intersections were compared to average collision rates for similar facilities statewide, as indicated in *2021 Collision Data on California State Highways*, California Department of Transportation (Caltrans). These average rates statewide are for intersections in the same environment (urban, suburban, or rural), with the same number of approaches (three or four), and the same controls (all-way stop, two-way stop, or traffic signal). It is noted that both intersections are at boundaries between two settings, so the more conservative suburban and urban settings were used rather than rural. The collision rate calculations are provided in Appendix A.

Table 1 – Collision Rates for the Study Intersections

Study Intersection	Number of Collisions (2018-2022)	Calculated Collision Rate (c/mve)	Statewide Average Collision Rate (c/mve)
1. SR-29/Deer Park Rd	8	**0.31**	0.13
2. Silverado Trl/Deer Park Rd	3	0.12	0.47

Note: c/mve = collisions per million vehicles entering; **Bold** = rate is higher than statewide average

Of the eight collisions at SR 29/Deer Park Road, four were broadsides, two were hit object collisions, one was a sideswipe, and one was head-on. All four broadside collisions and both hit object collisions involved different types of movements, and only one of the four included a vehicle exiting Deer Park Road. Therefore, due to the lack of similarity between the collisions, no remedial action is suggested. It is further noted that this intersection is at the boundary between an urban environment and a rural one, for which the average statewide rate is 0.29 c/mve. Given the higher speed limit north of the intersection, and rural-looking setting (no curb, gutter, sidewalk or streetlighting), comparison with the rural rate may be more appropriate. In this case the crash rate is only marginally above the statewide average and therefore within normal safety parameters.

Project Data

The project consists of a resort with 56 guest rooms and associated amenities such as swimming pools, a spa, event spaces and a restaurant with an estimated capacity of 150 seats. The proposed project site plan is shown in Figure 2.

Trip Generation

The anticipated peak hour 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 a Resort Hotel (LU #330). Because there is not a daily rate for this land use, the rate for a Business Hotel (LU #312) was applied to estimate daily trips; this rate appears reasonable as both the Resort and Business Hotel land uses have the same rate for the p.m. peak hour. There is also not a Saturday peak hour rate for either the Resort or Business Hotel land uses, so the rate for a Hotel (LU #310) was used.

Because the size of the restaurant is such that the number of seats exceeds the number of potential hotel guests, this use was considered separately. Rates for a Fine Dining Restaurant (LU #931) were applied to the 150-seat restaurant. It is anticipated that at least one-quarter of the diners would be drawn from the hotel, so a 25-percent internal capture rate was applied to the number of restaurant trips and these trips were deducted from the total site-generated trips.

It is noted that the project would also include other amenities such as a spa, pools, and meeting/event spaces. However, as these types of amenities are typical of such a development and, with the exception of the meeting/event spaces, would be for guest use only, no additional trips were estimated for these ancillary uses. It is common for meeting/event spaces to attract participants or attendees who are not staying at the hotel, so these trips would be captured by the standard trip generation rates with the possible exception of large events, such as weddings. However, as such events would occur either infrequently and/or outside the peak period on weekends, they would not affect the peak hour trip generation and therefore the analysis, so such trips are not addressed in the trip generation estimates.

Based on application of these rates and assumptions, the proposed project is expected to generate an average of 576 trips per day, including 55 trips during the weekday p.m. peak hour and 78 trips during the weekend peak hour. These results are summarized in Table 2.

Table 2 – Trip Generation Summary

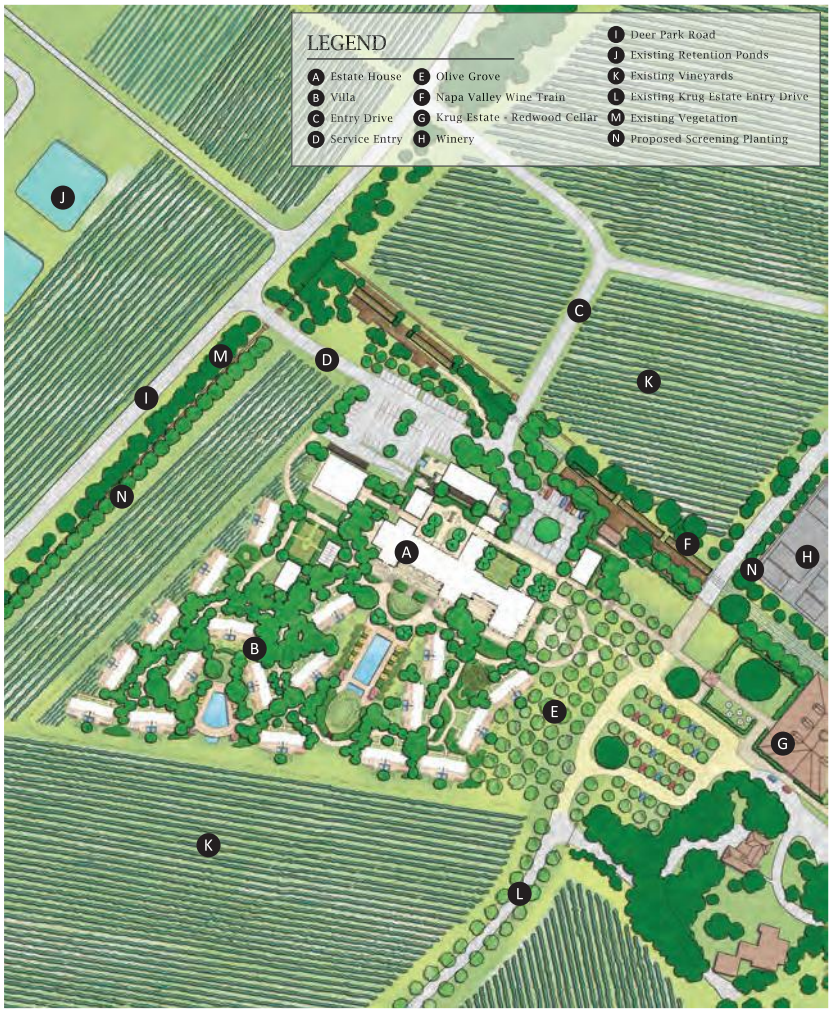
Land Use	Units	Daily		Weekday PM Peak Hour				Weekend PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Resort Hotel	56 rms	5.08	284	0.41	23	13	10	0.72	40	23	17
Fine Dining Restaurant	150 sts	2.60	390	0.28	42	28	14	0.33	50	29	21
Internal Capture		*-25%*	*-98*	*-25%*	*-10*	*-7*	*-3*	*-25%*	*-12*	*-7*	*-5*
Total			**576**		**55**	**34**	**21**		**78**	**45**	**33**

Note: rms = room; sts = seats

SITE PLAN

SITE PLAN

SITE PLAN (NOTATED)



ST. HELENA RESORT

SITE PLAN IN CONTEXT WITHIN THE SURROUNDING AREA

Transportation Impact Study for the St. Helena Resort Project

Figure 2 – Site Plan

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Trip Distribution

The pattern used to allocate new project trips to the street network was determined based on anticipated trip patterns for guests and employees. The assumptions shown in Table 3 were applied.

Table 3 – Trip Distribution Assumptions

Route	Percent
From/To the North via SR-29	35
From/To the South via SR-29	5
From/To the North via Silverado Trl	5
From/To the South via Silverado Trl	55
TOTAL	**100**

Circulation System

This section addresses the first transportation bullet point on the CEQA checklist, which relates to the potential for a project to conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.

Pedestrian Facilities

Existing and Planned Pedestrian Facilities

Pedestrian facilities include sidewalks, crosswalks, pedestrian signal phases, curb ramps, curb extensions, and various streetscape amenities such as lighting, benches, etc. The project location is within a rural agricultural area where pedestrian trips are not anticipated and there are no facilities to accommodate such trips. This is consistent with both City and County policy, as although SR 29 is considered a regional connector street that generally supports all modes, it transitions into a rural road in the study area at the northern edge of the City, so does not require pedestrian facilities.

Pedestrian Safety

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue for pedestrians. Collision records available from the California Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports were reviewed for the most current five-year period available, which was January 1, 2018, through December 31, 2022, at the time of the analysis. During the five-year study period there were no reported collisions involving pedestrians at the study intersections.

Project Impacts on Pedestrian Facilities

In general, SR 20 and Silverado Trail provide access to agricultural uses and vineyards. Given the rural location of the site and lack of any potential nearby trip generators for pedestrians, the project is not anticipated to generate new pedestrian trips except on-site and to the adjacent winery, and the existing conditions wherein pedestrians use the roadway shoulders is considered adequate. There is nothing proposed as part of the project that would potentially preclude the City's, County's or Caltrans' ability to implement future pedestrian enhancements on SR 29 or Deer Park Road, so the project's impact is considered less-than-significant.

Finding – Existing pedestrian facilities are considered adequate for the anticipated demand.

Bicycle Facilities

Existing and Planned Bicycle Facilities

The *Highway Design Manual*, Caltrans, 2020, classifies bikeways into four categories:

- **Class I Multi-Use Path** – a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.
- **Class II Bike Lane** – a striped and signed lane for one-way bike travel on a street or highway.
- **Class III Bike Route** – signing only for shared use with motor vehicles within the same travel lane on a street or highway.
- **Class IV Bikeway** – also known as a separated bikeway, a Class IV Bikeway is for the exclusive use of bicycles and includes a separation between the bikeway and the motor vehicle traffic lane. The separation may include, but is not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking.

In the project area, Class II bike lanes exist on Deer Park Road between SR 29 and Silverado Trail, as well as on Silverado Trail for the entirety of its length. Bicyclists ride on the Class I portion of the Vine Trail adjacent to SR 29 or in the roadway along all other streets within the project study area. Table 4**.** summarizes the existing and planned bicycle facilities in the project vicinity, as contained in the Napa Valley Transportation Authority's (NVTA) *Napa Countywide Bicycle Plan*.

Table 4 – Bicycle Facility Summary

Status Facility	Class	Length (miles)	Begin Point	End Point
Existing				
Vine Trl	I	1.10	Pratt Ave	City Limits (West)
Deer Park Rd	II	0.60	SR 29	Silverado Trail N
Silverado Trl	II	26.9	Trancas St (Napa)	SR 29 (Calistoga)
Planned				
Napa River Trl	I	1.90	Pope St	City Limits (North)
Pratt Ave	II	0.26	SR 29	Vine Trl
SR 29	III	1.11	Fulton Ln	City Limits (North)
Pratt Ave	III	0.48	Vine Trl	Napa River Trl
Vine Trl	TBD	2.00	Pratt Ave	City Limits (South)

Source: *Napa Countywide Bicycle Plan*, Napa Valley Transportation Authority (NVTA), 2019

Bicyclist Safety

Collision records for the study area were reviewed to determine if there had been any bicyclist-involved crashes. During the five-year study period between January 1, 2018, through December 31, 2022, there were no reported crashes involving a bicyclist at the study intersections, indicating that there are no readily apparent safety issues for cyclists in the project vicinity.

Project Impacts on Bicycle Facilities

Existing bicycle facilities, including Class II bike lanes on Deer Park Road and the Vine Trail, provide adequate access for bicyclists, including guests using the site-furnished bicycles. Further, upon completion of the planned bicycle improvements in the project vicinity, including Class III facilities on SR 29, the Class I Napa River Trail and the remainder of the Vine Trail, complete connectivity for bicyclists would be provided and guests could visit a number of local wineries by bicycle.

Bicycle Storage

The St. Helena Zoning Code Section 17.26.080 outlines the City's bicycle parking requirements. Short-term secure bicycle parking spaces must be at least five percent of the City's required parking spaces. If there will be 25 or more full-time employees, long-term bicycle parking must be provided at a ratio of one parking space per 25 required vehicle parking spaces. Therefore, a minimum of six short-term bicycle parking spaces are required based on the total of 101 parking spaces required under the City's code, as detailed in the Parking chapter. As there are to be more than 25 full-time employees, a minimum of four long-term spaces should be provided. The project would provide at least 10 short-term and 10 long-term bicycle parking spaces, thereby exceeding these minimum requirements. Additionally, courtesy bicycles would be available for use by guests.

Finding – Bicycle facilities serving the project site are adequate and the project would not include any frontage improvements that would preclude installation of planned facilities.

Transit Facilities

Existing Transit Facilities

The nearest transit stop is located approximately 0.7 miles northwest of the project site at SR 29/Lodi Lane and is serviced by Vine Transit Route 10, which provides fixed-route regional service between St. Helena and surrounding communities. This route operates Monday through Friday with approximately one-hour headways between 5:25 a.m. and 8:57 p.m. Saturday and Sunday services also operate with about one-hour headways between 6:00 a.m. and 7:30 p.m.

Two to three bicycles can be carried on most Vine Transit buses. Bike rack space is on a first come, first served basis and riders are responsible for loading and unloading their bicycles.

Dial-a-ride, also known as paratransit, or door-to-door service, is available for those who are unable to independently use the transit system due to a physical or mental disability. VineGo Paratransit is designed to serve the needs of individuals with disabilities within three-quarters of a mile from regular fixed-routes in Napa County.

Impact on Transit Facilities

Transit trips to and from the proposed project are not expected due to the type and location of the facility as well as the distance to the nearest stop. The project would not conflict with any policies relative to transit.

Significance Finding – The proposed project would not conflict with any plans or policies for transportation facilities. It would therefore have a less-than-significant impact on these facilities.

Vehicle Miles Traveled (VMT)

The potential for the project to conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b) was evaluated based the project's anticipated Vehicle Miles Traveled (VMT).

Thresholds of Significance

Traffic impacts under the California Environmental Quality Act (CEQA) have traditionally been assessed based on increases in intersection delay, which is measured by Level of Service (LOS). With the passage of SB 743, LOS can no longer be used as a measure to determine traffic impacts under CEQA; instead, these impacts are to be measured based on the vehicle miles traveled (VMT) generated by a project. Like many other jurisdictions in California, the City of Saint Helena has not yet adopted a policy or threshold of significance regarding VMT, so the *Technical Advisory on Evaluating Transportation Impacts in CEQA* (2018) developed by the state's Office of Planning and Research (OPR) is generally relied upon for guidance.

The OPR *Technical Advisory* includes suggested VMT significance thresholds for residential, employment, and retail uses and indicates that lead agencies may develop their own thresholds for other land use types, which include hotels and other visitor-based land uses. For the purposes of this analysis, the VMT associated with the proposed hotel and restaurant was assessed by applying OPR's guidance for retail uses and associated screening methods when considering the VMT associated with guests. The selection of a retail-type assessment for guests was also made in consideration of how other jurisdictions have chosen to assess hotel VMT. In addition, OPR's suggested metrics for employment based VMT were considered for the employees associated with the project.

Hotel and Restaurant Customer VMT

Hotels, restaurants, and other visitor-focused uses require consideration of the project's intended customer base and businesses those customers would otherwise have patronized if the project were not constructed. Unless a hotel or restaurant is an attraction on its own, it is unlikely to draw *new* visitors to the area; rather, it will redistribute where visitors stay and restaurants they visit. An example of such a regional attraction would be a hotel that includes a convention facility. The proposed hotel and restaurant are moderately sized and of a similar scale to similar facilities currently operating throughout Napa Valley, so would not be expected to generate additional demand for these services.

This redistribution of trips and VMT for visitor-serving uses is similar to how OPR considers retail uses, in which many types of retail projects may generally be presumed to have a less-than-significant VMT impact since the total amount of shopping that occurs in a given geographic area tends to remain unchanged; in fact, adding new retail uses to the urban fabric often reduces the distances (i.e., the "miles" in VMT) that people need to drive on shopping trips. The City of San Jose was an early adopter of VMT thresholds and has chosen to apply this methodology of treating hotel uses similar to retail, where small- to mid-sized hotels can be expected to shift trips rather than generate new VMT and can generally be presumed to have a less-than-significant transportation-related VMT impact.

OPR recommends a threshold of 50,000 square feet for screening out retail projects from VMT analysis, since smaller retail businesses tend to redistribute trips while large projects tend to impact regional travel by drawing customers from a greater distance. The project's estimated trip generation is 556 trips per day. Applying the trip generation rate for Strip Retail Plaza of less than 40,000 square feet (ITE land use #822), a retail project with a similar daily trip generation would be approximately 10,000 square feet. This is well below the recommended VMT screening threshold for retail projects.

The project location also supports the notion that resulting customer trips would improve efficiency of regional travel patterns. It is noted that the project site in Saint Helena is centrally located within Napa County; given its proximity to a large number of potential destinations, project trips would be expected to be shorter on average than trips from hotels closer to the periphery of the county. In addition, many visitor destinations to the project may be near the project site, as *The Napa Valley Visitor Profile 2018* study reported that Saint Helena received the second highest visitation among communities in the County after the City of Napa, with nearby Calistoga ranked fourth among the most visited communities.

While a vehicle is the most convenient transportation mode for accessing most nearby visitor-serving destinations, the Charles Krug Winery is adjacent to the site and there are several other wineries along SR 29 near Deer Park Road, less than one-half mile away, within walking or bicycling distance. In addition, the availability of the Vine Trail connection to Calistoga and the bike lanes along nearby Silverado Trail would offer guests alternative transportation options for accessing many sites in the area. Therefore, providing guests with bicycles could help to reduce local visitor trips.

Finding – Based on the location and other characteristics of the project, the total vehicle miles traveled in the region would be unlikely to change, and in fact could reduce slightly if future guests are comprised of people who were already intending to visit the area. Given this condition, and in consideration of OPR guidance and hotel VMT methodologies applied in other jurisdictions with adopted VMT thresholds, the project can reasonably be presumed to result in a less-than-significant VMT impact.

Employee VMT

Using OPR's recommended approach, employee VMT was evaluated using data from the Solano Napa Activity-Based Model. The model includes transportation analysis zones (TAZs) that cover geographic areas throughout the counties of Napa and Solano. Following OPR's guidance for evaluating employee VMT, the VMT per employee in the project TAZ was compared with countywide VMT per employee, and a VMT per capita that is not at least 15 percent below the countywide average would be considered significant. The countywide VMT per employee is 22.0, and the significance threshold would therefore be 18.7 miles. The project is located in TAZ 180 which has a VMT per employee of 13.2, which is well below this threshold.

While the project-related VMT is presumed to have a less-than-significant impact, consideration was given to reducing employee VMT, given the City of Saint Helena's goals and policies that support reductions in VMT to minimize climate change impacts. A transportation demand management (TDM) program would be prepared and implemented as part of the project to further reduce VMT and support the City's trip reduction and climate policies. The following section provides transportation demand management (TDM) measures that could be applied.

Potential Employee TDM Measures

TDM measures aim to reduce single-occupancy vehicle trips, parking demand, and total VMT through use of alternative modes of transportation and more efficiently planned trips. Employee VMT could be reduced through a combination of information, encouragement, and access to non-motorized travel options to reduce the number of vehicle trips, shifting these trips to other modes and thus reducing VMT. The following TDM measures were drawn from *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity*, California Air Pollution Control Officers Association (CAPCOA), 2021, and would support reductions in employee VMT to support City policies.

- **Carpool Incentives:** In non-metropolitan areas, carpooling is often the most effective trip reduction measure. Financial incentives can be an effective way to encourage employees to do so. The applicant could provide a monetary incentive each month to employees who agree to carpool to work a minimum of 50 percent of the time. This program could be offered to all employees of the project, including existing employees of the Charles Krug Winery.

- **Active Transportation Incentives:** Financial incentives can also be an effective way to encourage employees to use active modes of transportation to reach the site. In addition to those who carpool, the applicant could provide an incentive each month to employees who agree to walk or bicycle to work a minimum of 50 percent of the time. The Napa Valley Vine Trail will ultimately provide a facility extending from Calistoga to Vallejo along the SR 29 corridor. The segment of the Trail from Pratt Avenue to Calistoga is currently under construction. For employees living north of the project site, this will provide a convenient option for traveling to and from work.

- **Subsidized Transit Passes:** The project site is located approximately 0.7 miles from the nearest stops for Vine Transit. This is a longer distance than what is considered an acceptable walking distance; however, it is within the distance of typical bicycle trips, and bicycles can be accommodated on Vine Transit vehicles. Vine Transit has a monthly pass that is good for unlimited rides for $53 per month. Employees who agree to use transit to reach the site a minimum of 50 percent of the time could be provided a monthly pass for Vine Transit free of charge.

- **Guaranteed Ride Home:** One of the reasons that many employees do not carpool or commute via alternative modes is the fear of being stranded should they need to leave in an emergency. Employees who carpool to work should be guaranteed a ride home in case of an emergency or unique situation. As part of the V-Commute program offered by the Napa Valley Transportation Authority (NVTA), employees who carpool or commute via alternative modes are able to use a taxi, rental car, Lyft, Uber, or other means to get home in an emergency and are reimbursed for the full cost of the service. The program is available to all who work or attend college in Napa County and is free to join, but registration is required. As part of the project's TDM program, employees could be provided information about V-Commute and encouraged to register for the service.

- **Bicycle Trip-End Facilities:** Employees are more likely to ride their bicycle to work if secure and covered bicycle parking as well as showers and changing rooms are provided on-site. It is recommended that bicycle storage or lockers be provided for use by employees and consideration could be given to providing a changing room with a shower that employees could use to freshen up and change from athletic attire to work clothes. Additionally, basic bicycle maintenance provisions such as spare tubes and tire pumps could be made available on-site to encourage employees to commute via bicycle.

- **Transportation Coordinator:** One person could be designated as the transportation coordinator for the project site. This is not an additional position, but rather would fall under a manager's responsibilities. It is important to select someone to oversee the different TDM measures available, answer questions, pair carpoolers, administer incentives, etc.

Significance Finding – The proposed project would have a less-than-significant impact on VMT as it would be considered a local-serving retail facility for the visitor trips and employee trip lengths would be below the applicable significance threshold.

Safety Issues

The potential for the project to impact safety was evaluated in terms of the adequacy of sight distance and need for turn lanes at the project access as well as the adequacy of stacking space in dedicated turn lanes at the study intersections to accommodate additional queuing due to adding project-generated trips and need for additional right-of-way controls. This section addresses the third transportation bullet on the CEQA checklist which is whether or not the project would substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

Site Access

The proposed project would be accessible via a new driveway on Deer Park Road northwest of the project site, as well as via the existing Charles Krug Winery site to the southeast of the project site.

Sight Distance

Sight distance along Deer Park Road at the proposed project driveway location was evaluated based on sight distance criteria contained in the *Highway Design Manual* published by Caltrans. Though sight distance is not technically applicable to urban driveways, and the south side of the roadway is in the City Limits, due to the more rural character of the area and the fact that the north side of the road is in a rural area, sight distance was evaluated using the criteria applicable to a rural driveway. The corner sight distance criterion was therefore applied along with the approach travel speeds to determine the recommended sight distance. Additionally, the sight distance needed for a following driver to stop for a vehicle waiting to turn into the driveway was evaluated based on stopping sight distance criterion and the approach speed on the major street.

Actual speeds on Deer Park Road were sampled and indicate 85th percentile speeds of 49 mph eastbound and 44 mph westbound, which are both below the posted speed limit of 50 mph. To be conservative, the posted speed limit of 50 mph was used for the analysis.

The minimum corner sight distance needed for a 50-mph design speed is 550 feet and the stopping sight distance needed is 430 feet. Field measurements indicate that sight distances are more than 1,000 feet from the driveway in both directions along Deer Park Road. Additionally, as Deer Park Road is straight and flat, sight lines are adequate for a following motorist to observe and react to a preceding motorist slowing or stopped waiting to turn into the project driveway. As a result, sight lines are adequate to accommodate all turns into and out of the project site. To preserve existing sight lines, any new signage, monuments, or other structures to be placed near the project entrance would be positioned outside of the vision triangles of a driver waiting on the project approach.

Finding – Sight lines along Deer Park Road are adequate to accommodate all turning movements into and out of the project site. Any new signage, monuments, or other structures to be placed near the project entrance would be positioned outside of the vision triangles of a driver waiting on the project approach to preserve existing sight lines.

Access Analysis

Left-Turn Lane Warrants

The need for a left-turn lane on Deer Park Road at the proposed project 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. Because Deer Park Road is under the jurisdiction of the County of Napa, criteria published by the County in the *Napa County Road and Street Standards*, April 18, 2023, were also applied.

Based on Existing plus Project and Future plus Project volumes, a left-turn lane is not warranted on Deer Park Road at the proposed project driveway during either of the peak periods evaluated using the standard methodology applied other than in Napa County. However, based on Existing plus Project Average Daily Traffic counts and using the graph on Page 22 of the County's standards, a left-turn lane is warranted. Copies of the turn lane warrant analysis spreadsheets are provided in Appendix B.

A left-turn lane is proposed to be constructed on southbound Deer Park Road at the entrance driveway , which would conform with the County of Napa policy. Before installing the lane, an encroachment permit would be obtained for work within the public right-of-way.

Finding – Installation of a left-turn lane would not be warranted on Deer Park Road at the proposed project driveway under any scenario based on application of the methodology used in other jurisdictions but would be warranted using the County of Napa's criterion. The project would conform with the County's policy since a left-turn lane would be provided at the project driveway and an encroachment permit would be obtained prior to installing the left-turn lane.

Queuing

The City of St. Helena and County of Napa do not prescribe thresholds of significance regarding queue lengths. However, an increase in queue length due to project traffic was considered a potentially significant impact if the increase would cause the queue to extend out of a dedicated turn lane into a through traffic lane, or the back of queue into a visually restricted area, such as a blind corner. If queues would already be expected to extend past a dedicated turn lane or into a visually restricted area without project traffic, the addition of project traffic was considered to constitute a potentially adverse effect only if it would cause a new unacceptable conditions; in other words, if the queue were already beyond the turn lane and the project would cause it to stack into an adjacent intersection or a visually restricted area, and that would not occur without the project, that would be considered an impact. It is noted that queuing was not evaluated for the intersection of Silverado Trail/Deer Park Road as all vehicles must stop, so there is no safety issue associated with through traffic encountering a vehicle stacked into their travel lane.

Unsignalized Intersections

Southbound left-turn queues on SR-29 at Deer Park Road were determined using a methodology contained in "Estimating Maximum Queue Length at Unsignalized Intersections," John T. Gard, *ITE Journal*, November 2001. Based on Future plus Project volumes, the maximum queue was determined to be seven vehicles, or 175 feet. While the turn pocket is only 110 feet long, it transitions into a two-way left-turn lane, providing sufficient space for stacking as well as deceleration. Copies of the queueing calculations are contained in Appendix C.

Finding – The project would have a less-than-significant impact on queueing.

Significance Finding – The project would have a less-than-significant impact on safety in terms of the adequacy of sight lines and queuing space and the installation of a left-turn lane would address the potential for introducing any new hazards.

Emergency Access

The final transportation bullet on the CEQA checklist requires an evaluation as to whether the project would result in inadequate emergency access or not.

Adequacy of Site Access

The City of St. Helena Municipal Code provides requirements to ensure that developments provide adequate access for emergency vehicles. Applicable requirements identified in these plans include at least one point for fire apparatus access, minimum roadway widths of 16 feet for a one-way access drive and 25 feet for a two-way access drive as well as specific design criteria for on-site turnarounds. The site would have three access points, so should one access be compromised during an emergency, responders would be able to use one of the other access points to reach the site. The site design is not fully fleshed out but would reasonably be expected to include the requisite drive aisle widths and turnaround. These items will need to be confirmed during the plan review process.

Effect on Emergency Response Times

As detailed in the following section, the addition of project-generated traffic would have a limited effect on traffic operation and would therefore result in only a nominal increase in response times. However, as all traffic is required by law to pull to the side to allow emergency responders traveling with their lights and sirens operating to pass, response times would not be expected to change as a result of the project.

Finding – The proposed site access and on-site circulation would function acceptably for emergency response vehicles if designed to meet applicable standards, as anticipated, and the project would not increase emergency response times.

Significance Finding – The project would be expected to have a less-than-significant impact on emergency access.

Capacity Analysis

Intersection Level of Service Methodologies

Level of Service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. A unit of measure that indicates a level of delay generally accompanies the LOS designation.

The study intersections were analyzed using methodologies published in the *Highway Capacity Manual* (HCM), Transportation Research Board, 7th Edition. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle.

The Levels of Service for the intersection of SR-29/Deer Park Road, which has a stop control on Deer Park Road, were analyzed using the "Two-Way Stop-Controlled" intersection capacity method from the HCM. This methodology determines a level of service for each minor turning movement by estimating the level of average delay in seconds per vehicle. Results are presented for individual movements together with the weighted overall average delay for the intersection.

Silverado Trail/Deer Park Road operates with signals that flash red as an all-way stop-controlled intersection so it was analyzed using the "All-Way Stop-Controlled" Intersection methodology from the HCM. This methodology evaluates delay for each approach based on turning movements, opposing and conflicting traffic volumes, and the number of lanes. Average vehicle delay is computed for the intersection as a whole and is then related to a Level of Service.

The ranges of delay associated with the various levels of service are indicated in Table 5.

Table 5 – Intersection Level of Service Criteria

LOS	Two-Way Stop-Controlled	All-Way Stop-Controlled
A	Delay of 0 to 10 seconds. Gaps in traffic are readily available for drivers exiting the minor street.	Delay of 0 to 10 seconds. Upon stopping, drivers are immediately able to proceed.
B	Delay of 10 to 15 seconds. Gaps in traffic are somewhat less readily available than with LOS A, but no queuing occurs on the minor street.	Delay of 10 to 15 seconds. Drivers may wait for one or two vehicles to clear the intersection before proceeding from a stop.
C	Delay of 15 to 25 seconds. Acceptable gaps in traffic are less frequent, and drivers may approach while another vehicle is already waiting to exit the side street.	Delay of 15 to 25 seconds. Drivers will enter a queue of one or two vehicles on the same approach, and wait for vehicle to clear from one or more approaches prior to entering the intersection.
D	Delay of 25 to 35 seconds. There are fewer acceptable gaps in traffic, and drivers may enter a queue of one or two vehicles on the side street.	Delay of 25 to 35 seconds. Queues of more than two vehicles are encountered on one or more approaches.
E	Delay of 35 to 50 seconds. Few acceptable gaps in traffic are available, and longer queues may form on the side street.	Delay of 35 to 50 seconds. Longer queues are encountered on more than one approach to the intersection.
F	Delay of more than 50 seconds. Drivers may wait for long periods before there is an acceptable gap in traffic for exiting the side streets, creating long queues.	Delay of more than 50 seconds. Drivers enter long queues on all approaches.

Reference: *Highway Capacity Manual,* Transportation Research Board, 7th Edition

Traffic Operation Standards

Caltrans

The intersection of SR-29/Deer Park Road is under the jurisdiction of Caltrans. However, Caltrans does not have a standard of significance relative to operation as this is no longer a CEQA issue. The new *Vehicle Miles Traveled-Focused Transportation Impact Study Guide* (TISG), published in May 2020, replaced the *Guide for the Preparation of Traffic Impact Studies*, 2002. As indicated in the TISG, the Department is transitioning away from requesting LOS or other vehicle operations analyses of land use projects and will instead focus on Vehicle Miles Traveled (VMT). Adequacy of operation was therefore evaluated using the City of St. Helena's standards.

City of St. Helena

According to Appendix A of the *General Plan Update 2040*, City of St. Helena, 2019, the City seeks to maintain LOS C at all unsignalized intersections. If the LOS degrades below LOS C, an evaluation of the need for traffic signalization is to be undertaken according to standard Caltrans signal warrant.

County of Napa

The intersection of Silverado Trail/Deer Park Road is in the County of Napa. Per Policy CIR-38 the County seeks to maintain operations of roads and intersections in the unincorporated County area that minimize travel delays and promote safe access for all users. In general, the County seeks to maintain Level of Service (LOS) D on arterial roadways and at signalized intersections, as the service level that best aligns with the County's desire to balance its rural character with the needs of supporting economic vitality and growth.

A project would cause a significant impact requiring mitigation if, for existing conditions:

- *An unsignalized intersection operates at LOS E or F during the selected peak hours without Project trips, and the project contributes one percent or more of the total entering traffic for all-way stop-controlled intersections; the peak hour traffic signal criteria should also be evaluated and presented for informational purposes.*
    - *All-Way Stop-Controlled Intersections – The following equation should be used if the all-way stop-controlled intersection operates at LOS E or F without the Project:*
        - *Project Contribution % = Project Trips ÷ Existing Volumes*

A project would cause a significant impact requiring mitigation if, for cumulative (future) conditions, the Project's volume is equal to, or greater than five percent of the difference between cumulative (future) and existing volumes.

- *Cumulative Conditions* – A *Project's contribution to a cumulative condition would be calculated as the Project's percentage contribution to the total growth in traffic. This calculation applies to arterials, signalized intersections, and unsignalized intersections.*
    - *Project Contribution % = Project Trips ÷ (Cumulative Volumes – Existing Volumes)*

In situations where the County determines that achieving LOS D would cause an unacceptable conflict with other goals and objectives, minimizing collisions and the adequacy of local access will be the County's priorities. Mitigating operational impacts should first focus on reducing the project's vehicular trips through modifying the project definition, applying TDM strategies, and/or applying new technologies that could reduce vehicular travel and associated delays; then secondarily should consider physical infrastructure changes. Proposed mitigations will be evaluated for their effect on collisions and local access, and for their effectiveness in achieving the maximum potential reduction in the project's operational impacts (see the County's Transportation Impact Study Guidelines for a list of potential mitigation measures).

Existing Conditions

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the weekday and weekend p.m. peak periods. This condition does not include project-generated traffic volumes. Volume data was collected on Friday, January 26, and Saturday, January 27, 2024. Under existing weekday conditions, though the westbound left-turn on the Deer Park Road approach to SR 29 operates at LOS F, the intersection operates at LOS B overall, which is considered acceptable. The existing traffic volumes are shown in Figure 1. A summary of the intersection Level of Service calculations is contained in Table 6, and copies of the calculations are provided in Appendix D.

Table 6 – Existing PM Peak Hour Intersection Levels of Service

Study Intersection ***Approach***	**Weekday Peak**		**Weekend Peak**	
	Delay	**LOS**	**Delay**	**LOS**
1. SR-29/Deer Park Rd	10.8	B	4.6	A
Westbound (Deer Park Rd) Left Turn	*134.9*	*F*	*33.9*	*D*
Westbound (Deer Park Rd) Right Turn	*14.3*	*B*	*12.1*	*B*
2. Silverado Trl/Deer Park Rd	29.0	D	12.6	B

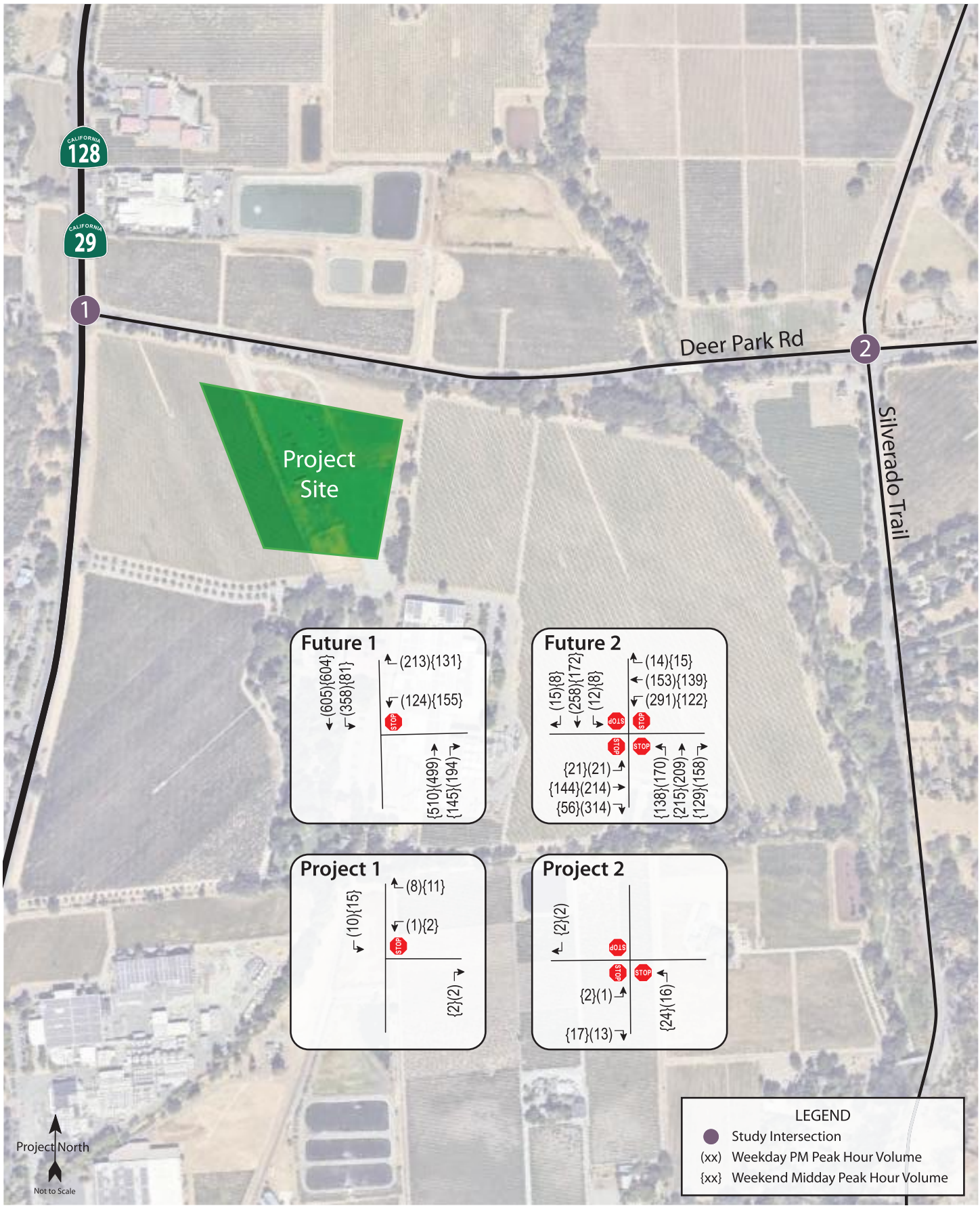
Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Future Conditions

Year 2040 intersection turning movements for the weekday p.m. peak hour was developed using the Furness procedure, which is a commonly accepted factoring algorithm used within the traffic engineering field wherein the base year turning movement counts at the intersection are factored until the total volumes in and out of each leg closely match the adjusted link volumes based on the base year and future scenario volumes from the Solano-Napa Activity-Based traffic model. A computer application of the Furness procedure was used to produce the future intersection turning movement volumes. In some instances, the model projected a traffic volume decrease. Decreases are attributable to assumed infrastructure improvements and forecast changes in demographic data throughout the region. Rather than assume volume decreases, existing counts were maintained as a "floor." This is a common technique used to ensure that the future projections are conservative.

Future turning movements for the weekend peak hour were developed by finding the average growth rate between the existing and projected future volumes for both study intersections for the weekday peak hour and multiplying the existing weekend volumes by the same average growth rate.

Under the anticipated future volumes, both study intersections are expected to operate unacceptably during the weekday p.m. peak period but acceptably at LOS C or better overall under weekend peak hour conditions. Future volumes are shown in Figure 3 and operating conditions are summarized in Table 7.



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Transportation Impact Study for the St. Helena Resort Project

Figure 3 – Future and Project Traffic Volumes

W-Trans

Table 7 – Future PM Peak Hour Intersection Levels of Service				
Study Intersection ***Approach***	**Weekday Peak**		**Weekend Peak**	
	Delay	**LOS**	**Delay**	**LOS**
1. SR-29/Deer Park Rd	**66.1**	**F**	14.9	B
Westbound (Deer Park Rd) Left Turn	*999.8*	*F*	*139.0*	*F*
Westbound (Deer Park Rd) Right Turn	*17.3*	*C*	*14.4*	*B*
Signalized	24.3	C	12.1	B
Roundabout	10.7	B	7.9	A
2. Silverado Trl/Deer Park Rd	**53.8**	**F**	16.4	C
Signalized	19.0	B	N/A	N/A

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* **Bold** text = deficient operation; Shaded cells = conditions with recommended improvements

Given the projected substantial delay to traffic exiting Deer Park Road to SR-29, consideration was given to the potential need to modify the controls and either signalize the intersection or convert it to a modern roundabout. As shown in Table 7, either of these options would result in acceptable operation. Under Caltrans policy an Intersection Control Evaluation (ICE) would need to be prepared to determine the most appropriate form of right-of-way control.

Similarly, improvements necessary to address the LOS F operation anticipated at Silverado Trail/Deer Park Road were considered. Initiation of the existing traffic signal along with modification of the lane assignments to provide exclusive left-turn lanes would achieve acceptable operation.

Project Conditions

Existing plus Project Conditions

Upon the addition of project-related traffic to the existing volumes, the study intersections are expected to operate acceptably, with the exception of the westbound Deer Park Road approach to SR 29 which will continue operating at LOS F under weekday peak hour volumes and will operate at LOS E under weekend peak hour volumes. Despite the increase in delay due to adding project-generated volumes, as the intersection's overall operation would remain acceptable at LOS A or B, the project is considered to have an acceptable effect on operations. Additionally, to minimize the number of drivers making left turns to enter SR 29, signage would be installed on the driveway to direct drivers exiting the site to use Silverado Trail to go south and SR 29 to go north. These results are summarized in Table 8. Project traffic volumes are shown in Figure 3.

Table 8 – Existing and Existing plus Project PM Peak Hour Intersection Levels of Service									
Study Intersection ***Approach***		**Existing Conditions**				**Existing plus Project**			
		Weekday Peak		**Weekend Peak**		**Weekday Peak**		**Weekend Peak**	
		Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
1.	SR-29/Deer Park Rd	10.8	B	4.6	A	12.2	B	5.2	A
	WB (Deer Park Rd) Left Turn	*134.9*	*F*	*33.8*	*D*	*157.1*	*F*	*38.2*	*E*
	WB (Deer Park Rd) Right Turn	*14.3*	*B*	*12.1*	*B*	*14.5*	*B*	*12.3*	*B*
2.	Silverado Trl/Deer Park Rd	29.0	D	12.6	B	31.6	D	13.3	B

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Finding – While the project's effect on traffic operation would be considered acceptable given that Caltrans does not prescribe to service level standards and overall operation would remain at LOS A, efforts should be made to minimize the increase in delay due to the project. By directing traffic outbound from the site to use Silverado Trail to go south and SR 29 to go north, the number of left turns onto SR 29 would be reduced.

During construction, a Construction Traffic Management Plan would be prepared and implemented to reduce traffic impacts to adjacent residential neighborhoods. Conditions during construction were not evaluated as the number of peak hour trips associated with construction activities is less than the volume evaluated for operation of the project.

Future plus Project Conditions

Upon the addition of project-generated traffic to the anticipated future volumes, SR-29/Deer Park Road is expected to continue operating deficiently during the weekday p.m. peak hour and with substantial delays for the stop-controlled traffic on Deer Park Road. While delay would also be high during the weekend peak hour, because overall operation remains at LOS C, this is considered acceptable. Silverado Trail/Deer Park Road is also expected to continue operating deficiently during the weekday peak hour but acceptably during the weekend peak hour. The Future plus Project operating conditions are summarized in Table 9.

Table 9 – Future and Future plus Project Peak Hour Intersection Levels of Service									
Study Intersection ***Approach***		**Future Conditions**				**Future plus Project**			
		Weekday Peak		**Weekend Peak**		**Weekday Peak**		**Weekend Peak**	
		Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
1.	SR-29/Deer Park Rd	**66.1**	**F**	14.9	B	**72.1**	**F**	17.9	C
	WB (Deer Park Rd) Left Turn	***134.9***	***F***	*63.1*	*F*	***1,096***	***F***	*169.6*	*F*
	WB (Deer Park Rd) Right Turn	*14.3*	*B*	*14.8*	*B*	*17.7*	*C*	*14.8*	*B*
	With Signal	24.3	C	12.1	B	25.3	C	12.8	B
2.	Silverado Trl/Deer Park Rd	**53.8**	**F**	16.4	C	**57.9**	**F**	17.8	C
	With Signal	19.0	B	-	-	29.9	C	-	-

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*; **Bold** text = deficient operation; Shaded cells = conditions with recommended improvements

Installation of a traffic signal at SR 29/Deer Park Road, as indicated is warranted for future volumes without the project, would be expected to improve operation to LOS C during both the weekday peak hour and LOS B during

the weekend peak hour. If the City of St. Helena decides to pursue such an improvement, the project would contribute a proportional share of the cost to the City.

According to the County of Napa's traffic operation standards, a project would cause an adverse effect requiring improvements if, for future conditions, the Project's volume is equal to, or greater than five percent of the difference between the future and existing volumes. Silverado Trail/Deer Park Road is under the County's jurisdiction and the project volume is approximately seven percent of the difference, so it would have an adverse effect on operations. Conversion of the existing traffic signal at Silverado Trail/Deer Park Road from flashing red operation to normal signal operation and modification of the westbound through/left-turn lane to a dedicated left-turn lane and the westbound right-turn lane to a through/right-turn lane would result in acceptable LOS C operation during the weekday peak hour with project-generated trips. If the County of Napa decides to pursue this improvement, funds would be deposited with the County to cover the cost of the striping improvements as part of the project. Additionally, the applicant would pay traffic impact fees based on the City's Master Fee Schedule.

Finding – With the addition of project volumes, the westbound Deer Park Road approach to SR 29 is expected to continue operating deficiently during both peak hours and Silverado Trail/Deer Park Road is expected to continue operating deficiently during the weekday peak hour. As part of the project, a proportional share of the cost would be contributed if the City decides to install a traffic signal at SR 29/Deer Park Road.

The project has an adverse effect on operations at Silverado Trail/Deer Park Road since it is a County-maintained intersection and the project volume is more than 5 percent of the projected growth at this intersection.

Conversion of the existing traffic signal at the intersection from flashing red operation to normal signal operation and changing the geometry on the westbound approach to a left-turn lane and through/right-turn lane would achieve acceptable operations. Because these improvements are not currently needed and will only be needed if volumes continue to increase as projected by the County's model, a fee sufficient to cover the cost of the restriping would be paid by the applicant, allowing the County to make the improvements when, and if, needed. Additionally, the applicant would pay traffic impact fees based on the City's Master Fee Schedule.

Parking

The project was analyzed to determine whether the proposed parking supply would be sufficient for the anticipated parking demand. The project site as proposed would provide a total of 67 parking spaces. Additionally, it is understood that the project would have a parking agreement with the Charles Krug Winery on the adjacent parcel to allow overflow parking and use of up to 50 spaces to occur there. The project site would also provide preferential parking spaces for low emission vehicles and would install electric vehicle recharging stations as required by St. Helena Municipal Code Section 17.26.090.

Parking supply requirements are based on the St. Helena Zoning Code Table 17.26.040; Minimum Off-Street Parking Requirements by Use. The proposed parking supply of 67 parking spaces on site does not meet City the requirements of 101 spaces. However, as the demand for staff, guests and restaurant patrons peak at different times, parking demand was evaluated based on standard rates published by the Urban Land Institute (ULI) in their *Shared Parking Calculation Model*. Based on these rates, the hotel and restaurant would generate a peak demand of 77 parking spaces. Therefore, the proposed parking supply on-site would not be adequate to meet the anticipated demand, but with the use of parking at the adjacent winery there would be an adequate parking supply to meet both the City's requirements as well as the anticipated demand.

The proposed parking supply, expected demand, and City requirements are shown in Table 10.

Table 10 – Parking Analysis Summary

Land Use	Units	Supply (spaces)	City Requirements		ULI Parking Generation
			Rate	Spaces Required	Est. Parking Demand
Hotel	56 rms, 20 employees		1 per room; 1 per 3 employees	56 7	43
Restaurant/ Lounge	150 sts; 4.35 ksf – 4.85 ksf		1 per 4 seats	38	34
Total		**67**		**101**	**77**

Notes: rms = rooms; sts = seats

Finding – The proposed on-site parking supply for the project would not be adequate to meet City requirements or the anticipated demand. However, with use of existing parking spaces on the Charles Krug Winery site through a parking agreement, as planned, there would be an adequate parking supply.

Conclusions

- The proposed project is expected to generate an average of 576 daily trips, including 55 trips during the weekday p.m. peak hour and 78 trips during the weekend peak hour.

- Pedestrian and transit facilities are considered adequate for the rural location. Bicycle facilities serving the project site would be adequate since more than the required number of short-term and long-term bicycle parking spaces would be provided. The project would not include any frontage improvements that would preclude installation of planned facilities.

- The project would not conflict with any policies related to pedestrian, bicycle, or transit travel, so has a less-than-significant impact on these modes.

- The proposed project is expected to result in a less-than-significant VMT impact. Transportation demand management (TDM) measures would be implemented to further reduce VMT and support the City's trip reduction and climate policies.

- Sight lines along Deer Park Road are adequate to accommodate all turning movements into and out of the project driveway. Any new signage, monuments, or other structures to be placed near the project entrance would be positioned outside of the vision triangles of a driver waiting on the project driveway.

- A left-turn lane is not warranted on Deer Park Road at the proposed project driveway under any scenario based on application of the typical methodology used. However, a left-turn lane is warranted at the proposed project driveway using the County of Napa's left-turn lane criterion and would be provided as part of the project.

- The proposed project should be designed to accommodate emergency response vehicles and would not impede emergency responders, resulting in a less-than-significant impact on emergency response.

- Under existing volumes with and without project-generated trips, both study intersections operate acceptably except that the westbound Deer Park Road approach to SR 29 operates unacceptably at LOS F. To minimize left turns onto SR 29 from Deer Park Road and the resulting increase in delays due to adding project traffic, signing would be installed on the driveway directing drivers to use SR 29 to go north and Silverado Trail to go south.

- Under Future and Future plus Project scenarios, the westbound Deer Park Road approach to SR 29 would continue to operate unacceptably at LOS F and Silverado Trail/Deer Park Road is expected to operate unacceptably at LOS F during the weekday peak hour. If the City of St. Helena decides to install a traffic signal at SR 29/Deer Park Road to achieve acceptable operation, the project would pay a proportional share of the cost. Additionally, converting the existing traffic signal at Silverado Trail/Deer Park Road from flashing red operation to normal signal operation and changing the geometry on the westbound approach to single left-turn and through/right-turn lanes would achieve acceptable operations under long-term volumes. The applicant would deposit funds with the County to cover the cost of the striping improvements. Additionally, the applicant would pay traffic impact fees based on the City's Master Fee Schedule.

- The proposed on-site parking supply for the project would not be adequate to meet City requirements or the anticipated demand. However, with the use of existing parking spaces on the adjacent Charles Krug Winery site through an off-site parking agreement, as planned, there would be an adequate parking supply.

Study Participants and References

Study Participants

Principal in Charge	Dalene J. Whitlock, PE (Civil, Traffic), PTOE
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Traffic Engineer	Kevin Carstens, PE (Civil, Traffic)
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Editing/Formatting	Jessica Bender
Quality Control	Dalene J. Whitlock, PE (Civil, Traffic), PTOE

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Appendix A

Collision Rate Calculations

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Intersection Collision Rate Worksheet

TIS for the St. Helena Resort Project

Intersection # 1: State Route 29-Main Street & Deer Park Road
Date of Count: Friday, January 26, 2024

Number of Collisions: 8
Number of Injuries: 4
Number of Fatalities: 0
Average Daily Traffic (ADT): 14300
Start Date: January 1, 2018
End Date: December 31, 2022
Number of Years: 5

Intersection Type: Tee
Control Type: Stop & Yield Controls
Area: Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times \text{Days per Year} \times \text{Number of Years}}$$

$$\text{Collision Rate} = \frac{8 \times 1{,}000{,}000}{14{,}300 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.31 c/mve**	**0.0%**	**50.0%**
Statewide Average*	**0.13 c/mve**	**1.3%**	**47.3%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2020 Collision Data on California State Highways, Caltrans

Intersection # 2: Silverado Trail & Deer Park Road
Date of Count: Friday, January 26, 2024

Number of Collisions: 3
Number of Injuries: 1
Number of Fatalities: 0
Average Daily Traffic (ADT): 13600
Start Date: January 1, 2018
End Date: December 31, 2022
Number of Years: 5

Intersection Type: Four-Legged
Control Type: 4 Way Flasher
Area: Suburban

$$\text{Collision Rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times \text{Days per Year} \times \text{Number of Years}}$$

$$\text{Collision Rate} = \frac{3 \times 1{,}000{,}000}{13{,}600 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.12 c/mve**	**0.0%**	**33.3%**
Statewide Average*	**0.47 c/mve**	**0.8%**	**32.0%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2020 Collision Data on California State Highways, Caltrans

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Appendix B

Left-Turn Lane Warrant Spreadsheets

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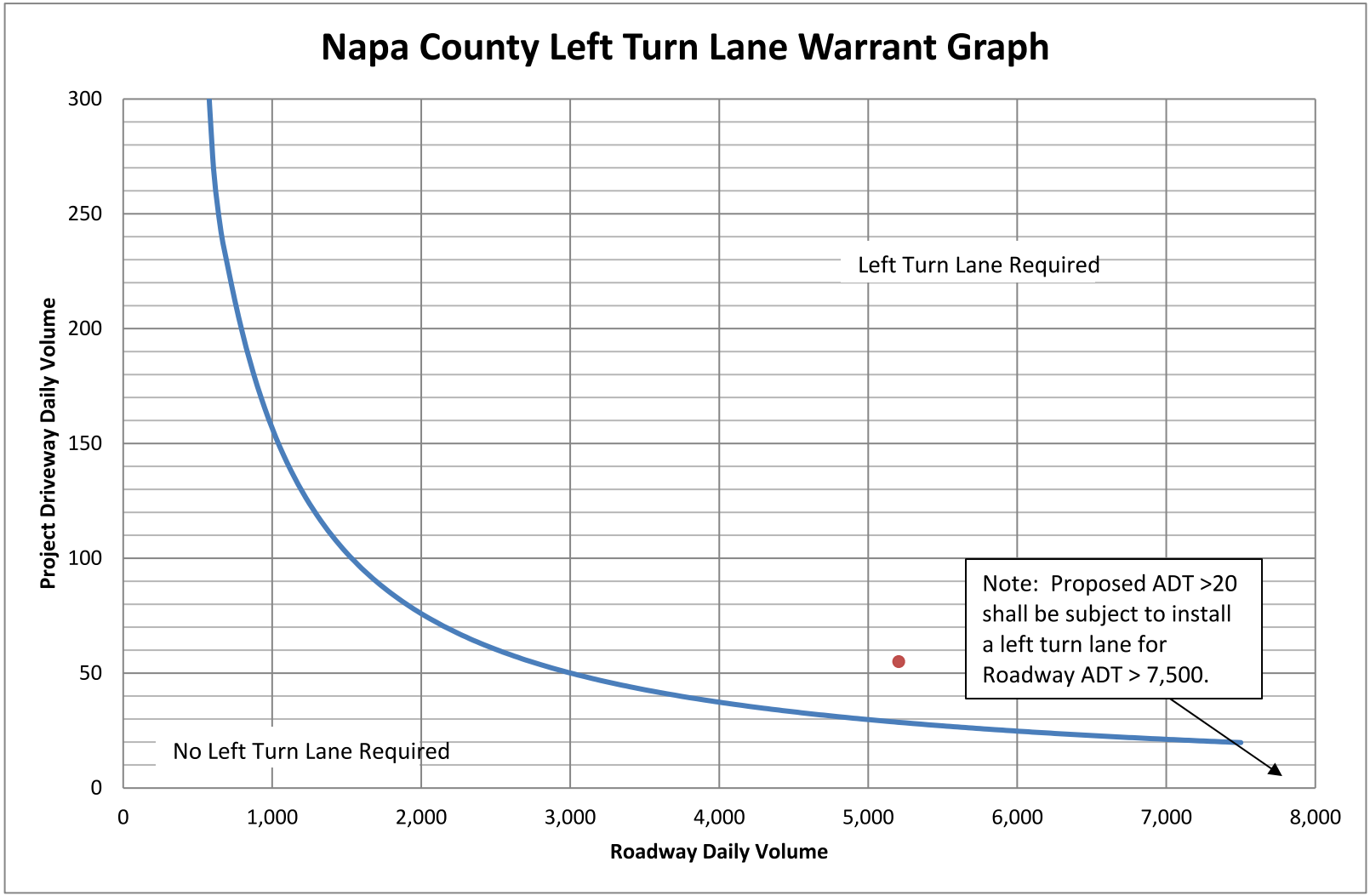
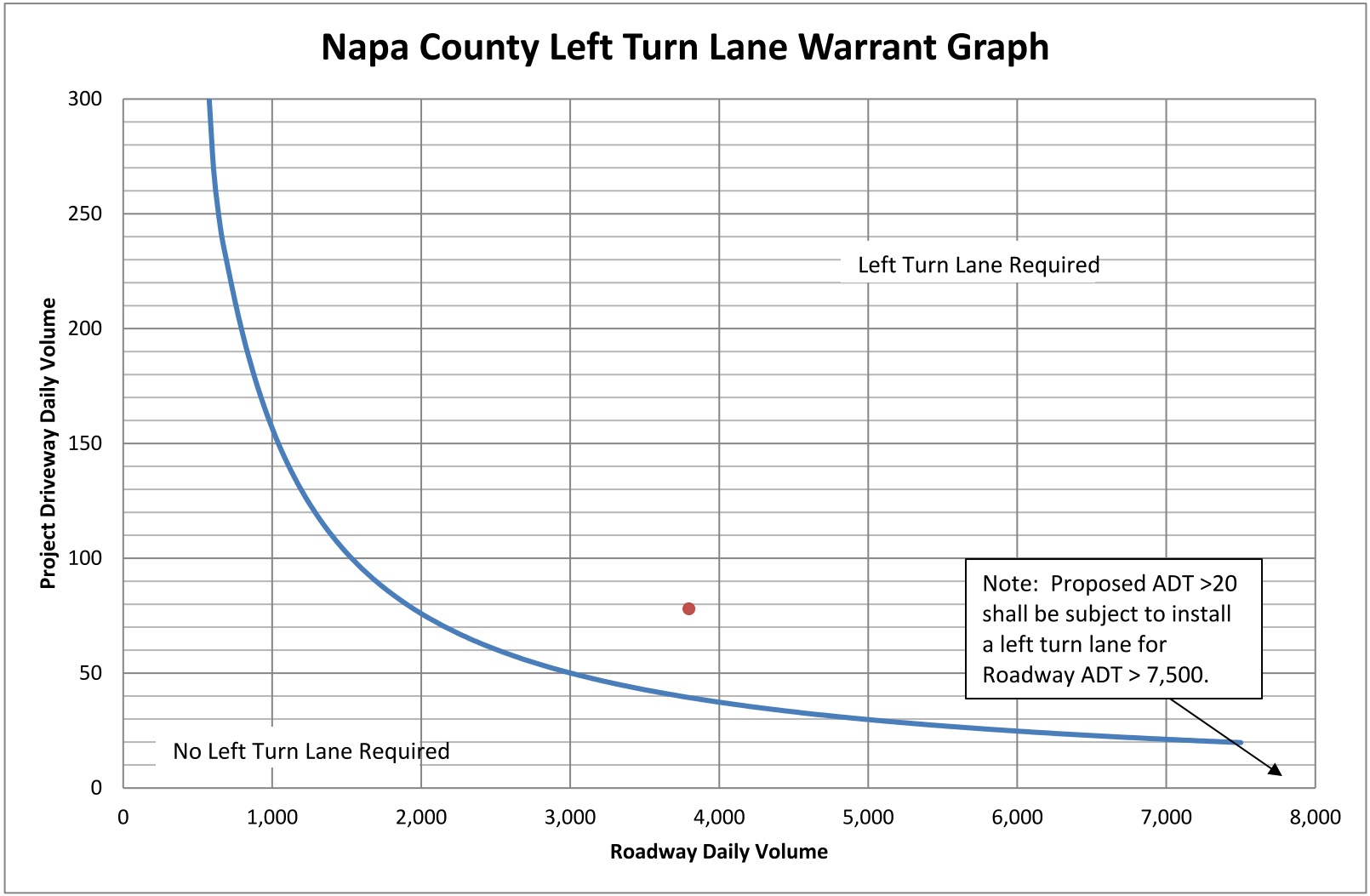
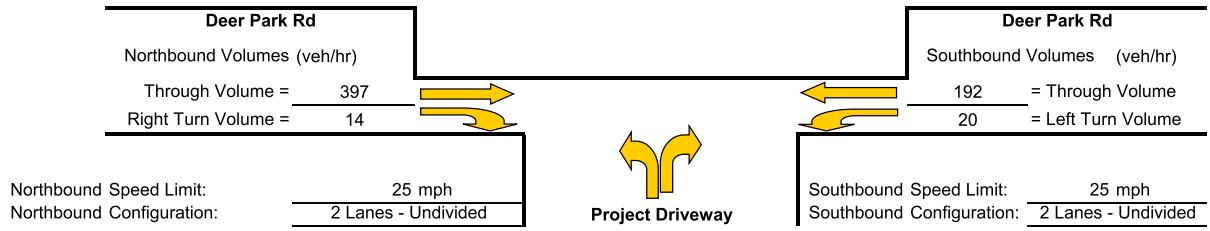

Napa County Left Turn Lane Warrant Graph
Project Driveway Daily Volume
300
250
200
150
100
50
0
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
Roadway Daily Volume
Left Turn Lane Required
No Left Turn Lane Required
Note: Proposed ADT >20 shall be subject to install a left turn lane for Roadway ADT > 7,500.


Napa County Left Turn Lane Warrant Graph
Project Driveway Daily Volume
300
250
200
150
100
50
0
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
Roadway Daily Volume
Left Turn Lane Required
No Left Turn Lane Required
Note: Proposed ADT >20 shall be subject to install a left turn lane for Roadway ADT > 7,500.

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Deer Park Rd/Project Driveway
Study Scenario: E+P Weekday

Direction of Analysis Street: North/South
Cross Street Intersects: From the East



Northbound Speed Limit:	25 mph	Southbound Speed Limit:	25 mph
Northbound Configuration:	2 Lanes - Undivided	Southbound Configuration:	2 Lanes - Undivided

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 =	945.1
Advancing Volume	Va =	411
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

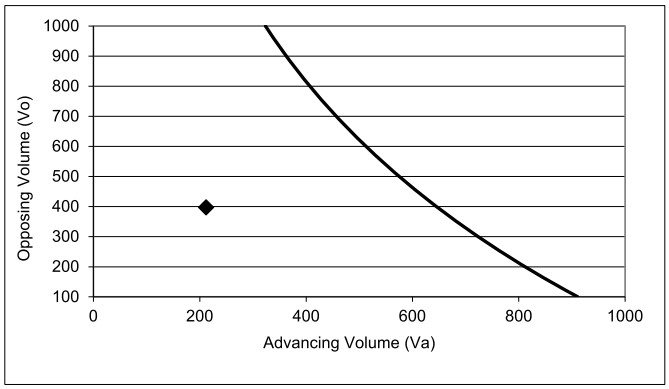
Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	411
If AV<Va then warrant is met		-

Right Turn Taper Warranted: **NO**

Southbound Left Turn Lane Warrants

Percentage Left Turns	%lt	9.4 %
Advancing Volume Threshold	AV	647 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

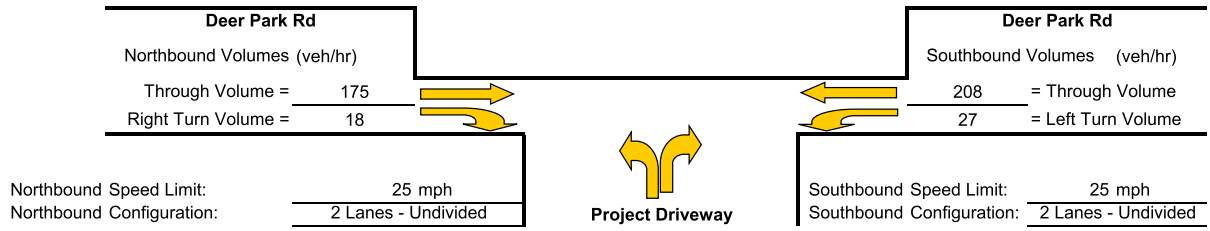
Left Turn Lane Warranted: **NO**

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: Deer Park Rd/Project Driveway
Study Scenario: E+P Weekend

Direction of Analysis Street: North/South
Cross Street Intersects: From the East



Northbound Speed Limit:	25 mph	Southbound Speed Limit:	25 mph
Northbound Configuration:	2 Lanes - Undivided	Southbound Configuration:	2 Lanes - Undivided

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 =	915.1
Advancing Volume	Va =	193
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

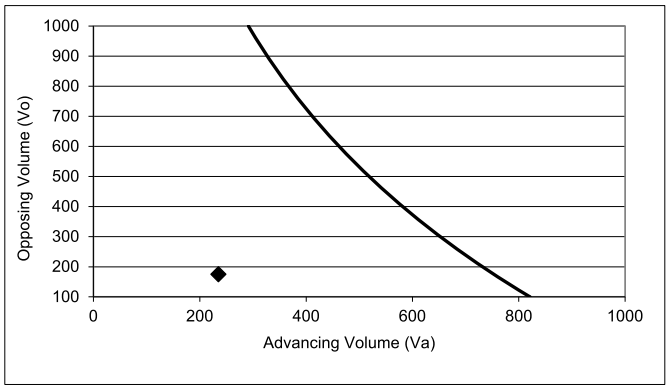
Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	193
If AV<Va then warrant is met		-

Right Turn Taper Warranted: **NO**

Southbound Left Turn Lane Warrants

Percentage Left Turns	%lt	11.5 %
Advancing Volume Threshold	AV	753 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

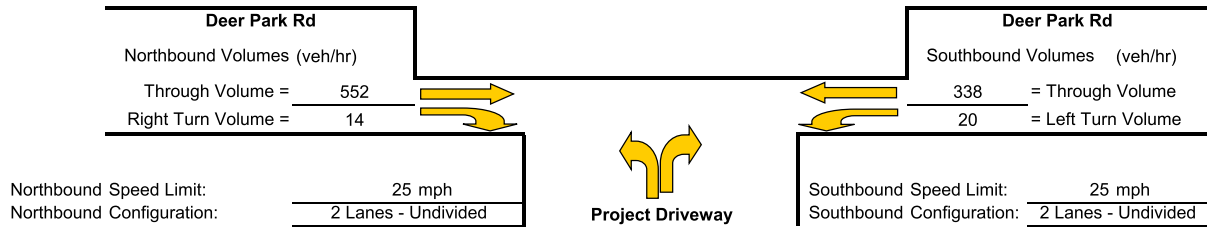
Left Turn Lane Warranted: **NO**

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: Deer Park Rd/Project Driveway
Study Scenario: F+P Weekday

Direction of Analysis Street: North/South
Cross Street Intersects: From the East



Northbound Speed Limit:	25 mph	Southbound Speed Limit:	25 mph
Northbound Configuration:	2 Lanes - Undivided	Southbound Configuration:	2 Lanes - Undivided

---

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 =	945.1
Advancing Volume	Va =	566
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

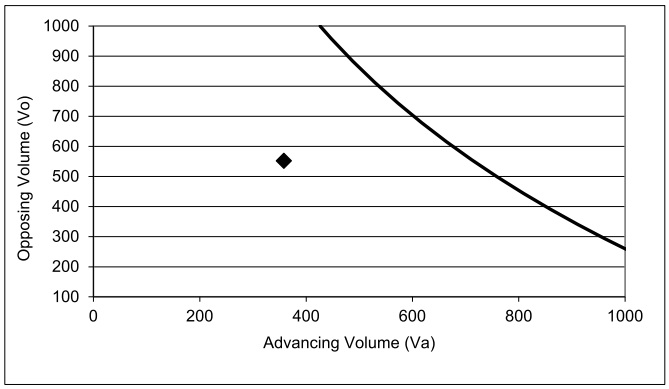
Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	566
If AV<Va then warrant is met		-

Right Turn Taper Warranted: **NO**

Southbound Left Turn Lane Warrants

Percentage Left Turns	%lt	5.6 %
Advancing Volume Threshold	AV	714 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

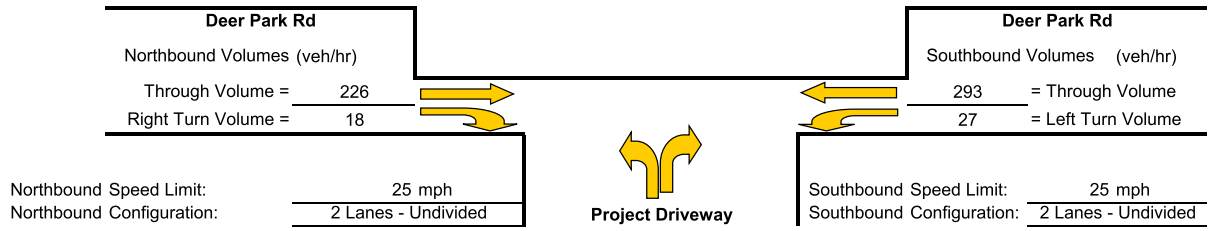
Left Turn Lane Warranted: **NO**

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: Deer Park Rd/Project Driveway
Study Scenario: F+P Weekend

Direction of Analysis Street: North/South
Cross Street Intersects: From the East



Northbound Speed Limit:	25 mph	Southbound Speed Limit:	25 mph
Northbound Configuration:	2 Lanes - Undivided	Southbound Configuration:	2 Lanes - Undivided

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 =	915.1
Advancing Volume	Va =	244
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

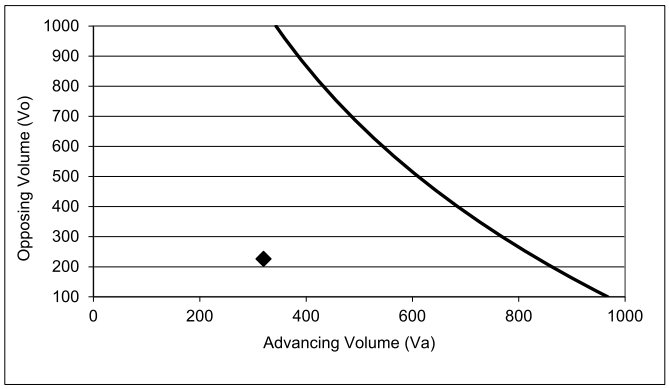
Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	244
If AV<Va then warrant is met		-

Right Turn Taper Warranted: **NO**

Southbound Left Turn Lane Warrants

Percentage Left Turns	%lt	8.4 %
Advancing Volume Threshold	AV	837 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.

Appendix C

Queuing Calculations

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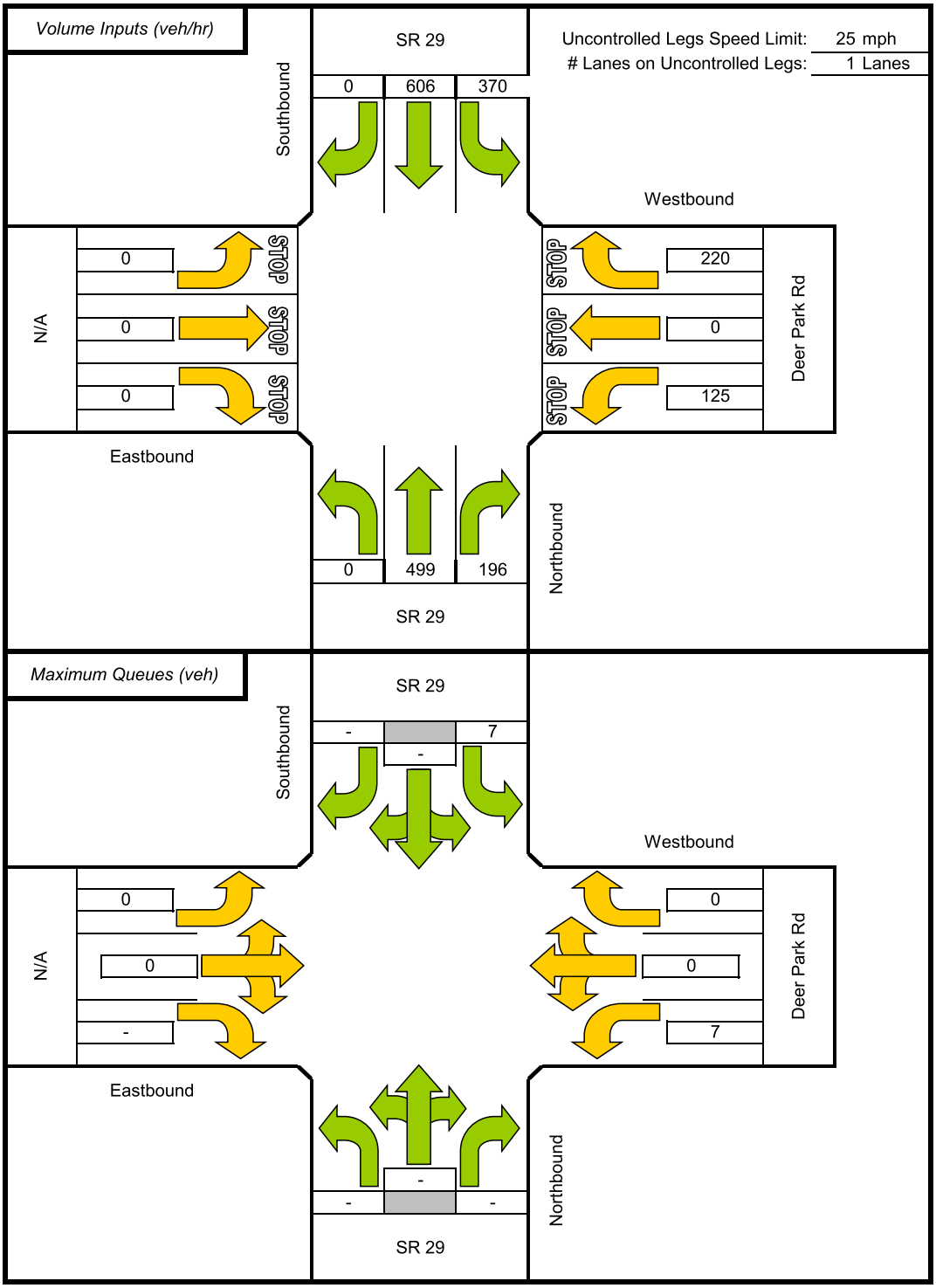
Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: SR 29
Side Street: Deer Park Rd

Scenario: Future Weekday plus Project
Stop Controlled Legs: East/West

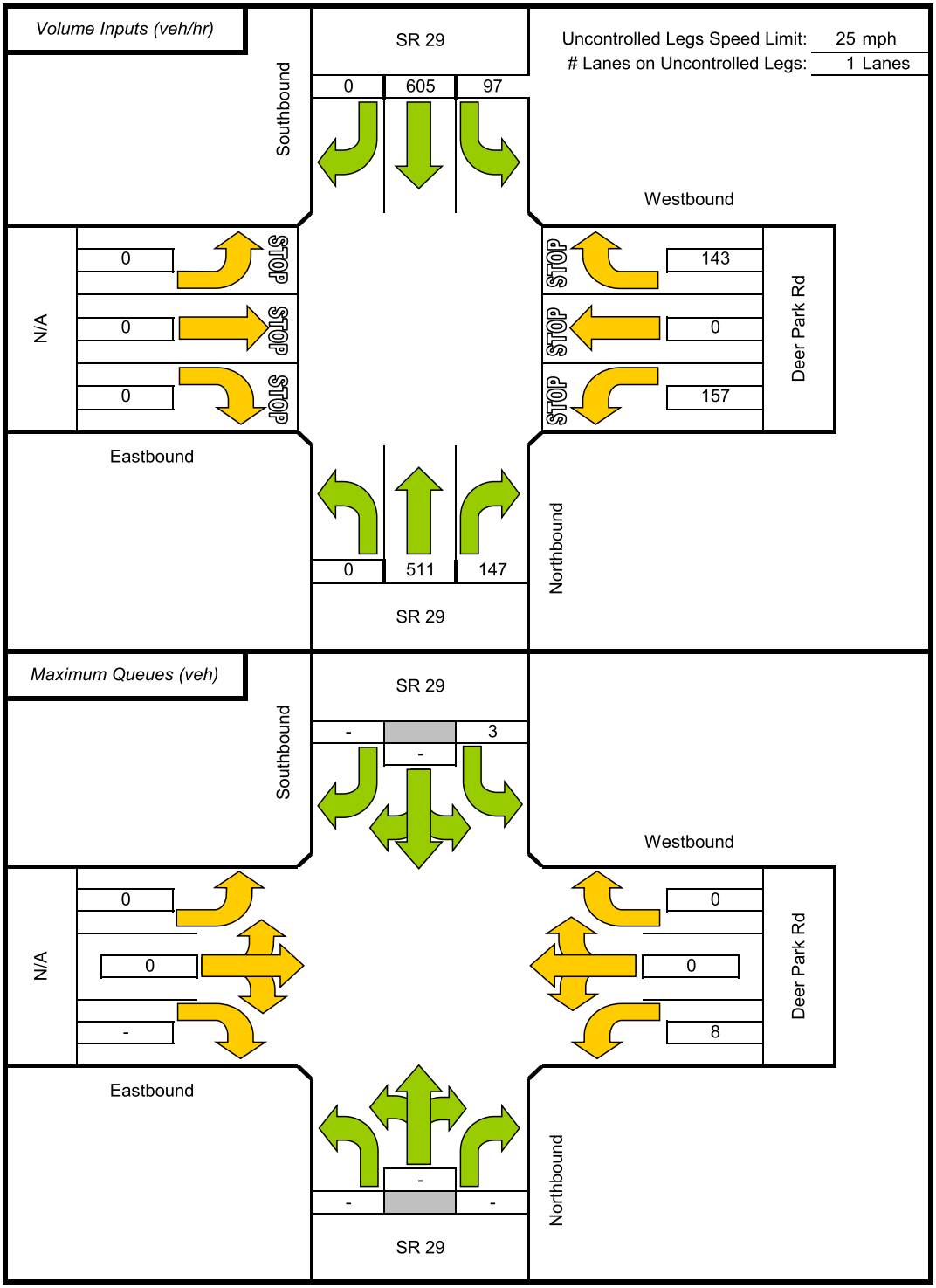


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: SR 29
Side Street: Deer Park Rd

Scenario: Future Weekend plus Project
Stop Controlled Legs: East/West



Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Appendix D

Intersection Level of Service Calculations

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Intersection Level Of Service Report
Intersection 1: SR 29/Deer Park Road

Control Type:	Two-way stop	Delay (sec / veh):	10.8
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.915

Intersection Setup

Name	SR 29		SR 29		Deer Park Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	190.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	SR 29		SR 29		Deer Park Road	
Base Volume Input [veh/h]	461	194	162	438	92	88
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	461	194	162	438	92	88
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	128	54	45	122	26	24
Total Analysis Volume [veh/h]	512	216	180	487	102	98
Pedestrian Volume [ped/h]	0		0		1	

Generated with PTV VISTRO 2/14/2024
Version 2023 (SP 0-9)

Intersection Settings

Priority Scheme	Free		Free		Stop	
Flared Lane						
Storage Area [veh]	0		0		1	
Two-Stage Gap Acceptance					No	
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.21	0.00	0.91	0.20
d_M, Delay for Movement [s/veh]	0.00	0.00	10.18	0.00	134.92	14.25
Movement LOS	A	A	B	A	F	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.77	0.00	5.62	0.74
95th-Percentile Queue Length [ft/ln]	0.00	0.00	19.28	0.00	140.45	18.62
d_A, Approach Delay [s/veh]	0.00		2.75		75.79	
Approach LOS	A		A		F	
d_I, Intersection Delay [s/veh]	10.65					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 2: Silverado Trail/Deer Park Road

Control Type:	All-way stop	Delay (sec / veh):	29.0
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.843

Intersection Setup

Name	Silverado Trail			Silverado Trail			Deer Park Road			Deer Park Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	160.00	100.00	100.00	80.00	100.00	100.00	140.00	100.00	100.00	170.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	55.00			45.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Silverado Trail			Silverado Trail			Deer Park Road			Deer Park Road		
Base Volume Input [veh/h]	77	209	127	12	251	13	21	166	168	213	92	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	77	209	127	12	251	13	21	166	168	213	92	14
Peak Hour Factor	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	60	36	3	72	4	6	48	48	61	26	4
Total Analysis Volume [veh/h]	89	240	146	14	289	15	24	191	193	245	106	16
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	425	473	422	462	417	459	417	475
Degree of Utilization, x	0.77	0.31	0.72	0.03	0.52	0.42	0.84	0.03

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	6.63	1.30	5.56	0.10	2.87	2.06	8.09	0.10
95th-Percentile Queue Length [ft]	165.64	32.47	138.94	2.51	71.73	51.39	202.17	2.61
Approach Delay [s/veh]	28.27		29.20		18.27		41.83	
Approach LOS	D		D		C		E	
Intersection Delay [s/veh]	29.03							
Intersection LOS	D							

Intersection Level Of Service Report
Intersection 1: SR 29/Deer Park Road

Control Type:	Two-way stop	Delay (sec / veh):	4.6
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.496

Intersection Setup

Name	SR 29		SR 29		Deer Park Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	190.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	SR 29		SR 29		Deer Park Road	
Base Volume Input [veh/h]	374	106	59	443	113	96
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	374	106	59	443	113	96
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	98	28	16	117	30	25
Total Analysis Volume [veh/h]	394	112	62	466	119	101
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	1
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.06	0.00	0.50	0.17
d_M, Delay for Movement [s/veh]	0.00	0.00	8.61	0.00	33.87	12.08
Movement LOS	A	A	A	A	D	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.19	0.00	2.53	0.59
95th-Percentile Queue Length [ft/ln]	0.00	0.00	4.66	0.00	63.14	14.77
d_A, Approach Delay [s/veh]	0.00		1.01		23.87	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	4.61					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 2: Silverado Trail/Deer Park Road

Control Type:	All-way stop	Delay (sec / veh):	12.6
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.503

Intersection Setup

Name	Silverado Trail			Silverado Trail			Deer Park Road			Deer Park Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	160.00	100.00	100.00	80.00	100.00	100.00	140.00	100.00	100.00	170.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	55.00			45.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Silverado Trail			Silverado Trail			Deer Park Road			Deer Park Road		
Base Volume Input [veh/h]	101	157	94	7	131	6	15	105	41	89	102	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	101	157	94	7	131	6	15	105	41	89	102	11
Peak Hour Factor	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	28	44	26	2	37	2	4	29	12	25	29	3
Total Analysis Volume [veh/h]	113	176	106	8	147	7	17	118	46	100	115	12
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	575	671	561	633	546	619	542	631
Degree of Utilization, x	0.50	0.16	0.28	0.01	0.25	0.07	0.40	0.02

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	2.82	0.56	1.12	0.03	0.97	0.24	1.89	0.06
95th-Percentile Queue Length [ft]	70.43	13.97	28.01	0.84	24.17	6.01	47.14	1.45
Approach Delay [s/veh]	13.52		11.41		10.82		13.37	
Approach LOS	B		B		B		B	
Intersection Delay [s/veh]	12.62							
Intersection LOS	B							

Intersection Level Of Service Report
Intersection 1: SR 29/Deer Park Road

Control Type:	Two-way stop	Delay (sec / veh):	66.1
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	2.785

Intersection Setup

Name	SR 29		SR 29		Deer Park Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	190.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	SR 29		SR 29		Deer Park Road	
Base Volume Input [veh/h]	499	194	358	606	124	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	499	194	358	606	124	213
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	125	49	90	152	31	53
Total Analysis Volume [veh/h]	499	194	358	606	124	213
Pedestrian Volume [ped/h]	0		0		1	

Generated with PTV VISTRO 2/14/2024
Version 2023 (SP 0-9)

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	1
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.40	0.01	2.78	0.42
d_M, Delay for Movement [s/veh]	0.00	0.00	11.61	0.00	999.83	17.34
Movement LOS	A	A	B	A	F	C
95th-Percentile Queue Length [veh/ln]	0.00	0.00	1.92	0.00	13.40	2.09
95th-Percentile Queue Length [ft/ln]	0.00	0.00	48.12	0.00	335.08	52.19
d_A, Approach Delay [s/veh]	0.00		4.31		378.85	
Approach LOS	A		A		F	
d_I, Intersection Delay [s/veh]	66.11					
Intersection LOS	F					

Intersection Level Of Service Report
Intersection 1: SR 29/Deer Park Road

Control Type:	Signalized	Delay (sec / veh):	24.3
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.724

Intersection Setup

Name	SR 29		SR 29		Deer Park Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	190.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		50.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		Yes	

Generated with PTV VISTRO 2/16/2024
Version 2023 (SP 0-9)

Volumes

Name	SR 29		SR 29		Deer Park Road	
Base Volume Input [veh/h]	499	194	358	606	124	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00					
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	499	194	358	606	124	213
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	125	49	90	152	31	53
Total Analysis Volume [veh/h]	499	194	358	606	124	213
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		1	
v_ci, Inbound Pedestrian Volume crossing mi	1		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Permissive	Permissive
Signal Group	6	0	5	2	7	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	0	5	10	5	0
Maximum Green [s]	188	0	5	188	44	0
Amber [s]	3.0	0.0	3.0	3.0	3.0	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	24	0	39	63	17	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	5	0	0	5	5	0
Pedestrian Clearance [s]	7	0	0	10	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
l1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
Minimum Recall	No		No	No	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	L	C	L	R
C, Cycle Length [s]	80	80	80	80	80
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	37	18	60	13	13
g / C, Green / Cycle	0.46	0.23	0.74	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.39	0.20	0.32	0.07	0.13
s, saturation flow rate [veh/h]	1781	1781	1870	1781	1589
c, Capacity [veh/h]	826	408	1388	281	251
d1, Uniform Delay [s]	18.91	29.89	3.94	30.60	32.88
k, delay calibration	0.50	0.11	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.99	6.17	1.00	1.08	7.75
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.84	0.88	0.44	0.44	0.85
d, Delay for Lane Group [s/veh]	28.90	36.06	4.94	31.69	40.63
Lane Group LOS	C	D	A	C	D
Critical Lane Group	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	11.79	6.79	2.32	2.08	4.22
50th-Percentile Queue Length [ft/ln]	294.70	169.83	58.03	52.01	105.60
95th-Percentile Queue Length [veh/ln]	17.42	11.07	4.18	3.74	7.59
95th-Percentile Queue Length [ft/ln]	435.47	276.69	104.46	93.62	189.86

Movement, Approach, & Intersection Results

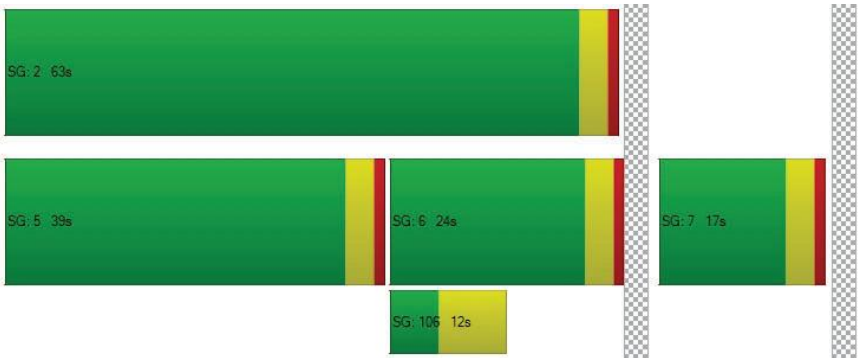
d_M, Delay for Movement [s/veh]	28.90	28.90	36.06	4.94	31.69	40.63
Movement LOS	C	C	D	A	C	D
d_A, Approach Delay [s/veh]	28.90		16.50		37.34	
Approach LOS	C		B		D	
d_I, Intersection Delay [s/veh]	24.33					
Intersection LOS	C					
Intersection V/C	0.724					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	9.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	1542.35
d_p, Pedestrian Delay [s]	0.00	0.00	31.59
l_p,int, Pedestrian LOS Score for Intersectio	0.000	0.000	2.418
Crosswalk LOS	F	F	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	499	1472	324
d_b, Bicycle Delay [s]	22.58	2.79	28.14
l_b,int, Bicycle LOS Score for Intersection	2.703	3.150	1.560
Bicycle LOS	B	C	A

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 1: SR 29/Deer Park Road

Control Type:	Roundabout	Delay (sec / veh):	10.7
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes		

Intersection Setup

Name	SR 29		SR 29		Deer Park Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	190.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	SR 29		SR 29		Deer Park Road	
Base Volume Input [veh/h]	499	194	358	606	124	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00					
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	499	194	358	606	124	213
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	125	49	90	152	31	53
Total Analysis Volume [veh/h]	499	194	358	606	124	213
Pedestrian Volume [ped/h]	0		0		1	

Intersection Settings

Number of Conflicting Circulating Lanes	1		1		1	
Circulating Flow Rate [veh/h]	365		126		509	
Exiting Flow Rate [veh/h]	745		726		563	
Demand Flow Rate [veh/h]	499	194	358	606	124	213
Adjusted Demand Flow Rate [veh/h]	499	194	358	606	124	213

Lanes

Overwrite Calculated Critical Headway	No	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00	4.00
Overwrite Calculated Follow-Up Time	No	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00	3.00
A (intercept)	1380.00	1420.00	1420.00	1420.00	1420.00
B (coefficient)	0.00102	0.00091	0.00091	0.00091	0.00091
HV Adjustment Factor	0.98	0.98	0.98	0.98	0.98
Entry Flow Rate [veh/h]	707	366	619	127	218
Capacity of Entry and Bypass Lanes [veh/h]	951	1266	1266	894	894
Pedestrian Impedance	1.00	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	933	1241	1241	876	876
X, volume / capacity	0.74	0.29	0.49	0.14	0.24

Movement, Approach, & Intersection Results

Lane LOS	C	A	A	A	A
95th-Percentile Queue Length [veh]	7.04	1.20	2.77	0.49	0.95
95th-Percentile Queue Length [ft]	175.88	30.09	69.18	12.31	23.84
Approach Delay [s/veh]	17.85	7.13		6.22	
Approach LOS	C	A		A	
Intersection Delay [s/veh]	10.70				
Intersection LOS	B				

Intersection Level Of Service Report
Intersection 2: Silverado Trail/Deer Park Road

Control Type:	All-way stop	Delay (sec / veh):	53.8
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.130

Intersection Setup

Name	Silverado Trail			Silverado Trail			Deer Park Road			Deer Park Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	160.00	100.00	100.00	80.00	100.00	100.00	140.00	100.00	100.00	170.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	55.00			45.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Silverado Trail			Silverado Trail			Deer Park Road			Deer Park Road		
Base Volume Input [veh/h]	170	209	159	12	258	15	21	214	314	292	153	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	170	209	159	12	258	15	21	214	314	292	153	14
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	43	52	40	3	65	4	5	54	79	73	38	4
Total Analysis Volume [veh/h]	170	209	159	12	258	15	21	214	314	292	153	14
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	407	453	397	430	405	442	445	445
Degree of Utilization, x	0.93	0.35	0.68	0.03	0.58	0.71	1.13	0.03

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	10.30	1.56	4.88	0.11	3.55	5.49	16.52	0.10
95th-Percentile Queue Length [ft]	257.43	38.91	121.89	2.71	88.78	137.22	412.93	2.43
Approach Delay [s/veh]	45.86		28.04		26.21		112.22	
Approach LOS	E		D		D		F	
Intersection Delay [s/veh]	53.83							
Intersection LOS	F							

Intersection Level Of Service Report
Intersection 2: Silverado Trail/Deer Park Road

Control Type:	Signalized	Delay (sec / veh):	19.0
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.776

Intersection Setup

Name	Silverado Trail			Silverado Trail			Deer Park Road			Deer Park Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	160.00	100.00	100.00	80.00	100.00	100.00	140.00	100.00	100.00	170.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	55.00			45.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	Silverado Trail			Silverado Trail			Deer Park Road			Deer Park Road		
Base Volume Input [veh/h]	170	209	159	12	258	15	21	214	314	292	153	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	170	209	159	12	258	15	21	214	314	292	153	14
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	43	52	40	3	65	4	5	54	79	73	38	4
Total Analysis Volume [veh/h]	170	209	159	12	258	15	21	214	314	292	153	14
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	10	0	0	10	0	0	10	0	0	10	0
Maximum Green [s]	0	25	0	0	25	0	0	27	0	0	27	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	32	0	0	32	0	0	28	0	0	28	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	R	C	R	L	C
C, Cycle Length [s]	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	28	28	28	28	24	24	24	24
g / C, Green / Cycle	0.47	0.47	0.47	0.47	0.40	0.40	0.40	0.40
(v / s)_i Volume / Saturation Flow Rate	0.44	0.10	0.15	0.01	0.13	0.20	0.33	0.09
s, saturation flow rate [veh/h]	858	1589	1783	1589	1832	1589	875	1843
c, Capacity [veh/h]	485	737	889	737	804	641	372	743
d1, Uniform Delay [s]	18.94	9.59	10.10	8.72	12.22	13.32	22.54	11.75
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11	0.26	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	11.89	0.67	0.88	0.05	0.20	0.58	8.35	0.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.78	0.22	0.30	0.02	0.29	0.49	0.78	0.22
d, Delay for Lane Group [s/veh]	30.83	10.26	10.98	8.77	12.42	13.90	30.89	11.90
Lane Group LOS	C	B	B	A	B	B	C	B
Critical Lane Group	Yes	No	No	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	5.72	1.00	1.91	0.09	1.71	2.52	4.41	1.17
50th-Percentile Queue Length [ft/ln]	142.92	25.05	47.64	2.29	42.65	63.06	110.30	29.16
95th-Percentile Queue Length [veh/ln]	9.64	1.80	3.43	0.16	3.07	4.54	7.86	2.10
95th-Percentile Queue Length [ft/ln]	240.95	45.09	85.75	4.11	76.77	113.50	196.42	52.49

Movement, Approach, & Intersection Results

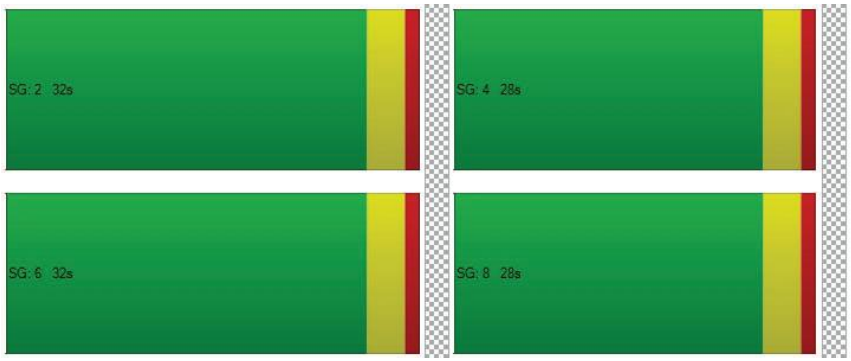
d_M, Delay for Movement [s/veh]	30.83	30.83	10.26	10.98	10.98	8.77	12.42	12.42	13.90	30.89	11.90	11.90
Movement LOS	C	C	B	B	B	A	B	B	B	C	B	B
d_A, Approach Delay [s/veh]	24.75			10.86			13.27			23.98		
Approach LOS	C			B			B			C		
d_I, Intersection Delay [s/veh]	18.95											
Intersection LOS	B											
Intersection V/C	0.776											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersectio	0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	933	933	800	800
d_b, Bicycle Delay [s]	8.53	8.53	10.80	10.80
l_b,int, Bicycle LOS Score for Intersection	2.447	2.030	2.465	2.317
Bicycle LOS	B	B	B	B

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 1: SR 29/Deer Park Road

Control Type:	Two-way stop	Delay (sec / veh):	14.9
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.024

Intersection Setup

Name	SR 29		SR 29		Deer Park Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	190.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	SR 29		SR 29		Deer Park Road	
Base Volume Input [veh/h]	511	145	81	605	155	131
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	511	145	81	605	155	131
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	128	36	20	151	39	33
Total Analysis Volume [veh/h]	511	145	81	605	155	131
Pedestrian Volume [ped/h]	0		0		0	

Generated with PTV VISTRO 2/14/2024
Version 2023 (SP 0-9)

Intersection Settings

Priority Scheme	Free		Free		Stop	
Flared Lane						
Storage Area [veh]	0		0		1	
Two-Stage Gap Acceptance					No	
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.09	0.01	1.02	0.26
d_M, Delay for Movement [s/veh]	0.00	0.00	9.23	0.00	139.00	14.44
Movement LOS	A	A	A	A	F	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.29	0.00	7.85	1.01
95th-Percentile Queue Length [ft/ln]	0.00	0.00	7.13	0.00	196.35	25.26
d_A, Approach Delay [s/veh]	0.00		1.09		81.94	
Approach LOS	A		A		F	
d_I, Intersection Delay [s/veh]	14.85					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 1: SR 29/Deer Park Road

Control Type:	Signalized	Delay (sec / veh):	12.1
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.497

Intersection Setup

Name	SR 29		SR 29		Deer Park Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	190.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		50.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

Generated with PTV VISTRO 2/16/2024
Version 2023 (SP 0-9)

Volumes

Name	SR 29		SR 29		Deer Park Road	
Base Volume Input [veh/h]	511	145	81	605	155	131
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00					
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	511	145	81	605	155	131
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	128	36	20	151	39	33
Total Analysis Volume [veh/h]	511	145	81	605	155	131
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Permissive	Permissive
Signal Group	6	0	5	2	7	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	0	5	10	5	0
Maximum Green [s]	34	0	5	43	9	0
Amber [s]	3.0	0.0	3.0	3.0	3.0	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	24	0	9	33	27	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	5	0	0	5	5	0
Pedestrian Clearance [s]	10	0	0	10	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
Minimum Recall	No		No	No	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	L	C	L	R
C, Cycle Length [s]	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	37	4	44	8	8
g / C, Green / Cycle	0.61	0.06	0.74	0.13	0.13
(v / s)_i Volume / Saturation Flow Rate	0.36	0.05	0.32	0.09	0.08
s, saturation flow rate [veh/h]	1800	1781	1870	1781	1589
c, Capacity [veh/h]	1098	115	1386	224	200
d1, Uniform Delay [s]	7.18	27.51	2.97	25.13	25.00
k, delay calibration	0.50	0.11	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.40	7.69	1.00	3.83	3.64
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.60	0.71	0.44	0.69	0.66
d, Delay for Lane Group [s/veh]	9.58	35.20	3.97	28.96	28.64
Lane Group LOS	A	D	A	C	C
Critical Lane Group	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	3.74	1.27	1.06	2.07	1.74
50th-Percentile Queue Length [ft/ln]	93.44	31.69	26.39	51.71	43.53
95th-Percentile Queue Length [veh/ln]	6.73	2.28	1.90	3.72	3.13
95th-Percentile Queue Length [ft/ln]	168.19	57.04	47.49	93.07	78.35

Movement, Approach, & Intersection Results

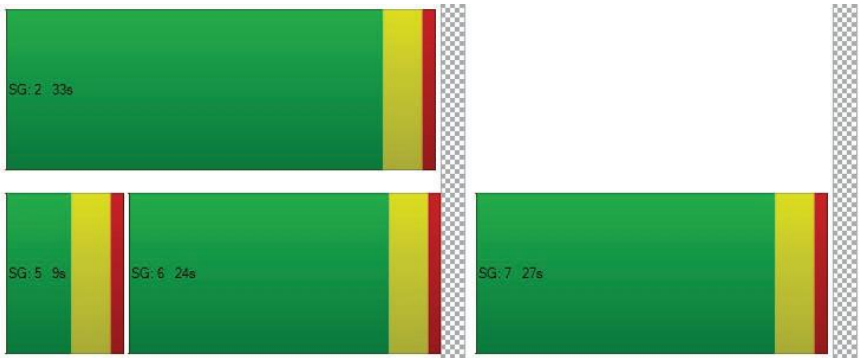
d_M, Delay for Movement [s/veh]	9.58	9.58	35.20	3.97	28.96	28.64
Movement LOS	A	A	D	A	C	C
d_A, Approach Delay [s/veh]	9.58		7.66		28.81	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	12.15					
Intersection LOS	B					
Intersection V/C	0.497					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersectio	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	667	967	767
d_b, Bicycle Delay [s]	13.33	8.01	11.41
I_b,int, Bicycle LOS Score for Intersection	2.642	2.692	1.560
Bicycle LOS	B	B	A

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 1: SR 29/Deer Park Road

Control Type:	Roundabout	Delay (sec / veh):	7.9
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	SR 29		SR 29		Deer Park Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	190.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	SR 29		SR 29		Deer Park Road	
Base Volume Input [veh/h]	511	145	81	605	155	131
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00					
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	511	145	81	605	155	131
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	128	36	20	151	39	33
Total Analysis Volume [veh/h]	511	145	81	605	155	131
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Number of Conflicting Circulating Lanes	1		1		1	
Circulating Flow Rate [veh/h]	83		158		521	
Exiting Flow Rate [veh/h]	775		655		231	
Demand Flow Rate [veh/h]	511	145	81	605	155	131
Adjusted Demand Flow Rate [veh/h]	511	145	81	605	155	131

Lanes

Overwrite Calculated Critical Headway	No	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00	4.00
Overwrite Calculated Follow-Up Time	No	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00	3.00
A (intercept)	1380.00	1420.00	1420.00	1420.00	1420.00
B (coefficient)	0.00102	0.00091	0.00091	0.00091	0.00091
HV Adjustment Factor	0.98	0.98	0.98	0.98	0.98
Entry Flow Rate [veh/h]	670	83	618	159	134
Capacity of Entry and Bypass Lanes [veh/h]	1269	1230	1230	884	884
Pedestrian Impedance	1.00	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	1244	1206	1206	867	867
X, volume / capacity	0.53	0.07	0.50	0.18	0.15

Movement, Approach, & Intersection Results

Lane LOS	A	A	A	A	A
95th-Percentile Queue Length [veh]	3.21	0.22	2.91	0.65	0.53
95th-Percentile Queue Length [ft]	80.23	5.39	72.73	16.22	13.28
Approach Delay [s/veh]	8.72	7.88		5.81	
Approach LOS	A	A		A	
Intersection Delay [s/veh]	7.86				
Intersection LOS	A				

Intersection Level Of Service Report
Intersection 2: Silverado Trail/Deer Park Road

Control Type:	All-way stop	Delay (sec / veh):	16.4
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.667

Intersection Setup

Name	Silverado Trail			Silverado Trail			Deer Park Road			Deer Park Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	160.00	100.00	100.00	80.00	100.00	100.00	140.00	100.00	100.00	170.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	55.00			45.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Silverado Trail			Silverado Trail			Deer Park Road			Deer Park Road		
Base Volume Input [veh/h]	138	215	129	9	177	8	21	144	56	122	139	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	138	215	129	9	177	8	21	144	56	122	139	15
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	35	54	32	2	44	2	5	36	14	31	35	4
Total Analysis Volume [veh/h]	138	215	129	9	177	8	21	144	56	122	139	15
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	529	610	509	567	496	555	497	572
Degree of Utilization, x	0.67	0.21	0.37	0.01	0.33	0.10	0.52	0.03

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	4.91	0.79	1.66	0.04	1.44	0.33	3.01	0.08
95th-Percentile Queue Length [ft]	122.82	19.84	41.50	1.07	36.10	8.36	75.17	2.02
Approach Delay [s/veh]	18.89		13.60		12.61		17.19	
Approach LOS	C		B		B		C	
Intersection Delay [s/veh]	16.43							
Intersection LOS	C							

Intersection Level Of Service Report
Intersection 1: SR 29/Deer Park Road

Control Type:	Two-way stop	Delay (sec / veh):	12.2
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.978

Intersection Setup

Name	SR 29		SR 29		Deer Park Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	190.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	SR 29		SR 29		Deer Park Road	
Base Volume Input [veh/h]	461	194	162	438	92	88
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	12	0	1	7
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	461	196	174	438	93	95
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	128	54	48	122	26	26
Total Analysis Volume [veh/h]	512	218	193	487	103	106
Pedestrian Volume [ped/h]	0		0		1	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	1
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.22	0.00	0.98	0.22
d_M, Delay for Movement [s/veh]	0.00	0.00	10.29	0.00	157.05	14.46
Movement LOS	A	A	B	A	F	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.84	0.00	6.07	0.82
95th-Percentile Queue Length [ft/ln]	0.00	0.00	21.09	0.00	151.82	20.55
d_A, Approach Delay [s/veh]	0.00		2.92		84.73	
Approach LOS	A		A		F	
d_I, Intersection Delay [s/veh]	12.16					
Intersection LOS	B					

Generated with PTV VISTRO 3/12/2024
Version 2023 (SP 0-9)

Intersection Level Of Service Report
Intersection 2: Silverado Trail/Deer Park Road

Control Type:	All-way stop	Delay (sec / veh):	31.6
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.857

Intersection Setup

Name	Silverado Trail			Silverado Trail			Deer Park Road			Deer Park Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	160.00	100.00	100.00	80.00	100.00	100.00	140.00	100.00	100.00	170.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	55.00			45.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Silverado Trail			Silverado Trail			Deer Park Road			Deer Park Road		
Base Volume Input [veh/h]	77	209	127	12	251	13	21	166	168	213	92	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	18	0	0	0	0	2	1	0	12	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	95	209	127	12	251	15	22	166	180	213	92	14
Peak Hour Factor	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	27	60	36	3	72	4	6	48	52	61	26	4
Total Analysis Volume [veh/h]	109	240	146	14	289	17	25	191	207	245	106	16
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	419	466	415	453	410	450	410	466
Degree of Utilization, x	0.83	0.31	0.73	0.04	0.53	0.46	0.86	0.03

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	7.88	1.32	5.77	0.12	2.98	2.37	8.37	0.11
95th-Percentile Queue Length [ft]	196.91	33.06	144.14	2.92	74.50	59.32	209.36	2.66
Approach Delay [s/veh]	33.57		30.51		19.15		44.24	
Approach LOS	D		D		C		E	
Intersection Delay [s/veh]	31.60							
Intersection LOS	D							

Intersection Level Of Service Report
Intersection 1: SR 29/Deer Park Road

Control Type:	Two-way stop	Delay (sec / veh):	5.2
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.538

Intersection Setup

Name	SR 29		SR 29		Deer Park Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	190.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	SR 29		SR 29		Deer Park Road	
Base Volume Input [veh/h]	374	106	59	443	113	96
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	16	0	2	12
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	374	108	75	443	115	108
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	98	28	20	117	30	28
Total Analysis Volume [veh/h]	394	114	79	466	121	114
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	1
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.07	0.00	0.54	0.19
d_M, Delay for Movement [s/veh]	0.00	0.00	8.68	0.00	38.22	12.28
Movement LOS	A	A	A	A	E	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.24	0.00	2.86	0.68
95th-Percentile Queue Length [ft/ln]	0.00	0.00	6.05	0.00	71.56	17.11
d_A, Approach Delay [s/veh]	0.00		1.26		25.63	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	5.21					
Intersection LOS	A					

Generated with PTV VISTRO 3/12/2024
Version 2023 (SP 0-9)

Intersection Level Of Service Report
Intersection 2: Silverado Trail/Deer Park Road

Control Type:	All-way stop	Delay (sec / veh):	13.4
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.563

Intersection Setup

Name	Silverado Trail			Silverado Trail			Deer Park Road			Deer Park Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	160.00	100.00	100.00	80.00	100.00	100.00	140.00	100.00	100.00	170.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	55.00			45.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Silverado Trail			Silverado Trail			Deer Park Road			Deer Park Road		
Base Volume Input [veh/h]	101	157	94	7	131	6	15	105	41	89	102	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	25	0	0	0	0	2	2	0	17	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	126	157	94	7	131	8	17	105	58	89	102	11
Peak Hour Factor	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	35	44	26	2	37	2	5	29	16	25	29	3
Total Analysis Volume [veh/h]	142	176	106	8	147	9	19	118	65	100	115	12
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	564	661	549	618	536	605	530	615
Degree of Utilization, x	0.56	0.16	0.28	0.01	0.26	0.11	0.41	0.02

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	3.48	0.57	1.15	0.04	1.01	0.36	1.95	0.06
95th-Percentile Queue Length [ft]	86.95	14.22	28.83	1.11	25.29	8.98	48.75	1.49
Approach Delay [s/veh]	15.04		11.64		10.97		13.76	
Approach LOS	C		B		B		B	
Intersection Delay [s/veh]	13.40							
Intersection LOS	B							

Intersection Level Of Service Report
Intersection 1: SR 29/Deer Park Road

Control Type:	Two-way stop	Delay (sec / veh):	72.1
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	2.979

Intersection Setup

Name	SR 29		SR 29		Deer Park Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	190.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	SR 29		SR 29		Deer Park Road	
Base Volume Input [veh/h]	499	194	358	606	124	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	12	0	1	7
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	499	196	370	606	125	220
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	125	49	93	152	31	55
Total Analysis Volume [veh/h]	499	196	370	606	125	220
Pedestrian Volume [ped/h]	0		0		1	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	1
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.41	0.01	2.98	0.44
d_M, Delay for Movement [s/veh]	0.00	0.00	11.78	0.00	1096.03	17.66
Movement LOS	A	A	B	A	F	C
95th-Percentile Queue Length [veh/ln]	0.00	0.00	2.04	0.00	13.78	2.20
95th-Percentile Queue Length [ft/ln]	0.00	0.00	50.89	0.00	344.55	55.11
d_A, Approach Delay [s/veh]	0.00		4.46		408.37	
Approach LOS	A		A		F	
d_I, Intersection Delay [s/veh]	72.05					
Intersection LOS	F					

Intersection Level Of Service Report
Intersection 1: SR 29/Deer Park Road

Control Type:	Signalized	Delay (sec / veh):	25.3
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.736

Intersection Setup

Name	SR 29		SR 29		Deer Park Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	190.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		50.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		Yes	

Volumes

Name	SR 29		SR 29		Deer Park Road	
Base Volume Input [veh/h]	499	194	358	606	124	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00					
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	12	0	1	7
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	499	196	370	606	125	220
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	125	49	93	152	31	55
Total Analysis Volume [veh/h]	499	196	370	606	125	220
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		1	
v_ci, Inbound Pedestrian Volume crossing mi	1		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Generated with PTV VISTRO 3/12/2024
Version 2023 (SP 0-9)

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Permissive	Permissive
Signal Group	6	0	5	2	7	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	0	5	10	5	0
Maximum Green [s]	188	0	5	188	44	0
Amber [s]	3.0	0.0	3.0	3.0	3.0	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	24	0	39	63	17	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	5	0	0	5	5	0
Pedestrian Clearance [s]	7	0	0	10	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
Minimum Recall	No		No	No	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	L	C	L	R
C, Cycle Length [s]	80	80	80	80	80
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	36	19	59	13	13
g / C, Green / Cycle	0.45	0.24	0.74	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.39	0.21	0.32	0.07	0.14
s, saturation flow rate [veh/h]	1781	1781	1870	1781	1589
c, Capacity [veh/h]	808	419	1382	288	257
d1, Uniform Delay [s]	19.66	29.64	4.05	30.37	32.77
k, delay calibration	0.50	0.11	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	11.59	6.23	1.01	1.03	8.05
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.86	0.88	0.44	0.43	0.86
d, Delay for Lane Group [s/veh]	31.25	35.87	5.07	31.40	40.82
Lane Group LOS	C	D	A	C	D
Critical Lane Group	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	12.41	7.01	2.40	2.08	4.38
50th-Percentile Queue Length [ft/ln]	310.24	175.20	59.98	52.11	109.41
95th-Percentile Queue Length [veh/ln]	18.19	11.35	4.32	3.75	7.81
95th-Percentile Queue Length [ft/ln]	454.67	283.74	107.97	93.80	195.18

Movement, Approach, & Intersection Results

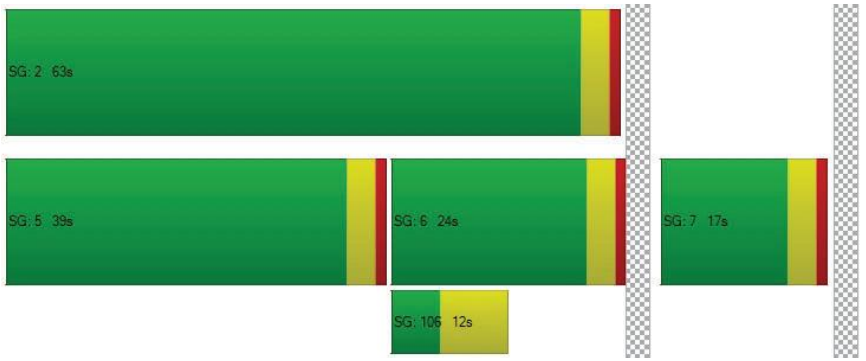
d_M, Delay for Movement [s/veh]	31.25	31.25	35.87	5.07	31.40	40.82
Movement LOS	C	C	D	A	C	D
d_A, Approach Delay [s/veh]	31.25		16.74		37.41	
Approach LOS	C		B		D	
d_I, Intersection Delay [s/veh]	25.28					
Intersection LOS	C					
Intersection V/C	0.736					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	9.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	1478.75
d_p, Pedestrian Delay [s]	0.00	0.00	31.59
I_p,int, Pedestrian LOS Score for Intersectio	0.000	0.000	2.429
Crosswalk LOS	F	F	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	499	1472	324
d_b, Bicycle Delay [s]	22.58	2.79	28.14
I_b,int, Bicycle LOS Score for Intersection	2.706	3.170	1.560
Bicycle LOS	B	C	A

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Silverado Trail/Deer Park Road

Control Type:	All-way stop	Delay (sec / veh):	57.9
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.144

Intersection Setup

Name	Silverado Trail			Silverado Trail			Deer Park Road			Deer Park Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	160.00	100.00	100.00	80.00	100.00	100.00	140.00	100.00	100.00	170.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	55.00			45.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Silverado Trail			Silverado Trail			Deer Park Road			Deer Park Road		
Base Volume Input [veh/h]	170	209	159	12	258	15	21	214	314	292	153	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	18	0	0	0	0	2	1	0	12	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	188	209	159	12	258	17	22	214	326	292	153	14
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	47	52	40	3	65	4	6	54	82	73	38	4
Total Analysis Volume [veh/h]	188	209	159	12	258	17	22	214	326	292	153	14
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	405	452	393	425	402	438	445	439
Degree of Utilization, x	0.98	0.35	0.69	0.04	0.59	0.75	1.14	0.03

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	11.69	1.56	4.98	0.12	3.64	6.10	16.88	0.10
95th-Percentile Queue Length [ft]	292.32	39.09	124.57	3.12	90.95	152.47	422.11	2.47
Approach Delay [s/veh]	54.05		28.68		28.12		117.26	
Approach LOS	F		D		D		F	
Intersection Delay [s/veh]	57.89							
Intersection LOS	F							

Intersection Level Of Service Report
Intersection 2: Silverado Trail/Deer Park Road

Control Type:	Signalized	Delay (sec / veh):	29.9
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.969

Intersection Setup

Name	Silverado Trail			Silverado Trail			Deer Park Road			Deer Park Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	160.00	100.00	100.00	80.00	100.00	100.00	140.00	100.00	100.00	170.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	55.00			45.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	Silverado Trail			Silverado Trail			Deer Park Road			Deer Park Road		
Base Volume Input [veh/h]	170	209	159	12	258	15	21	214	314	292	153	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	18	0	0	0	0	2	1	0	12	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	188	209	159	12	258	17	22	214	326	292	153	14
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	47	52	40	3	65	4	6	54	82	73	38	4
Total Analysis Volume [veh/h]	188	209	159	12	258	17	22	214	326	292	153	14
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	10	0	0	10	0	0	10	0	0	10	0
Maximum Green [s]	0	25	0	0	25	0	0	27	0	0	27	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	32	0	0	32	0	0	28	0	0	28	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	R	C	R	L	C
C, Cycle Length [s]	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	28	28	28	28	24	24	24	24
g / C, Green / Cycle	0.47	0.47	0.47	0.47	0.40	0.40	0.40	0.40
(v / s)_i Volume / Saturation Flow Rate	0.63	0.10	0.18	0.01	0.13	0.21	0.34	0.09
s, saturation flow rate [veh/h]	629	1589	1481	1589	1830	1589	865	1843
c, Capacity [veh/h]	380	737	749	737	803	641	369	743
d1, Uniform Delay [s]	22.36	9.59	10.40	8.73	12.23	13.45	22.64	11.75
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11	0.26	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	58.50	0.67	1.35	0.06	0.20	0.63	8.90	0.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.05	0.22	0.36	0.02	0.29	0.51	0.79	0.22
d, Delay for Lane Group [s/veh]	80.86	10.26	11.75	8.78	12.43	14.07	31.54	11.90
Lane Group LOS	F	B	B	A	B	B	C	B
Critical Lane Group	Yes	No	No	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	10.94	1.00	1.97	0.10	1.71	2.65	4.48	1.17
50th-Percentile Queue Length [ft/ln]	273.52	25.05	49.22	2.59	42.86	66.16	112.10	29.16
95th-Percentile Queue Length [veh/ln]	16.86	1.80	3.54	0.19	3.09	4.76	7.96	2.10
95th-Percentile Queue Length [ft/ln]	421.58	45.09	88.59	4.67	77.15	119.09	198.92	52.49

Movement, Approach, & Intersection Results

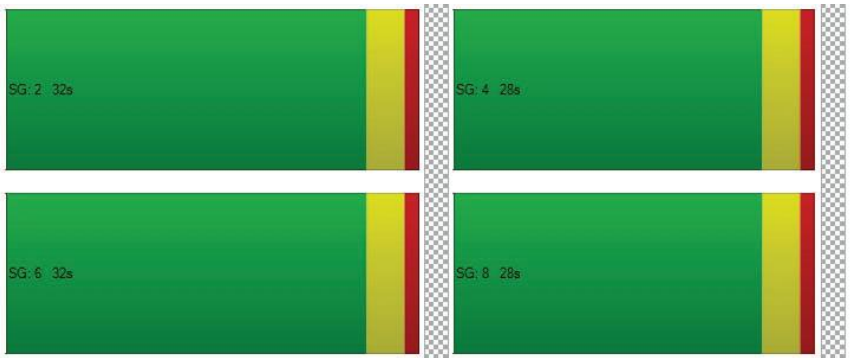
d_M, Delay for Movement [s/veh]	80.86	80.86	10.26	11.75	11.75	8.78	12.43	12.43	14.07	31.54	11.90	11.90
Movement LOS	F	F	B	B	B	A	B	B	B	C	B	B
d_A, Approach Delay [s/veh]	60.67			11.58			13.38			24.40		
Approach LOS	E			B			B			C		
d_I, Intersection Delay [s/veh]	29.92											
Intersection LOS	C											
Intersection V/C	0.969											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersectio	0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	933	933	800	800
d_b, Bicycle Delay [s]	8.53	8.53	10.80	10.80
l_b,int, Bicycle LOS Score for Intersection	2.477	2.033	2.487	2.317
Bicycle LOS	B	B	B	B

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 1: SR 29/Deer Park Road

Control Type:	Two-way stop	Delay (sec / veh):	17.9
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.107

Intersection Setup

Name	SR 29		SR 29		Deer Park Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	190.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	SR 29		SR 29		Deer Park Road	
Base Volume Input [veh/h]	511	145	81	605	155	131
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	16	0	2	12
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	511	147	97	605	157	143
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	128	37	24	151	39	36
Total Analysis Volume [veh/h]	511	147	97	605	157	143
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	1
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.10	0.01	1.11	0.28
d_M, Delay for Movement [s/veh]	0.00	0.00	9.32	0.00	169.57	14.75
Movement LOS	A	A	A	A	F	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.35	0.00	8.68	1.14
95th-Percentile Queue Length [ft/ln]	0.00	0.00	8.71	0.00	217.06	28.43
d_A, Approach Delay [s/veh]	0.00		1.29		95.77	
Approach LOS	A		A		F	
d_I, Intersection Delay [s/veh]	17.85					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 1: SR 29/Deer Park Road

Control Type:	Signalized	Delay (sec / veh):	12.8
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.510

Intersection Setup

Name	SR 29		SR 29		Deer Park Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	190.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		50.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

Volumes

Name	SR 29		SR 29		Deer Park Road	
Base Volume Input [veh/h]	511	145	81	605	155	131
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00					
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	16	0	2	12
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	511	147	97	605	157	143
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	128	37	24	151	39	36
Total Analysis Volume [veh/h]	511	147	97	605	157	143
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Permissive	Permissive
Signal Group	6	0	5	2	7	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	0	5	10	5	0
Maximum Green [s]	34	0	5	43	9	0
Amber [s]	3.0	0.0	3.0	3.0	3.0	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	24	0	9	33	27	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	5	0	0	5	5	0
Pedestrian Clearance [s]	10	0	0	10	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
l1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
Minimum Recall	No		No	No	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	L	C	L	R
C, Cycle Length [s]	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	36	4	44	8	8
g / C, Green / Cycle	0.60	0.07	0.74	0.13	0.13
(v / s)_i Volume / Saturation Flow Rate	0.37	0.05	0.32	0.09	0.09
s, saturation flow rate [veh/h]	1799	1781	1870	1781	1589
c, Capacity [veh/h]	1078	130	1381	228	204
d1, Uniform Delay [s]	7.60	27.28	3.03	25.01	25.06
k, delay calibration	0.50	0.11	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.58	8.32	1.01	3.66	4.36
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.61	0.75	0.44	0.69	0.70
d, Delay for Lane Group [s/veh]	10.18	35.59	4.04	28.67	29.41
Lane Group LOS	B	D	A	C	C
Critical Lane Group	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	3.99	1.52	1.10	2.08	1.93
50th-Percentile Queue Length [ft/ln]	99.65	38.05	27.61	51.99	48.32
95th-Percentile Queue Length [veh/ln]	7.17	2.74	1.99	3.74	3.48
95th-Percentile Queue Length [ft/ln]	179.37	68.48	49.69	93.58	86.97

Generated with PTV VISTRO 3/14/2024
Version 2023 (SP 0-9)

Movement, Approach, & Intersection Results

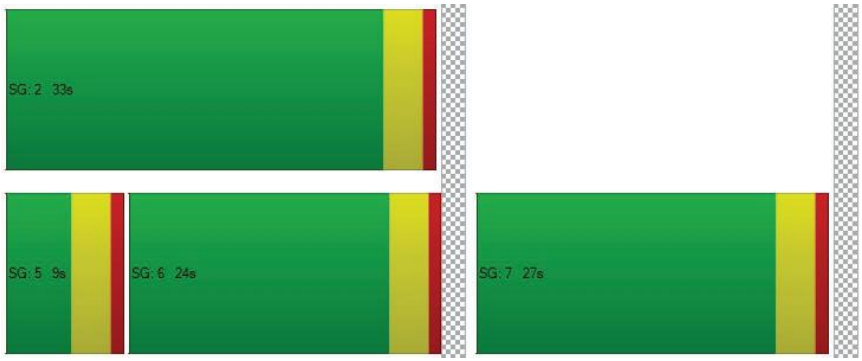
d_M, Delay for Movement [s/veh]	10.18	10.18	35.59	4.04	28.67	29.41
Movement LOS	B	B	D	A	C	C
d_A, Approach Delay [s/veh]	10.18		8.40		29.02	
Approach LOS	B		A		C	
d_I, Intersection Delay [s/veh]	12.84					
Intersection LOS	B					
Intersection V/C	0.510					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersectio	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	667	967	767
d_b, Bicycle Delay [s]	13.33	8.01	11.41
l_b,int, Bicycle LOS Score for Intersection	2.645	2.718	1.560
Bicycle LOS	B	B	A

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Silverado Trail/Deer Park Road

Control Type:	All-way stop	Delay (sec / veh):	17.8
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.725

Intersection Setup

Name	Silverado Trail			Silverado Trail			Deer Park Road			Deer Park Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	160.00	100.00	100.00	80.00	100.00	100.00	140.00	100.00	100.00	170.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	55.00			45.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Silverado Trail			Silverado Trail			Deer Park Road			Deer Park Road		
Base Volume Input [veh/h]	138	215	129	9	177	8	21	144	56	122	139	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	25	0	0	0	0	2	2	0	17	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	163	215	129	9	177	10	23	144	73	122	139	15
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	54	32	2	44	3	6	36	18	31	35	4
Total Analysis Volume [veh/h]	163	215	129	9	177	10	23	144	73	122	139	15
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	522	602	498	555	487	545	488	559
Degree of Utilization, x	0.72	0.21	0.37	0.02	0.34	0.13	0.54	0.03

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	5.94	0.81	1.71	0.06	1.51	0.46	3.11	0.08
95th-Percentile Queue Length [ft]	148.46	20.18	42.76	1.38	37.69	11.52	77.85	2.07
Approach Delay [s/veh]	21.78		13.91		12.81		17.78	
Approach LOS	C		B		B		C	
Intersection Delay [s/veh]	17.84							
Intersection LOS	C							

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