Attachment 13

Final Traffic Impact Study for the Burbank Avenue Subdivision Project

Prepared for the City of Santa Rosa

Submitted by
W-Trans

December 11, 2019

TRAFFIC ENGINEERING
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Table of Contents

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Executive Summary

The proposed Burbank Avenue Subdivision would be located at 1400, 1690, 1720, and 1780 Burbank Avenue and would consist of 64 apartments, 62 single-family detached residences, and 12 single-family duplex units. Based on application of standard trip generation rates, the project is anticipated to generate an average of 1,158 daily vehicle trips, including 83 trips during the weekday morning peak hour and 108 trips during the weekday evening peak hour.

The study area includes the intersections of Burbank Avenue with Sebastopol Road, Hughes Avenue, and Hearn Avenue. Analysis indicates that these are currently operating acceptably at LOS A overall during both peak hours, though the southbound approach at Hearn Avenue/Burbank Avenue is operating at LOS F during both the morning peak hour and evening peak hour. Upon the addition of project-related traffic to Existing volumes, all three study intersections would continue to operate acceptably overall and the project's impact would be considered less-than-significant, though the southbound approach at Hearn Avenue/Burbank Avenue would experience increased delays during both peak hours.

Under Baseline volumes, which include the addition of traffic associated with Roseland Accelerated Middle School, Roseland Village, and Sebastopol Road Town Homes, the study intersections would be expected to continue operating acceptably overall without or with the proposed project and the southbound approach at Hearn Avenue/Burbank Avenue would continue to operate with substantial delays during both peak hours. With the addition of project traffic, the intersection would operate at LOS E overall during the a.m. peak hour. It is understood that the City is aware of the high delays experienced on the southbound approach of Hearn Avenue/ Burbank Avenue and has plans to signalize the intersection, as contained in the *Santa Rosa Roseland Area/ Sebastopol Road Specific Plan*, though with a realignment that would place the signalized intersection north of its current location. While the traffic added from this project would result in the intersection reaching LOS E, the project would not cause a significant impact were it not for the substantial volume of traffic added by the Roseland Accelerated Middle School. In recognition of this, City staff has identified that the project should pay a fee $96,000 for the signalization of the intersection of Hearn Avenue/Burbank Avenue.

Access for pedestrians and bicyclists will be adequate upon completion of the planned future improvements to Burbank Avenue, which include the provision of sidewalks on both sides of the street and Class II bike lanes in both directions of travel. The project will complete a portion of these improvements along their frontage. The City of Santa Rosa should consider initiating a CityBus route along Burbank Avenue to serve the developing area.

A left-turn lane on Burbank Avenue at the new street connections is not warranted under Baseline plus Project volumes during either the a.m. or p.m. peak hour. A traffic signal is warranted at the intersection of Hearn Avenue/Burbank Avenue under Baseline and Baseline plus Project volumes during both peak hours. All-way stop-controls are not warranted at the intersection of Hughes Road/Burbank Avenue under any scenario evaluated.

Site access and circulation are expected to operate acceptably, and adequate sight distance is available in each direction at the project driveway.

Based on the most recent site plan, the proposed parking supply is adequate to meet City requirements. Bicycle parking would be adequate because the units have private garages for bicycle storage.

Introduction

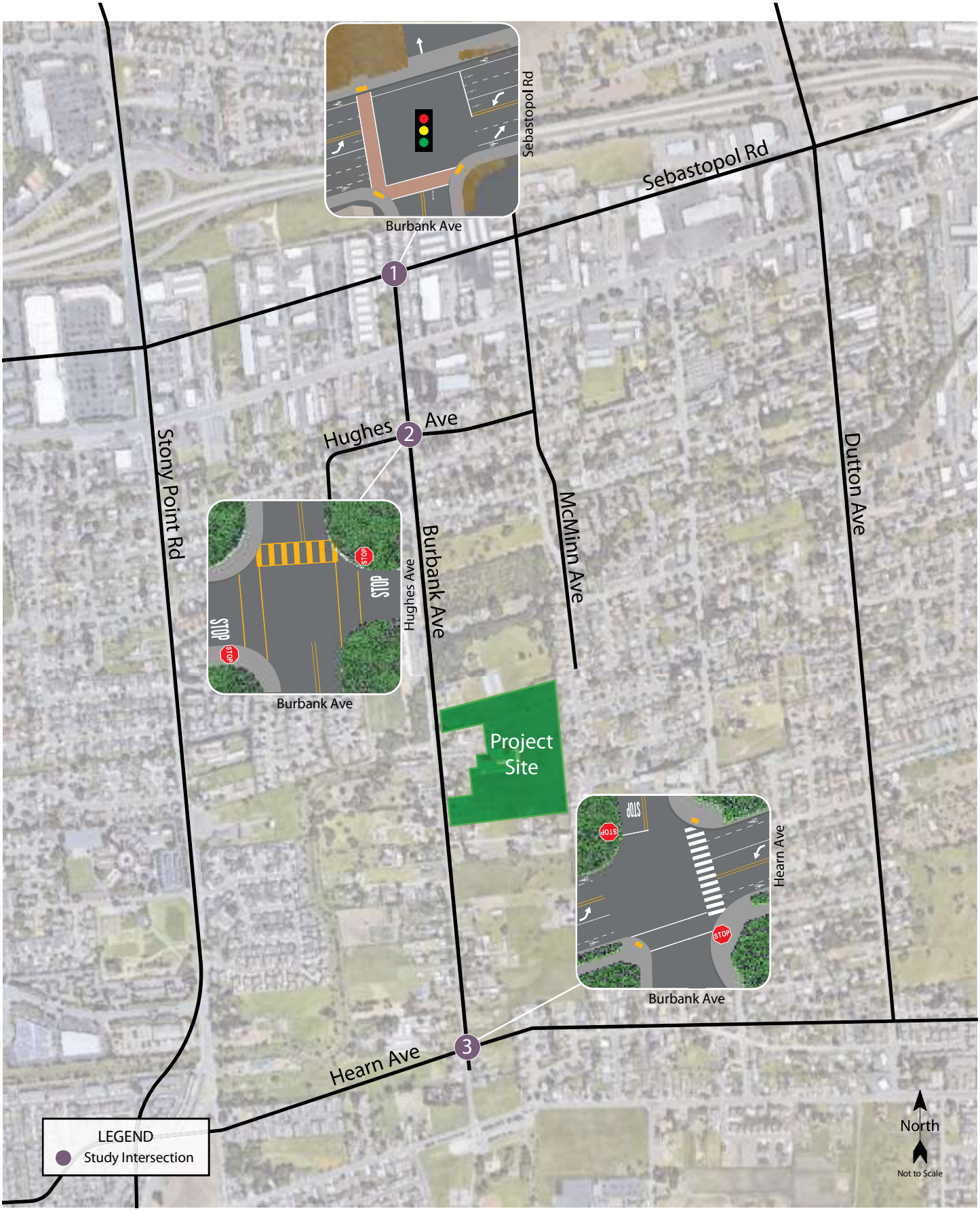
This report presents an analysis of the potential traffic impacts that would be associated with development of 64 apartments, 62 single-family detached residences, and 12 single-family duplex units at 1400, 1690, 1720 and 1780 Burbank Avenue in the City of Santa Rosa. The traffic study was completed in accordance with the criteria established by the City of Santa Rosa, reflects a scope of work reviewed and 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 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 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 project site is located on the east side of Burbank Avenue opposite Roseland Creek Elementary School, as shown in Figure 1. As proposed, the project would merge four parcels at 1400, 1690, 1720 and 1780 Burbank Avenue to construct 64 apartments, 62 single-family detached residences, and 12 single-family duplex units. To make room for the new housing, one existing single-family residence would be removed. The development would be accessed via two new street connections to Burbank Avenue.



sro496.ai 11/19

Traffic Impact Study for the Burbank Avenue Subdivision 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 following intersections:

1. Sebastopol Road/Burbank Avenue
2. Hughes Avenue/Burbank Avenue
3. Hearn Avenue/Burbank 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 Road/Burbank Avenue is a signalized "tee" intersection with a private one-way northbound driveway entrance to Roseland Mobile Home Park forming the north leg of the intersection. Left-turn lanes are provided on the westbound and eastbound Sebastopol Road approaches and there is protected left-turn phasing on the westbound approach, but permitted left-turn phasing eastbound. There are marked crosswalks on the south and west legs.

Hughes Avenue/Burbank Avenue is an unsignalized intersection that is stop-controlled on the eastbound and westbound approaches. Marked yellow crosswalks are present on the north and west legs.

Hearn Avenue/Burbank Avenue is an unsignalized intersection stop-controlled on the northbound Southwest Community Park access point and the southbound Burbank Avenue approach. Left-turn lanes are provided on the eastbound and westbound Hearn Avenue approaches and the east leg has a marked crosswalk.

On Burbank Avenue at the northern border of the Roseland School District building, there is an existing actuated flashing warning beacon and a yellow zebra striped crosswalk. The crosswalk and beacon connect the multi-use path on the west side of Burbank Avenue to the asphalt curb separated path on the east side of the street.

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

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 December 1, 2013 through November 30, 2018.

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 *2014 Collision Data on California State Highways*,

California Department of Transportation (Caltrans). Two of the three study intersections have above-average collision rates. The collision rate calculations are provided in Appendix A.

Table 1 – Collision Rates at the Study Intersections

Study Intersection	Number of Collisions (2013-2018)	Calculated Collision Rate (c/mve)	Statewide Average Collision Rate (c/mve)
1. Sebastopol Rd/Burbank Ave	16	**0.56**	0.43
2. Hughes Ave/Burbank Ave	2	0.21	0.26
3. Hearn Ave/Burbank Ave	8	**0.33**	0.26

Note: c/mve = collisions per million vehicles entering; **bold** text indicates a collision rate that exceeds the Statewide average for similar facilities

At Sebastopol Road/Burbank Avenue, 10 out of the 16 collisions were either broadsides (six) or rear-ends (four). The rear-end crashes are common at signalized intersections during congested conditions and the broadside crashes, five of which were between westbound left-turning vehicles and eastbound through vehicles, are likely due to the left-turning drivers entering at the end of the yellow clearance interval. Consideration could be given to increasing the red-clearance interval to give motorists more time to clear the intersection prior to the green indication for the next movement, which would likely help to reduce the incidence of broadside crashes.

The predominant crash type at Hearn Avenue/Burbank Avenue was broadside collisions; of five such crashes three involved vehicles entering Hearn Avenue from either Burbank Avenue or the Southwest Community Park. It is noted that with fewer than five preventable crashes in a year (the highest number was three in twelve months) a traffic signal is not currently warranted for safety reasons, but the City may wish to monitor the crash history at this location to ensure that conditions do not worsen.

Alternative Modes

Pedestrian Facilities

Pedestrian facilities include sidewalks, crosswalks, pedestrian signal phases, curb ramps, curb extensions, and various streetscape amenities such as lighting, benches, etc. Although a connected sidewalk network is lacking on Burbank Avenue, pedestrian access is provided via a combination of sidewalks and multi-use paths on the shoulders of the roadway. The section along Roseland Creek Elementary School has a sidewalk along its frontage, while the section between the school and Hearn Avenue has a multi-use path on the eastern shoulder and the section north of the school has a multi-use path on the western shoulder. The path is separated from the travel lanes by an asphalt curb. A crosswalk with an actuated flashing warning beacon connects the facilities on the east side of the street with those on the west side near the southern end of the school property.

The *Santa Rosa Roseland Area/Sebastopol Road Specific Plan* (Specific Plan), completed in November 2016, identifies plans to redesign Burbank Avenue with a greater focus on safety for pedestrians and bicyclists. As proposed, the roadway would have sidewalks on both sides of the street and Class II bike lanes in both directions of travel; furthermore, the segment between the project site and Hearn Avenue would include a tree-lined bioswale that would separate the sidewalk from the bike lanes and travel lanes. The plan references an existing segment of Burbank Avenue adjacent to Roseland Creek Elementary School, which already has a Class II bike lane and separated sidewalk, as an example for the rest of the roadway.

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.

Per the Specific Plan Burbank Avenue is to have six-foot bike lanes in both directions of travel that would connect to the existing bike lane along the school frontage as well as to the existing bike lanes on Sebastopol Road and Hearn Avenue. The document also indicates that in the future there will be a Class I trail along Roseland Creek from Stony Point Road to McMinn Avenue that would cross Burbank Avenue just south of the project site. Table 2 summarizes the planned bicycle facilities in the project vicinity, as contained in the Specific Plan.

Table 2 – Planned Bicycle Facilities in the Project Vicinity

Facility	Class	Length (miles)	Begin Point	End Point
Roseland Creek Trail	I	1.0	Stony Point Rd	McMinn Ave
Burbank Ave	II	1.0	Sebastopol Rd	Hearn Ave

Source: *Santa Rosa Roseland Area/Sebastopol Road Specific Plan*, City of Santa Rosa, 2016

Transit Facilities

Santa Rosa CityBus provides fixed route bus service in Santa Rosa. There are no CityBus stops located within one-quarter mile of the project site, but Routes 2, 12, and 15 serve southwest Santa Rosa seven days a week. Route 2 stops on Sebastopol Road approximately 200 feet east of Burbank Avenue. Routes 12 and 15 stop at Southwest Community Park approximately 120 feet south of the intersection of Hearn Avenue/Burbank Avenue. These transit stops are roughly one-half mile from the project site so transit would be a viable option for most project residents, though not as convenient as is typically considered desirable.

Sonoma County Transit (SCT) provides regional service throughout Sonoma County. Route 22 stops on Sebastopol Road at Burbank Avenue and operates Monday through Friday with approximately one- to six-hour headways between 7:15 a.m. and 5:30 p.m.

Two to three bicycles can be carried on most CityBus and 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.

Paratransit, also known as dial-a-ride, 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. CityBus paratransit is contracted out to MV Transportation and is designed to serve the needs of individuals with disabilities within three-quarters (3/4) of a mile from existing CityBus routes. Paratransit service is available seven days a week, but rides must be scheduled one day in advance.

Capacity Analysis

Intersection Level of Service Methodologies

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

The study intersections were analyzed using methodologies published in the *Highway Capacity Manual* (HCM), Transportation Research Board, 6th Edition, 2018. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle.

The Levels of Service for the intersections with side-street stop controls, or those which are unsignalized and have one or two approaches stop controlled, were analyzed using the "Two-Way Stop-Controlled" intersection capacity method from the HCM. This methodology determines a level of service for each minor turning movement by estimating the level of average delay in seconds per vehicle. Results are presented for individual movements together with the weighted overall average delay for the intersection.

The study intersections that are currently controlled by a traffic signal, or may be in the future, were evaluated using the signalized methodology from the HCM. This methodology is based on 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. Delays were calculated using signal timing obtained from the City staff.

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, 6th Edition, 2018

Traffic Operation Standards

City of Santa Rosa

Section 5.8 Transportation Goals & Policy of the City of Santa Rosa General Plan states:

T-D-1 *– Maintain a Level of Service (LOS) D or better along all major corridors. Exceptions to meeting the standard include:*

- Within downtown;
- Where attainment would result in significant degradation;
- Where topography or impacts makes the improvement impossible; or
- Where attainment would ensure loss of an area's unique character.

The LOS is to be calculated using the average traffic demand over the highest 60-minute period.

Traffic Engineering Division will require a level of service evaluation of arterial and collector corridors if deemed necessary.

T-D-2 *– Monitor level of service at intersections to assure that improvements or alterations to improve corridor level of service do not cause severe impacts at any single intersection.*

General interpretation of Policy T-D-2. The impact to an intersection is considered significant if the project related and/or future trips result in:

1. The level of service (LOS) at an intersection degrading from LOS D or better to LOS E or F, OR

2. An increase in average vehicle delay of greater than 5 seconds at a signalized intersection where the current LOS operates at either LOS E or F.
3. Queuing impacts based on a comparative analysis between the design queue length and the available queue storage capacity. Impacts include, but are not limited to, spillback queue at project access locations (both ingress and egress), turn lanes at intersections, lane drops, spill back that impacts upstream intersections or interchange ramps.
4. Exceptions may be granted under the following conditions:
    a. Within downtown,
    b. Where attainment would result in significant degradation,
    c. Where topography or impacts makes the improvement impossible; or
    d. Where attainment would ensure loss of an area's unique character.

T-C-3 *– Implement traffic calming techniques on streets subject to high speed and/or cut-through traffic, in order to improve neighborhood livability, Techniques Include:*

- Narrow Streets
- On-street parking
- Choker or diverters
- Decorative crosswalks
- Planted islands

General interpretation of Policy T-C-3. An impact is considered significant if the project has the potential to alter community character by significantly increasing cut-through traffic, unexpected vehicle maneuvers or commercial vehicle trips in a residential area.

T-H-3 *– Require new development to provide transit improvements, where a rough proportionality to demand from the project is established. Transit improvements may include:*

- Direct and paved pedestrian access to transit stops
- Bus turnouts and shelters
- Lane width to accommodate buses.

General interpretation of Policy T-H-3. An impact is considered significant if the project has the potential to disrupt existing transit operations or establishes transit facilities and equipment such that it creates a sight distance deficiency or vehicle conflict point.

T-J *– Provide attractive and safe streets for pedestrian and bicyclists.*

General interpretation of Policy T-J. An impact is considered significant if the project generates 20 pedestrians in any single hour at an unsignalized intersection, mid-block crossing or where no crossing has been established.

An impact is further considered significant if the project interrupts existing or proposed pedestrian, bicycle and transit facilities, path or travel, direct access resulting in excessive rerouting or creates a vehicle conflict condition which affects the safety of other roadway users.

Reporting of Peak Hour Delay

Per the City of Santa Rosa's General Plan policy T-D-1, LOS is calculated based on the average traffic demand over the hour, rather than the peak 15 minutes within the hour; therefore, a peak hour factor (PHF) of 1.0 was used in the analysis.

Existing Conditions

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the a.m. and p.m. peak hours. This condition does not include project-generated traffic volumes. Volume data was collected in September 2019 during clear weather and while local schools were in session.

Intersection Levels of Service

Under Existing Conditions, the study intersections operate acceptably at LOS A overall during both peak hours studied. A summary of the intersection level of service calculations is contained in Table 4, and copies of the Level of Service calculations 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 Rd/Burbank Ave	9.1	A	7.0	A
2. Hughes Ave/Burbank Ave	3.2	A	2.6	A
Eastbound Approach	*14.8*	*B*	*12.5*	*B*
Westbound Approach	*17.1*	*C*	*12.2*	*B*
3. Hearn Ave/Burbank Ave	8.9	A	7.0	A
Northbound Approach	*21.8*	*C*	*23.3*	*C*
Southbound Approach	*64.7*	*F*	*50.3*	*F*

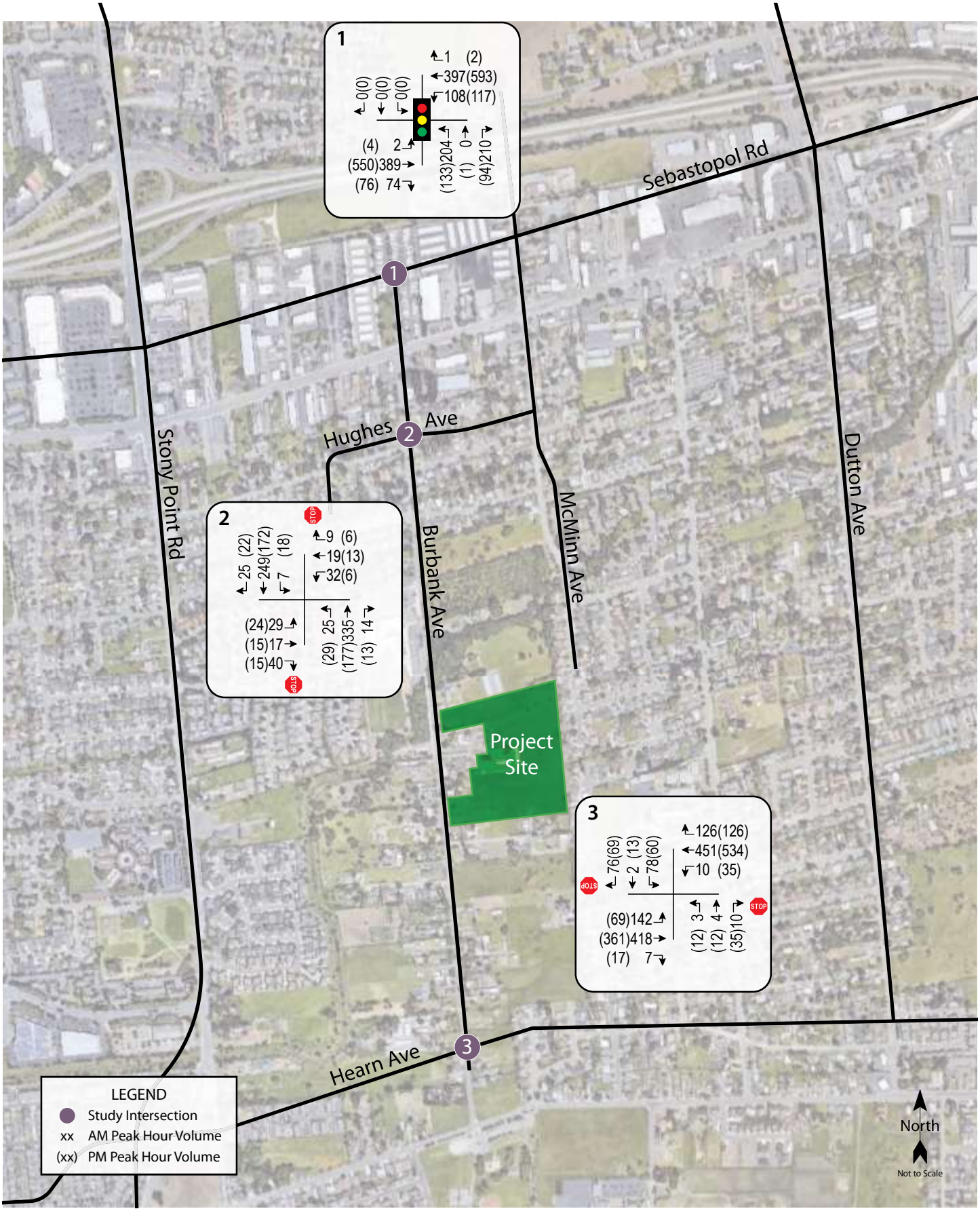
Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Though the intersection of Hearn Avenue/Burbank Avenue is operating acceptably at LOS A overall, the City is aware of the high delays experienced on the southbound approach and has plans to signalize the intersection, as detailed in the Specific Plan. The installation of a signal would be expected to reduce the delays on the southbound approach to a tolerable level.

Baseline Conditions

Baseline (Existing plus Approved or Pending) operating conditions were determined with traffic from approved and pending projects in and near the study area added to the Existing volumes. As directed by staff, the following projects contained in the Citywide Summary of Pending Development Report were included for Baseline Conditions. The same trip generation and trip distribution assumptions used in the traffic studies for the projects were used in this analysis. Standard rates as published in *Trip Generation Manual*, 10th Edition, 2017, were applied in both traffic studies.

Roseland Accelerated Middle School is a proposed project that would relocate an existing 300-student middle school campus to the Roseland Creek Elementary School site on Burbank Avenue. The project is expected to generate 567 trips per day, including 189 trips during the morning peak hour and 105 trips during the evening peak hour.



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Traffic Impact Study for the Burbank Avenue Subdivision Project

Figure 2 – Existing Traffic Volumes

Roseland Village is a pending 175-unit multifamily residential development with up to 20,000 square feet of retail space that would be located at 665 Sebastopol Road. The project is expected to generate 1,775 new trips per day, including 109 trips during the morning peak hour and 183 trips during the evening peak hour.

Sebastopol Road Town Homes is an approved 198-unit multifamily residential development to be located at 1755 Sebastopol Road. The project is expected to generate 1,456 new trips per day, including 184 trips during the morning peak hour and 131 trips during the evening peak hour.

Intersection Levels of Service

Upon adding trips from the approved and pending projects to Existing volumes, the study intersections are expected to continue operating at acceptable service levels overall, and the southbound approach to Hearn Avenue/Burbank Avenue would experience increased delays. These results are summarized in Table 5, and Baseline volumes are shown in Figure 3.

Table 5 – Baseline Peak Hour Intersection Levels of Service

Study Intersection *Approach*	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. Sebastopol Rd/Burbank Ave	10.4	B	7.8	A
2. Hughes Ave/Burbank Ave	3.2	A	2.5	A
Eastbound Approach	*16.4*	*C*	*13.2*	*B*
Westbound Approach	*19.4*	*C*	*12.8*	*B*
3. Hearn Ave/Burbank Ave	28.1	D	13.2	B
Northbound Approach	*32.6*	*D*	*27.1*	*D*
Southbound Approach	*188.5**	*F*	*91.5**	*F*

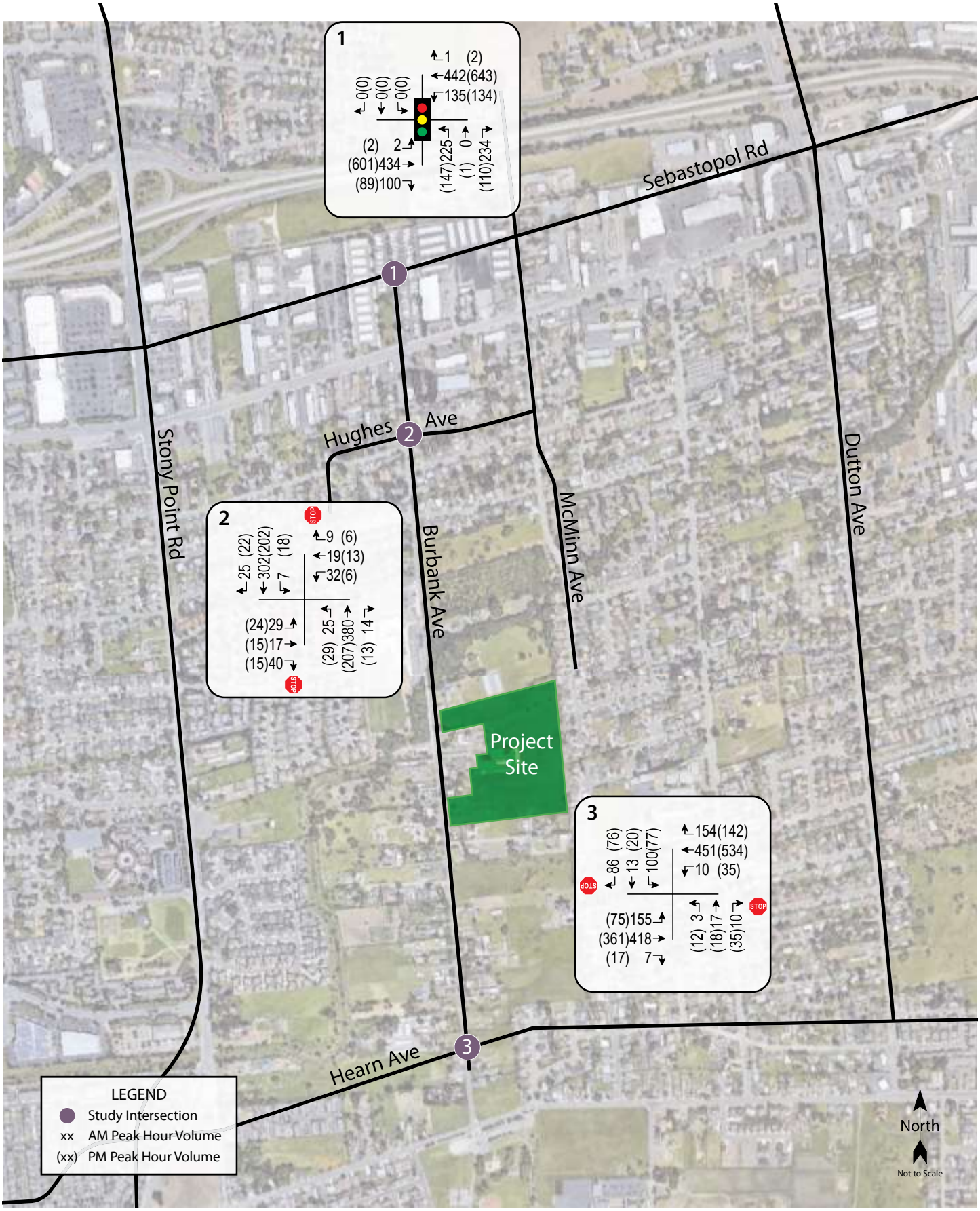
Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* * = delay exceeds reliable threshold of methodology

Project Description

The project site is located on the east side of Burbank Avenue opposite Roseland Creek Elementary School. As proposed, the project would merge four parcels at 1400, 1690, 1720 and 1780 Burbank Avenue to construct 64 apartments, 62 single-family detached residences, and 12 single-family duplex units. To make room for the new housing, one existing single-family residence would be removed. The development would be accessed via two new street connections to Burbank Avenue. The proposed project site plan is shown in Figure 4.

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. Rates for "Single-Family Detached Housing" (LU #210) were applied to the proposed single-family homes and duplex units and to the existing residence that would be removed. Rates for "Multifamily Housing (Low-Rise)" (LU #220) were applied to the proposed apartment units. Based on application of these rates, the proposed project would be expected to result in 1,167 daily trips on average, including 84 trips during the weekday a.m. peak hour and 109 trips during the p.m. peak hour; these results are shown in Table 6. After deductions for the existing residence are taken into account, the project would result in 1,158 new daily trips on average to the surrounding roadway network, including 83 new trips during the morning peak hour and 108 new trips during the evening peak hour.



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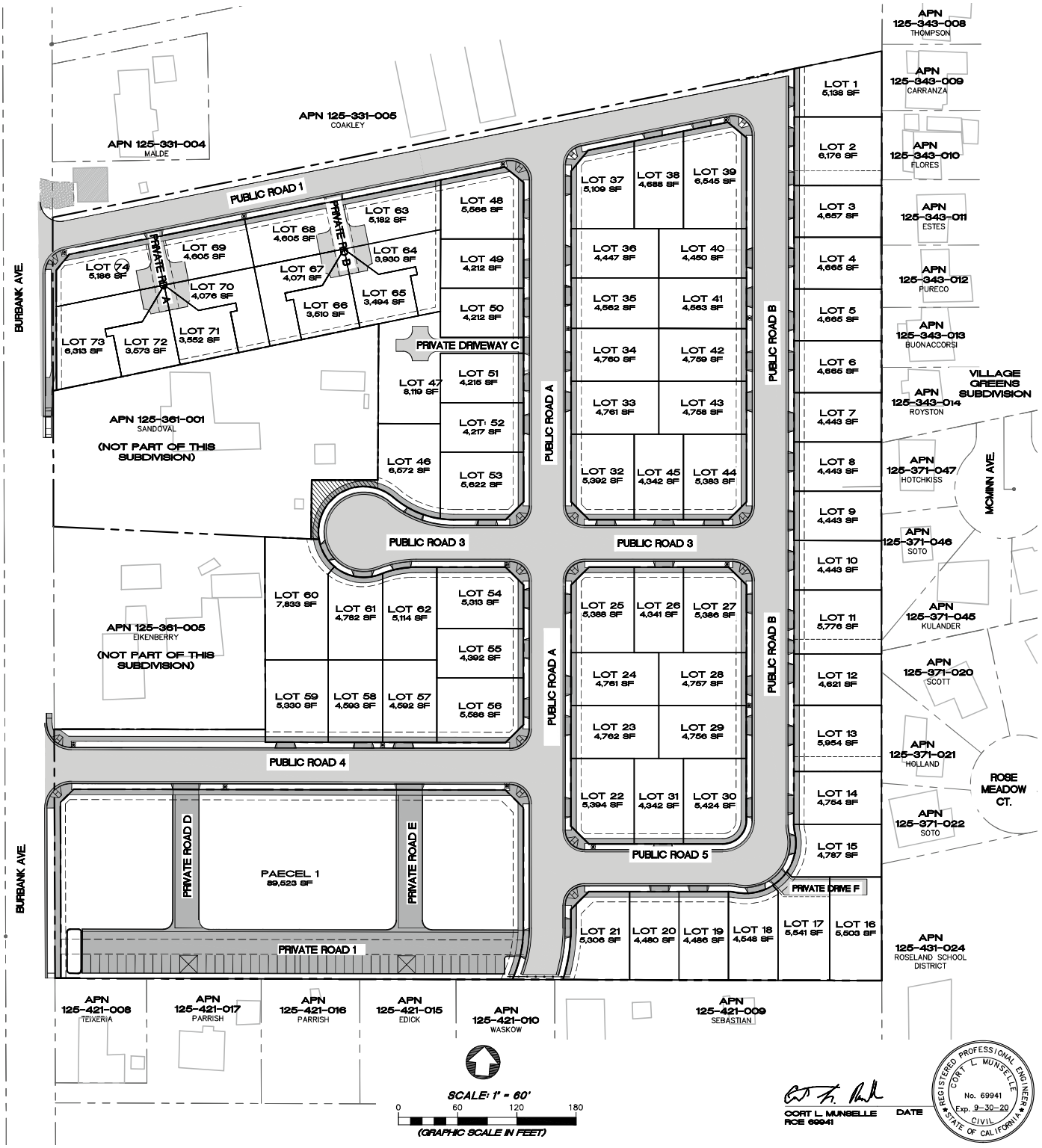
Traffic Impact Study for the Burbank Avenue Subdivision Project

Figure 3 – Baseline Traffic Volumes



Source: Munselle Civil Engineering 8/19 sro496.ai 10/19

Traffic Impact Study for the Burbank Avenue Subdivision Project

Figure 4 – Site Plan

Table 6 – Trip Generation Summary											
Land Use	**Units**	**Daily**		**AM Peak Hour**				**PM Peak Hour**			
		Rate	**Trips**	**Rate**	**Trips**	**In**	**Out**	**Rate**	**Trips**	**In**	**Out**
Existing											
Single-Family Detached Housing	1 du	9.44	9	0.74	1	0	1	0.99	1	1	0
Proposed											
Multifamily Housing (Low-Rise)	64 du	7.32	468	0.46	29	7	22	0.56	36	23	13
Single-Family Detached Housing	74 du	9.44	699	0.74	55	14	41	0.99	73	46	27
Total Proposed			*1,167*		*84*	*21*	*63*		*109*	*69*	*40*
Net New Trips			**1,158**		**83**	**21**	**62**		**108**	**68**	**40**

Note: du = dwelling unit

Trip Distribution

The pattern used to allocate new project trips to the street network was based on a review of existing turning movements at the study intersections and knowledge of the area and surrounding region, including previous analyses prepared for other projects in the vicinity. The applied distribution assumptions are shown in Table 7.

Table 7 – Trip Distribution Assumptions	
Route	**Percent**
Sebastopol Rd (East of Burbank Ave)	35%
Sebastopol Rd (West of Burbank Ave)	25%
Hearn Ave (East of Burbank Ave)	25%
Hearn Ave (West of Burbank Ave)	15%
TOTAL	**100%**

Intersection Operation

Existing plus Project Conditions

Upon the addition of project-related traffic to the Existing volumes, the study intersections are expected to continue operating acceptably at LOS A or B overall, though the southbound approach to Hearn Avenue/Burbank Avenue would experience increased delays. Project traffic volumes are shown in Figure 5 and Existing plus Project volumes are shown in Figure 6. These results are summarized in Table 8.

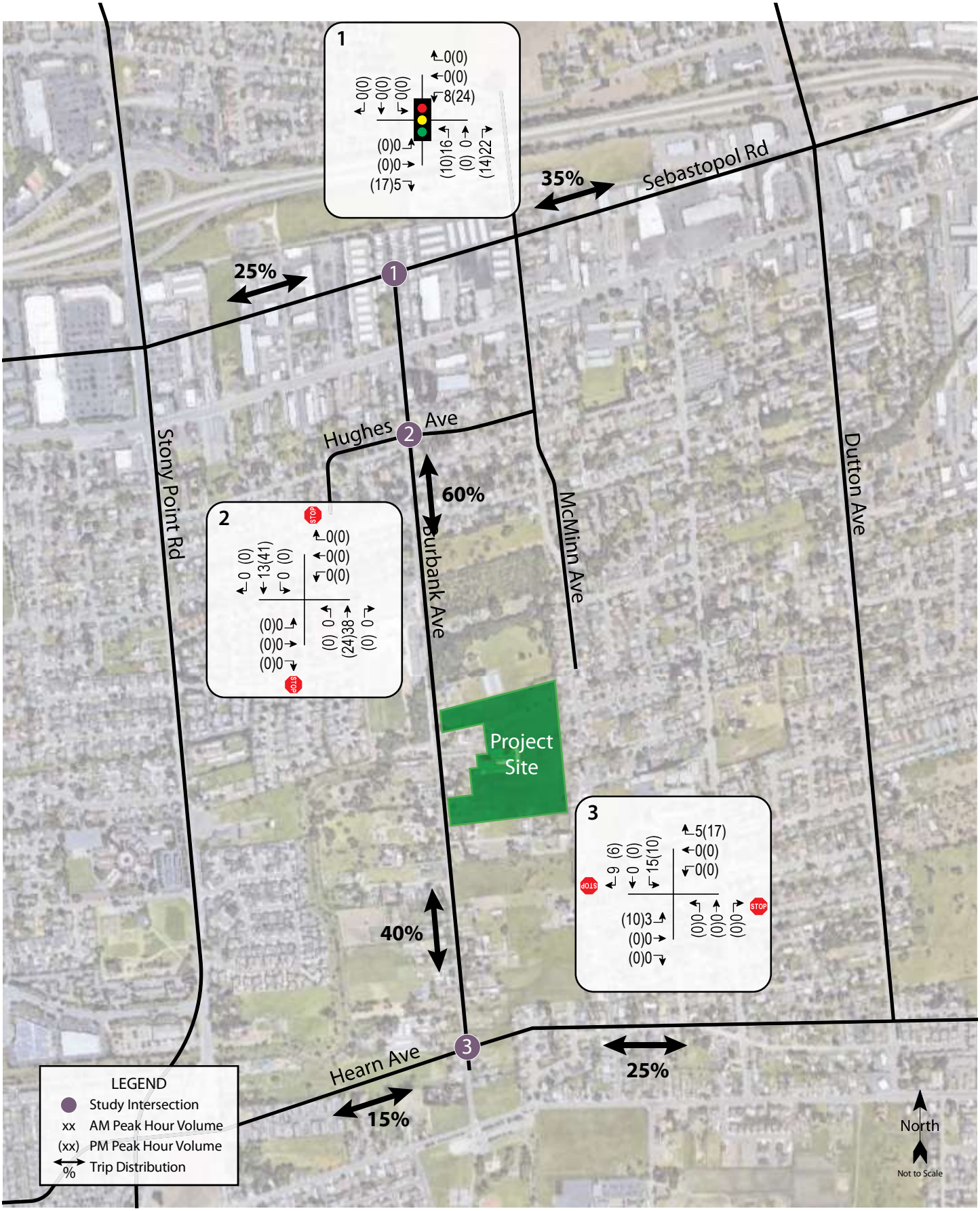


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Figure 5 – Project Traffic Volumes and Trip Distribution

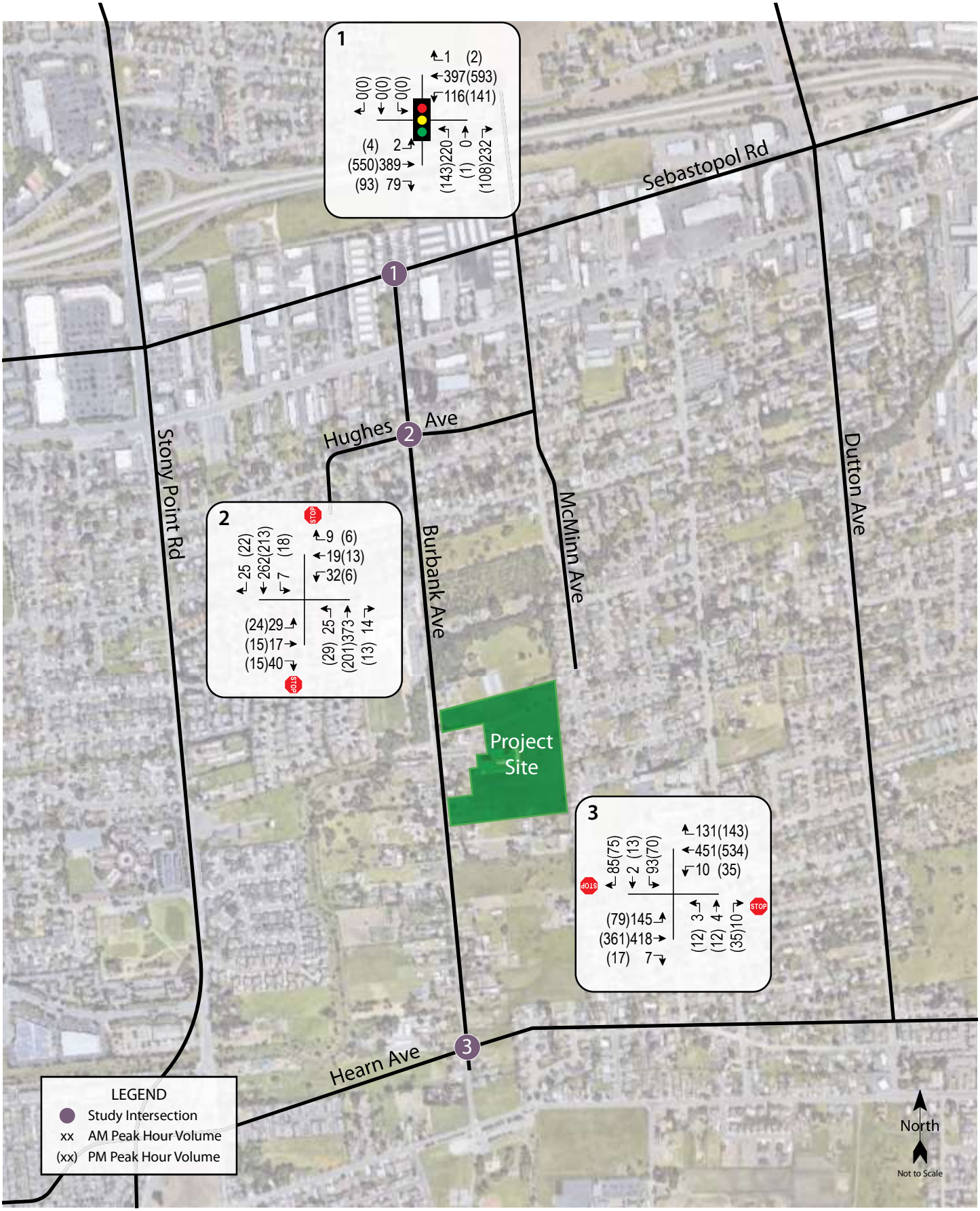

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Figure 6 – Existing plus Project Traffic Volumes

Table 8 – 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 Rd/Burbank Ave	9.1	A	7.0	A	9.8	A	7.7	A
2.	Hughes Ave/Burbank Ave	3.2	A	2.6	A	3.2	A	2.4	A
	Eastbound Approach	*14.8*	*B*	*12.5*	*B*	*15.5*	*C*	*13.2*	*B*
	Westbound Approach	*17.1*	*C*	*12.2*	*B*	*18.2*	*C*	*12.9*	*B*
3.	Hearn Ave/Burbank Ave	8.9	A	7.0	A	13.8	B	9.5	A
	Northbound Approach	*21.8*	*C*	*23.3*	*C*	*22.2*	*C*	*24.6*	*C*
	Southbound Approach	*64.7*	*F*	*50.3*	*F*	*94.0*	*F*	*67.8*	*F*

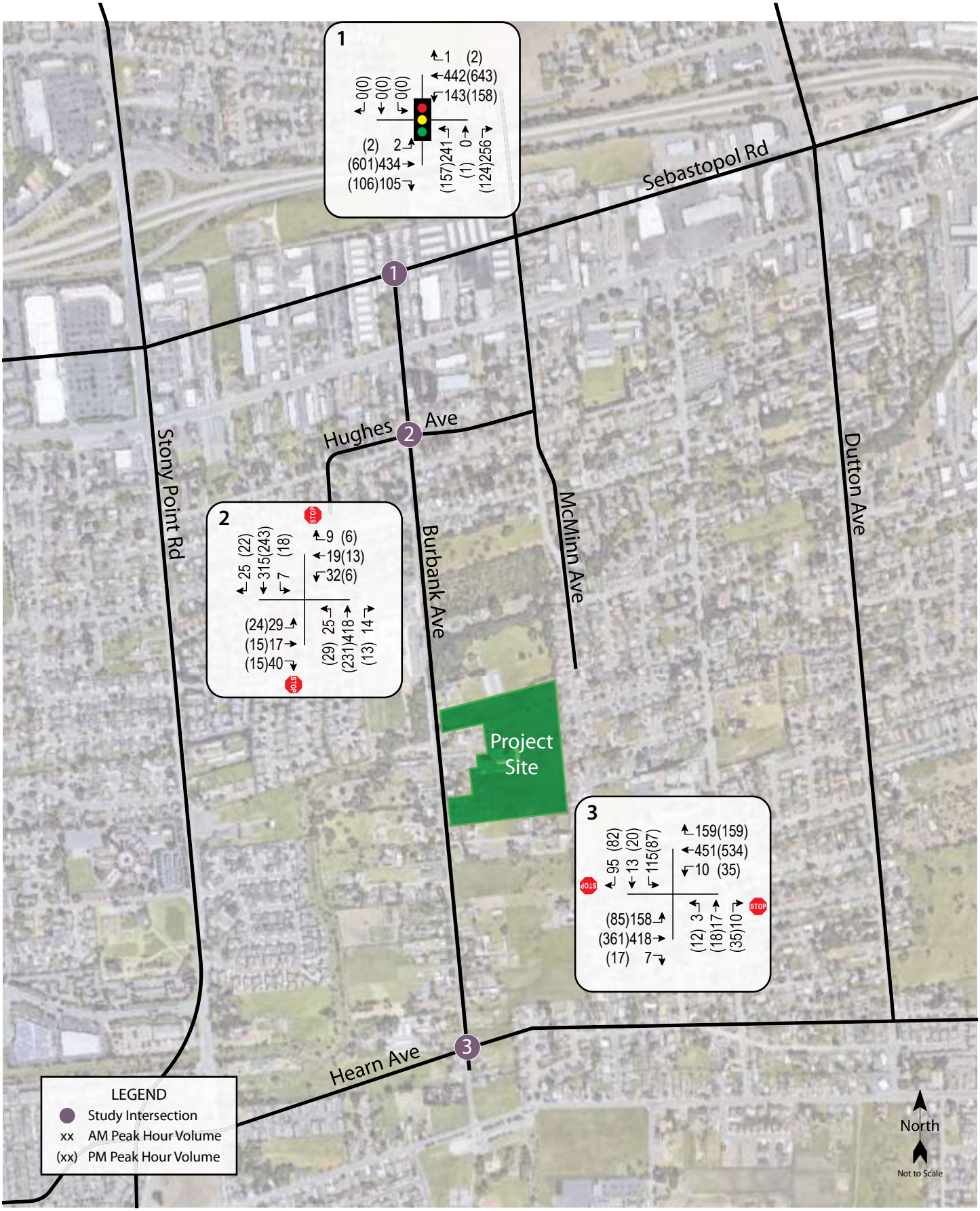
Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

It should be noted that with the addition of project-related traffic volumes, average delay at the intersection of Hughes Avenue/Burbank Avenue decreases slightly during the p.m. peak hour. While this is counter-intuitive, this condition occurs when a project adds trips to movements that are currently underutilized or have delays that are below the intersection average, resulting in a better balance between approaches and lower overall average delay. The project would add traffic predominantly to the northbound and southbound through movements, which have average delays that are lower than the average for the intersection as a whole, resulting in a slight reduction in the overall average delay. The conclusion could incorrectly be drawn that the project actually improves operation based on this data alone; however, it is more appropriate to conclude that the project trips are expected to make use of excess capacity at this location, so drivers will experience little, if any, change in conditions as a result of the project.

Finding –The study intersections are expected to continue operating acceptably overall during both peak hours upon the addition of project-related traffic to Existing volumes. Although the southbound approach at Hearn Avenue/Burbank Avenue is expected to operate at LOS F, the project's impact would be considered less-than-significant as the intersection would be expected to continue operating acceptably overall.

Baseline plus Project Conditions

With project-related traffic added to Baseline volumes, the study intersections Sebastopol Road/Burbank Avenue and Hughes Avenue/Burbank Avenue are expected to continue operating acceptably at LOS B or better overall. However, the intersection of Hearn Avenue/Burbank Avenue would be expected to operate at LOS E overall during the a.m. peak hour. Baseline plus Project volumes are shown in Figure 7 and these results are summarized in Table 9.



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Traffic Impact Study for the Burbank Avenue Subdivision Project

Figure 7 – Baseline plus Project Traffic Volumes

Table 9 – Baseline and Baseline plus Project Peak Hour Intersection Levels of Service

	Study Intersection *Approach*	Baseline Conditions				Baseline plus Project			
		AM Peak		PM Peak		AM Peak		PM Peak	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1.	Sebastopol Rd/Burbank Ave	10.4	B	7.8	A	11.2	B	8.6	A
2.	Hughes Ave/Burbank Ave	3.2	A	2.5	A	3.2	A	2.3	A
	Eastbound Approach	*16.4*	*C*	*13.2*	*B*	*17.4*	*C*	*14.0*	*B*
	Westbound Approach	*19.4*	*C*	*12.8*	*B*	*20.8*	*C*	*13.6*	*B*
3.	Hearn Ave/Burbank Ave	28.1	D	13.2	B	**41.1**	**E**	19.3	*C*
	Northbound Approach	*32.6*	*D*	*27.1*	*D*	*33.5*	*D*	*29.0*	*D*
	Southbound Approach	*188.5**	*F*	*91.5**	*F*	*256.7**	*F*	*132.0**	*F*

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* **bold** text indicates unacceptable operation under the County's standard; * = delay exceeds reliable threshold of methodology

Finding –Two of the study intersections are expected to continue operating acceptably overall during both peak hours upon the addition of project-related traffic to Baseline volumes. However, operation at Hearn Avenue/Burbank Avenue would drop from LOS D to E during the a.m. peak hour. It is noted that without the addition of traffic from the proposed Roseland Accelerated Middle School, the intersection would operate at an acceptable LOS C overall, even with project traffic added to volumes with the other approved projects. Because the contribution of traffic from this proposed would not warrant the signalization of Hearn Avenue/Burbank Avenue without the substantially higher additional volume of traffic associated with the Roseland Accelerated Middle School, it appears reasonable for the project to contribute a proportional share of the cost for the traffic signal rather than being responsible for its entire cost.

Recommendation – The applicant should contribute a proportional share for the signalization of the intersection of Hearn Avenue/Burbank Avenue. As directed by City staff, a share of 30 percent is to be paid based on the increase in a.m. peak hour delay due to project traffic. As contained in the *Infrastructure Report for Roseland Area/ Sebastopol Road Specific Plan and Roseland Area Annexation*, Michael Baker International, 2016, the signalization project is estimated to have a total cost of $320,000 ($200,000 for construction and $120,000 for soft costs), which equates to a fee of $96,000 for the applicant.

Alternative Modes

Pedestrian Facilities

The proposed site plan identifies sidewalks along the project frontage and within the project, connecting the residences to each other and the street. However, the project site wraps around two properties along Burbank Avenue that contain existing houses and outbuildings and would remain in place, so the project frontage is not continuous along Burbank Avenue. A new sidewalk constructed by the project would connect the northern part of the project site to the crosswalk on Burbank Avenue with an actuated warning beacon, which is located approximately 180 feet south of the northern street connection. An existing path on the eastern shoulder of Burbank Avenue would connect the crosswalk with the warning beacon to the new project sidewalk proposed along the project's southern boundary with Burbank Avenue, so adequate connectivity would be provided between the project site and the surrounding pedestrian network. Children would be able to walk between the project site and the school facilities on the west side of the street by using the sidewalks within the site, the sidewalk or path on the east side of Burbank Avenue, the crosswalk with a warning beacon, and the sidewalk on the east side of the street.

As noted previously, improvements were identified in the Specific Plan to redesign Burbank Avenue to include continuous sidewalks on both sides of the street and Class II bike lanes in both directions of travel. The project would construct its frontage improvements in compliance with the City's future plans for the roadway, including adequate width for a bike lane, planter strip, and sidewalk, though the bike lanes would not be striped until they are more continuous. Upon completion of the planned improvements outlined in the Specific Plan along all properties fronting Burbank Avenue, sidewalks would be provided along the entirety of the street and would connect the project site to the surrounding neighborhoods as well as the existing pedestrian infrastructure on Sebastopol Road and Hearn Avenue.

Finding – The proposed project sidewalk is consistent with the improvements outlined in the Specific Plan and would adequately connect to the existing pedestrian facilities.

Bicycle Facilities

The planned bike lanes on Burbank Avenue and Class I trail along Roseland Creek would connect the site to the surrounding neighborhoods and existing bike lanes on Sebastopol Road and Hearn Avenue. The project would improve its frontage with Burbank Avenue consistent with the Specific Plan, including the provision of pavement width for Class II bike lanes, though the bike lanes would not be striped until a more continuous section of bike lane can be provided.

Finding – Bike access would be adequate upon completion of the planned bike lanes on Burbank Avenue. The project would dedicate sufficient right-of-way and construct adequate improvements to the project frontage to accommodate the future bike lanes.

Recommendation – Rather than striping two short sections of Class II bike lane along the project frontage, it is recommended that the project construct the pavement for the bike lane, but that it not be striped until a more continuous section can be provided.

Transit

Existing transit routes have transit stops located approximately one-half mile from the project site. Based on the distance between the project site and employment centers, it is reasonable to expect that some residents would want to travel using transit if it were available.

Finding – Transit facilities serving the project site are generally adequate, though not as convenient as would be desirable.

Recommendation – The applicant should request that the City of Santa Rosa consider initiating a CityBus route along Burbank Avenue to serve this developing area.

Access and Circulation

Site Access

The project would be accessed via two new public street connections with Burbank Avenue. The northern street connection, Public Road 1, would be located approximately 300 feet south of the drop-off loop exit for Roseland Creek Elementary School and the southern street connection, Public Road 4, would be about 520 feet south of the project's northern street connection. The proposed access points would not be in conflict with any existing street connections on the opposite side of Burbank Avenue, though there would be two private driveways, one on either side, of the southern access point. All proposed streets within the site are consistent with City street design standards so on-site circulation is expected to operate acceptably. The proposed street cross-sections are provided in Appendix C.

Finding – Site access and circulation within the site would be expected to operate acceptably as all street cross-sections would be consistent with City design standards.

Sight Distance

Sight distances along Burbank Avenue at the locations of the proposed street connections were evaluated based on sight distance criteria contained in the *Highway Design Manual* published by Caltrans. The recommended sight distance at intersections of public streets is based on corner sight distances with approach travel speeds used as the basis for determining the recommended sight distance. Additionally, the stopping sight distance needed for a following driver to stop if there is a vehicle waiting to turn into a side street or driveway is evaluated based on stopping sight distance criterion and the approach speed on the major street.

For the posted 25-mph speed limit on Burbank Avenue, the recommended corner sight distance is 275 feet and the recommended stopping sight distance is 150 feet. Based on a review of field conditions, sight lines at both of the proposed street connections extend more than 300 feet in each direction, which would be more than adequate for the posted speed limit. Additionally, as Burbank Avenue is straight and flat adjacent to the site, sight lines would be adequate for a following driver to observe and react to a motorist slowing or stopped to turn into either access point.

Finding – Adequate corner and stopping sight distances would be available to accommodate all turns into and out of the project site.

Access Analysis

Left-Turn Lane Warrants

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

Based on Baseline plus Project volumes, as well as safety criteria, a left-turn lane would not be warranted on Burbank Avenue at either new street connection. A sensitivity analysis indicates that volumes on Burbank as well

as turning into the site would need to nearly double before a left-turn lane would be warranted. Copies of the Turn Lane Warrant Spreadsheets are provided in Appendix D.

Finding –A left-turn lane on Burbank Avenue at the new street connections would not be warranted under volumes for the Baseline plus project scenarios during both the a.m. and p.m. peak hours.

Traffic Signal Warrants

Although the Specific Plan already identifies the future need for a traffic signal at the intersection of Hearn Avenue/Burbank Avenue, a signal warrant study was performed. Chapter 4C of the *California Manual on Uniform Traffic Control Devices* (CA-MUTCD) provides guidance on when a traffic signal should be considered. There are nine different warrants, or criteria, but for the purposes of this study, only Warrant 3 (the peak hour warrant) was evaluated.

Warrant 3: Under the Peak Hour Warrant the need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:

A. If all three of the following conditions exist for the same one hour (any four consecutive 15-minute periods) of an average day:

    1. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: four vehicle-hours for a one-lane approach; or five vehicle-hours for a two-lane approach, and
    2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes, and
    3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.

B. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.

The intersection of Hearn Avenue/Burbank Avenue does not currently warrant a traffic signal under Existing volumes, but would warrant one under Baseline volumes during both the a.m. and p.m. peak hours. A signal would also be warranted under Baseline plus Project volumes. Copies of the Signal Warrant Spreadsheets are provided in Appendix D.

As contained in the Specific Plan, the intersection of Hearn Avenue/Burbank Avenue would be shifted northwest and reoriented such that new segment of Hearn Avenue would become the eastbound approach and the renamed (existing) segment of West Hearn Avenue would become the northbound approach. In addition to the change in configuration and geometry, the intersection would be signalized. Because the project would contribute to the need for these improvements, the project should pay a proportional share fee toward the cost of construction. At the direction of City staff, it was determined that a proportional share fee of 30 percent of the signalization project, or $96,000, would be appropriate based on the additional delay caused by the project during the a.m. peak hour.

As an interim measure, all-way stop-controls (AWSC) were considered for the intersection of Hearn Avenue/Burbank Avenue; however, under Baseline and Baseline plus project volumes, the major street approaches would experience LOS F operation so installation of AWSC is therefore not recommended.

Finding – The Peak Hour Volume warrant would be met under both a.m. and p.m. peak hour volumes at the intersection of Hearn Avenue/Burbank Avenue under Baseline and Baseline plus Project Conditions. Volumes are sufficient to meet the warrant without the addition of project-generated traffic, but because the intersection would operate deficiently upon the addition of project traffic, the project would contribute to the need for a signal.

Recommendation – The applicant should be responsible for contributing a proportional share fee of $96,000 toward the cost for the planned signalization and reconfiguration of Hearn Avenue/Burbank Avenue.

All-way Stop Control Warrants

All-way Stop Warrants

Generally, warrants for all-way stop-controlled intersections are based on guidelines contained in the *California Manual on Uniform Traffic Control Devices* (CA-MUTCD). The warrants include consideration of the following issues in determining potential need for all-way stop controls.

- excessive volume
- high number of collisions
- limited visibility
- excessive speeds
- crossing residential collectors
- residential frontages

An intersection meeting any one of the criteria is considered a candidate for all-way stop controls.

Based on the counts collected at the intersection of Hughes Road/Burbank Avenue, the volumes on the minor street approach are insufficient to warrant all-way stop-control, even with the 80 percent reduction for the combination warrant. Only one collision was reported in a 12-month period susceptible to correction by AWSC; a minimum of five crashes are needed to meet the warrant. Additionally, none of the optional warrants were met. A copy of the All-Way Stop-Control Warrant is provided in Appendix D.

Finding – All-way stop-controls are not warranted at the intersection of Hughes Road/Burbank Avenue.

Parking

The project was analyzed to determine whether the proposed parking supply would be sufficient to satisfy City requirements. City of Santa Rosa parking supply requirements are based on the City of Santa Rosa City Code, Chapter 20-36; Parking and Loading. The proposed parking supply of 437 spaces is anticipated to adequately accommodate the estimated parking demand based on City Code, as shown in Table 10.

Table 10 – Parking Analysis Summary

Land Use	Units	Supply (spaces)	City Requirements	
			Rate	Spaces Required
1 bdr Apartment	17 du	64 covered sp 32 tandem sp 58 open sp	1.0 covered sp/unit 0.5 visitor sp/unit	17 covered sp 9 visitor sp
2+ bdr Apartment	47 du		1.0 covered sp/unit 1.5 visitor sp/unit	47 covered sp 70 visitor sp
Duplex	12 du	24 covered sp 24 tandem sp	1.0 covered sp/unit 1.5 visitor sp/unit	12 covered sp 18 visitor sp
Detatched Single-Family Dwelling	62 du	124 covered sp 124 tandem sp	1 covered sp/unit 3 additional sp/unit	62 covered sp 186 other sp
Total		**450**		**421**

Notes: du = dwelling unit; bdr = bedrooms; sp = space

Finding – The proposed parking supply for the project would be adequate to meet the City's parking requirements.

Bicycle Parking

The City of Santa Rosa's Municipal Code also stipulates the City's bicycle parking requirements for new developments. According to the City of Santa Rosa Municipal Code, bicycle parking is required for multifamily residential units at a ratio of one space per four units if units do not have a private garage or private storage space for bike storage. For the proposed project, bicycle parking would be adequate because the units have private garages for bicycle storage.

Conclusions and Recommendations

Conclusions

- The proposed project is expected to generate an average of 1,158 new daily vehicle trips, including 83 trips during the weekday morning peak hour and 108 trips during the weekday evening peak hour.

- The study intersections of Burbank Avenue with Sebastopol Road, Hughes Avenue, and Hearn Avenue are currently operating acceptably at LOS A overall during both peak hours, though it is noted that the southbound approach at Hearn Avenue/Burbank Avenue is operating at LOS F during both the a.m. and p.m. peak hours.

- The study intersections are expected to continue operating acceptably overall during both peak hours upon the addition of project-related traffic to Existing volumes. Although the southbound approach at Hearn Avenue/Burbank Avenue is expected to operate at LOS F during both peak hours, the project's impact would be considered less-than-significant as the intersection would operate acceptably overall.

- Under Baseline volumes, which include the addition of traffic associated with Roseland Accelerated Middle School, Roseland Village, and Sebastopol Road Town Homes, the study intersections would be expected to continue operating acceptably overall and the southbound approach at Hearn Avenue/Burbank Avenue would continue to operate with substantial delays. The intersection would drop to LOS E during the a.m. peak hour with the addition of project traffic, which would be considered a significant impact. It is noted, however, that without the Roseland Accelerated Middle School operation with the project and the remaining Baseline projects would remain at LOS C, indicating that the school is the primary trip generator contributing to the need for a traffic signal.

- The proposed pedestrian facilities along the project frontage are consistent with the planned improvements to Burbank Avenue outlined in the *Santa Rosa Roseland Area/Sebastopol Road Specific Plan*. Upon completion of the planned improvements to the rest of Burbank Avenue, pedestrian and bicycle facilities would be adequate.

- Site access and circulation is expected to operate acceptably.

- A left-turn lane would not be warranted on Burbank Avenue at either new street connection created by the project.

- The Peak Hour Volume Warrant indicating potential need for a traffic signal is met under Baseline and Baseline plus Project volumes during both the a.m. and p.m. peak hours at Hearn Avenue/Burbank Avenue. The need for a traffic signal is identified in the Specific Plan.

- All-way stop-controls are not warranted at the intersection of Hughes Avenue/Burbank Avenue under any scenario evaluated.

- The proposed parking supply satisfies City requirements. Bicycle parking is not necessary because private garages would provide adequate bicycle storage.

Recommendations

- Hearn Avenue/Burbank Avenue is planned to be converted to a signalized intersection in the future. The applicant should pay $96,000 as a proportional share for the signalization project, as negotiated with City staff.

- The project should include installation of full frontage improvements consistent with the *Santa Rosa Roseland Area/Sebastopol Road Specific Plan*, though striping of the pavement to include a bike lane should be deferred until a more continuous facility can be provided.

- The applicant should request that the City of Santa Rosa consider initiating a CityBus route along Burbank Avenue to serve this developing area.

Study Participants and References

Study Participants

Principal in Charge	Dalene J. Whitlock, PE, PTOE
Associate Engineer	Cameron Nye, EIT
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Editing/Formatting	Alex Scrobonia
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References

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Appendix A

Collision Rate Calculations

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Intersection Collision Rate Calculations

Traffic Impact Study for the Burbank Avenue Subdivision Project

Intersection # 1: Burbank Avenue & Sebastopol Road

Date of Count: Wednesday, September 11, 2019

Number of Collisions: 16
Number of Injuries: 6
Number of Fatalities: 0
ADT: 15700
Start Date: December 1, 2013
End Date: November 30, 2018
Number of Years: 5

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

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

$$\text{collision rate} = \frac{16 \times 1{,}000{,}000}{15{,}700 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.56 c/mve**	**0.0%**	**37.5%**
Statewide Average*	**0.43 c/mve**	**0.4%**	**37.9%**

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: Burbank Avenue & Hughes Avenue

Date of Count: Wednesday, September 11, 2019

Number of Collisions: 2
Number of Injuries: 1
Number of Fatalities: 0
ADT: 5100
Start Date: December 1, 2013
End Date: November 30, 2018
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Stop & Yield Controls
Area: Suburban

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

$$\text{collision rate} = \frac{2 \times 1{,}000{,}000}{5{,}100 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.21 c/mve**	**0.0%**	**50.0%**
Statewide Average*	**0.26 c/mve**	**0.9%**	**37.4%**

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

Traffic Impact Study for the Burbank Avenue Subdivision Project

Intersection # 3: Burbank Avenue & Hearn Avenue

Date of Count: Wednesday, September 11, 2019

Number of Collisions: 8
Number of Injuries: 6
Number of Fatalities: 0
ADT: 13400
Start Date: December 1, 2013
End Date: November 30, 2018
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Stop & Yield Controls
Area: Suburban

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

$$\text{collision rate} = \frac{8 \times 1{,}000{,}000}{13{,}400 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.33 c/mve**	**0.0%**	**75.0%**
Statewide Average*	**0.26 c/mve**	**0.9%**	**37.4%**

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 6th Signalized Intersection Summary
1: Burbank Ave & Sebastopol Rd

10/07/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	389	74	108	397	1	204	0	210	0	0	0
Future Volume (veh/h)	2	389	74	108	397	1	204	0	210	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	0.99		0.95	1.00		0.97	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1900	1870	1900			
Adj Flow Rate, veh/h	2	389	50	108	397	1	204	0	117			
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	2	2	2	2	0	2	0			
Cap, veh/h	499	854	109	139	1743	4	299	0	172			
Arrive On Green	0.27	0.27	0.27	0.08	0.48	0.48	0.28	0.00	0.28			
Sat Flow, veh/h	978	3151	401	1781	3636	9	1080	0	619			
Grp Volume(v), veh/h	2	218	221	108	194	204	321	0	0			
Grp Sat Flow(s),veh/h/ln	978	1777	1775	1781	1777	1868	1699	0	0			
Q Serve(g_s), s	0.0	3.1	3.2	1.8	2.0	2.0	5.2	0.0	0.0			
Cycle Q Clear(g_c), s	0.0	3.1	3.2	1.8	2.0	2.0	5.2	0.0	0.0			
Prop In Lane	1.00		0.23	1.00		0.00	0.64		0.36			
Lane Grp Cap(c), veh/h	499	482	481	139	852	895	471	0	0			
V/C Ratio(X)	0.00	0.45	0.46	0.77	0.23	0.23	0.68	0.00	0.00			
Avail Cap(c_a), veh/h	916	1240	1239	809	2278	2396	1820	0	0			
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	1.00	1.00	1.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	8.2	9.3	9.3	13.9	4.7	4.7	9.9	0.0	0.0			
Incr Delay (d2), s/veh	0.0	0.7	0.7	3.4	0.1	0.1	0.7	0.0	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	0.0	0.9	0.9	0.7	0.4	0.4	1.5	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.2	10.0	10.0	17.4	4.8	4.8	10.6	0.0	0.0			
LnGrp LOS	A	A	B	B	A	A	B	A	A			
Approach Vol, veh/h		441			506			321				
Approach Delay, s/veh		10.0			7.5			10.6				
Approach LOS		B			A			B				
Timer - Assigned Phs		2	3	4				8				
Phs Duration (G+Y+Rc), s		12.5	6.4	11.9				18.3				
Change Period (Y+Rc), s		4.0	4.0	3.5				3.5				
Max Green Setting (Gmax), s		33.0	14.0	21.5				39.5				
Max Q Clear Time (g_c+I1), s		7.2	3.8	5.2				4.0				
Green Ext Time (p_c), s		1.5	0.1	2.4				2.5				
Intersection Summary												
HCM 6th Ctrl Delay			9.1									
HCM 6th LOS			A									

HCM 6th TWSC
2: Burbank Ave & Hughes Ave

10/07/2019

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	17	40	32	19	9	25	335	14	7	249	25
Future Vol, veh/h	29	17	40	32	19	9	25	335	14	7	249	25
Conflicting Peds, #/hr	2	0	0	0	0	2	10	0	0	0	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	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	29	17	40	32	19	9	25	335	14	7	249	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	694	685	272	696	690	344	284	0	0	349	0	0
Stage 1	286	286	-	392	392	-	-	-	-	-	-	-
Stage 2	408	399	-	304	298	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	357	371	767	356	368	699	1278	-	-	1210	-	-
Stage 1	721	675	-	633	606	-	-	-	-	-	-	-
Stage 2	620	602	-	705	667	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	326	356	761	317	353	698	1267	-	-	1210	-	-
Mov Cap-2 Maneuver	326	356	-	317	353	-	-	-	-	-	-	-
Stage 1	697	665	-	617	591	-	-	-	-	-	-	-
Stage 2	577	587	-	646	657	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.8	17.1	0.5	0.2
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1267	-	-	454	358	1210	-	-
HCM Lane V/C Ratio	0.02	-	-	0.189	0.168	0.006	-	-
HCM Control Delay (s)	7.9	0	-	14.8	17.1	8	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.7	0.6	0	-	-

HCM 6th TWSC
3: Burbank Ave & Hearn Ave 10/07/2019

Intersection												
Int Delay, s/veh	8.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	142	418	7	10	451	126	3	4	10	78	2	76
Future Vol, veh/h	142	418	7	10	451	126	3	4	10	78	2	76
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	5	5	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	65	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	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	142	418	7	10	451	126	3	4	10	78	2	76

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	577	0	0	428	0	0	1282	1306	430	1252	1246	514
Stage 1	-	-	-	-	-	-	709	709	-	534	534	-
Stage 2	-	-	-	-	-	-	573	597	-	718	712	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	996	-	-	1131	-	-	142	160	625	149	174	560
Stage 1	-	-	-	-	-	-	425	437	-	530	524	-
Stage 2	-	-	-	-	-	-	505	491	-	420	436	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	996	-	-	1128	-	-	107	136	621	126	148	560
Mov Cap-2 Maneuver	-	-	-	-	-	-	107	136	-	126	148	-
Stage 1	-	-	-	-	-	-	363	374	-	454	519	-
Stage 2	-	-	-	-	-	-	431	487	-	349	373	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.3	0.1	21.8	64.7
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	231	996	-	-	1128	-	-	203
HCM Lane V/C Ratio	0.074	0.143	-	-	0.009	-	-	0.768
HCM Control Delay (s)	21.8	9.2	-	-	8.2	-	-	64.7
HCM Lane LOS	C	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	0.2	0.5	-	-	0	-	-	5.3

HCM 6th Signalized Intersection Summary
1: Burbank Ave & Sebastopol Rd 10/07/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	550	76	117	593	2	133	1	94	0	0	0
Future Volume (veh/h)	4	550	76	117	593	2	133	1	94	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	0.99		0.96	1.00		0.97	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			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1900	1870	1900			
Adj Flow Rate, veh/h	2	550	51	117	593	2	133	1	45			
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	2	2	2	2	0	2	0			
Cap, veh/h	543	1128	104	153	2089	7	196	1	66			
Arrive On Green	0.34	0.34	0.34	0.09	0.58	0.58	0.15	0.15	0.15			
Sat Flow, veh/h	818	3277	303	1781	3632	12	1283	10	434			
Grp Volume(v), veh/h	2	298	303	117	290	305	179	0	0			
Grp Sat Flow(s),veh/h/ln	818	1777	1803	1781	1777	1868	1726	0	0			
Q Serve(g_s), s	0.0	3.6	3.7	1.8	2.3	2.3	2.7	0.0	0.0			
Cycle Q Clear(g_c), s	0.0	3.6	3.7	1.8	2.3	2.3	2.7	0.0	0.0			
Prop In Lane	1.00		0.17	1.00		0.01	0.74		0.25			
Lane Grp Cap(c), veh/h	543	612	621	153	1022	1074	264	0	0			
V/C Ratio(X)	0.00	0.49	0.49	0.76	0.28	0.28	0.68	0.00	0.00			
Avail Cap(c_a), veh/h	900	1386	1406	905	2546	2677	2067	0	0			
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	1.00	1.00	1.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	5.9	7.1	7.1	12.3	3.0	3.0	11.0	0.0	0.0			
Incr Delay (d2), s/veh	0.0	0.6	0.6	3.0	0.2	0.1	1.2	0.0	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	0.0	0.9	0.9	0.6	0.2	0.2	0.8	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.9	7.7	7.7	15.3	3.1	3.1	12.2	0.0	0.0			
LnGrp LOS	A	A	A	B	A	A	B	A	A			
Approach Vol, veh/h		603			712			179				
Approach Delay, s/veh		7.7			5.1			12.2				
Approach LOS		A			A			B				

Timer - Assigned Phs		2	3	4				8				
Phs Duration (G+Y+Rc), s		8.2	6.4	13.0				19.4				
Change Period (Y+Rc), s		4.0	4.0	3.5				3.5				
Max Green Setting (Gmax), s		33.0	14.0	21.5				39.5				
Max Q Clear Time (g_c+I1), s		4.7	3.8	5.7				4.3				
Green Ext Time (p_c), s		0.7	0.1	3.3				4.0				

Intersection Summary	
HCM 6th Ctrl Delay	7.0
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	24	15	15	6	13	6	29	177	13	18	172	22
Future Vol, veh/h	24	15	15	6	13	6	29	177	13	18	172	22
Conflicting Peds, #/hr	0	0	0	0	0	0	5	0	0	0	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	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	24	15	15	6	13	6	29	177	13	18	172	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	475	472	188	476	477	184	199	0	0	190	0	0
Stage 1	224	224	-	242	242	-	-	-	-	-	-	-
Stage 2	251	248	-	234	235	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	500	490	854	499	487	858	1373	-	-	1384	-	-
Stage 1	779	718	-	762	705	-	-	-	-	-	-	-
Stage 2	753	701	-	769	710	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	470	469	850	464	467	858	1367	-	-	1384	-	-
Mov Cap-2 Maneuver	470	469	-	464	467	-	-	-	-	-	-	-
Stage 1	757	704	-	744	688	-	-	-	-	-	-	-
Stage 2	716	684	-	728	697	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.5	12.2	1	0.6
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1367	-	-	536	523	1384	-	-
HCM Lane V/C Ratio	0.021	-	-	0.101	0.048	0.013	-	-
HCM Control Delay (s)	7.7	0	-	12.5	12.2	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.1	0	-	-

Intersection	
Int Delay, s/veh	7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱			↕			↕	
Traffic Vol, veh/h	69	361	17	35	534	126	12	12	35	60	13	69
Future Vol, veh/h	69	361	17	35	534	126	12	12	35	60	13	69
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	65	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	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	69	361	17	35	534	126	12	12	35	60	13	69

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	660	0	0	380	0	0	1218	1240	373	1199	1185	597
Stage 1	-	-	-	-	-	-	510	510	-	667	667	-
Stage 2	-	-	-	-	-	-	708	730	-	532	518	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	928	-	-	1178	-	-	157	175	673	162	189	503
Stage 1	-	-	-	-	-	-	546	538	-	448	457	-
Stage 2	-	-	-	-	-	-	426	428	-	531	533	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	928	-	-	1176	-	-	117	157	671	133	169	503
Mov Cap-2 Maneuver	-	-	-	-	-	-	117	157	-	133	169	-
Stage 1	-	-	-	-	-	-	505	497	-	415	443	-
Stage 2	-	-	-	-	-	-	346	415	-	454	492	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	0.4	23.3	50.3
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	255	928	-	-	1176	-	-	213
HCM Lane V/C Ratio	0.231	0.074	-	-	0.03	-	-	0.667
HCM Control Delay (s)	23.3	9.2	-	-	8.2	-	-	50.3
HCM Lane LOS	C	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	0.9	0.2	-	-	0.1	-	-	4.1

HCM 6th Signalized Intersection Summary
1: Burbank Ave & Sebastopol Rd

10/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	434	100	135	442	1	225	0	234	0	0	0
Future Volume (veh/h)	2	434	100	135	442	1	225	0	234	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	0.99		0.95	1.00		0.97	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1900	1870	1900			
Adj Flow Rate, veh/h	2	434	76	135	442	1	225	0	141			
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	2	2	2	2	0	2	0			
Cap, veh/h	463	834	145	175	1776	4	314	0	196			
Arrive On Green	0.28	0.28	0.28	0.10	0.49	0.49	0.30	0.00	0.30			
Sat Flow, veh/h	939	3003	521	1781	3637	8	1042	0	653			
Grp Volume(v), veh/h	2	255	255	135	216	227	366	0	0			
Grp Sat Flow(s),veh/h/ln	939	1777	1747	1781	1777	1869	1695	0	0			
Q Serve(g_s), s	0.1	4.3	4.4	2.6	2.5	2.5	6.8	0.0	0.0			
Cycle Q Clear(g_c), s	0.1	4.3	4.4	2.6	2.5	2.5	6.8	0.0	0.0			
Prop In Lane	1.00		0.30	1.00		0.00	0.61		0.39			
Lane Grp Cap(c), veh/h	463	494	485	175	868	913	510	0	0			
V/C Ratio(X)	0.00	0.52	0.52	0.77	0.25	0.25	0.72	0.00	0.00			
Avail Cap(c_a), veh/h	770	1074	1056	701	1973	2075	1572	0	0			
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	1.00	1.00	1.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	9.3	10.8	10.9	15.7	5.3	5.3	11.1	0.0	0.0			
Incr Delay (d2), s/veh	0.0	0.8	0.9	2.7	0.1	0.1	0.7	0.0	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	0.0	1.4	1.4	1.0	0.6	0.6	2.1	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.3	11.7	11.7	18.4	5.4	5.4	11.8	0.0	0.0			
LnGrp LOS	A	B	B	B	A	A	B	A	A			
Approach Vol, veh/h		512			578			366				
Approach Delay, s/veh		11.7			8.5			11.8				
Approach LOS		B			A			B				
Timer - Assigned Phs		2	3	4				8				
Phs Duration (G+Y+Rc), s		14.7	7.5	13.4				20.9				
Change Period (Y+Rc), s		4.0	4.0	3.5				3.5				
Max Green Setting (Gmax), s		33.0	14.0	21.5				39.5				
Max Q Clear Time (g_c+I1), s		8.8	4.6	6.4				4.5				
Green Ext Time (p_c), s		1.7	0.1	2.7				2.8				
Intersection Summary												
HCM 6th Ctrl Delay			10.4									
HCM 6th LOS			B									

HCM 6th TWSC
2: Burbank Ave & Hughes Ave

10/29/2019

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	17	40	32	19	9	25	380	14	7	302	25
Future Vol, veh/h	29	17	40	32	19	9	25	380	14	7	302	25
Conflicting Peds, #/hr	2	0	0	0	0	2	10	0	0	0	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	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	29	17	40	32	19	9	25	380	14	7	302	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	792	783	325	794	788	389	337	0	0	394	0	0
Stage 1	339	339	-	437	437	-	-	-	-	-	-	-
Stage 2	453	444	-	357	351	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	307	325	716	306	323	659	1222	-	-	1165	-	-
Stage 1	676	640	-	598	579	-	-	-	-	-	-	-
Stage 2	586	575	-	661	632	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	279	312	710	270	310	658	1212	-	-	1165	-	-
Mov Cap-2 Maneuver	279	312	-	270	310	-	-	-	-	-	-	-
Stage 1	653	630	-	582	564	-	-	-	-	-	-	-
Stage 2	543	560	-	603	623	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.4	19.4	0.5	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1212	-	-	400	310	1165	-	-
HCM Lane V/C Ratio	0.021	-	-	0.215	0.194	0.006	-	-
HCM Control Delay (s)	8	0	-	16.4	19.4	8.1	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.8	0.7	0	-	-

HCM 6th TWSC
3: Burbank Ave & Hearn Ave 10/29/2019

Intersection												
Int Delay, s/veh	28.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	155	418	7	10	451	154	3	17	10	100	13	86
Future Vol, veh/h	155	418	7	10	451	154	3	17	10	100	13	86
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	5	5	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	65	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	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	155	418	7	10	451	154	3	17	10	100	13	86

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	605	0	0	428	0	0	1333	1360	430	1298	1286	528
Stage 1	-	-	-	-	-	-	735	735	-	548	548	-
Stage 2	-	-	-	-	-	-	598	625	-	750	738	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	973	-	-	1131	-	-	131	148	625	139	164	550
Stage 1	-	-	-	-	-	-	411	425	-	521	517	-
Stage 2	-	-	-	-	-	-	489	477	-	403	424	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	973	-	-	1128	-	-	89	123	621	106	136	550
Mov Cap-2 Maneuver	-	-	-	-	-	-	89	123	-	106	136	-
Stage 1	-	-	-	-	-	-	345	357	-	438	512	-
Stage 2	-	-	-	-	-	-	398	473	-	316	356	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.5	0.1	32.6	188.5
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	160	973	-	-	1128	-	-	166
HCM Lane V/C Ratio	0.188	0.159	-	-	0.009	-	-	1.199
HCM Control Delay (s)	32.6	9.4	-	-	8.2	-	-	188.5
HCM Lane LOS	D	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	0.7	0.6	-	-	0	-	-	10.9

HCM 6th Signalized Intersection Summary
1: Burbank Ave & Sebastopol Rd 10/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	601	89	134	643	2	147	1	110	0	0	0
Future Volume (veh/h)	4	601	89	134	643	2	147	1	110	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	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			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1900	1870	1900			
Adj Flow Rate, veh/h	2	601	64	134	643	2	147	1	61			
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	2	2	2	2	0	2	0			
Cap, veh/h	508	1128	120	173	2096	7	215	1	89			
Arrive On Green	0.35	0.35	0.35	0.10	0.58	0.58	0.18	0.18	0.18			
Sat Flow, veh/h	782	3228	343	1781	3633	11	1208	8	501			
Grp Volume(v), veh/h	2	330	335	134	314	331	209	0	0			
Grp Sat Flow(s),veh/h/ln	782	1777	1794	1781	1777	1868	1718	0	0			
Q Serve(g_s), s	0.1	4.5	4.6	2.2	2.8	2.8	3.5	0.0	0.0			
Cycle Q Clear(g_c), s	0.1	4.5	4.6	2.2	2.8	2.8	3.5	0.0	0.0			
Prop In Lane	1.00		0.19	1.00		0.01	0.70		0.29			
Lane Grp Cap(c), veh/h	508	621	627	173	1025	1078	306	0	0			
V/C Ratio(X)	0.00	0.53	0.53	0.78	0.31	0.31	0.68	0.00	0.00			
Avail Cap(c_a), veh/h	784	1248	1260	815	2294	2411	1852	0	0			
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	1.00	1.00	1.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	6.5	8.0	8.0	13.5	3.3	3.3	11.8	0.0	0.0			
Incr Delay (d2), s/veh	0.0	0.7	0.7	2.8	0.2	0.2	1.0	0.0	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	0.0	1.2	1.2	0.8	0.3	0.3	1.1	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.5	8.7	8.7	16.3	3.5	3.5	12.8	0.0	0.0			
LnGrp LOS	A	A	A	B	A	A	B	A	A			
Approach Vol, veh/h		667			779			209				
Approach Delay, s/veh		8.7			5.7			12.8				
Approach LOS		A			A			B				
Timer - Assigned Phs		2	3	4				8				
Phs Duration (G+Y+Rc), s		9.4	7.0	14.2				21.2				
Change Period (Y+Rc), s		4.0	4.0	3.5				3.5				
Max Green Setting (Gmax), s		33.0	14.0	21.5				39.5				
Max Q Clear Time (g_c+I1), s		5.5	4.2	6.6				4.8				
Green Ext Time (p_c), s		0.9	0.1	3.7				4.4				

Intersection Summary	
HCM 6th Ctrl Delay	7.8
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	24	15	15	6	13	6	29	207	13	18	202	22
Future Vol, veh/h	24	15	15	6	13	6	29	207	13	18	202	22
Conflicting Peds, #/hr	0	0	0	0	0	0	5	0	0	0	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	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	24	15	15	6	13	6	29	207	13	18	202	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	535	532	218	536	537	214	229	0	0	220	0	0
Stage 1	254	254	-	272	272	-	-	-	-	-	-	-
Stage 2	281	278	-	264	265	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	456	453	822	455	450	826	1339	-	-	1349	-	-
Stage 1	750	697	-	734	685	-	-	-	-	-	-	-
Stage 2	726	680	-	741	689	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	427	434	819	422	431	826	1333	-	-	1349	-	-
Mov Cap-2 Maneuver	427	434	-	422	431	-	-	-	-	-	-	-
Stage 1	728	684	-	716	668	-	-	-	-	-	-	-
Stage 2	689	663	-	701	676	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.2	12.8	0.9	0.6
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1333	-	-	495	484	1349	-	-
HCM Lane V/C Ratio	0.022	-	-	0.109	0.052	0.013	-	-
HCM Control Delay (s)	7.8	0	-	13.2	12.8	7.7	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.2	0	-	-

Intersection	
Int Delay, s/veh	13.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱		↕			↕	
Traffic Vol, veh/h	75	361	17	35	534	142	12	18	35	77	20	76
Future Vol, veh/h	75	361	17	35	534	142	12	18	35	77	20	76
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	65	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	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	75	361	17	35	534	142	12	18	35	77	20	76

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	676	0	0	380	0	0	1245	1268	373	1222	1205	605
Stage 1	-	-	-	-	-	-	522	522	-	675	675	-
Stage 2	-	-	-	-	-	-	723	746	-	547	530	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	915	-	-	1178	-	-	151	168	673	156	184	498
Stage 1	-	-	-	-	-	-	538	531	-	444	453	-
Stage 2	-	-	-	-	-	-	417	421	-	521	527	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	915	-	-	1176	-	-	106	149	671	123	164	498
Mov Cap-2 Maneuver	-	-	-	-	-	-	106	149	-	123	164	-
Stage 1	-	-	-	-	-	-	493	486	-	408	439	-
Stage 2	-	-	-	-	-	-	327	408	-	436	483	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.5	0.4	27.1	91.5
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	227	915	-	-	1176	-	-	192
HCM Lane V/C Ratio	0.286	0.082	-	-	0.03	-	-	0.901
HCM Control Delay (s)	27.1	9.3	-	-	8.2	-	-	91.5
HCM Lane LOS	D	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	1.1	0.3	-	-	0.1	-	-	7

HCM 6th Signalized Intersection Summary
1: Burbank Ave & Sebastopol Rd

10/07/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	389	79	116	397	1	220	0	232	0	0	0
Future Volume (veh/h)	2	389	79	116	397	1	220	0	232	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	0.99		0.95	1.00		0.97	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1900	1870	1900			
Adj Flow Rate, veh/h	2	389	55	116	397	1	220	0	139			
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	2	2	2	2	0	2	0			
Cap, veh/h	478	823	115	148	1709	4	313	0	198			
Arrive On Green	0.26	0.26	0.26	0.08	0.47	0.47	0.30	0.00	0.30			
Sat Flow, veh/h	978	3108	435	1781	3636	9	1039	0	656			
Grp Volume(v), veh/h	2	221	223	116	194	204	359	0	0			
Grp Sat Flow(s),veh/h/ln	978	1777	1767	1781	1777	1868	1695	0	0			
Q Serve(g_s), s	0.0	3.4	3.5	2.1	2.1	2.1	6.2	0.0	0.0			
Cycle Q Clear(g_c), s	0.0	3.4	3.5	2.1	2.1	2.1	6.2	0.0	0.0			
Prop In Lane	1.00		0.25	1.00		0.00	0.61		0.39			
Lane Grp Cap(c), veh/h	478	470	468	148	835	878	511	0	0			
V/C Ratio(X)	0.00	0.47	0.48	0.78	0.23	0.23	0.70	0.00	0.00			
Avail Cap(c_a), veh/h	861	1165	1158	760	2140	2250	1705	0	0			
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	1.00	1.00	1.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	8.9	10.1	10.1	14.7	5.2	5.2	10.2	0.0	0.0			
Incr Delay (d2), s/veh	0.0	0.7	0.8	3.4	0.1	0.1	0.7	0.0	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	0.0	1.1	1.1	0.8	0.5	0.5	1.8	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.9	10.9	10.9	18.1	5.3	5.3	10.8	0.0	0.0			
LnGrp LOS	A	B	B	B	A	A	B	A	A			
Approach Vol, veh/h		446			514			359				
Approach Delay, s/veh		10.9			8.2			10.8				
Approach LOS		B			A			B				
Timer - Assigned Phs		2	3	4				8				
Phs Duration (G+Y+Rc), s		13.9	6.7	12.2				18.9				
Change Period (Y+Rc), s		4.0	4.0	3.5				3.5				
Max Green Setting (Gmax), s		33.0	14.0	21.5				39.5				
Max Q Clear Time (g_c+I1), s		8.2	4.1	5.5				4.1				
Green Ext Time (p_c), s		1.7	0.1	2.4				2.5				
Intersection Summary												
HCM 6th Ctrl Delay			9.8									
HCM 6th LOS			A									

HCM 6th TWSC
2: Burbank Ave & Hughes Ave

10/07/2019

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	17	40	32	19	9	25	373	14	7	262	25
Future Vol, veh/h	29	17	40	32	19	9	25	373	14	7	262	25
Conflicting Peds, #/hr	2	0	0	0	0	2	10	0	0	0	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	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	29	17	40	32	19	9	25	373	14	7	262	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	745	736	285	747	741	382	297	0	0	387	0	0
Stage 1	299	299	-	430	430	-	-	-	-	-	-	-
Stage 2	446	437	-	317	311	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	330	346	754	329	344	665	1264	-	-	1171	-	-
Stage 1	710	666	-	603	583	-	-	-	-	-	-	-
Stage 2	591	579	-	694	658	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	301	332	748	292	330	664	1253	-	-	1171	-	-
Mov Cap-2 Maneuver	301	332	-	292	330	-	-	-	-	-	-	-
Stage 1	687	656	-	588	568	-	-	-	-	-	-	-
Stage 2	548	565	-	635	648	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.5	18.2	0.5	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1253	-	-	428	332	1171	-	-
HCM Lane V/C Ratio	0.02	-	-	0.201	0.181	0.006	-	-
HCM Control Delay (s)	7.9	0	-	15.5	18.2	8.1	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.7	0.6	0	-	-

HCM 6th TWSC
3: Burbank Ave & Hearn Ave 10/07/2019

Intersection												
Int Delay, s/veh	13.8											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	145	418	7	10	451	131	3	4	10	93	2	85
Future Vol, veh/h	145	418	7	10	451	131	3	4	10	93	2	85
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	5	5	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	65	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	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	145	418	7	10	451	131	3	4	10	93	2	85

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	582	0	0	428	0	0	1295	1317	430	1261	1255	517
Stage 1	-	-	-	-	-	-	715	715	-	537	537	-
Stage 2	-	-	-	-	-	-	580	602	-	724	718	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	992	-	-	1131	-	-	139	157	625	147	172	558
Stage 1	-	-	-	-	-	-	422	434	-	528	523	-
Stage 2	-	-	-	-	-	-	500	489	-	417	433	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	992	-	-	1128	-	-	103	133	621	124	145	558
Mov Cap-2 Maneuver	-	-	-	-	-	-	103	133	-	124	145	-
Stage 1	-	-	-	-	-	-	360	370	-	451	518	-
Stage 2	-	-	-	-	-	-	418	485	-	345	369	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.4	0.1	22.2	94
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	226	992	-	-	1128	-	-	196
HCM Lane V/C Ratio	0.075	0.146	-	-	0.009	-	-	0.918
HCM Control Delay (s)	22.2	9.2	-	-	8.2	-	-	94
HCM Lane LOS	C	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	0.2	0.5	-	-	0	-	-	7.3

HCM 6th Signalized Intersection Summary
1: Burbank Ave & Sebastopol Rd 10/17/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	550	93	141	593	2	143	1	108	0	0	0
Future Volume (veh/h)	4	550	93	141	593	2	143	1	108	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	0.99		0.96	1.00		0.97	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			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1900	1870	1900			
Adj Flow Rate, veh/h	2	550	68	141	593	2	143	1	59			
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	2	2	2	2	0	2	0			
Cap, veh/h	519	1071	132	182	2087	7	210	1	87			
Arrive On Green	0.34	0.34	0.34	0.10	0.57	0.57	0.17	0.17	0.17			
Sat Flow, veh/h	818	3169	390	1781	3632	12	1210	8	499			
Grp Volume(v), veh/h	2	308	310	141	290	305	203	0	0			
Grp Sat Flow(s),veh/h/ln	818	1777	1783	1781	1777	1868	1718	0	0			
Q Serve(g_s), s	0.0	4.1	4.2	2.3	2.5	2.5	3.3	0.0	0.0			
Cycle Q Clear(g_c), s	0.0	4.1	4.2	2.3	2.5	2.5	3.3	0.0	0.0			
Prop In Lane	1.00		0.22	1.00		0.01	0.70		0.29			
Lane Grp Cap(c), veh/h	519	601	603	182	1021	1073	298	0	0			
V/C Ratio(X)	0.00	0.51	0.52	0.77	0.28	0.28	0.68	0.00	0.00			
Avail Cap(c_a), veh/h	833	1284	1288	838	2359	2480	1905	0	0			
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	1.00	1.00	1.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	6.5	7.9	7.9	13.0	3.2	3.2	11.5	0.0	0.0			
Incr Delay (d2), s/veh	0.0	0.7	0.7	2.7	0.2	0.1	1.0	0.0	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	0.0	1.1	1.1	0.8	0.3	0.3	1.0	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.5	8.6	8.6	15.7	3.4	3.4	12.6	0.0	0.0			
LnGrp LOS	A	A	A	B	A	A	B	A	A			
Approach Vol, veh/h		620			736			203				
Approach Delay, s/veh		8.6			5.7			12.6				
Approach LOS		A			A			B				

Timer - Assigned Phs		2	3	4				8				
Phs Duration (G+Y+Rc), s		9.2	7.0	13.6				20.6				
Change Period (Y+Rc), s		4.0	4.0	3.5				3.5				
Max Green Setting (Gmax), s		33.0	14.0	21.5				39.5				
Max Q Clear Time (g_c+I1), s		5.3	4.3	6.2				4.5				
Green Ext Time (p_c), s		0.9	0.1	3.4				4.0				

Intersection Summary	
HCM 6th Ctrl Delay	7.7
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	24	15	15	6	13	6	29	201	13	18	213	22
Future Vol, veh/h	24	15	15	6	13	6	29	201	13	18	213	22
Conflicting Peds, #/hr	0	0	0	0	0	0	5	0	0	0	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	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	24	15	15	6	13	6	29	201	13	18	213	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	540	537	229	541	542	208	240	0	0	214	0	0
Stage 1	265	265	-	266	266	-	-	-	-	-	-	-
Stage 2	275	272	-	275	276	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	453	450	810	452	447	832	1327	-	-	1356	-	-
Stage 1	740	689	-	739	689	-	-	-	-	-	-	-
Stage 2	731	685	-	731	682	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	424	431	807	419	428	832	1321	-	-	1356	-	-
Mov Cap-2 Maneuver	424	431	-	419	428	-	-	-	-	-	-	-
Stage 1	719	676	-	721	672	-	-	-	-	-	-	-
Stage 2	694	668	-	691	669	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.2	12.9	0.9	0.5
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1321	-	-	491	482	1356	-	-
HCM Lane V/C Ratio	0.022	-	-	0.11	0.052	0.013	-	-
HCM Control Delay (s)	7.8	0	-	13.2	12.9	7.7	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.2	0	-	-

Intersection	
Int Delay, s/veh	9.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱			↕			↕	
Traffic Vol, veh/h	79	361	17	35	534	143	12	12	35	70	13	75
Future Vol, veh/h	79	361	17	35	534	143	12	12	35	70	13	75
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	65	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	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	79	361	17	35	534	143	12	12	35	70	13	75

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	677	0	0	380	0	0	1250	1277	373	1228	1214	606
Stage 1	-	-	-	-	-	-	530	530	-	676	676	-
Stage 2	-	-	-	-	-	-	720	747	-	552	538	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	915	-	-	1178	-	-	150	166	673	155	182	497
Stage 1	-	-	-	-	-	-	533	527	-	443	453	-
Stage 2	-	-	-	-	-	-	419	420	-	518	522	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	915	-	-	1176	-	-	109	147	671	126	161	497
Mov Cap-2 Maneuver	-	-	-	-	-	-	109	147	-	126	161	-
Stage 1	-	-	-	-	-	-	486	481	-	405	439	-
Stage 2	-	-	-	-	-	-	335	407	-	437	476	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.6	0.4	24.6	67.8
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	242	915	-	-	1176	-	-	201
HCM Lane V/C Ratio	0.244	0.086	-	-	0.03	-	-	0.786
HCM Control Delay (s)	24.6	9.3	-	-	8.2	-	-	67.8
HCM Lane LOS	C	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	0.9	0.3	-	-	0.1	-	-	5.5

HCM 6th Signalized Intersection Summary
1: Burbank Ave & Sebastopol Rd

10/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	434	105	143	442	1	241	0	256	0	0	0
Future Volume (veh/h)	2	434	105	143	442	1	241	0	256	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	0.99		0.95	1.00		0.97	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1900	1870	1900			
Adj Flow Rate, veh/h	2	434	81	143	442	1	241	0	163			
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	2	2	2	2	0	2	0			
Cap, veh/h	444	805	149	186	1749	4	325	0	220			
Arrive On Green	0.27	0.27	0.27	0.10	0.48	0.48	0.32	0.00	0.32			
Sat Flow, veh/h	939	2968	549	1781	3637	8	1009	0	683			
Grp Volume(v), veh/h	2	258	257	143	216	227	404	0	0			
Grp Sat Flow(s),veh/h/ln	939	1777	1741	1781	1777	1869	1692	0	0			
Q Serve(g_s), s	0.1	4.7	4.8	3.0	2.7	2.7	8.1	0.0	0.0			
Cycle Q Clear(g_c), s	0.1	4.7	4.8	3.0	2.7	2.7	8.1	0.0	0.0			
Prop In Lane	1.00		0.32	1.00		0.00	0.60		0.40			
Lane Grp Cap(c), veh/h	444	482	472	186	854	898	544	0	0			
V/C Ratio(X)	0.00	0.54	0.54	0.77	0.25	0.25	0.74	0.00	0.00			
Avail Cap(c_a), veh/h	721	1006	985	657	1848	1943	1470	0	0			
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	1.00	1.00	1.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	10.1	11.8	11.8	16.6	5.8	5.8	11.5	0.0	0.0			
Incr Delay (d2), s/veh	0.0	0.9	1.0	2.5	0.2	0.1	0.8	0.0	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	0.0	1.6	1.6	1.2	0.7	0.7	2.5	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.1	12.7	12.8	19.1	6.0	6.0	12.2	0.0	0.0			
LnGrp LOS	B	B	B	B	A	A	B	A	A			
Approach Vol, veh/h		517			586			404				
Approach Delay, s/veh		12.8			9.2			12.2				
Approach LOS		B			A			B				
Timer - Assigned Phs		2	3	4				8				
Phs Duration (G+Y+Rc), s		16.2	8.0	13.8				21.8				
Change Period (Y+Rc), s		4.0	4.0	3.5				3.5				
Max Green Setting (Gmax), s		33.0	14.0	21.5				39.5				
Max Q Clear Time (g_c+I1), s		10.1	5.0	6.8				4.7				
Green Ext Time (p_c), s		1.9	0.1	2.7				2.8				
Intersection Summary												
HCM 6th Ctrl Delay			11.2									
HCM 6th LOS			B									

HCM 6th TWSC
2: Burbank Ave & Hughes Ave

10/29/2019

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	17	40	32	19	9	25	418	14	7	315	25
Future Vol, veh/h	29	17	40	32	19	9	25	418	14	7	315	25
Conflicting Peds, #/hr	2	0	0	0	0	2	10	0	0	0	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	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	29	17	40	32	19	9	25	418	14	7	315	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	843	834	338	845	839	427	350	0	0	432	0	0
Stage 1	352	352	-	475	475	-	-	-	-	-	-	-
Stage 2	491	482	-	370	364	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	284	304	704	283	302	628	1209	-	-	1128	-	-
Stage 1	665	632	-	570	557	-	-	-	-	-	-	-
Stage 2	559	553	-	650	624	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	256	291	698	248	289	627	1199	-	-	1128	-	-
Mov Cap-2 Maneuver	256	291	-	248	289	-	-	-	-	-	-	-
Stage 1	642	622	-	555	542	-	-	-	-	-	-	-
Stage 2	516	538	-	591	614	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.4	20.8	0.4	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1199	-	-	376	287	1128	-	-
HCM Lane V/C Ratio	0.021	-	-	0.229	0.209	0.006	-	-
HCM Control Delay (s)	8.1	0	-	17.4	20.8	8.2	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.9	0.8	0	-	-

HCM 6th TWSC
3: Burbank Ave & Hearn Ave 10/29/2019

Intersection												
Int Delay, s/veh	41.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	158	418	7	10	451	159	3	17	10	115	13	95
Future Vol, veh/h	158	418	7	10	451	159	3	17	10	115	13	95
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	5	5	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	65	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	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	158	418	7	10	451	159	3	17	10	115	13	95

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	610	0	0	428	0	0	1346	1371	430	1307	1295	531
Stage 1	-	-	-	-	-	-	741	741	-	551	551	-
Stage 2	-	-	-	-	-	-	605	630	-	756	744	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	969	-	-	1131	-	-	128	146	625	137	162	548
Stage 1	-	-	-	-	-	-	408	423	-	519	515	-
Stage 2	-	-	-	-	-	-	485	475	-	400	421	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	969	-	-	1128	-	-	85	121	621	~ 104	134	548
Mov Cap-2 Maneuver	-	-	-	-	-	-	85	121	-	~ 104	134	-
Stage 1	-	-	-	-	-	-	341	353	-	434	510	-
Stage 2	-	-	-	-	-	-	387	471	-	312	352	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.6	0.1	33.5	256.7
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	156	969	-	-	1128	-	-	162
HCM Lane V/C Ratio	0.192	0.163	-	-	0.009	-	-	1.377
HCM Control Delay (s)	33.5	9.4	-	-	8.2	-	-	256.7
HCM Lane LOS	D	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	0.7	0.6	-	-	0	-	-	13.7

Notes
~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary
1: Burbank Ave & Sebastopol Rd 10/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	601	106	158	643	2	157	1	124	0	0	0
Future Volume (veh/h)	4	601	106	158	643	2	157	1	124	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	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			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1900	1870	1900			
Adj Flow Rate, veh/h	2	601	81	158	643	2	157	1	75			
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	2	2	2	2	0	2	0			
Cap, veh/h	484	1071	144	206	2099	7	227	1	108			
Arrive On Green	0.34	0.34	0.34	0.12	0.58	0.58	0.20	0.20	0.20			
Sat Flow, veh/h	782	3132	421	1781	3633	11	1153	7	551			
Grp Volume(v), veh/h	2	340	342	158	314	331	233	0	0			
Grp Sat Flow(s),veh/h/ln	782	1777	1776	1781	1777	1868	1712	0	0			
Q Serve(g_s), s	0.1	5.2	5.2	2.9	3.0	3.0	4.2	0.0	0.0			
Cycle Q Clear(g_c), s	0.1	5.2	5.2	2.9	3.0	3.0	4.2	0.0	0.0			
Prop In Lane	1.00		0.24	1.00		0.01	0.67		0.32			
Lane Grp Cap(c), veh/h	484	608	607	206	1027	1079	336	0	0			
V/C Ratio(X)	0.00	0.56	0.56	0.77	0.31	0.31	0.69	0.00	0.00			
Avail Cap(c_a), veh/h	723	1150	1149	751	2113	2221	1700	0	0			
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	1.00	1.00	1.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	7.2	8.9	8.9	14.3	3.6	3.6	12.4	0.0	0.0			
Incr Delay (d2), s/veh	0.0	0.8	0.8	2.3	0.2	0.2	1.0	0.0	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	0.0	1.5	1.5	1.0	0.4	0.5	1.4	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.2	9.7	9.7	16.5	3.8	3.8	13.4	0.0	0.0			
LnGrp LOS	A	A	A	B	A	A	B	A	A			
Approach Vol, veh/h		684			803			233				
Approach Delay, s/veh		9.7			6.3			13.4				
Approach LOS		A			A			B				
Timer - Assigned Phs		2	3	4				8				
Phs Duration (G+Y+Rc), s		10.5	7.8	14.9				22.7				
Change Period (Y+Rc), s		4.0	4.0	3.5				3.5				
Max Green Setting (Gmax), s		33.0	14.0	21.5				39.5				
Max Q Clear Time (g_c+I1), s		6.2	4.9	7.2				5.0				
Green Ext Time (p_c), s		1.0	0.1	3.7				4.4				

Intersection Summary	
HCM 6th Ctrl Delay	8.6
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	24	15	15	6	13	6	29	231	13	18	243	22
Future Vol, veh/h	24	15	15	6	13	6	29	231	13	18	243	22
Conflicting Peds, #/hr	0	0	0	0	0	0	5	0	0	0	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	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	24	15	15	6	13	6	29	231	13	18	243	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	600	597	259	601	602	238	270	0	0	244	0	0
Stage 1	295	295	-	296	296	-	-	-	-	-	-	-
Stage 2	305	302	-	305	306	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	413	416	780	412	414	801	1293	-	-	1322	-	-
Stage 1	713	669	-	712	668	-	-	-	-	-	-	-
Stage 2	705	664	-	705	662	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	385	397	777	380	395	801	1288	-	-	1322	-	-
Mov Cap-2 Maneuver	385	397	-	380	395	-	-	-	-	-	-	-
Stage 1	692	656	-	693	651	-	-	-	-	-	-	-
Stage 2	668	647	-	665	649	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14	13.6	0.8	0.5
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1288	-	-	452	445	1322	-	-
HCM Lane V/C Ratio	0.023	-	-	0.119	0.056	0.014	-	-
HCM Control Delay (s)	7.9	0	-	14	13.6	7.8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.2	0	-	-

Intersection	
Int Delay, s/veh	19.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱			↕			↕	
Traffic Vol, veh/h	85	361	17	35	534	159	12	18	35	87	20	82
Future Vol, veh/h	85	361	17	35	534	159	12	18	35	87	20	82
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	65	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	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	85	361	17	35	534	159	12	18	35	87	20	82

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	693	0	0	380	0	0	1277	1305	373	1251	1234	614
Stage 1	-	-	-	-	-	-	542	542	-	684	684	-
Stage 2	-	-	-	-	-	-	735	763	-	567	550	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	902	-	-	1178	-	-	143	160	673	149	177	492
Stage 1	-	-	-	-	-	-	525	520	-	439	449	-
Stage 2	-	-	-	-	-	-	411	413	-	508	516	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	902	-	-	1176	-	-	98	140	671	116	155	492
Mov Cap-2 Maneuver	-	-	-	-	-	-	98	140	-	116	155	-
Stage 1	-	-	-	-	-	-	475	470	-	398	436	-
Stage 2	-	-	-	-	-	-	317	401	-	419	466	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	0.4	29	132
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	214	902	-	-	1176	-	-	181
HCM Lane V/C Ratio	0.304	0.094	-	-	0.03	-	-	1.044
HCM Control Delay (s)	29	9.4	-	-	8.2	-	-	132
HCM Lane LOS	D	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	1.2	0.3	-	-	0.1	-	-	8.9

Appendix C

Proposed Street Cross-Sections

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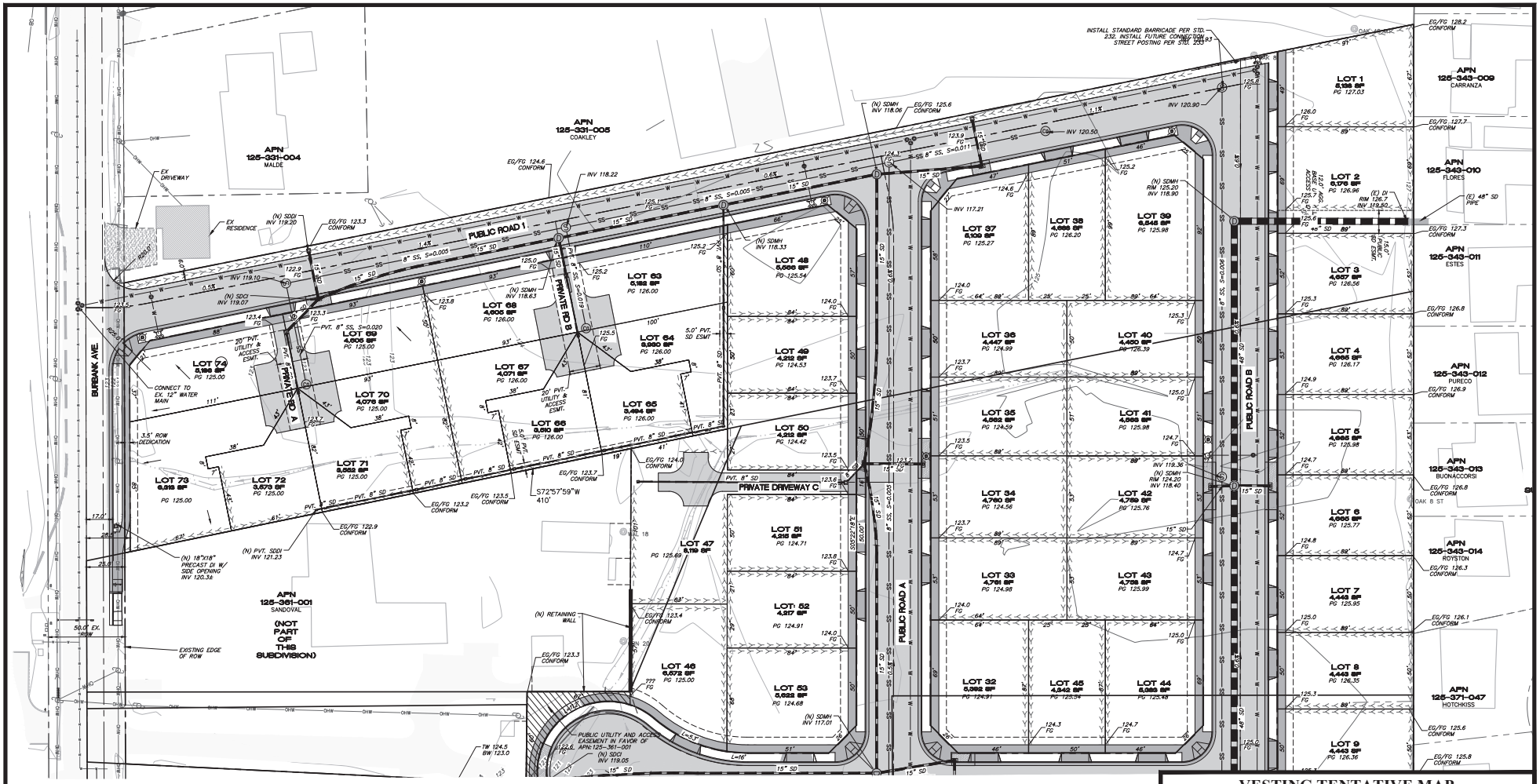
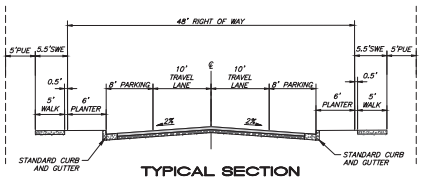
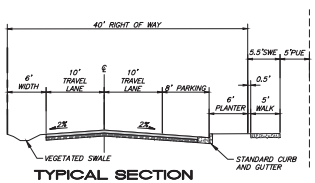
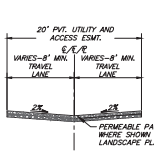




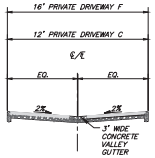
TYPICAL SECTION
PUBLIC ROADS A and B, 2, 3, 4 and 5



TYPICAL SECTION
PUBLIC ROAD 1



TYPICAL SECTION
PRIVATE ROAD A AND B



TYPICAL SECTION
PRIVATE DRIVEWAY C AND F

TYPICAL ROADWAY SECTIONS
NOT TO SCALE

CORT L. MUNSELLE
RCE 69941

DATE

REGISTERED PROFESSIONAL ENGINEER
CORT L. MUNSELLE
No. 69941
Exp. 9-30-20
CIVIL
STATE OF CALIFORNIA

VESTING TENTATIVE MAP
SCHELLINGER BURBANK AVENUE SUBDIVISION

SANTA ROSA, CA

APN: 125-331-003, 125-361-006, 125-361-007, 125-361-003

ADDRESS: **1400, 1690, 1720, 1780 BURBANK AVE.**

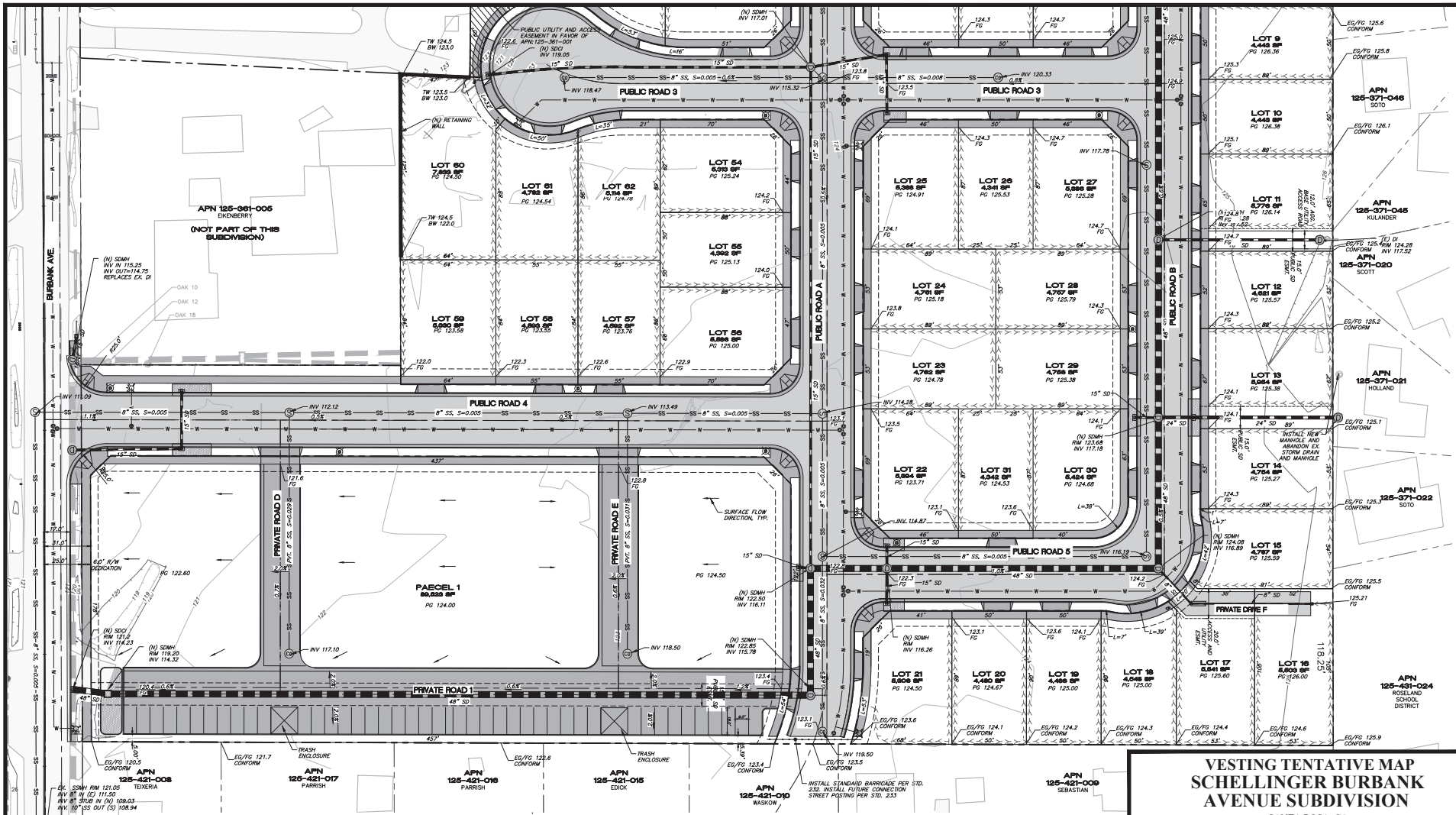
LOT TOTAL: 74 LOTS + 1 PARCEL | PROJECT AREA: 14.25 ACRES

BOUNDARY DESCRIPTION: BEING A SUBDIVISION OF THE LANDS OF SBRI 1780 BURBANK LLC AS DESCRIBED IN DOCUMENT NUMBER 2016-111853, SONOMA COUNTY RECORDS, AND THE LANDS OF SB LAND CO LP AS DESCRIBED BY DOCUMENT NUMBER 2018-059989, SONOMA COUNTY RECORDS

NORTH PORTION

MUNSELLE CIVIL ENGINEERING
CIVIL ENGINEERING & LAND PLANNING
513 CENTER STREET
HEALDSBURG, CA 95448
(707) 395-0968

JOB: 169-17
DATE: 08-14-2019
SHEET No. 3 OF 5



TYPICAL SECTION
BURBANK AVE.

TYPICAL SECTION
PRIVATE ROAD 1

TYPICAL SECTION
PRIVATE ROAD D and E

TYPICAL SECTION
STORM DRAIN EASEMENT

CORT L. MUNSELLE
RCE 69941

DATE

REGISTERED PROFESSIONAL ENGINEER
CORT L. MUNSELLE
No. 69941
Exp. 9-30-20
CIVIL
STATE OF CALIFORNIA

VESTING TENTATIVE MAP
SCHELLINGER BURBANK AVENUE SUBDIVISION

SANTA ROSA, CA

APN: 125-331-003, 125-361-006, 125-361-007, 125-361-003

ADDRESS: **1400, 1690, 1720, 1780 BURBANK AVE.**

LOT TOTAL: 74 LOTS + 1 PARCEL | PROJECT AREA: 14.25 ACRES

BOUNDARY DESCRIPTION: BEING A SUBDIVISION OF THE LANDS OF SBRI 1780 BURBANK LLC AS DESCRIBED IN DOCUMENT NUMBER 2016-111853, SONOMA COUNTY RECORDS, AND THE LANDS OF SB LAND CO LP AS DESCRIBED BY DOCUMENT NUMBER 2018-059989, SONOMA COUNTY RECORDS

TENTATIVE MAP - SOUTH PORTION

MUNSELLE CIVIL ENGINEERING
CIVIL ENGINEERING & LAND PLANNING
513 CENTER STREET
HEALDSBURG, CA 95448
(707) 395-0968

JOB: 169-17
DATE: 08-14-2019
SHEET No. 4 OF 5

P:\MCE JOBS\2017\169-17 WORDEN SUBDIVISION-SCHELLINGER\DWGS\169-17 TM.DWG 11/26/2019 1:46 PM MI

Appendix D

Warrant Analyses

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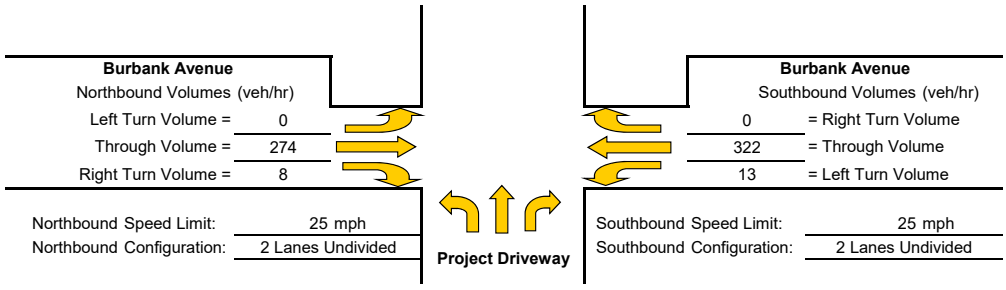
Turn Lane Warrant Analysis - 4 Legged Intersections

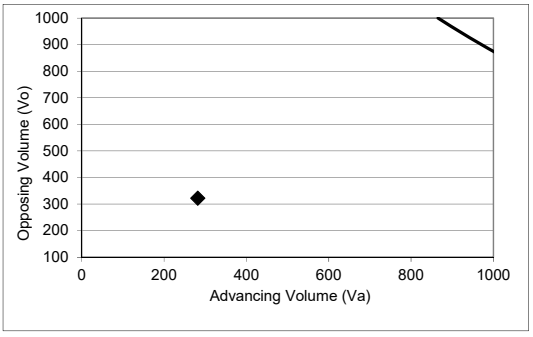
Study Intersection: Burbank Avenue/Project Driveway
Study Scenario: AM Background plus Project

Direction of Analysis Street: North/South



Northbound Left Turn Lane Warrants

Percentage Left Turns %lt 0.0 %
Advancing Volume Threshold AV 1889 veh/hr
If AV<Va then warrant is met

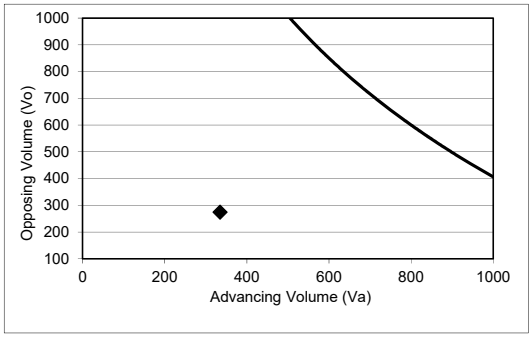


◆ Study Intersection
Two lane roadway warrant threshold for: 25 mph
Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: **NO**

Southbound Left Turn Lane Warrants

Percentage Left Turns %lt 3.9 %
Advancing Volume Threshold AV 1165 veh/hr
If AV<Va then warrant is met



◆ Study Intersection
Two lane roadway warrant threshold for: 25 mph
Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: **NO**

Note: If one direction has a left turn lane warranted, a left turn lane should be installed on the other side as well

Northbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold: AV = -
Advancing Volume Va = 282
If AV<Va then warrant is met No

Right Turn Lane Warranted: **NO**

Southbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold: AV = 1050.1
Advancing Volume Va = 335
If AV<Va then warrant is met No

Right Turn Lane Warranted: **NO**

Northbound Right Turn Taper Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for taper

Advancing Volume Threshold AV = 1067
Advancing Volume Va = 282
If AV<Va then warrant is met No

Right Turn Taper Warranted: **NO**

Southbound Right Turn Taper Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

2. Check advance volume threshold criteria for taper

Advancing Volume Threshold AV = -
Advancing Volume Va = 335
If AV<Va then warrant is met -

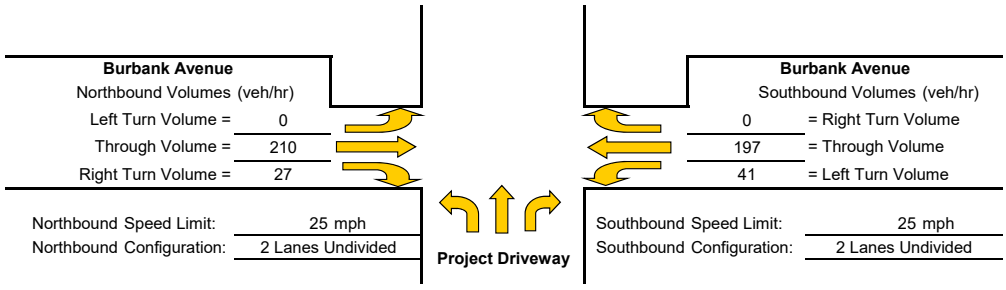
Right Turn Taper Warranted: **NO**

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, Jan. 1997.
The right turn lane and taper analysis is based on work conducted by Cottrell in 1981. The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

Turn Lane Warrant Analysis - 4 Legged Intersections

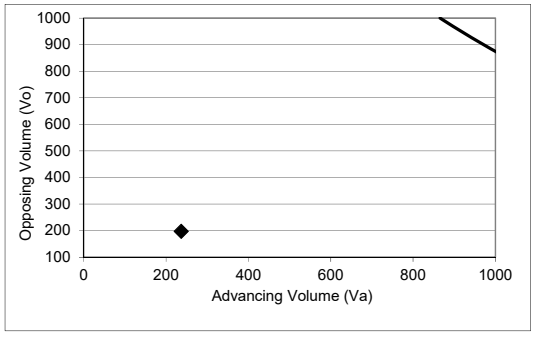
Study Intersection: Burbank Avenue/Project Driveway
Study Scenario: PM Background plus Project

Direction of Analysis Street: North/South



Northbound Left Turn Lane Warrants

Percentage Left Turns %lt 0.0 %
Advancing Volume Threshold AV 2181 veh/hr
If AV<Va then warrant is met

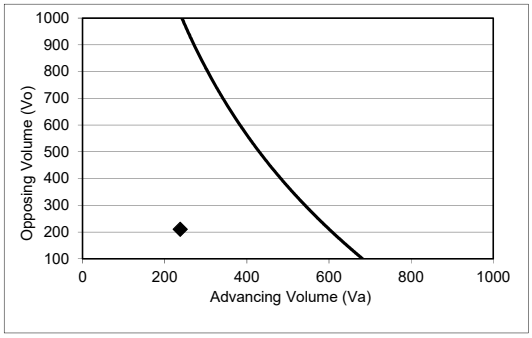


◆ Study Intersection
Two lane roadway warrant threshold for: 25 mph
Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: **NO**

Southbound Left Turn Lane Warrants

Percentage Left Turns %lt 17.2 %
Advancing Volume Threshold AV 601 veh/hr
If AV<Va then warrant is met



◆ Study Intersection
Two lane roadway warrant threshold for: 25 mph
Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: **NO**

Note: If one direction has a left turn lane warranted, a left turn lane should be installed on the other side as well

Northbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold: AV = -
Advancing Volume Va = 237
If AV<Va then warrant is met No

Right Turn Lane Warranted: **NO**

Southbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold: AV = 1050.1
Advancing Volume Va = 238
If AV<Va then warrant is met No

Right Turn Lane Warranted: **NO**

Northbound Right Turn Taper Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for taper

Advancing Volume Threshold AV = 433.3
Advancing Volume Va = 237
If AV<Va then warrant is met No

Right Turn Taper Warranted: **NO**

Southbound Right Turn Taper Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

2. Check advance volume threshold criteria for taper

Advancing Volume Threshold AV = -
Advancing Volume Va = 238
If AV<Va then warrant is met -

Right Turn Taper Warranted: **NO**

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, Jan. 1997.
The right turn lane and taper analysis is based on work conducted by Cottrell in 1981. The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

Warrant 3: Peak-Hour Volumes and Delay

Hearn Avenue & Burbank Avenue
City of Santa Rosa

Project Name: Burbank Avenue Subdivision Project TIS

Intersection: 1

	Major Street	Minor Street
Street Name	Hearn Avenue	Burbank Avenue
Direction	E-W	N-S
Number of Lanes	1	1
Approach Speed	25	25

Population less than 10,000? No
Date of Count: Wednesday, September 11, 2019
Scenario: AM Baseline

Warrant 3 Met?: Met when either Condition A or B is met — **Yes**

Condition A: Met when conditions A1, A2, and A3 are met — Met

Condition A1 — Met

The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach

Minor Approach Delay: 10.42 vehicle-hours

Condition A2 — Met

The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes

Minor Approach Volume: 199 vph

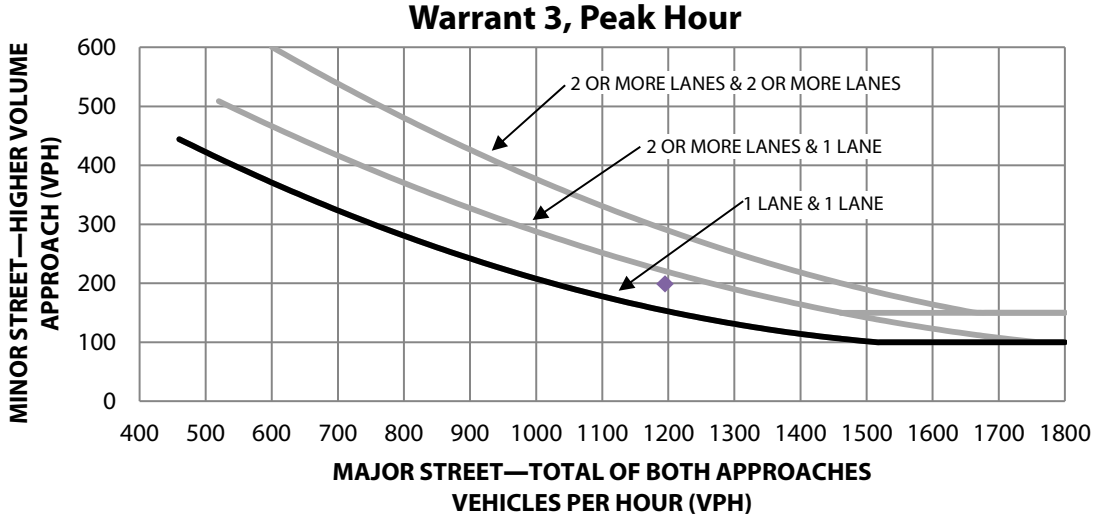
Condition A3 — Met

The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more appraches or 650 vph for intersections with three approaches

Total Entering Volume: 1424 vph

Condition B — Met

The plotted point falls above the curve



Warrant 3: Peak-Hour Volumes and Delay

Hearn Avenue & Burbank Avenue
City of Santa Rosa

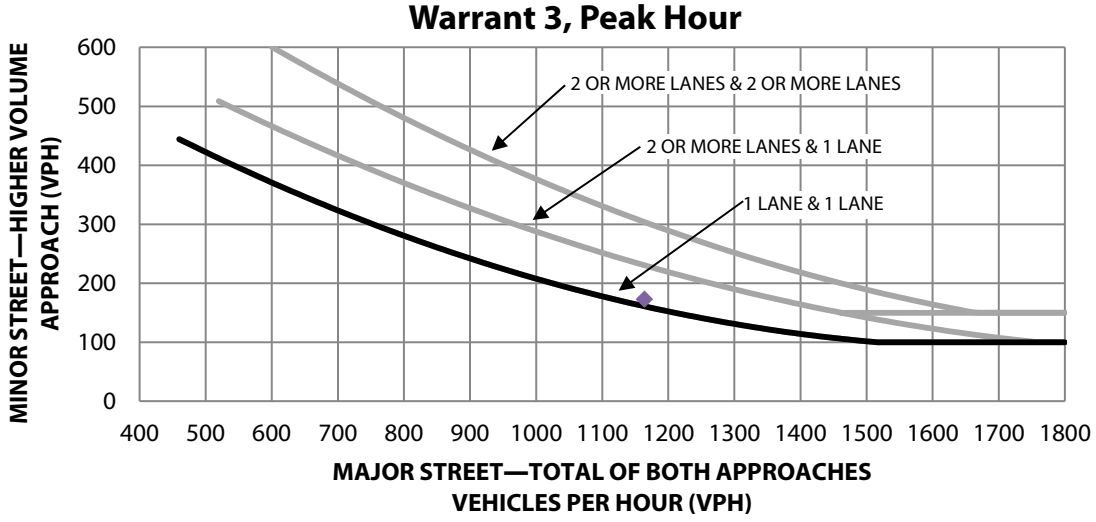
Project Name: Burbank Avenue Subdivision Project TIS

Intersection: 1

	Major Street	Minor Street
Street Name	Hearn Avenue	Burbank Avenue
Direction	E-W	N-S
Number of Lanes	1	1
Approach Speed	25	25

Population less than 10,000? No
Date of Count: Wednesday, September 11, 2019
Scenario: PM Baseline

Warrant 3 Met?: Met when either Condition A or B is met	**Yes**
Condition A: Met when conditions A1, A2, and A3 are met	Met
Condition A1	Met
The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach	
Minor Approach Delay: 4.4 vehicle-hours	
Condition A2	Met
The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes	
Minor Approach Volume: 173 vph	
Condition A3	Met
The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more appraches or 650 vph for intersections with three approaches	
Total Entering Volume: 1402 vph	
Condition B	Met
The plotted point falls above the curve	



Warrant 3: Peak-Hour Volumes and Delay

Hearn Avenue & Burbank Avenue
City of Santa Rosa

Project Name: Burbank Avenue Subdivision Project TIS

Intersection: 1

	Major Street	Minor Street
Street Name	Hearn Avenue	Burbank Avenue
Direction	E-W	N-S
Number of Lanes	1	1
Approach Speed	25	25

Population less than 10,000? No
Date of Count: Wednesday, September 11, 2019
Scenario: AM Baseline Plus Project

Warrant 3 Met?: Met when either Condition A or B is met	**Yes**
Condition A: Met when conditions A1, A2, and A3 are met	Met
Condition A1	Met

The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach

Minor Approach Delay: 15.9 vehicle-hours

Condition A2 — Met

The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes

Minor Approach Volume: 223 vph

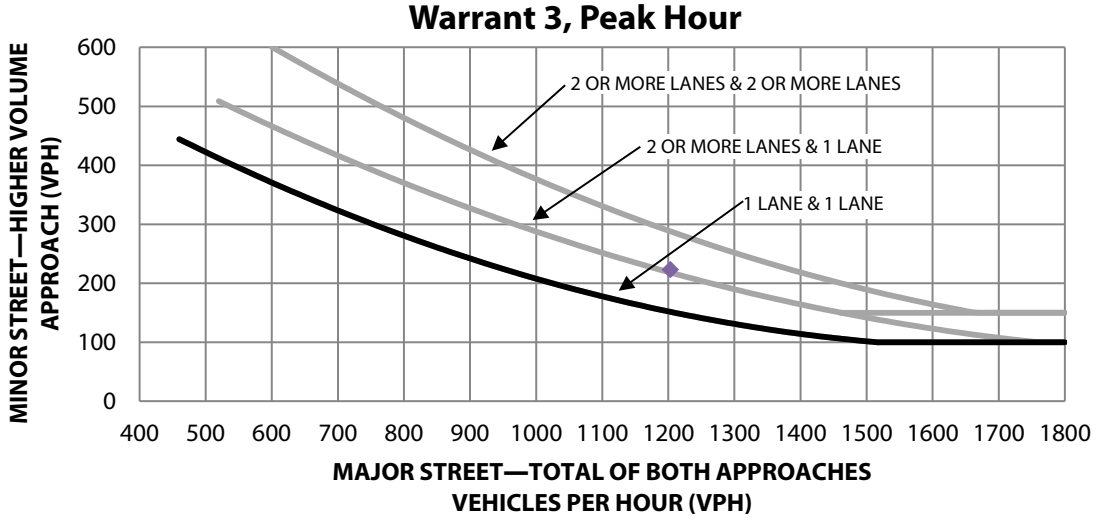
Condition A3 — Met

The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more appraches or 650 vph for intersections with three approaches

Total Entering Volume: 1456 vph

Condition B — Met

The plotted point falls above the curve



Warrant 3: Peak-Hour Volumes and Delay

Hearn Avenue & Burbank Avenue
City of Santa Rosa

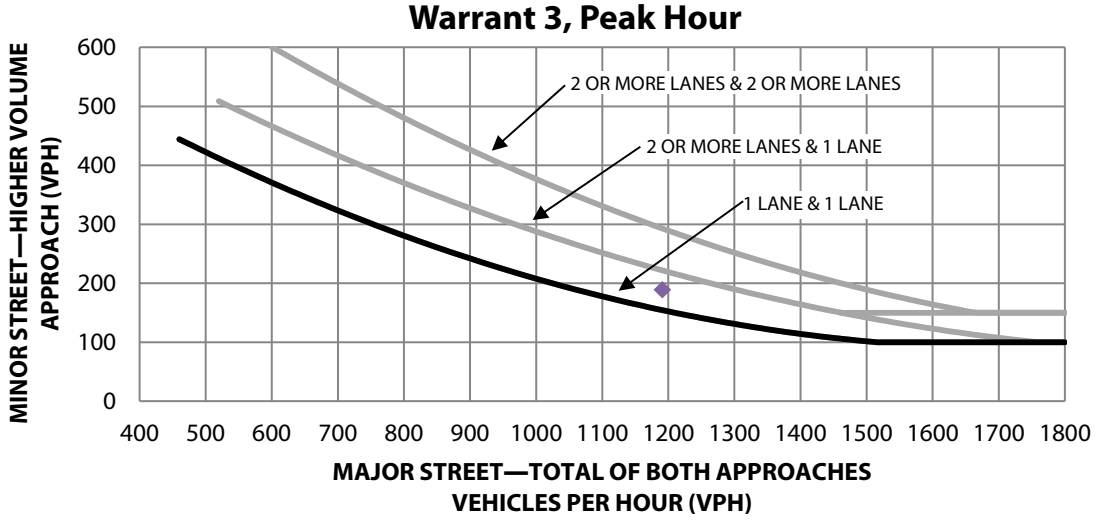
Project Name: Burbank Avenue Subdivision Project TIS

Intersection: 1

	Major Street	Minor Street
Street Name	Hearn Avenue	Burbank Avenue
Direction	E-W	N-S
Number of Lanes	1	1
Approach Speed	25	25

Population less than 10,000? No
Date of Count: Wednesday, September 11, 2019
Scenario: PM Baseline Plus Project

Warrant 3 Met?: Met when either Condition A or B is met	**Yes**
Condition A: Met when conditions A1, A2, and A3 are met	Met
Condition A1	Met
The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach	
Minor Approach Delay: 6.93 vehicle-hours	
Condition A2	Met
The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes	
Minor Approach Volume: 189 vph	
Condition A3	Met
The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more appraches or 650 vph for intersections with three approaches	
Total Entering Volume: 1445 vph	
Condition B	Met
The plotted point falls above the curve	



California Manual on Uniform Traffic Control Devices (CaMUTCD)
All-Way Stop Control (AWSC) Warrant Worksheet

Intersection #:	2	Calc:	AKW
Major Street:	Burbank Avenue		
Minor Street:	Hughes Road		
Existing Control:	Two-Way Stop		
Volume Count Date:	9/11/2019		
Speed Count Date:	N/A	At least one warrant satisfied?	**No**
		Optional Warrants Satisfied?	**0**

WARRANT A - Interim Measure

Satisfied? No

CaMUTCD Language

Condition A: Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.

Are traffic control signals justified at this location? No

WARRANT B - Crash History

Satisfied? No

CaMUTCD Language

Condition B: Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.

	Crashes	Minimum
Total in a 12-month period	1	-
Total in a 12-month period susceptible to correction by AWSC	1	5

WARRANT C - Eight Hour Volume

C.1+C.2 or C.3 Satisfied? No

CaMUTCD Language

Condition C.1: The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and

Condition C.2: The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour.

Hour	C.1 Volume	C.2 Volume
7:00 - 8:00	400	97
8:00 - 9:00	533	122
13:00 - 14:00	440	83
14:00 - 15:00	279	54
15:00 - 16:00	344	69
16:00 - 17:00	367	57
17:00 - 18:00	431	83
18:00 - 19:00	335	67

	Average Volume	Minimum	Satisfied?
C.1	391	300	Yes
C.2	79	200	No

	Peak Hour Delay	Minimum	Satisfied?
C.2	14	30	No

Peak Hour
7:30 - 8:30

Intersection #: 2
Major Street: Burbank Avenue
Minor Street: Hughes Road

CaMUTCD Language

Condition C.3: If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.

	Value	Minimum	Satisfied?
C.1. Major Street Entering Vehicles (Both Approaches)	391	210	Yes
C.2. Minor Street Entering Vehicles, Pedestrians, and Bicycles (Both Approaches)	79	140	No
C.2. Minor Street Peak Hour Vehicle Delay (Seconds)	14	21	No
C.3. Major Street 85th-percentile Speed	N/A	41	No

WARRANT D - Combination of Above

Satisfied? No

CaMUTCD Language

Condition D: Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.

	Value	Minimum	Satisfied?
B. Crashes in 12-month period susceptible to correction by AWSC	1	4	No
C.1. Major Street Entering Vehicles (Both Approaches)	391	240	Yes
C.2. Minor Street Entering Vehicles, Pedestrians, and Bicycles (Both Approaches)	79	160	No
C.2. Minor Street Peak Hour Vehicular Delay (Seconds)	14	24	No

OPTIONAL WARRANTS

0 Optional Warrants Satisfied

A The need to control left-turn conflicts — Satisfied? No

B The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes — Satisfied? No

C Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop — Satisfied? No

D An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operational characteristics of the intersection — Satisfied? No