Traffic Impact Study for the Benedetti Car Wash Project

Prepared for the City of Sebastopol

Submitted by
W-Trans

July 15, 2020

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Executive Summary

The proposed Benedetti Car Wash project would be located on the southern half of the existing Benedetti Tire Center and Express Lube property at 6809 Sebastopol Avenue (SR 12) in the City of Sebastopol. As proposed, a new car wash facility of approximately 3,000 square feet and 16 vacuum parking stalls would be developed on-site; no changes are proposed to the existing tire center or express lube facilities. As part of the project, a new connection would be made to Abbott Avenue and Barnes Avenue at the southwest corner of the property.

The proposed project would be expected to generate an average of 400 trips per day, including 43 trips during each of the a.m. and p.m. peak hours. After pass-by trip deductions are taken into account, the project would be expected to result in 300 new daily trips to the surrounding roadway network, including 32 trips during each peak hour.

The project's characteristics are consistent with a local-serving retail use. The project would be expected to result in no increase to regional vehicle miles traveled, and therefore may be presumed to have a less than significant VMT impact.

The study area includes the intersections of Sebastopol Avenue (SR 12)/Morris Street, Sebastopol Avenue (SR 12)/Petaluma Avenue (SR 116), and Petaluma Avenue/Abbott Avenue. Analysis indicates that under Existing Conditions the study intersections are all operating acceptably at LOS D or better during both peak periods and would continue to operate acceptably upon the addition of project-related traffic.

Existing pedestrian, bicycle, and transit facilities are generally adequate to serve the project site so employees could reach the site without a vehicle, though all customer trips would be expected to be made by vehicles since the project is a car wash.

Site access would be expected to operate acceptably as proposed and the provision of a new connection to Abbott Avenue-Barnes Avenue would be a benefit as it would allow motorists to make a right turn onto Petaluma Avenue when exiting the site as opposed to a left turn onto Sebastopol Avenue, which is typically a less challenging maneuver during peak periods.

Adequate stopping sight distance is available at both of the project driveways to accommodate all turns into and out of the site and the circulation layout shown in the site plan would be expected to function acceptably. It is recommended that any new project signage be installed outside of the vision triangles at the project driveways to preserve existing sight lines.

Introduction

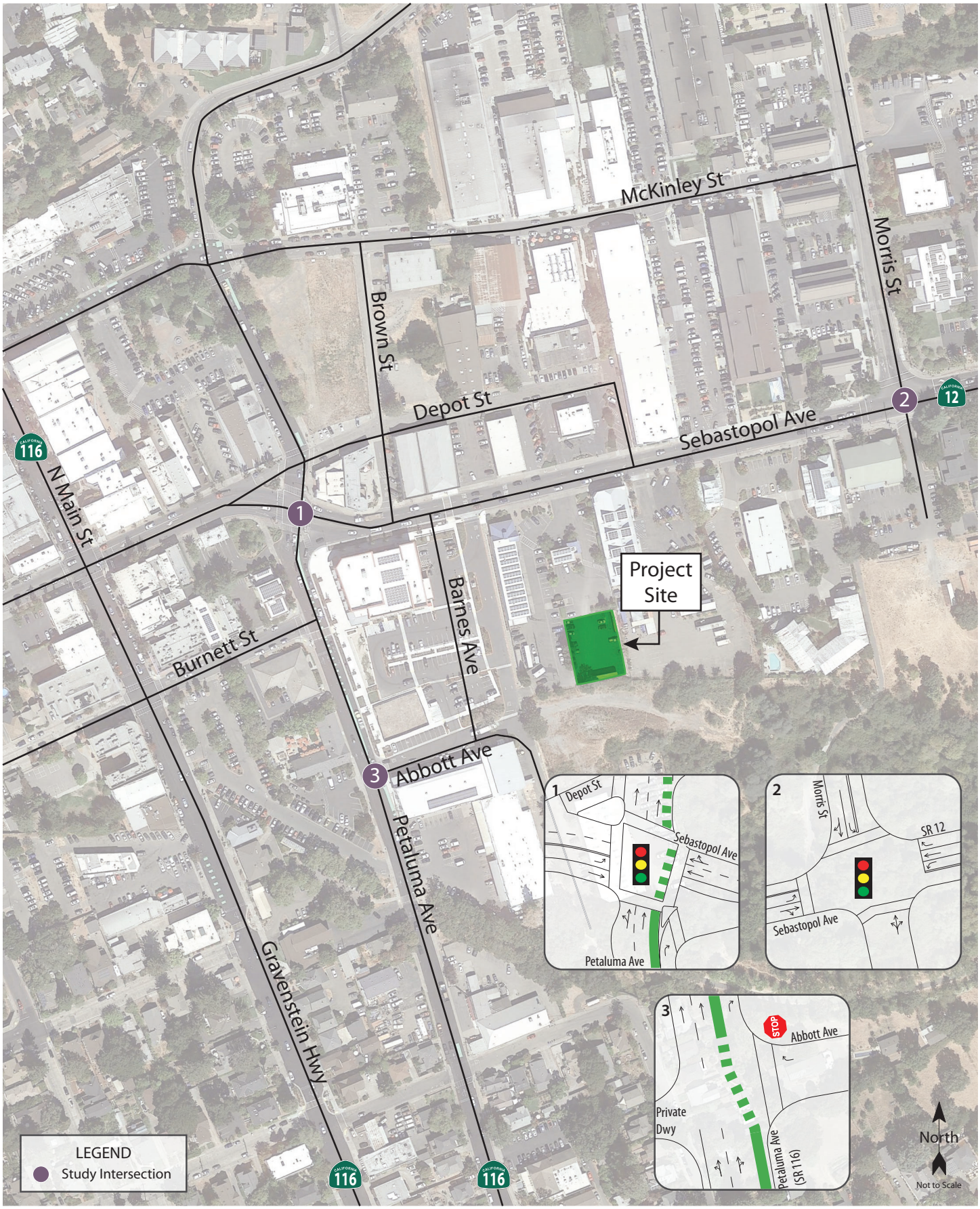
This report presents an analysis of the potential traffic impacts that would be associated with development of a car wash facility at the existing Benedetti Tire Center and Express Lube property at 6809 Sebastopol Avenue (SR 12) in the City of Sebastopol. The traffic study was completed in accordance with the criteria established by the City of Sebastopol, reflects a scope of work approved by City staff, and is consistent with standard traffic engineering techniques.

Prelude

The purpose of a traffic impact study is to provide City staff and policy makers with data that they can use to make an informed decision regarding the potential traffic impacts of a proposed project, and any associated improvements that would be required in order to mitigate these impacts to a level of insignificance as defined by the City's General Plan or other policies. Vehicular traffic impacts are typically evaluated 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 existing travel patterns or anticipated travel patterns specific to the proposed project, then analyzing the impact the new traffic would be expected to have on critical intersections or roadway segments. Impacts relative to access for pedestrians, bicyclists, and to transit are also addressed.

Project Profile

The proposed project includes a new car wash facility of approximately 3,000 square feet and 16 vacuum parking stalls on the southern half of the existing Benedetti Tire Center Express Lube property at 6809 Sebastopol Avenue (SR 12) in the City of Sebastopol. No changes are proposed to the existing tire center or lube facilities, which would continue operating in the same capacity. As part of the project, a new access connection would be made to Abbott Avenue and Barnes Avenue at the southwest corner of the property. The project site is shown in Figure 1.



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Traffic Impact Study for the Benedetti Car Wash Project

Figure 1 – Study Area and Existing Lane Configurations

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Transportation Setting

Operational Analysis

Study Area and Periods

The study area consists of the section of Sebastopol Avenue fronting the project site and the following intersections:

1. Sebastopol Avenue (SR 12)/Petaluma Avenue (SR 116)
2. Sebastopol Avenue (SR 12)/Morris Street
3. Petaluma Avenue (SR 116)/Abbott Avenue

Operating conditions during the weekday a.m. and p.m. peak periods were evaluated to capture the highest potential impacts for the proposed project as well as the highest volumes on the local transportation network. The morning peak hour occurs between 7:00 and 9:00 a.m. and reflects conditions during the home to work or school commute, while the p.m. peak hour occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion during the homeward bound commute.

Study Intersections

Sebastopol Avenue/Petaluma Avenue is a signalized four-legged intersection with the north and south legs composed of SR 116 and the east and west legs SR 12. Protected left-turn phasing is provided on the eastbound approach and the northbound approach has a channelized right-turn lane. Marked crosswalks are provided on all four legs and across the channelized right-turn lane; curb ramps are lacking truncated domes, except for the ramp on the recently improved CVS property frontage. It should be noted that Caltrans is in the process of reconstructing the intersection to eliminate the northbound free right-turn and the pedestrian crosswalk across the channelized right-turn lane.

Sebastopol Avenue/Morris Street is a signalized intersection with protected left-turn phasing on the eastbound and westbound Sebastopol Avenue approaches and split phasing on the northbound and southbound Morris Street approaches. There are marked crosswalks on the north, south, and west legs of the intersection.

Petaluma Avenue/Abbott Avenue is a two-way stop-controlled tee-intersection with Abbott Avenue terminating. Petaluma Avenue is a one-way northbound street and Abbott Avenue is an east-west street that becomes Barnes Avenue approximately 250 feet east of Petaluma Avenue. A crosswalk is marked on the east leg.

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

Study Roadway

Sebastopol Avenue is SR 12 and runs in a generally east-west alignment within the City of Sebastopol. The section along the project frontage has one travel lane in each direction along with a center two-way left-turn lane (TWLTL). The roadway has a total paved width of approximately 40 feet and a posted speed limit of 25 miles per hour (mph). Based on count data posted on the Caltrans website, the roadway has an average daily traffic (ADT) volume of about 23,000 vehicles near the eastern City portion of the City.

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 September 1, 2014 through August 31, 2019.

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 *2016 Collision Data on California State Highways*, California Department of Transportation (Caltrans). All three study intersections had collision rates higher than the Statewide average for similar intersections, which warranted further review. The collision rate calculations are provided in Appendix A.

Table 1 – Collision Rates at the Study Intersections

Study Intersection	Number of Collisions (2014-2019)	Calculated Collision Rate (c/mve)	Statewide Average Collision Rate (c/mve)
1. Sebastopol Ave/Petaluma Ave	24	**0.53**	0.24
2. Sebastopol Ave/Morris St	10	**0.41**	0.24
3. Petaluma Ave/Abbott Ave	5	**0.26**	0.08

Note: c/mve = collisions per million vehicles entering; **bold** text denotes collision rate above statewide average

The predominant crash types at Sebastopol Avenue/Petaluma Avenue were broadsides and sideswipe collisions, with the primary causes being right-of-way violations, traffic signals and signs violations, and improper turning. The remaining crashes were four rear-end collisions, three vehicle-pedestrian collisions and two hit object collisions. It should be noted that the majority of the data analysis period occurred prior to the reconfiguration of Petaluma Avenue with bike lanes so the results of the collision analysis do not fully reflect current conditions. Also, the City previously studied the intersections on Sebastopol Avenue to improve the signal timing and possible coordination within the downtown core. Those modifications have yet to be installed. The reported vehicle-pedestrian collisions had a primary collision factor of pedestrian right-of-way violation. With the planned signal timing improvements, an emphasis should be placed on considering pedestrian safety. It should also be noted that Caltrans is in the process of reconstructing the Petaluma Avenue intersection to eliminate the northbound free right-turn and the pedestrian crosswalk across the channelized right-turn lane which will help to address pedestrian safety concerns.

Further review of the collisions recorded at Sebastopol Avenue/Morris Street indicates that nine of the 14 collisions were rear-end collisions, all which occurred on the east and west legs of the intersection. This type of crash is common at signalized intersections where there is congestion during peak periods, and especially at transition points from a rural high-speed setting into an urban environment. The Sebastopol Avenue/Morris Street intersection acts as a gateway between the higher-speed section of SR 12 and the urban section within the City. Three hit object crashes occurred due to unsafe speed and a vehicle-pedestrian collision and broadside collision were a result of right-of-way violations. The planned signal timing improvements would help to reduce congestion and ultimately the frequency of rear-end collisions and increased enforcement may help to reduce the number of collisions attributed to unsafe speeds.

All five of the collisions recorded at Petaluma Avenue/Abbott Avenue were sideswipe collisions. These incidents occurred when vehicles were changing lanes or making a left turn into the Hopmonk Tavern driveway. Sideswipe collisions are common at locations with multiple lanes such as the subject intersection, though it should be noted that all five of the collisions occurred prior to completion of the SR 116 bike lane project. As part of the project, the northbound right-turn lane at the adjacent Sebastopol Avenue/Petaluma Avenue intersection was extended

further south to the Abbott Avenue intersection, which has reduced the potential for lane changes in the vicinity as motorists wishing to turn right at Sebastopol Avenue/Petaluma Avenue now maneuver into the correct position prior to entering the Petaluma Avenue/Abbott Avenue intersection.

Alternative Modes

Pedestrian Facilities

Pedestrian facilities generally include sidewalks, crosswalks, pedestrian signal phases, curb ramps, curb extensions, and various streetscape amenities such as lighting, benches, etc. In general, a network of sidewalks, crosswalks, traffic signals, and curb ramps provide access for pedestrians in the vicinity of the project site.

- **Petaluma Avenue** – Along the project frontage there is sidewalk coverage on both sides of Petaluma Avenue between Fannen Avenue and Sebastopol Avenue. Pedestrians can cross the street using the enhanced crosswalk with pedestrian-activated warning lights at Burnett Street or at the Joe Rodota Trail crossing.

- **Sebastopol Avenue** – Sebastopol Avenue is the main connector between the City's eastern edge and the Barlow area and the Downtown core with nearby neighborhoods and schools. Along the northern project frontage there is sidewalk coverage on both sides of Sebastopol Avenue between Petaluma Avenue and approximately 900 feet east of Morris Street.

- **Morris Street** – Complete sidewalk coverage is provided on the eastern side of Morris Street between Sebastopol Avenue and Eddie Lane. Partial sidewalk coverage is provided on the western side of Morris Street, with gaps in sidewalk coverage between Laguna Park Way and Eddie Lane.

Bicycle Facilities

The *Highway Design Manual*, Caltrans, 2017, 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 there are several Class I multi-use paths, including the Joe Rodota Trail, which connects Sebastopol with Santa Rosa; the Railroad Forest Path, which connects the intersection of Sebastopol Avenue/Morris Street with the Joe Rodota Trail; and the West County Trail, which runs between Eddie Lane and Occidental Road to the north. There are existing bicycle lanes along Morris Street between Sebastopol Avenue and Eddie Lane and along the entirety of SR 116 within City Limits between Mill Station Road and Cooper Road. According to the *City of Sebastopol Bicycle and Pedestrian Master Plan* (2011), a bike route is planned along Sebastopol Avenue-Bodega Avenue between Petaluma Avenue and Dutton Avenue and bike lanes are planned on Bodega Avenue between Dutton Avenue and Ragle Road. Table 2 summarizes the existing and planned bicycle facilities in the project vicinity.

Table 2 – Bicycle Facility Summary				
Status **Facility**	**Class**	**Length (miles)**	**Begin Point**	**End Point**
Existing				
Railroad Forest Bike path	I	0.20	Sebastopol Ave	Joe Rodota Trail
Joe Rodota Trail*	I	6.30	Petaluma Ave	Santa Rosa Trail
West County Trail*	I	0.34	N Main St	Dufranc Ave
Morris St	II	0.42	Sebastopol Ave	Eddie Ln
SR 116	II	2.43	Mill Station Rd	Cooper Rd
Sebastopol Ave	III	0.19	Morris St	Petaluma Ave
Planned				
Bodega Ave	II	0.87	Dutton Ave	Ragle Rd
Sebastopol Ave-Bodega Ave	III	0.32	Petaluma Ave	Dutton Ave

Notes: * Portions of these bikeways are located within adjacent jurisdictions
Source: *City of Sebastopol Bicycle and Pedestrian Master Plan*, Sonoma County Transportation Authority, 2011

Transit Facilities

Sonoma County Transit (SCT) provides fixed route bus service in Sonoma County. Routes 20 and 24 provide regional service between Sebastopol and surrounding communities. Each route stops at the Petaluma Avenue/Abbott Avenue intersection about 500 feet southwest of the project site.

Route 20 runs between the Russian River area and Santa Rosa and operates Monday through Friday, serving regional commuters to Santa Rosa with one-and-one-half to two-hour headways between 6:00 a.m. and 9:30 p.m. On the weekends, Route 20 runs from 8:00 a.m.to 8:15 p.m. with approximately three-hour headways.

Route 24 provides service within Sebastopol, operating on weekdays with headways of about 45 minutes between 9:00 a.m. and 3:30 p.m., and on Saturdays with headways of about 45 minutes between 9:00 a.m. and 3:00 p.m.

Two bicycles can be carried on most SCT buses. Bike rack space is on a first-come, first-served basis. Additional bicycles are allowed on SCT buses at the discretion of the driver.

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. Volunteer Wheels, the Americans with Disabilities Act (ADA) paratransit operator for Sonoma County Transit, is designed to serve the needs of individuals with disabilities within the incorporated areas of Sonoma County and between the County's nine incorporated cities.

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 of Sebastopol Avenue/Petaluma Avenue and Sebastopol Avenue/Morris Street were analyzed using the "Signalized" methodology published in the *Highway Capacity Manual* (HCM), Transportation Research Board, 2010. 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 signalized methodology uses factors including traffic volumes, green time for each movement, phasing, whether the signals are coordinated or not, truck traffic, and pedestrian activity. Average stopped delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology.

The study intersection of Sebastopol Avenue/Abbott Avenue was 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.

The ranges of delay associated with the various levels of service are indicated in Table 3.

Table 3 – Intersection Level of Service Criteria

LOS	Two-Way Stop-Controlled	Signalized
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. Most vehicles arrive during the green phase, so do not stop at all.
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 20 seconds. More vehicles stop than with LOS A, but many drivers still do not have to 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 20 to 35 seconds. The number of vehicles stopping is significant, although many still pass through without stopping.
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 35 to 55 seconds. The influence of congestion is noticeable, and most vehicles have to stop.
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 55 to 80 seconds. Most, if not all, vehicles must stop and drivers consider the delay excessive.
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 80 seconds. Vehicles may wait through more than one cycle to clear the intersection.

Reference: *Highway Capacity Manual,* Transportation Research Board, 2010

Traffic Operation Standards

All study intersections are located within the City of Sebastopol's City Limits and are therefore subject to the City's LOS standards. The *City of Sebastopol General Plan*, last updated in 2016, adopted Level of Service standards in Program 16.1 and as implemented by the City as follows:

- **At signalized intersections**: At signalized intersections, levels of service shall be determined for the overall intersection.

- Intersection queuing shall be evaluated in tandem with LOS. Projected queues at signalized intersections shall not extend through upstream signalized intersections.

- In evaluating circulation improvement needs at downtown intersections, mitigations should be avoided which increase capacity by widening that causes impacts to right-of-way and/or historical structures.

- Allow a minimum operation of LOS D for signalized intersections within the Downtown; a LOS C for all signalized intersections outside of the Downtown; and LOS D for all side street movements at unsignalized intersections.

The following significance criteria which the City has used in other traffic studies was also considered in this analysis:

> *A project would normally have a significant adverse impact on the environment if it would cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., results in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads or delays at intersections), or change the condition of an existing street (i.e., street closures, changing direction of travel) in a manner that would substantially affect access or traffic load and capacity of the street system. The specific City of Sebastopol criteria utilized for this analysis are as follows:*
>
> *A project-related or cumulative traffic impact is considered to be significant if the proposed project would do any of the following:*
>
> - *Cause the existing baseline LOS to degrade to worse than LOS D at any signalized intersection within the Downtown; or,*
> - *Cause the existing baseline LOS to degrade to worse than LOS C at any signalized intersection outside of the Downtown.*
>
> *The City of Sebastopol does not have an adopted threshold of significance for project-related impacts at intersections that are already operating, or projected to operate, at unacceptable LOS under Existing or Cumulative Conditions without the addition of any project-related traffic.*
>
> *Therefore, for the purpose of such studies to determine whether a project-related impact would be significant, the following criteria have been utilized in other studies in the City of Sebastopol. Similar criteria are utilized within other jurisdictions such as the City of Napa, City of Santa Rosa, City of San Francisco, and the City of Oakland:*
>
> - *A project impact is considered significant if the proposed project would cause the average control delay at any signalized intersections to increase by five (5.0) seconds or more for intersections already operating at unacceptable LOS E or LOS F under the no project conditions.*

Existing Conditions

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the weekday a.m. and p.m. peak periods. This condition does not include project-generated traffic volumes. Traffic counts collected in December 2018 were used for the Sebastopol Ave/Petaluma Avenue and Sebastopol Avenue/Morris Street intersections. Volume data for Petaluma Avenue/Abbott Avenue was collected in February 2020 while local schools were in session and during typical traffic conditions prior to the shelter-in-place directives associated with the COVID-19 pandemic. Peak hour factors (PHF's) were calculated based on the counts obtained at each intersection and used in the analysis.

Intersection Levels of Service

Under Existing Conditions, all study intersections are operating acceptably at LOS C or better during each peak hour. A summary of the intersection level of service calculations is contained in Table 4, and copies for all evaluated scenarios are provided in Appendix B. The Existing traffic volumes are shown in Figure 2.

Table 4 – Existing Peak Hour Intersection Levels of Service

	Study Intersection *Approach*	**AM Peak**		**PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**
1.	Sebastopol Ave/Petaluma Ave	16.0	B	20.5	C
2.	Sebastopol Ave/Morris St	19.1	B	23.7	C
3.	Petaluma Ave/Abbott Ave	0.4	A	0.6	A
	Westbound (Abbott Ave) Approach	*13.6*	*B*	*12.9*	*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*

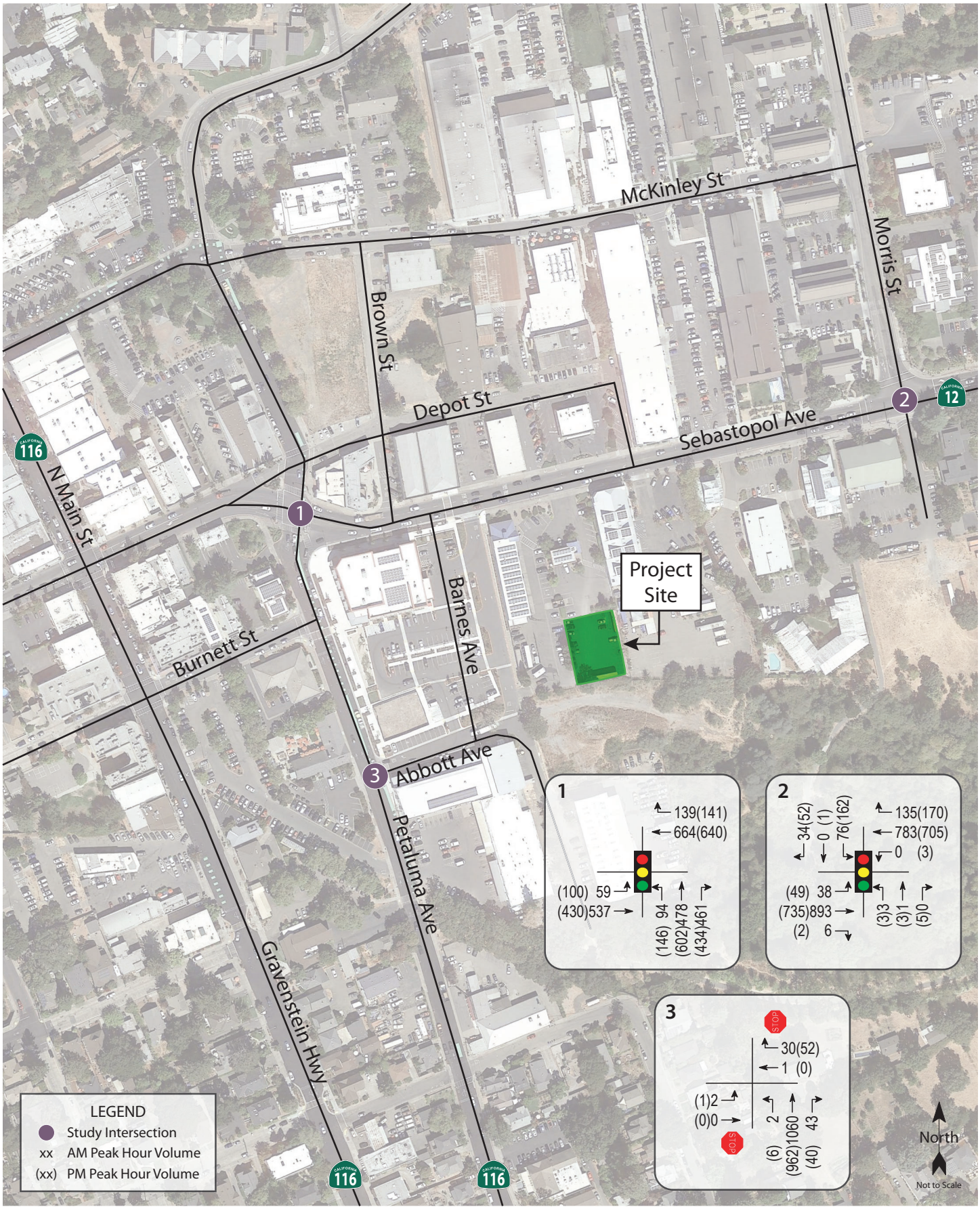
Future Conditions

The City of Sebastopol is working with Caltrans to improve signal timing at multiple intersections along SR 12 and SR 116 within the downtown core. Signal coordination at several of the studied intersections was previously recommended and is now being considered by Caltrans, along with re-evaluating the existing cycle lengths. Two of the intersections included in this analysis are part of the signal improvement study, Sebastopol Avenue/Petaluma Avenue and Sebastopol Avenue/Morris Street. In addition, Caltrans is in the process of modifying the Petaluma Avenue intersection to improve pedestrian safety. These future modifications along with the current COVID-19 situation will result in changes to Future traffic conditions. Because the project traffic generation is small in comparison with existing traffic and since the planned improvements have yet to be installed, a future conditions scenario was not analyzed.

Project Description

The proposed project would be located on the southern half of the existing Benedetti Tire Center and Express Lube property at 6809 Sebastopol Avenue (SR 12) in the City of Sebastopol. As proposed, a new car wash facility of approximately 3,000 square feet and 16 vacuum parking stalls would be developed on-site; no changes are proposed to the existing tire center or express lube facilities. The primary access would be located on Sebastopol Avenue at the current facility driveway. As part of the project, a new access connection would be made to Abbott Avenue and Barnes Avenue at the southwest corner of the property. The car wash facility would require two to three employees and would operate between the hours of 7:00 a.m. and 7:00 p.m. Monday through Saturday.

The project site plan is shown in Figure 3.



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Traffic Impact Study for the Benedetti Car Wash Project

Figure 2 – Existing Traffic Volumes

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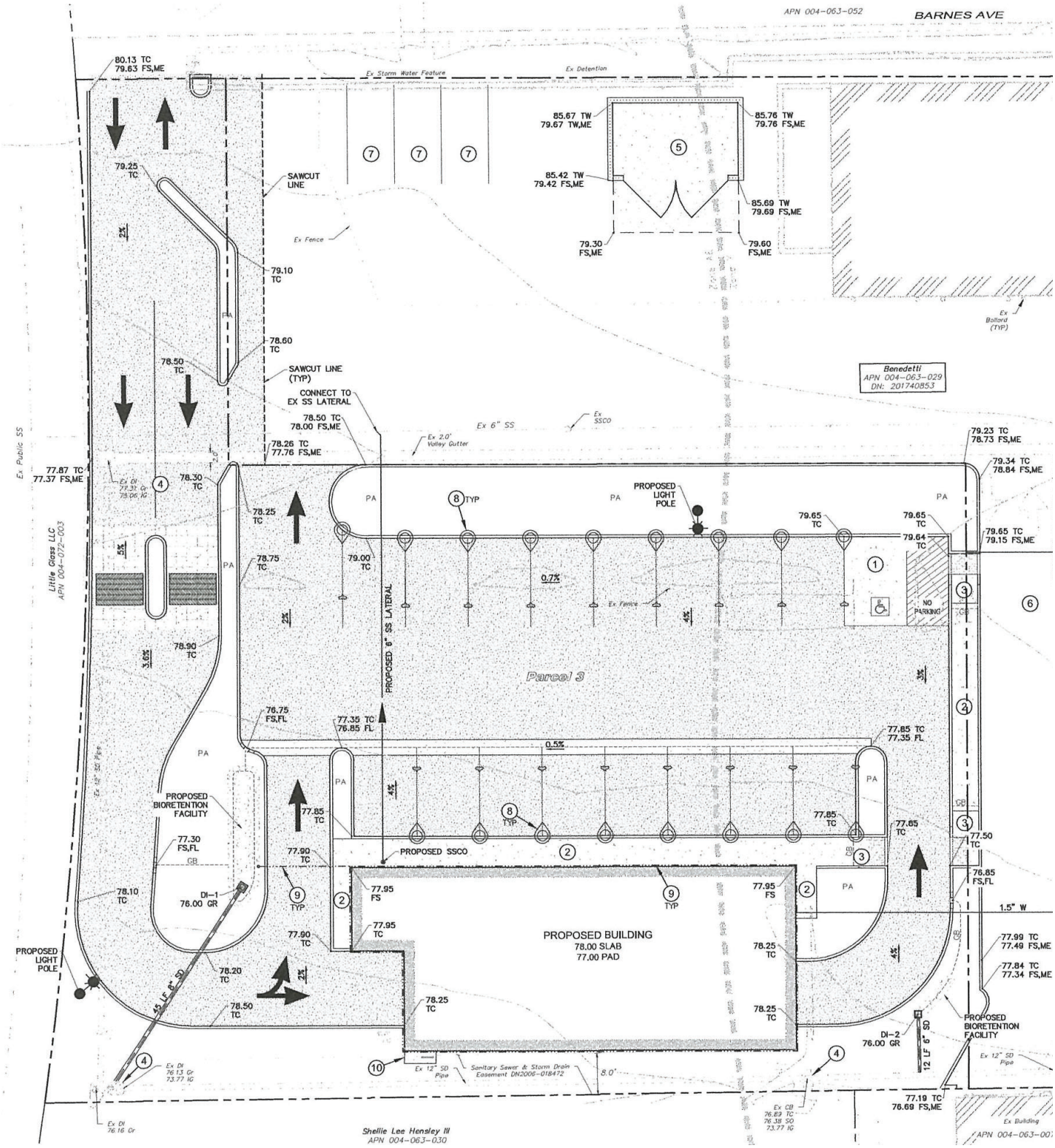

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Traffic Impact Study for the Benedetti Car Wash Project

Figure 3 – Site Plan

Trip Generation

The anticipated trip generation for the proposed project was estimated using standard rates published by the Institute of Transportation Engineers (ITE) in Trip Generation Manual, 10th Edition, 2017 for Automated Car Wash (Land Use #948), as this description most closely matches the proposed project. The Trip Generation Manual does not include daily or a.m. peak hour rates so the daily rate was calculated based on customer projections provided by the applicant and the a.m. peak hour rate was assumed to be the same as the p.m. peak hour rate to provide a conservative analysis, even though car wash facilities are typically busier in the evening than in the morning. The applicant anticipates serving an average of 125 to 150 customers per day, with 200 customers on a peak day. In order to provide conservative results, the trip generation numbers were based on the anticipated peak demand. Also, since some customers to the carwash may also utilize the services of the tire and lube center, there may be a sharing of trips. However, to be conservative, this sharing of trips was not included in the calculations.

Pass-by Trips

A portion of the project trips associated with the car wash would be drawn from existing traffic on nearby streets. These vehicle trips, known as pass-by trips, are not considered new trips since they consist of drivers who are already driving on the adjacent street and choose to make an interim stop. The percentage of these pass-by trips was based on information provided in the Trip Generation Handbook, 3rd Edition, Institute of Transportation Engineers, 2017. Since the Handbook does not provide a pass-by trip percentage for the Automated Car Wash land use, the pass-by trip percentages for Gasoline Service Station (Land Use #944) were used as a reference. However, because a car wash is not a necessity, the pass-by trip percentage would likely be lower than that of a gasoline service station, which is about 60 percent during each peak hour. It is estimated that approximately 25 percent of the car wash trips would be pass-by trips.

Total Project Trip Generation

Based on application of these rates and assumptions, the proposed project would be expected to generate an average of 400 trips per day, including 43 trips during each of the a.m. and p.m. peak hours. After pass-by trip deductions are taken into account, the project would be expected to result in 300 new trips to the surrounding roadway network, including 32 trips during each peak hour. These results are summarized in Table 5.

Table 5 – Trip Generation Summary

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Automated Car Wash	3 ksf	133.33	400	14.20	43	21	22	14.20	43	21	22
Pass-by		*-25%*	*-100*	*-25%*	*-11*	*-5*	*-6*	*-25%*	*-11*	*-5*	*-6*
Net New Trips			**300**		**32**	**16**	**16**		**32**	**16**	**16**

Note: ksf = 1,000 square feet

Trip Distribution

The pattern used to allocate new project trips to the street network was determined by reviewing existing turning movements at the study intersections as well as anticipated travel patterns for patrons of the car wash. Because Petaluma Avenue is one-way northbound, it was assumed that trips leaving the site to destinations to the south would utilize the new access to Abbott Avenue, turning right onto Petaluma Avenue, then left onto Burnett Street to gain access to southbound South Main Street. The applied distribution assumptions approved by City staff are shown in Table 6.

Table 6 – Trip Distribution Assumptions	
Route	**Percent**
Sebastopol Ave (East of Morris St)	25%
Sebastopol Ave (West of Petaluma Ave)	45%
Morris St (North of Sebastopol Ave)	5%
Petaluma Ave/Gravenstein Hwy S (South of Abbott Ave)	25%
TOTAL	**100%**

Vehicle Miles Traveled

Senate Bill (SB) 743 established a change in the metric to be applied for determining traffic impacts associated with development projects. Rather than the delay-based criteria associated with a Level of Service analysis, the increase in Vehicle Miles Traveled (VMT) as a result of a project is now the basis for determining impacts. Because the City of Sebastopol has not yet adopted a standard of significance for evaluating VMT, guidance provided by the California Governor's Office of Planning and Research (OPR) in the publication *Transportation Impacts (SB 743) CEQA Guidelines Update and Technical Advisory*, 2018, was used (referred to herein as the Technical Advisory). OPR's guidance for retail land uses, which is the classification under which the proposed project would fall, were applied.

The OPR Technical Advisory indicates that retail projects should generally be analyzed by examining total VMT, with an increase in total regional VMT being considered a potentially significant impact. In the Technical Advisory, OPR indicates that *local-serving* retail may generally be presumed by lead agencies to have a less-than-significant VMT impact (see Technical Advisory pages 16-17). OPR bases this presumption on substantial evidence and research demonstrating that adding local-serving retail uses typically improves destination accessibility to customers, often reducing trip distances (i.e., the, "miles" in vehicle miles traveled) since customers need to travel shorter distances than they previously did. The total demand for retail in a region, or in this case for car wash facilities, also tends to hold steady; adding new local-serving retail typically shifts trips away from another provider rather than adding entirely new trips to the region. OPR cites a size of 50,000 square feet or greater as being a potential indicator of regional-serving retail (versus local-serving) that would typically require a quantitative VMT analysis. At 3,000 square feet, the proposed project would be well below the 50,000 square foot size referenced by OPR.

Further consideration was given to the project type and its potential to draw traffic that is regional, versus local, in nature. Car wash facilities tend to be convenience-based uses; customers are generally unwilling to travel substantially out of their way to visit such outlets and tend to visit the closest location to their home or along their route. The proposed project would be expected to attract some of its customers from drivers already traveling on Sebastopol Avenue; these customers would result in no new vehicle miles traveled as this would be an interim stop on a trip that was already being made. In addition to drivers already passing by the site, customers would likely be drawn from the surrounding area. Based on a review of online mapping tools it appears that there are currently two car wash facilities in Sebastopol, one located at a gas station approximately 0.5 miles north of the proposed project on Healdsburg Avenue and one self-service location approximately 0.7 miles to the south on Gravenstein Highway South. By adding another car wash facility to the urban fabric, the average trip length driven by Sebastopol residents to such facilities would be expected to decrease, leading to a modest reduction in regional VMT.

Based on this assessment, the proposed project would function as a local-serving retail use, and based on guidance provided by OPR, may be presumed to result in a less-than-significant VMT impact.

Finding – The project is anticipated to result in a less-than-significant impact on vehicle miles traveled.

Intersection Operation

Existing plus Project Conditions

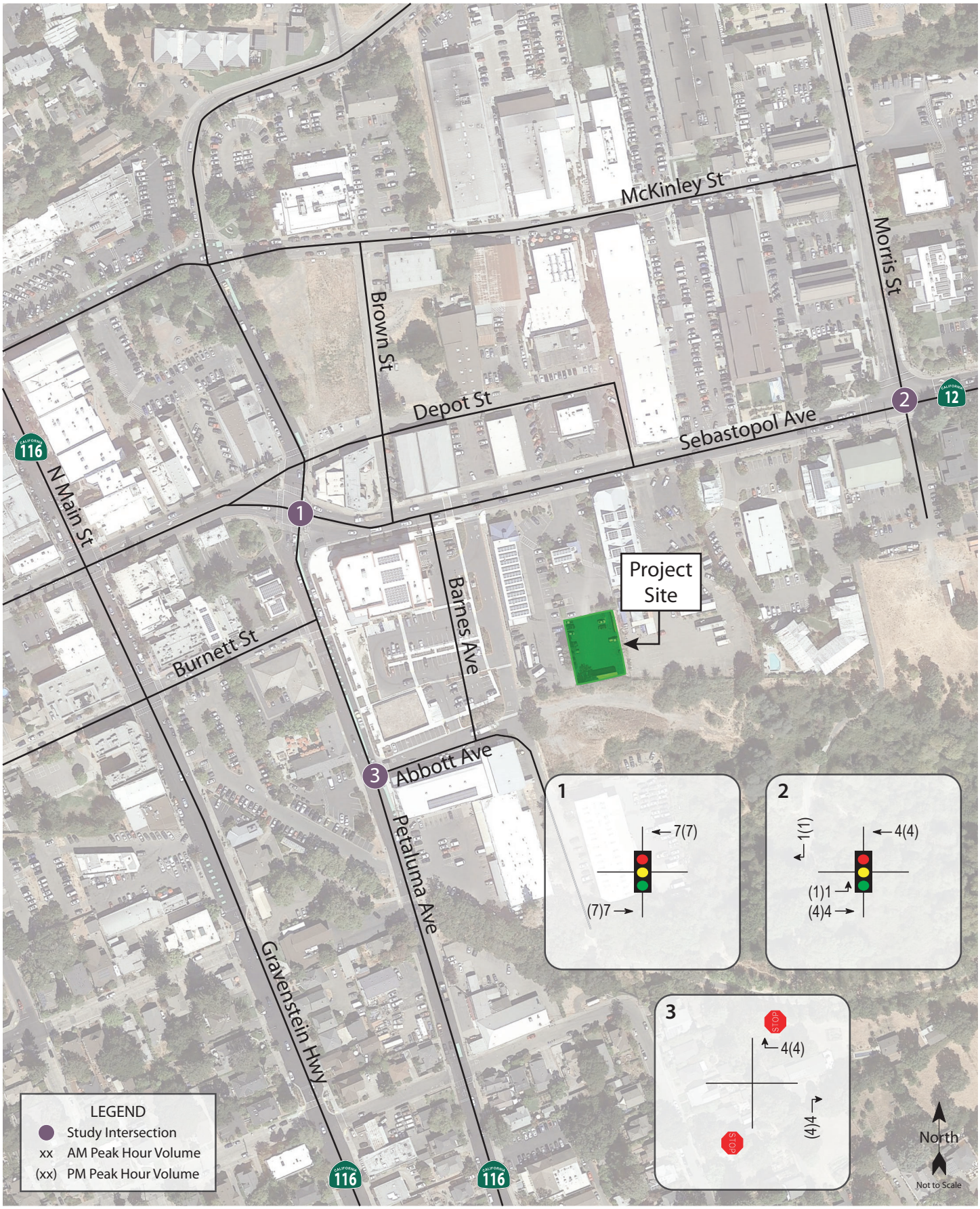
Upon the addition of project-related traffic to the Existing volumes, the study intersections are expected to operate at the same service levels as without project-related traffic. These results are summarized in Table 7. Project only traffic volumes are shown in Figure 4.

Table 7 – Existing and Existing plus Project Peak Hour Intersection Levels of Service

Study Intersection *Approach*	Existing Conditions				Existing plus Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Sebastopol Ave/Petaluma Ave	16.0	B	20.5	C	16.1	B	20.5	C
2. Sebastopol Ave/Morris St	19.1	B	23.7	C	20.3	C	25.1	C
3. Petaluma Ave/Abbott Ave	0.4	A	0.6	A	0.4	A	0.7	A
Westbound (Abbott Ave) Approach	*13.6*	*B*	*12.9*	*B*	*13.8*	*B*	*13.0*	*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 – Upon the addition of project traffic volumes to Existing volumes, the study intersections are expected to continue operating acceptably and at the same Levels of Service as without project-generated traffic with a maximum of only 1.0 to 1.5 seconds increase in average delay.



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Traffic Impact Study for the Benedetti Car Wash Project

Figure 4 – Project Traffic Volumes

Alternative Modes

Given the proximity to Sebastopol's Downtown area, the Barlow district, the Laguna open space, and transit stops near the site, it is reasonable to assume that some employees would want to walk, bicycle, and/or use transit to travel to and from the project site, though because the project is a car wash customers would travel to the site in a vehicle.

Pedestrian Facilities

Sebastopol Avenue connects to the Barlow District and the Downtown from the east entrance point into the City of Sebastopol. Morris Street and Petaluma Avenue connect neighborhoods to the Barlow District, Analy High School, the Community Center, and the Laguna Skate Park. These roads would serve as the primary path of travel for pedestrian activity. Sidewalk connectivity between the project site and destinations surrounding the project site is generally adequate.

Pedestrians would be able to use the existing sidewalk on Sebastopol Avenue to reach the site or would be able to reach the site from Petaluma Avenue using the sidewalk that was installed north of Abbott Avenue as part of the CVS project. As shown on the site plan, an ADA accessible path of travel would be provided through the site from Petaluma Avenue to the car wash facility.

Finding – Pedestrian facilities serving the project site would be adequate.

Bicycle Facilities

Existing and planned bicycle facilities in the surrounding vicinity, per the *City of Sebastopol Bicycle and Pedestrian Master Plan*, would provide adequate access for bicyclists. The City of Sebastopol Ordinance 17.110.030 requires car washes to provide one bicycle parking space for every four employees. Based on three employees that would operate the car wash as proposed, the project is required to provide a minimum of one bicycle parking space. As shown on the site plan, a bicycle rack would be located on-site near the southeast corner of the car wash facility, which would be adequate to satisfy City requirements.

Finding – Bicycle facilities serving the project site are adequate.

Transit

Existing transit routes are adequate to accommodate project-generated transit trips and existing stops are within acceptable walking distance of the site.

Finding – Transit facilities serving the project site are adequate.

Access and Circulation

Site Access

The proposed carwash facility would have two access points, an existing driveway on Sebastopol Avenue and a new secondary connection to Barnes Avenue-Abbott Avenue near the southwest corner of the site. There is an existing two-way left-turn lane (TWLTL) on Sebastopol Avenue that facilitates left turns into the project site from destinations to the east. It can be challenging to make left turns out of the project driveway onto Sebastopol Avenue during peak hours so the provision of a new connection to Abbott Avenue-Barnes Avenue would be a benefit as it would allow motorists to make a right turn onto Petaluma Avenue as opposed to a left turn onto Sebastopol Avenue, which is typically a less challenging maneuver during peak periods.

Finding – Site access would be expected to operate acceptably and the provision of a new connection to Abbott Avenue-Barnes Avenue would allow motorists the ability to make a right-turn when exiting to reach destinations west of the site during peak periods.

Sight Distance

Sight distances along Sebastopol Avenue at the existing driveway and along Barnes Avenue at the new driveway were evaluated based on sight distance criteria contained in the *Highway Design Manual* published by Caltrans. The recommended sight distance for driveway approaches is based on stopping sight distance and uses the approach travel speed as the basis for determining the recommended sight distance.

Sebastopol Avenue, which has a posted speed of 25 mph, requires a minimum stopping sight distance of 150 feet. The minimum stopping sight distance on Barnes Avenue, which has a posted speed limit of 20 mph, is 125 feet. Available sight lines were field measured and exceed 150 feet and 125 feet at the existing and proposed driveways, respectively so are adequate to meet the applicable Caltrans sight distance requirements.

Finding – Based on a review of filed conditions, sight distances along Sebastopol Avenue and Barnes Avenue are adequate to accommodate all turns into and out of the project driveways.

Recommendation – Any new signage for the carwash should be placed outside of the vision triangle at the project driveways to preserve existing sight lines.

On-site Circulation

As shown on the site plan, the new drive aisle connection to Barnes Avenue would be 24 feet-wide which would be adequate width for two-way traffic. The one-way loop through the car wash facility would vary between 12 and 14 feet-wide, which is expected to be adequate for car wash circulation. No changes are proposed to the existing drive aisles and parking stalls serving the Benedetti Tire Center and Express Lube facilities, which have perpendicular and angled parking spaces. The drive aisles would connect internally, allowing access to the existing facilities and the proposed car wash.

Finding – On-site circulation is anticipated to function acceptably.

Conclusions and Recommendations

Conclusions

- The proposed project is expected to generate an average of 300 new daily trips to the surrounding roadway network, including 32 trips during each peak hour. These estimates are conservatively high since they do not account for shared trips between the carwash and the existing tire and lube facilities.
- The project is anticipated to result in a less-than-significant impact on vehicle miles traveled.
- The study intersections are currently operating acceptably at LOS D or better overall during both peak hours. With anticipated project related traffic added, the intersections are expected to continue operating at the same service levels as without project trips with little change in delay.
- Existing pedestrian, bicycle, and transit facilities are generally adequate to serve the project site, though the vast majority of project trips would be made by passenger vehicles being a car wash.
- Sight distances are adequate along Sebastopol Avenue and Barnes Avenue at the project driveways.
- Site access and on-site circulation are anticipated to function acceptably.

Recommendations

- Any new project signage should be installed outside of the vision triangles at the project driveways to preserve existing sight lines.

Study Participants and References

Study Participants

Principal in Charge	Steve Weinberger, PE, PTOE
Associate Engineer	Cameron Nye, EIT
Assistant Engineer	Kimberly Tellez
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References

2016 Collision Data on California State Highways, California Department of Transportation, 2018
City of Sebastopol Bicycle and Pedestrian Master Plan, Sonoma County Transportation Authority, 2011
City of Sebastopol General Plan, City of Sebastopol, 2008
Highway Capacity Manual, Transportation Research Board, 2010
Highway Design Manual, 6th Edition, California Department of Transportation, 2017
Statewide Integrated Traffic Records System (SWITRS), California Highway Patrol, 2014-2019
Transportation Impacts (SB 743) CEQA Guidelines Update and Technical Advisory, California Governor's Office of Planning and Research (OPR), 2018
Trip Generation Manual, 10th Edition, Institute of Transportation Engineers, 2017

SEB057

Appendix A

Collision Rate Calculations

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Intersection Collision Rate Calculations

SEB057 Benedetti Car Wash

Intersection # 1: Sebastopol Avenue & Petaluma Avenue
Date of Count: Wednesday, December 5, 2018

Number of Collisions: 24
Number of Injuries: 10
Number of Fatalities: 0
ADT: 24900
Start Date: September 1, 2014
End Date: August 31, 2019
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Urban

$$\text{collision rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x 365 Days per Year x Number of Years}}$$

$$\text{collision rate} = \frac{24 \times 1{,}000{,}000}{24{,}900 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.53 c/mve**	**0.0%**	**41.7%**
Statewide Average*	**0.24 c/mve**	**0.5%**	**44.6%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2013 Collision Data on California State Highways, Caltrans

Intersection # 2: Sebastopol Avenue & Morris Street
Date of Count: Wednesday, December 5, 2018

Number of Collisions: 14
Number of Injuries: 10
Number of Fatalities: 0
ADT: 18900
Start Date: September 1, 2014
End Date: August 31, 2019
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Urban

$$\text{collision rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x 365 Days per Year x Number of Years}}$$

$$\text{collision rate} = \frac{14 \times 1{,}000{,}000}{18{,}900 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.41 c/mve**	**0.0%**	**71.4%**
Statewide Average*	**0.24 c/mve**	**0.5%**	**44.6%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2013 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Calculaions

SEB057 Benedetti Car Wash

Intersection # 3: Petaluma Avenue & Abbott Avenue
Date of Count: Thursday, February 27, 2020

Number of Collisions: 5
Number of Injuries: 4
Number of Fatalities: 0
ADT: 10600
Start Date: September 1, 2014
End Date: August 31, 2019
Number of Years: 5

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

$$\text{collision rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x 365 Days per Year x Number of Years}}$$

$$\text{collision rate} = \frac{5 \times 1{,}000{,}000}{10{,}600 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.26 c/mve**	**0.0%**	**80.0%**
Statewide Average*	**0.08 c/mve**	**1.0%**	**45.1%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2013 Collision Data on California State Highways, Caltrans

Intersection # 4: &
Date of Count: Saturday, January 0, 1900

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
ADT: 0
Start Date: January 0, 1900
End Date: January 0, 1900
Number of Years: 0

Intersection Type: 0
Control Type: No Controls
Area: 0

$$\text{collision rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x 365 Days per Year x Number of Years}}$$

$$\text{collision rate} = \frac{0 \times 1{,}000{,}000}{0 \times 365 \times 0}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.00 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.22 c/mve**	**1.0%**	**34.6%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2013 Collision Data on California State Highways, Caltrans

Appendix B

Intersection Level of Service Calculations

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HCM 2010 Signalized Intersection Summary
1: Petaluma Ave & Sebastopol Ave

04/01/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	59	537	0	0	664	139	94	478	461	0	0	0
Future Volume (veh/h)	59	537	0	0	664	139	94	478	461	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1700	1700	0	0	1700	1700	1700	1700	1700			
Adj Flow Rate, veh/h	61	554	0	0	685	143	97	493	0			
Adj No. of Lanes	1	1	0	0	2	0	0	2	1			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	138	941	0	0	1035	216	147	792	413			
Arrive On Green	0.09	0.55	0.00	0.00	0.39	0.39	0.29	0.29	0.00			
Sat Flow, veh/h	1619	1700	0	0	2746	555	516	2773	1445			
Grp Volume(v), veh/h	61	554	0	0	416	412	315	275	0			
Grp Sat Flow(s),veh/h/ln	1619	1700	0	0	1615	1601	1674	1615	1445			
Q Serve(g_s), s	2.1	12.9	0.0	0.0	12.6	12.6	9.8	8.8	0.0			
Cycle Q Clear(g_c), s	2.1	12.9	0.0	0.0	12.6	12.6	9.8	8.8	0.0			
Prop In Lane	1.00		0.00	0.00		0.35	0.31		1.00			
Lane Grp Cap(c), veh/h	138	941	0	0	628	623	478	461	413			
V/C Ratio(X)	0.44	0.59	0.00	0.00	0.66	0.66	0.66	0.60	0.00			
Avail Cap(c_a), veh/h	334	1141	0	0	1084	1075	1248	1204	1077			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	25.9	8.8	0.0	0.0	15.0	15.0	18.7	18.3	0.0			
Incr Delay (d2), s/veh	0.8	0.6	0.0	0.0	1.7	1.7	1.9	1.5	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.0	6.2	0.0	0.0	5.8	5.8	4.8	4.1	0.0			
LnGrp Delay(d),s/veh	26.7	9.4	0.0	0.0	16.7	16.7	20.6	19.8	0.0			
LnGrp LOS	C	A			B	B	C	B				
Approach Vol, veh/h		615			828			590				
Approach Delay, s/veh		11.1			16.7			20.2				
Approach LOS		B			B			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		38.0			9.8	28.2		21.6				
Change Period (Y+Rc), s		5.0			* 4.7	5.0		4.6				
Max Green Setting (Gmax), s		40.0			* 12	40.0		44.4				
Max Q Clear Time (g_c+I1), s		14.9			4.1	14.6		11.8				
Green Ext Time (p_c), s		4.1			0.0	8.5		5.1				

Intersection Summary	
HCM 2010 Ctrl Delay	16.0
HCM 2010 LOS	B

Notes

HCM 2010 Signalized Intersection Summary
2: Sebastopol Ave & Morris St

04/01/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	893	6	0	783	135	3	1	0	76	0	34
Future Volume (veh/h)	38	893	6	0	783	135	3	1	0	76	0	34
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adj Flow Rate, veh/h	40	940	6	0	824	142	3	1	0	80	0	36
Adj No. of Lanes	1	1	0	1	1	1	0	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	129	1171	7	2	948	804	13	4	0	196	0	168
Arrive On Green	0.08	0.69	0.69	0.00	0.56	0.56	0.01	0.01	0.00	0.12	0.00	0.12
Sat Flow, veh/h	1619	1687	11	1619	1700	1442	1229	410	0	1619	0	1385
Grp Volume(v), veh/h	40	0	946	0	824	142	4	0	0	80	0	36
Grp Sat Flow(s),veh/h/ln	1619	0	1698	1619	1700	1442	1639	0	0	1619	0	1385
Q Serve(g_s), s	1.9	0.0	32.0	0.0	34.6	4.0	0.2	0.0	0.0	3.8	0.0	1.9
Cycle Q Clear(g_c), s	1.9	0.0	32.0	0.0	34.6	4.0	0.2	0.0	0.0	3.8	0.0	1.9
Prop In Lane	1.00		0.01	1.00		1.00	0.75		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	129	0	1178	2	948	804	17	0	0	196	0	168
V/C Ratio(X)	0.31	0.00	0.80	0.00	0.87	0.18	0.23	0.00	0.00	0.41	0.00	0.21
Avail Cap(c_a), veh/h	526	0	1178	429	1064	902	315	0	0	682	0	583
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.1	0.0	8.8	0.0	15.8	9.0	40.8	0.0	0.0	33.8	0.0	33.0
Incr Delay (d2), s/veh	1.3	0.0	4.7	0.0	8.4	0.2	6.6	0.0	0.0	1.4	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	16.2	0.0	18.2	1.6	0.1	0.0	0.0	1.8	0.0	0.8
LnGrp Delay(d),s/veh	37.4	0.0	13.4	0.0	24.2	9.2	47.3	0.0	0.0	35.1	0.0	33.6
LnGrp LOS	D		B		C	A	D			D		C
Approach Vol, veh/h		986			966			4			116	
Approach Delay, s/veh		14.4			22.0			47.3			34.7	
Approach LOS		B			C			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	62.8		14.8	11.3	51.4		5.6				
Change Period (Y+Rc), s	4.7	5.1		* 4.7	* 4.7	5.1		4.7				
Max Green Setting (Gmax), s	12.3	45.0		* 35	* 27	52.0		16.0				
Max Q Clear Time (g_c+I1), s	10.6	34.0		5.8	3.9	36.6		2.2				
Green Ext Time (p_c), s	0.0	7.9		0.4	0.1	9.8		0.0				

Intersection Summary	
HCM 2010 Ctrl Delay	19.1
HCM 2010 LOS	B

Notes

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	0	0	1	30	2	1060	43	0	0	0
Future Vol, veh/h	2	0	0	0	1	30	2	1060	43	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	65536	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	0	0	0	1	32	2	1140	46	0	0	0

Major/Minor	Minor1			Major1			
Conflicting Flow All	-	1167	593	0	0	0	
Stage 1	-	1167	-	-	-	-	
Stage 2	-	0	-	-	-	-	
Critical Hdwy	-	6.54	6.94	4.14	-	-	
Critical Hdwy Stg 1	-	5.54	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	
Follow-up Hdwy	-	4.02	3.32	2.22	-	-	
Pot Cap-1 Maneuver	0	192	449	-	-	-	
Stage 1	0	266	-	-	-	-	
Stage 2	0	-	-	-	-	-	
Platoon blocked, %					-	-	
Mov Cap-1 Maneuver	-	0	449	-	-	-	
Mov Cap-2 Maneuver	-	0	-	-	-	-	
Stage 1	-	0	-	-	-	-	
Stage 2	-	0	-	-	-	-	

Approach	WB	NB
HCM Control Delay, s	13.6	
HCM LOS	B	

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	-	449
HCM Lane V/C Ratio	-	-	-	0.072
HCM Control Delay (s)	-	-	-	13.6
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	430	0	0	640	141	146	602	434	0	0	0
Future Volume (veh/h)	100	430	0	0	640	141	146	602	434	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1667	1667	0	0	1667	1700	1700	1667	1667			
Adj Flow Rate, veh/h	103	443	0	0	660	145	151	621	0			
Adj No. of Lanes	1	1	0	0	2	0	0	2	1			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	155	871	0	0	925	203	206	898	486			
Arrive On Green	0.10	0.52	0.00	0.00	0.36	0.36	0.34	0.34	0.00			
Sat Flow, veh/h	1587	1667	0	0	2663	566	602	2618	1417			
Grp Volume(v), veh/h	103	443	0	0	405	400	411	361	0			
Grp Sat Flow(s),veh/h/ln	1587	1667	0	0	1583	1563	1637	1583	1417			
Q Serve(g_s), s	4.5	12.3	0.0	0.0	15.7	15.7	15.7	13.8	0.0			
Cycle Q Clear(g_c), s	4.5	12.3	0.0	0.0	15.7	15.7	15.7	13.8	0.0			
Prop In Lane	1.00		0.00	0.00		0.36	0.37		1.00			
Lane Grp Cap(c), veh/h	155	871	0	0	568	561	561	543	486			
V/C Ratio(X)	0.66	0.51	0.00	0.00	0.71	0.71	0.73	0.67	0.00			
Avail Cap(c_a), veh/h	274	936	0	0	889	878	1020	987	883			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	31.0	11.1	0.0	0.0	19.7	19.7	20.5	19.9	0.0			
Incr Delay (d2), s/veh	1.8	0.5	0.0	0.0	2.4	2.4	2.2	1.7	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.0	5.8	0.0	0.0	7.2	7.2	7.4	6.3	0.0			
LnGrp Delay(d),s/veh	32.8	11.5	0.0	0.0	22.1	22.1	22.8	21.6	0.0			
LnGrp LOS	C	B			C	C	C	C				
Approach Vol, veh/h		546			805			772				
Approach Delay, s/veh		15.5			22.1			22.2				
Approach LOS		B			C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		42.2			11.7	30.5		29.0
Change Period (Y+Rc), s		5.0			* 4.7	5.0		4.6
Max Green Setting (Gmax), s		40.0			* 12	40.0		44.4
Max Q Clear Time (g_c+I1), s		14.3			6.5	17.7		17.7
Green Ext Time (p_c), s		3.1			0.1	7.8		6.7

Intersection Summary	
HCM 2010 Ctrl Delay	20.5
HCM 2010 LOS	C

Notes

HCM 2010 Signalized Intersection Summary
2: Sebastopol Ave & Morris St

04/01/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	735	2	3	705	170	3	3	5	162	1	52
Future Volume (veh/h)	49	735	2	3	705	170	3	3	5	162	1	52
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		0.96	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adj Flow Rate, veh/h	53	799	2	3	766	185	3	3	5	176	1	57
Adj No. of Lanes	1	1	0	1	1	1	0	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	147	1025	3	13	887	753	11	11	19	230	3	195
Arrive On Green	0.09	0.60	0.60	0.01	0.52	0.52	0.03	0.03	0.03	0.14	0.14	0.14
Sat Flow, veh/h	1619	1695	4	1619	1700	1442	416	416	694	1619	24	1374
Grp Volume(v), veh/h	53	0	801	3	766	185	11	0	0	176	0	58
Grp Sat Flow(s),veh/h/ln	1619	0	1699	1619	1700	1442	1526	0	0	1619	0	1398
Q Serve(g_s), s	2.7	0.0	31.0	0.2	34.5	6.2	0.6	0.0	0.0	9.2	0.0	3.3
Cycle Q Clear(g_c), s	2.7	0.0	31.0	0.2	34.5	6.2	0.6	0.0	0.0	9.2	0.0	3.3
Prop In Lane	1.00		0.00	1.00		1.00	0.27		0.45	1.00		0.98
Lane Grp Cap(c), veh/h	147	0	1027	13	887	753	41	0	0	230	0	199
V/C Ratio(X)	0.36	0.00	0.78	0.23	0.86	0.25	0.27	0.00	0.00	0.77	0.00	0.29
Avail Cap(c_a), veh/h	497	0	1027	405	1006	853	278	0	0	645	0	557
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.5	0.0	13.0	43.3	18.3	11.5	41.9	0.0	0.0	36.3	0.0	33.7
Incr Delay (d2), s/veh	1.5	0.0	4.5	8.7	8.4	0.4	3.5	0.0	0.0	5.3	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	15.5	0.1	18.0	2.5	0.3	0.0	0.0	4.4	0.0	1.3
LnGrp Delay(d),s/veh	39.0	0.0	17.5	52.1	26.7	11.9	45.4	0.0	0.0	41.5	0.0	34.5
LnGrp LOS	D		B	D	C	B	D			D		C
Approach Vol, veh/h		854			954			11			234	
Approach Delay, s/veh		18.9			23.9			45.4			39.8	
Approach LOS		B			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	58.2		17.2	12.7	51.0		7.1
Change Period (Y+Rc), s	4.7	5.1		* 4.7	* 4.7	5.1		4.7
Max Green Setting (Gmax), s	23	45.0		* 35	* 27	52.0		16.0
Max Q Clear Time (g_c+I1), s	2.2	33.0		11.2	4.7	36.5		2.6
Green Ext Time (p_c), s	0.0	7.3		0.9	0.1	9.4		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	23.7
HCM 2010 LOS	C

Notes

HCM 2010 TWSC
3: Petaluma Ave & Abbott Ave

04/01/2020

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	0	0	0	0	52	6	962	40	0	0	0
Future Vol, veh/h	1	0	0	0	0	52	6	962	40	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	3407872		-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	0	0	0	0	53	6	982	41	0	0	0

Major/Minor	Minor1			Major1		
Conflicting Flow All	-	-	512	0	0	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	4.14	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	2.22	-	-
Pot Cap-1 Maneuver	0	0	507	-	-	-
Stage 1	0	0	-	-	-	-
Stage 2	0	0	-	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	-	0	507	-	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-
Stage 1	-	0	-	-	-	-
Stage 2	-	0	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	12.9	
HCM LOS	B	

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	-	507
HCM Lane V/C Ratio	-	-	-	0.105
HCM Control Delay (s)	-	-	-	12.9
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.3

HCM 2010 Signalized Intersection Summary
1: Petaluma Ave & Sebastopol Ave

04/01/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	59	544	0	0	671	139	94	478	461	0	0	0
Future Volume (veh/h)	59	544	0	0	671	139	94	478	461	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1700	1700	0	0	1700	1700	1700	1700	1700			
Adj Flow Rate, veh/h	61	561	0	0	692	143	97	493	0			
Adj No. of Lanes	1	1	0	0	2	0	0	2	1			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	138	943	0	0	1042	215	147	790	412			
Arrive On Green	0.09	0.55	0.00	0.00	0.39	0.39	0.29	0.29	0.00			
Sat Flow, veh/h	1619	1700	0	0	2751	551	516	2773	1445			
Grp Volume(v), veh/h	61	561	0	0	419	416	315	275	0			
Grp Sat Flow(s),veh/h/ln	1619	1700	0	0	1615	1601	1674	1615	1445			
Q Serve(g_s), s	2.1	13.1	0.0	0.0	12.8	12.8	9.9	8.8	0.0			
Cycle Q Clear(g_c), s	2.1	13.1	0.0	0.0	12.8	12.8	9.9	8.8	0.0			
Prop In Lane	1.00		0.00	0.00		0.34	0.31		1.00			
Lane Grp Cap(c), veh/h	138	943	0	0	631	626	477	460	412			
V/C Ratio(X)	0.44	0.60	0.00	0.00	0.66	0.66	0.66	0.60	0.00			
Avail Cap(c_a), veh/h	333	1136	0	0	1079	1070	1242	1198	1072			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	26.0	8.9	0.0	0.0	15.0	15.0	18.8	18.4	0.0			
Incr Delay (d2), s/veh	0.8	0.6	0.0	0.0	1.7	1.7	1.9	1.5	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.0	6.2	0.0	0.0	5.9	5.8	4.8	4.1	0.0			
LnGrp Delay(d),s/veh	26.9	9.5	0.0	0.0	16.7	16.7	20.7	20.0	0.0			
LnGrp LOS	C	A			B	B	C	B				
Approach Vol, veh/h		622			835			590				
Approach Delay, s/veh		11.2			16.7			20.4				
Approach LOS		B			B			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		38.2			9.8	28.4		21.7
Change Period (Y+Rc), s		5.0			* 4.7	5.0		4.6
Max Green Setting (Gmax), s		40.0			* 12	40.0		44.4
Max Q Clear Time (g_c+I1), s		15.1			4.1	14.8		11.9
Green Ext Time (p_c), s		4.1			0.0	8.6		5.1

Intersection Summary	
HCM 2010 Ctrl Delay	16.1
HCM 2010 LOS	B

Notes

HCM 2010 Signalized Intersection Summary
2: Sebastopol Ave & Morris St

04/01/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	897	6	0	787	135	3	1	0	76	0	34
Future Volume (veh/h)	39	897	6	0	787	135	3	1	0	76	0	34
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1700	1667	1700	1667	1667	1667	1700	1700	1700	1667	1700	1700
Adj Flow Rate, veh/h	41	944	6	0	828	142	3	1	0	80	0	36
Adj No. of Lanes	1	1	0	1	1	1	0	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	2	2	2	2	2	0	0	0	2	0	0
Cap, veh/h	130	1154	7	2	935	794	13	4	0	190	0	166
Arrive On Green	0.08	0.70	0.70	0.00	0.56	0.56	0.01	0.01	0.00	0.12	0.00	0.12
Sat Flow, veh/h	1619	1654	11	1587	1667	1417	1229	410	0	1587	0	1385
Grp Volume(v), veh/h	41	0	950	0	828	142	4	0	0	80	0	36
Grp Sat Flow(s),veh/h/ln	1619	0	1665	1587	1667	1417	1639	0	0	1587	0	1385
Q Serve(g_s), s	2.0	0.0	33.9	0.0	36.5	4.1	0.2	0.0	0.0	3.9	0.0	2.0
Cycle Q Clear(g_c), s	2.0	0.0	33.9	0.0	36.5	4.1	0.2	0.0	0.0	3.9	0.0	2.0
Prop In Lane	1.00		0.01	1.00		1.00	0.75		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	130	0	1161	2	935	794	17	0	0	190	0	166
V/C Ratio(X)	0.31	0.00	0.82	0.00	0.89	0.18	0.23	0.00	0.00	0.42	0.00	0.22
Avail Cap(c_a), veh/h	519	0	1161	415	1030	875	312	0	0	660	0	576
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.5	0.0	9.0	0.0	16.1	9.0	41.3	0.0	0.0	34.3	0.0	33.5
Incr Delay (d2), s/veh	1.4	0.0	5.3	0.0	9.9	0.2	6.6	0.0	0.0	1.5	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	17.0	0.0	19.1	1.7	0.1	0.0	0.0	1.8	0.0	0.8
LnGrp Delay(d),s/veh	37.9	0.0	14.3	0.0	26.0	9.2	47.9	0.0	0.0	35.8	0.0	34.1
LnGrp LOS	D		B		C	A	D			D		C
Approach Vol, veh/h		991			970			4			116	
Approach Delay, s/veh		15.2			23.6			47.9			35.3	
Approach LOS		B			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.0	63.8		14.8	11.5	52.3		5.6
Change Period (Y+Rc), s	4.7	5.1		* 4.7	* 4.7	5.1		4.7
Max Green Setting (Gmax), s	12.3	45.0		* 35	* 27	52.0		16.0
Max Q Clear Time (g_c+I1), s	10.6	35.9		5.9	4.0	38.5		2.2
Green Ext Time (p_c), s	0.0	6.8		0.4	0.1	8.7		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	20.3
HCM 2010 LOS	C

Notes

HCM 2010 TWSC
3: Petaluma Ave & Abbott Ave 04/01/2020

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	0	0	1	34	2	1060	47	0	0	0
Future Vol, veh/h	2	0	0	0	1	34	2	1060	47	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	65536	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	0	0	0	1	37	2	1140	51	0	0	0

Major/Minor	Minor1			Major1			
Conflicting Flow All	-	1170	596	0	0	0	
Stage 1	-	1170	-	-	-	-	
Stage 2	-	0	-	-	-	-	
Critical Hdwy	-	6.54	6.94	4.14	-	-	
Critical Hdwy Stg 1	-	5.54	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	
Follow-up Hdwy	-	4.02	3.32	2.22	-	-	
Pot Cap-1 Maneuver	0	192	447	-	-	-	
Stage 1	0	265	-	-	-	-	
Stage 2	0	-	-	-	-	-	
Platoon blocked, %					-	-	
Mov Cap-1 Maneuver	-	0	447	-	-	-	
Mov Cap-2 Maneuver	-	0	-	-	-	-	
Stage 1	-	0	-	-	-	-	
Stage 2	-	0	-	-	-	-	

Approach	WB	NB
HCM Control Delay, s	13.8	
HCM LOS	B	

Minor Lane/Major Mvmt	NBL	NBT	NBRWBLn1
Capacity (veh/h)	-	-	- 447
HCM Lane V/C Ratio	-	-	- 0.082
HCM Control Delay (s)	-	-	- 13.8
HCM Lane LOS	-	-	- B
HCM 95th %tile Q(veh)	-	-	- 0.3

HCM 2010 Signalized Intersection Summary
1: Sebastopol Rd & Petaluma Ave 04/01/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	437	0	0	647	141	146	602	434	0	0	0
Future Volume (veh/h)	100	437	0	0	647	141	146	602	434	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1667	1667	0	0	1667	1700	1700	1667	1667			
Adj Flow Rate, veh/h	103	451	0	0	667	145	151	621	0			
Adj No. of Lanes	1	1	0	0	2	0	0	2	1			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	155	873	0	0	932	202	206	896	485			
Arrive On Green	0.10	0.52	0.00	0.00	0.36	0.36	0.34	0.34	0.00			
Sat Flow, veh/h	1587	1667	0	0	2669	561	602	2618	1417			
Grp Volume(v), veh/h	103	451	0	0	408	404	411	361	0			
Grp Sat Flow(s),veh/h/ln	1587	1667	0	0	1583	1564	1637	1583	1417			
Q Serve(g_s), s	4.5	12.7	0.0	0.0	15.9	15.9	15.8	13.9	0.0			
Cycle Q Clear(g_c), s	4.5	12.7	0.0	0.0	15.9	15.9	15.8	13.9	0.0			
Prop In Lane	1.00		0.00	0.00		0.36	0.37		1.00			
Lane Grp Cap(c), veh/h	155	873	0	0	571	564	560	542	485			
V/C Ratio(X)	0.67	0.52	0.00	0.00	0.72	0.72	0.73	0.67	0.00			
Avail Cap(c_a), veh/h	273	932	0	0	885	874	1015	982	879			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	31.2	11.1	0.0	0.0	19.7	19.7	20.7	20.1	0.0			
Incr Delay (d2), s/veh	1.8	0.5	0.0	0.0	2.4	2.4	2.3	1.7	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.1	5.9	0.0	0.0	7.3	7.2	7.4	6.3	0.0			
LnGrp Delay(d),s/veh	33.0	11.6	0.0	0.0	22.1	22.2	22.9	21.8	0.0			
LnGrp LOS	C	B			C	C	C	C				
Approach Vol, veh/h		554			812			772				
Approach Delay, s/veh		15.6			22.1			22.4				
Approach LOS		B			C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		42.5			11.7	30.8		29.1
Change Period (Y+Rc), s		5.0			* 4.7	5.0		4.6
Max Green Setting (Gmax), s		40.0			* 12	40.0		44.4
Max Q Clear Time (g_c+I1), s		14.7			6.5	17.9		17.8
Green Ext Time (p_c), s		3.1			0.1	7.9		6.7

Intersection Summary	
HCM 2010 Ctrl Delay	20.5
HCM 2010 LOS	C

Notes

HCM 2010 Signalized Intersection Summary
2: Sebastopol Ave & Morris St

04/01/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	739	2	3	709	170	3	3	5	162	1	52
Future Volume (veh/h)	50	739	2	3	709	170	3	3	5	162	1	52
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1700	1667	1700	1667	1667	1667	1700	1685	1700	1667	1700	1700
Adj Flow Rate, veh/h	54	803	2	3	771	185	3	3	5	176	1	57
Adj No. of Lanes	1	1	0	1	1	1	0	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	2	2	2	0	0	0	2	0	0
Cap, veh/h	147	1009	3	13	874	743	11	11	19	227	3	197
Arrive On Green	0.09	0.61	0.61	0.01	0.52	0.52	0.03	0.03	0.03	0.14	0.14	0.14
Sat Flow, veh/h	1619	1662	4	1587	1667	1417	420	420	700	1587	24	1375
Grp Volume(v), veh/h	54	0	805	3	771	185	11	0	0	176	0	58
Grp Sat Flow(s),veh/h/ln	1619	0	1666	1587	1667	1417	1540	0	0	1587	0	1399
Q Serve(g_s), s	2.8	0.0	32.8	0.2	36.6	6.4	0.6	0.0	0.0	9.6	0.0	3.3
Cycle Q Clear(g_c), s	2.8	0.0	32.8	0.2	36.6	6.4	0.6	0.0	0.0	9.6	0.0	3.3
Prop In Lane	1.00		0.00	1.00		1.00	0.27		0.45	1.00		0.98
Lane Grp Cap(c), veh/h	147	0	1012	13	874	743	41	0	0	227	0	200
V/C Ratio(X)	0.37	0.00	0.80	0.24	0.88	0.25	0.27	0.00	0.00	0.77	0.00	0.29
Avail Cap(c_a), veh/h	489	0	1012	390	969	824	276	0	0	621	0	547
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.2	0.0	13.3	44.1	18.8	11.6	42.7	0.0	0.0	36.9	0.0	34.2
Incr Delay (d2), s/veh	1.5	0.0	5.1	9.1	10.1	0.4	3.4	0.0	0.0	5.6	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	16.4	0.1	19.2	2.5	0.3	0.0	0.0	4.6	0.0	1.3
LnGrp Delay(d),s/veh	39.8	0.0	18.5	53.2	28.9	12.0	46.1	0.0	0.0	42.5	0.0	35.0
LnGrp LOS	D		B	D	C	B	D			D		D
Approach Vol, veh/h		859			959			11			234	
Approach Delay, s/veh		19.8			25.7			46.1			40.6	
Approach LOS		B			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	59.4		17.5	12.8	52.0		7.1
Change Period (Y+Rc), s	4.7	5.1		* 4.7	* 4.7	5.1		4.7
Max Green Setting (Gmax), s	23	45.0		* 35	* 27	52.0		16.0
Max Q Clear Time (g_c+I1), s	2.2	34.8		11.6	4.8	38.6		2.6
Green Ext Time (p_c), s	0.0	6.4		0.9	0.1	8.3		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	25.1
HCM 2010 LOS	C

Notes

HCM 2010 TWSC
3: Petaluma Ave & Abbott Ave

04/01/2020

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	0	0	0	0	56	6	962	44	0	0	0
Future Vol, veh/h	1	0	0	0	0	56	6	962	44	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	0	0	0	0	57	6	982	45	0	0	0

Major/Minor	Minor1			Major1		
Conflicting Flow All	-	-	514	0	0	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	4.14	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	2.22	-	-
Pot Cap-1 Maneuver	0	0	505	-	-	-
Stage 1	0	0	-	-	-	-
Stage 2	0	0	-	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	-	0	505	-	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-
Stage 1	-	0	-	-	-	-
Stage 2	-	0	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	13	
HCM LOS	B	

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	-	505
HCM Lane V/C Ratio	-	-	-	0.113
HCM Control Delay (s)	-	-	-	13
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.4

HCM 2010 Signalized Intersection Summary
1: Petaluma Ave & Sebastopol Ave

04/08/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	143	656	0	0	895	196	152	586	580	0	0	0
Future Volume (veh/h)	143	656	0	0	895	196	152	586	580	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1700	1700	0	0	1700	1700	1700	1700	1700			
Adj Flow Rate, veh/h	143	656	0	0	895	196	152	586	0			
Adj No. of Lanes	1	1	0	0	2	0	0	2	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	173	981	0	0	1093	239	200	816	447			
Arrive On Green	0.11	0.58	0.00	0.00	0.41	0.41	0.31	0.31	0.00			
Sat Flow, veh/h	1619	1700	0	0	2720	577	646	2637	1445			
Grp Volume(v), veh/h	143	656	0	0	548	543	392	346	0			
Grp Sat Flow(s),veh/h/ln	1619	1700	0	0	1615	1597	1668	1615	1445			
Q Serve(g_s), s	7.3	22.5	0.0	0.0	25.4	25.5	18.0	15.9	0.0			
Cycle Q Clear(g_c), s	7.3	22.5	0.0	0.0	25.4	25.5	18.0	15.9	0.0			
Prop In Lane	1.00		0.00	0.00		0.36	0.39		1.00			
Lane Grp Cap(c), veh/h	173	981	0	0	670	662	516	500	447			
V/C Ratio(X)	0.83	0.67	0.00	0.00	0.82	0.82	0.76	0.69	0.00			
Avail Cap(c_a), veh/h	235	981	0	0	764	755	876	848	759			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	37.0	12.3	0.0	0.0	21.9	21.9	26.4	25.7	0.0			
Incr Delay (d2), s/veh	11.9	1.8	0.0	0.0	6.8	6.9	2.8	2.1	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	3.8	10.9	0.0	0.0	12.5	12.4	8.7	7.4	0.0			
LnGrp Delay(d),s/veh	48.9	14.1	0.0	0.0	28.8	28.9	29.2	27.7	0.0			
LnGrp LOS	D	B			C	C	C	C				
Approach Vol, veh/h		799			1091			738				
Approach Delay, s/veh		20.3			28.8			28.5				
Approach LOS		C			C			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		53.8			13.7	40.1		30.8				
Change Period (Y+Rc), s		5.0			* 4.7	5.0		4.6				
Max Green Setting (Gmax), s		40.0			* 12	40.0		44.4				
Max Q Clear Time (g_c+I1), s		24.5			9.3	27.5		20.0				
Green Ext Time (p_c), s		4.3			0.1	7.6		6.2				

Intersection Summary	
HCM 2010 Ctrl Delay	26.1
HCM 2010 LOS	C

Notes

HCM 2010 Signalized Intersection Summary
2: Sebastopol Ave & Morris St

04/08/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	1092	7	1	1071	185	3	1	3	85	0	38
Future Volume (veh/h)	44	1092	7	1	1071	185	3	1	3	85	0	38
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1700	1667	1700	1667	1667	1667	1700	1686	1700	1667	1700	1700
Adj Flow Rate, veh/h	44	1092	7	1	1071	185	3	1	3	85	0	38
Adj No. of Lanes	1	1	0	1	1	1	0	1	0	1	1	0
Peak Hour 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
Percent Heavy Veh, %	0	2	2	2	2	2	0	0	0	2	0	0
Cap, veh/h	132	1081	7	4	958	814	12	4	12	181	0	158
Arrive On Green	0.08	0.65	0.65	0.00	0.57	0.57	0.02	0.02	0.02	0.11	0.00	0.11
Sat Flow, veh/h	1619	1654	11	1587	1667	1417	658	220	658	1587	0	1382
Grp Volume(v), veh/h	44	0	1099	1	1071	185	7	0	0	85	0	38
Grp Sat Flow(s),veh/h/ln	1619	0	1665	1587	1667	1417	1536	0	0	1587	0	1382
Q Serve(g_s), s	2.3	0.0	59.1	0.1	52.0	5.8	0.4	0.0	0.0	4.5	0.0	2.3
Cycle Q Clear(g_c), s	2.3	0.0	59.1	0.1	52.0	5.8	0.4	0.0	0.0	4.5	0.0	2.3
Prop In Lane	1.00		0.01	1.00		1.00	0.43		0.43	1.00		1.00
Lane Grp Cap(c), veh/h	132	0	1088	4	958	814	27	0	0	181	0	158
V/C Ratio(X)	0.33	0.00	1.01	0.23	1.12	0.23	0.26	0.00	0.00	0.47	0.00	0.24
Avail Cap(c_a), veh/h	483	0	1088	386	958	814	272	0	0	614	0	534
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.3	0.0	15.7	45.0	19.2	9.4	43.8	0.0	0.0	37.5	0.0	36.5
Incr Delay (d2), s/veh	1.5	0.0	29.9	24.8	67.3	0.3	4.8	0.0	0.0	1.9	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	35.6	0.1	41.6	2.3	0.2	0.0	0.0	2.1	0.0	0.9
LnGrp Delay(d),s/veh	40.7	0.0	45.6	69.9	86.6	9.7	48.7	0.0	0.0	39.4	0.0	37.3
LnGrp LOS	D		F	E	F	A	D			D		D
Approach Vol, veh/h		1143			1257			7			123	
Approach Delay, s/veh		45.4			75.2			48.7			38.8	
Approach LOS		D			E			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.9	64.2		15.0	12.1	57.1		6.3				
Change Period (Y+Rc), s	4.7	5.1		* 4.7	* 4.7	5.1		4.7				
Max Green Setting (Gmax), s	12.3	45.0		* 35	* 27	52.0		16.0				
Max Q Clear Time (g_c+I1), s	2.1	61.1		6.5	4.3	54.0		2.4				
Green Ext Time (p_c), s	0.0	0.0		0.5	0.1	0.0		0.0				

Intersection Summary	
HCM 2010 Ctrl Delay	59.9
HCM 2010 LOS	E

Notes

HCM 2010 TWSC
3: Petaluma Ave & Abbott Ave

04/08/2020

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	0	0	1	34	2	1203	48	0	0	0
Future Vol, veh/h	2	0	0	0	1	34	2	1203	48	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	65536	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	0	0	0	1	34	2	1203	48	0	0	0

Major/Minor	Minor1			Major1			
Conflicting Flow All	-	1231	626	0	0	0	
Stage 1	-	1231	-	-	-	-	
Stage 2	-	0	-	-	-	-	
Critical Hdwy	-	6.54	6.94	4.14	-	-	
Critical Hdwy Stg 1	-	5.54	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	
Follow-up Hdwy	-	4.02	3.32	2.22	-	-	
Pot Cap-1 Maneuver	0	176	427	-	-	-	
Stage 1	0	248	-	-	-	-	
Stage 2	0	-	-	-	-	-	
Platoon blocked, %					-	-	
Mov Cap-1 Maneuver	-	0	427	-	-	-	
Mov Cap-2 Maneuver	-	0	-	-	-	-	
Stage 1	-	0	-	-	-	-	
Stage 2	-	0	-	-	-	-	

Approach	WB	NB
HCM Control Delay, s	14.2	
HCM LOS	B	

Minor Lane/Major Mvmt	NBL	NBT	NBRWBLn1
Capacity (veh/h)	-	-	- 427
HCM Lane V/C Ratio	-	-	- 0.08
HCM Control Delay (s)	-	-	- 14.2
HCM Lane LOS	-	-	- B
HCM 95th %tile Q(veh)	-	-	- 0.3

HCM 2010 Signalized Intersection Summary
1: Sebastopol Rd & Petaluma Ave

04/08/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	178	637	0	0	947	292	239	896	604	0	0	0
Future Volume (veh/h)	178	637	0	0	947	292	239	896	604	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1667	1667	0	0	1667	1700	1700	1667	1667			
Adj Flow Rate, veh/h	178	637	0	0	947	292	239	896	0			
Adj No. of Lanes	1	1	0	0	2	0	0	2	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	177	864	0	0	867	266	255	1014	559			
Arrive On Green	0.11	0.52	0.00	0.00	0.36	0.36	0.39	0.39	0.00			
Sat Flow, veh/h	1587	1667	0	0	2467	732	647	2570	1417			
Grp Volume(v), veh/h	178	637	0	0	628	611	603	532	0			
Grp Sat Flow(s),veh/h/ln	1587	1667	0	0	1583	1532	1634	1583	1417			
Q Serve(g_s), s	12.3	32.8	0.0	0.0	40.0	40.0	39.0	33.7	0.0			
Cycle Q Clear(g_c), s	12.3	32.8	0.0	0.0	40.0	40.0	39.0	33.7	0.0			
Prop In Lane	1.00		0.00	0.00		0.48	0.40		1.00			
Lane Grp Cap(c), veh/h	177	864	0	0	576	557	645	625	559			
V/C Ratio(X)	1.00	0.74	0.00	0.00	1.09	1.10	0.94	0.85	0.00			
Avail Cap(c_a), veh/h	177	864	0	0	576	557	660	639	572			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	48.9	20.7	0.0	0.0	35.0	35.0	32.0	30.4	0.0			
Incr Delay (d2), s/veh	68.3	3.4	0.0	0.0	64.5	67.3	20.7	10.7	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	8.7	15.8	0.0	0.0	27.7	27.3	21.1	16.5	0.0			
LnGrp Delay(d),s/veh	117.2	24.0	0.0	0.0	99.5	102.3	52.6	41.0	0.0			
LnGrp LOS	F	C			F	F	D	D				
Approach Vol, veh/h		815			1239			1135				
Approach Delay, s/veh		44.4			100.9			47.2				
Approach LOS		D			F			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		62.0			17.0	45.0		48.0
Change Period (Y+Rc), s		5.0			* 4.7	5.0		4.6
Max Green Setting (Gmax), s		40.0			* 12	40.0		44.4
Max Q Clear Time (g_c+I1), s		34.8			14.3	42.0		41.0
Green Ext Time (p_c), s		2.0			0.0	0.0		2.4

Intersection Summary	
HCM 2010 Ctrl Delay	67.3
HCM 2010 LOS	E

Notes

HCM 2010 Signalized Intersection Summary
2: Sebastopol Ave & Morris St

04/08/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	1144	5	3	1031	190	4	5	6	181	3	65
Future Volume (veh/h)	55	1144	5	3	1031	190	4	5	6	181	3	65
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1700	1667	1700	1667	1667	1667	1700	1687	1700	1667	1700	1700
Adj Flow Rate, veh/h	55	1144	5	3	1031	190	4	5	6	181	3	65
Adj No. of Lanes	1	1	0	1	1	1	0	1	0	1	1	0
Peak Hour 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
Percent Heavy Veh, %	0	2	2	2	2	2	0	0	0	2	0	0
Cap, veh/h	142	1022	4	13	894	760	14	18	21	228	9	193
Arrive On Green	0.09	0.62	0.62	0.01	0.54	0.54	0.03	0.03	0.03	0.14	0.14	0.14
Sat Flow, veh/h	1619	1658	7	1587	1667	1417	415	519	622	1587	62	1344
Grp Volume(v), veh/h	55	0	1149	3	1031	190	15	0	0	181	0	68
Grp Sat Flow(s),veh/h/ln	1619	0	1665	1587	1667	1417	1556	0	0	1587	0	1406
Q Serve(g_s), s	3.1	0.0	59.7	0.2	52.0	7.0	0.9	0.0	0.0	10.7	0.0	4.2
Cycle Q Clear(g_c), s	3.1	0.0	59.7	0.2	52.0	7.0	0.9	0.0	0.0	10.7	0.0	4.2
Prop In Lane	1.00		0.00	1.00		1.00	0.27		0.40	1.00		0.96
Lane Grp Cap(c), veh/h	142	0	1026	13	894	760	53	0	0	228	0	202
V/C Ratio(X)	0.39	0.00	1.12	0.24	1.15	0.25	0.28	0.00	0.00	0.79	0.00	0.34
Avail Cap(c_a), veh/h	451	0	1026	360	894	760	257	0	0	573	0	508
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	41.8	0.0	18.6	47.8	22.5	12.0	45.6	0.0	0.0	40.1	0.0	37.4
Incr Delay (d2), s/veh	1.7	0.0	67.0	9.2	81.7	0.4	2.8	0.0	0.0	6.2	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	46.2	0.1	43.9	2.8	0.4	0.0	0.0	5.1	0.0	1.7
LnGrp Delay(d),s/veh	43.5	0.0	85.6	57.0	104.1	12.4	48.5	0.0	0.0	46.3	0.0	38.3
LnGrp LOS	D		F	E	F	B	D			D		D
Approach Vol, veh/h		1204			1224			15			249	
Approach Delay, s/veh		83.7			89.8			48.5			44.1	
Approach LOS		F			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	64.8		18.6	13.2	57.1		8.0
Change Period (Y+Rc), s	4.7	5.1		* 4.7	* 4.7	5.1		4.7
Max Green Setting (Gmax), s	23	45.0		* 35	* 27	52.0		16.0
Max Q Clear Time (g_c+I1), s	2.2	61.7		12.7	5.1	54.0		2.9
Green Ext Time (p_c), s	0.0	0.0		0.9	0.1	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	82.6
HCM 2010 LOS	F

Notes

HCM 2010 TWSC
3: Petaluma Ave & Abbott Ave

04/08/2020

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	0	0	0	0	58	7	1241	45	0	0	0
Future Vol, veh/h	1	0	0	0	0	58	7	1241	45	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	3801088		-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	0	0	0	0	58	7	1241	45	0	0	0

Major/Minor	Minor1			Major1		
Conflicting Flow All	-	-	643	0	0	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	4.14	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	2.22	-	-
Pot Cap-1 Maneuver	0	0	416	-	-	-
Stage 1	0	0	-	-	-	-
Stage 2	0	0	-	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	-	0	416	-	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-
Stage 1	-	0	-	-	-	-
Stage 2	-	0	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	15.1	
HCM LOS	C	

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	-	416
HCM Lane V/C Ratio	-	-	-	0.139
HCM Control Delay (s)	-	-	-	15.1
HCM Lane LOS	-	-	-	C
HCM 95th %tile Q(veh)	-	-	-	0.5

HCM 2010 Signalized Intersection Summary
1: Petaluma Ave & Sebastopol Ave

04/08/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	143	663	0	0	902	196	152	586	580	0	0	0
Future Volume (veh/h)	143	663	0	0	902	196	152	586	580	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1700	1700	0	0	1700	1700	1700	1700	1700			
Adj Flow Rate, veh/h	143	663	0	0	902	196	152	586	0			
Adj No. of Lanes	1	1	0	0	2	0	0	2	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	173	982	0	0	1097	238	200	815	446			
Arrive On Green	0.11	0.58	0.00	0.00	0.42	0.42	0.31	0.31	0.00			
Sat Flow, veh/h	1619	1700	0	0	2724	573	646	2637	1445			
Grp Volume(v), veh/h	143	663	0	0	552	546	392	346	0			
Grp Sat Flow(s),veh/h/ln	1619	1700	0	0	1615	1597	1668	1615	1445			
Q Serve(g_s), s	7.3	22.9	0.0	0.0	25.7	25.8	18.0	16.0	0.0			
Cycle Q Clear(g_c), s	7.3	22.9	0.0	0.0	25.7	25.8	18.0	16.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.36	0.39		1.00			
Lane Grp Cap(c), veh/h	173	982	0	0	671	664	515	499	446			
V/C Ratio(X)	0.83	0.67	0.00	0.00	0.82	0.82	0.76	0.69	0.00			
Avail Cap(c_a), veh/h	235	982	0	0	761	753	873	845	756			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	37.1	12.4	0.0	0.0	22.0	22.0	26.5	25.8	0.0			
Incr Delay (d2), s/veh	12.1	1.8	0.0	0.0	7.0	7.2	2.8	2.1	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	3.9	11.2	0.0	0.0	12.7	12.5	8.7	7.4	0.0			
LnGrp Delay(d),s/veh	49.2	14.2	0.0	0.0	29.1	29.2	29.3	27.9	0.0			
LnGrp LOS	D	B			C	C	C	C				
Approach Vol, veh/h		806			1098			738				
Approach Delay, s/veh		20.4			29.1			28.6				
Approach LOS		C			C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		54.0			13.8	40.3		30.8
Change Period (Y+Rc), s		5.0			* 4.7	5.0		4.6
Max Green Setting (Gmax), s		40.0			* 12	40.0		44.4
Max Q Clear Time (g_c+I1), s		24.9			9.3	27.8		20.0
Green Ext Time (p_c), s		4.3			0.1	7.5		6.2

Intersection Summary	
HCM 2010 Ctrl Delay	26.3
HCM 2010 LOS	C

Notes

HCM 2010 Signalized Intersection Summary
2: Sebastopol Ave & Morris St

04/08/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	1096	7	1	1075	185	3	1	3	85	0	38
Future Volume (veh/h)	45	1096	7	1	1075	185	3	1	3	85	0	38
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1700	1667	1700	1667	1667	1667	1700	1686	1700	1667	1700	1700
Adj Flow Rate, veh/h	45	1096	7	1	1075	185	3	1	3	85	0	38
Adj No. of Lanes	1	1	0	1	1	1	0	1	0	1	1	0
Peak Hour 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
Percent Heavy Veh, %	0	2	2	2	2	2	0	0	0	2	0	0
Cap, veh/h	133	1081	7	4	957	813	12	4	12	181	0	157
Arrive On Green	0.08	0.65	0.65	0.00	0.57	0.57	0.02	0.02	0.02	0.11	0.00	0.11
Sat Flow, veh/h	1619	1654	11	1587	1667	1417	658	220	658	1587	0	1382
Grp Volume(v), veh/h	45	0	1103	1	1075	185	7	0	0	85	0	38
Grp Sat Flow(s),veh/h/ln	1619	0	1665	1587	1667	1417	1536	0	0	1587	0	1382
Q Serve(g_s), s	2.4	0.0	59.2	0.1	52.0	5.8	0.4	0.0	0.0	4.5	0.0	2.3
Cycle Q Clear(g_c), s	2.4	0.0	59.2	0.1	52.0	5.8	0.4	0.0	0.0	4.5	0.0	2.3
Prop In Lane	1.00		0.01	1.00		1.00	0.43		0.43	1.00		1.00
Lane Grp Cap(c), veh/h	133	0	1088	4	957	813	27	0	0	181	0	157
V/C Ratio(X)	0.34	0.00	1.01	0.23	1.12	0.23	0.26	0.00	0.00	0.47	0.00	0.24
Avail Cap(c_a), veh/h	483	0	1088	385	957	813	271	0	0	613	0	534
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.2	0.0	15.7	45.1	19.3	9.5	43.9	0.0	0.0	37.6	0.0	36.6
Incr Delay (d2), s/veh	1.5	0.0	30.7	24.8	69.4	0.3	4.8	0.0	0.0	1.9	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	35.9	0.1	42.1	2.3	0.2	0.0	0.0	2.1	0.0	0.9
LnGrp Delay(d),s/veh	40.7	0.0	46.4	69.9	88.7	9.8	48.7	0.0	0.0	39.5	0.0	37.4
LnGrp LOS	D		F	E	F	A	D			D		D
Approach Vol, veh/h		1148			1261			7			123	
Approach Delay, s/veh		46.2			77.1			48.7			38.8	
Approach LOS		D			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.9	64.3		15.0	12.2	57.1		6.3
Change Period (Y+Rc), s	4.7	5.1		* 4.7	* 4.7	5.1		4.7
Max Green Setting (Gmax), s	2.3	45.0		* 35	* 27	52.0		16.0
Max Q Clear Time (g_c+I1), s	2.1	61.2		6.5	4.4	54.0		2.4
Green Ext Time (p_c), s	0.0	0.0		0.5	0.1	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	61.2
HCM 2010 LOS	E

Notes

HCM 2010 TWSC
3: Petaluma Ave & Abbott Ave 04/08/2020

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	0	0	1	38	2	1203	52	0	0	0
Future Vol, veh/h	2	0	0	0	1	38	2	1203	52	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	65536	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	0	0	0	1	38	2	1203	52	0	0	0

Major/Minor	Minor1			Major1			
Conflicting Flow All	-	1233	628	0	0	0	
Stage 1	-	1233	-	-	-	-	
Stage 2	-	0	-	-	-	-	
Critical Hdwy	-	6.54	6.94	4.14	-	-	
Critical Hdwy Stg 1	-	5.54	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	
Follow-up Hdwy	-	4.02	3.32	2.22	-	-	
Pot Cap-1 Maneuver	0	176	426	-	-	-	
Stage 1	0	247	-	-	-	-	
Stage 2	0	-	-	-	-	-	
Platoon blocked, %					-	-	
Mov Cap-1 Maneuver	-	0	426	-	-	-	
Mov Cap-2 Maneuver	-	0	-	-	-	-	
Stage 1	-	0	-	-	-	-	
Stage 2	-	0	-	-	-	-	

Approach	WB	NB
HCM Control Delay, s	14.3	
HCM LOS	B	

Minor Lane/Major Mvmt	NBL	NBT	NBRWBLn1
Capacity (veh/h)	-	-	- 426
HCM Lane V/C Ratio	-	-	- 0.089
HCM Control Delay (s)	-	-	- 14.3
HCM Lane LOS	-	-	- B
HCM 95th %tile Q(veh)	-	-	- 0.3

HCM 2010 Signalized Intersection Summary
1: Sebastopol Rd & Petaluma Ave 04/08/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	178	644	0	0	954	292	239	896	604	0	0	0
Future Volume (veh/h)	178	644	0	0	954	292	239	896	604	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1667	1667	0	0	1667	1700	1700	1667	1667			
Adj Flow Rate, veh/h	178	644	0	0	954	292	239	896	0			
Adj No. of Lanes	1	1	0	0	2	0	0	2	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	177	864	0	0	869	265	255	1014	559			
Arrive On Green	0.11	0.52	0.00	0.00	0.36	0.36	0.39	0.39	0.00			
Sat Flow, veh/h	1587	1667	0	0	2472	728	647	2570	1417			
Grp Volume(v), veh/h	178	644	0	0	631	615	603	532	0			
Grp Sat Flow(s),veh/h/ln	1587	1667	0	0	1583	1533	1634	1583	1417			
Q Serve(g_s), s	12.3	33.4	0.0	0.0	40.0	40.0	39.0	33.7	0.0			
Cycle Q Clear(g_c), s	12.3	33.4	0.0	0.0	40.0	40.0	39.0	33.7	0.0			
Prop In Lane	1.00		0.00	0.00		0.47	0.40		1.00			
Lane Grp Cap(c), veh/h	177	864	0	0	576	558	645	625	559			
V/C Ratio(X)	1.00	0.75	0.00	0.00	1.10	1.10	0.94	0.85	0.00			
Avail Cap(c_a), veh/h	177	864	0	0	576	558	660	639	572			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	48.9	20.8	0.0	0.0	35.0	35.0	32.0	30.4	0.0			
Incr Delay (d2), s/veh	68.3	3.6	0.0	0.0	66.4	69.4	20.7	10.7	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	8.7	16.1	0.0	0.0	28.1	27.6	21.1	16.5	0.0			
LnGrp Delay(d),s/veh	117.2	24.4	0.0	0.0	101.4	104.4	52.6	41.0	0.0			
LnGrp LOS	F	C			F	F	D	D				
Approach Vol, veh/h		822			1246			1135				
Approach Delay, s/veh		44.5			102.9			47.2				
Approach LOS		D			F			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		62.0			17.0	45.0		48.0
Change Period (Y+Rc), s		5.0			* 4.7	5.0		4.6
Max Green Setting (Gmax), s		40.0			* 12	40.0		44.4
Max Q Clear Time (g_c+I1), s		35.4			14.3	42.0		41.0
Green Ext Time (p_c), s		1.8			0.0	0.0		2.4

Intersection Summary	
HCM 2010 Ctrl Delay	68.2
HCM 2010 LOS	E

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	1148	5	3	1035	190	4	5	6	181	3	65
Future Volume (veh/h)	56	1148	5	3	1035	190	4	5	6	181	3	65
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1700	1667	1700	1667	1667	1667	1700	1687	1700	1667	1700	1700
Adj Flow Rate, veh/h	56	1148	5	3	1035	190	4	5	6	181	3	65
Adj No. of Lanes	1	1	0	1	1	1	0	1	0	1	1	0
Peak Hour 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
Percent Heavy Veh, %	0	2	2	2	2	2	0	0	0	2	0	0
Cap, veh/h	143	1022	4	13	893	759	14	18	21	228	9	193
Arrive On Green	0.09	0.62	0.62	0.01	0.54	0.54	0.03	0.03	0.03	0.14	0.14	0.14
Sat Flow, veh/h	1619	1658	7	1587	1667	1417	415	519	622	1587	62	1344
Grp Volume(v), veh/h	56	0	1153	3	1035	190	15	0	0	181	0	68
Grp Sat Flow(s),veh/h/ln	1619	0	1665	1587	1667	1417	1556	0	0	1587	0	1406
Q Serve(g_s), s	3.2	0.0	59.8	0.2	52.0	7.0	0.9	0.0	0.0	10.7	0.0	4.2
Cycle Q Clear(g_c), s	3.2	0.0	59.8	0.2	52.0	7.0	0.9	0.0	0.0	10.7	0.0	4.2
Prop In Lane	1.00		0.00	1.00		1.00	0.27		0.40	1.00		0.96
Lane Grp Cap(c), veh/h	143	0	1027	13	893	759	53	0	0	228	0	202
V/C Ratio(X)	0.39	0.00	1.12	0.24	1.16	0.25	0.28	0.00	0.00	0.79	0.00	0.34
Avail Cap(c_a), veh/h	451	0	1027	360	893	759	257	0	0	573	0	507
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	41.8	0.0	18.6	47.8	22.5	12.1	45.7	0.0	0.0	40.2	0.0	37.4
Incr Delay (d2), s/veh	1.7	0.0	68.4	9.2	83.9	0.4	2.8	0.0	0.0	6.2	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	46.6	0.1	44.6	2.8	0.4	0.0	0.0	5.1	0.0	1.7
LnGrp Delay(d),s/veh	43.5	0.0	87.0	57.0	106.4	12.4	48.5	0.0	0.0	46.4	0.0	38.4
LnGrp LOS	D		F	E	F	B	D			D		D
Approach Vol, veh/h		1209			1228			15			249	
Approach Delay, s/veh		85.0			91.7			48.5			44.2	
Approach LOS		F			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	64.9		18.6	13.3	57.1		8.0
Change Period (Y+Rc), s	4.7	5.1		* 4.7	* 4.7	5.1		4.7
Max Green Setting (Gmax), s	23	45.0		* 35	* 27	52.0		16.0
Max Q Clear Time (g_c+I1), s	2.2	61.8		12.7	5.2	54.0		2.9
Green Ext Time (p_c), s	0.0	0.0		0.9	0.1	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	84.1
HCM 2010 LOS	F

Notes

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	0	0	0	0	62	7	1241	49	0	0	0
Future Vol, veh/h	1	0	0	0	0	62	7	1241	49	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	4063232		-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	0	0	0	0	62	7	1241	49	0	0	0

Major/Minor	Minor1			Major1		
Conflicting Flow All	-	-	645	0	0	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	4.14	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	2.22	-	-
Pot Cap-1 Maneuver	0	0	415	-	-	-
Stage 1	0	0	-	-	-	-
Stage 2	0	0	-	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	-	0	415	-	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-
Stage 1	-	0	-	-	-	-
Stage 2	-	0	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	15.2	
HCM LOS	C	

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	-	415
HCM Lane V/C Ratio	-	-	-	0.149
HCM Control Delay (s)	-	-	-	15.2
HCM Lane LOS	-	-	-	C
HCM 95th %tile Q(veh)	-	-	-	0.5