



Traffic Impact Study for the 38 Degrees North Phase 2 Project



Prepared for the City of Santa Rosa

Submitted by
W-Trans

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Executive Summary

The proposed 38 Degrees North Phase 2 project would include construction of 172 multifamily units and the future development of a 20,000 square-foot community shopping center that would include an additional 1,000 square feet of ancillary retail uses at 2660 Petaluma Hill Road in the City of Santa Rosa. The project would allocate 1.04 acres on the southwest corner of the property for a future community shopping center to be processed under a separate application at a later date. The proposed project would connect to the 38 Degrees North Phase 1 project located at 2604 Petaluma Hill Road and Phases 1 and 2 would have shared access. There would be a total of six driveways accessing both the Phase 1 and Phase 2 projects.

The proposed residential and commercial project would be expected to generate an average of 3,019 net new daily trips, including 142 trips during the morning peak period and 257 trips during the evening peak period. The residential component alone has an anticipated trip generation of 936 trips daily, including 62 during the morning peak hour and 76 during the evening peak hour.

Eight intersections were evaluated under existing volumes, baseline volumes, and with traffic generated by the residential component of the project only added to baseline conditions as well as residential and commercial project-generated traffic added to baseline conditions. All eight intersections are expected to operate acceptably under Existing and Baseline scenarios.

As part of the proposed residential component, several improvements would be made to the street network fronting the project site. Franz Kafka Avenue is partially under development as part of the Kawana Meadows Subdivision Project and the Kawana Springs Project (38 Degrees North Phase 1). Additionally, the approved Kawana Meadows Subdivision Project would construct three lanes of the Farmers Lane extension, converting Petaluma Hill Road/Yolanda Avenue from a tee-intersection to a four-legged intersection. The residential component of 38 Degrees North Phase 2 would construct right-of-way improvements along the site frontages including constructing a two-way left-turn lane and additional northbound lane on Petaluma Hill Road, widening Franz Kafka Avenue to provide the southbound lane approaching the Farmers Lane extension and constructing the westbound right-turn lane on the Farmers Lane extension. Because a second northbound receiving lane at Yolanda Avenue-Farmers Lane/Petaluma Hill Road would be constructed along with the residential component of the project, plans for this phase should include restriping the northbound approach to the intersection to include a left-turn pocket, two through lanes, and a right-turn pocket and bike lane.

With the addition of traffic generated by the residential development to Baseline conditions, and with the baseline and residential component improvements, all but one of the study intersections are expected to continue operating acceptably; the intersection of Yolanda Avenue-Farmers Lane/Petaluma Hill Road is expected to deteriorate to unacceptable LOS E operation during the evening peak period. To mitigate this potentially significant impact, the project should include construction of an eastbound left-turn pocket with stacking for three vehicles and implementation of protected left-turn phasing for the eastbound and westbound approaches.

Upon the addition of traffic generated by both the residential and commercial components of the project to Baseline volumes, and with the proposed project and baseline improvements added to the street network, the intersection of Yolanda Avenue-Farmers Lane/Petaluma Hill Road would deteriorate to unacceptable LOS F operation during the evening peak period. The intersection would operate acceptably with the construction of an eastbound left-turn pocket and associated signal phasing modifications as recommended for Baseline plus Residential conditions. However, extension of the left-turn pocket to provide stacking for seven vehicles would be recommended for the commercial component of the project if such improvements have not already been made by the City or others.

Facilities providing access to the site via alternative modes, including pedestrians, bicyclists, and transit riders, are adequate and would be improved with the project. The residential component of the project would include improvements along its Farmers Lane frontage to complete the planned Class II bike lane and along its Petaluma

Hill Road frontage to maintain the existing Class II bike lane. Santa Rosa City Code requires 26 bicycle parking spaces. As proposed, the project would provide three short-term and 23 long-term bicycle parking spaces and 68 of the 172 dwelling units would include private storage spaces that could accommodate bicycles.

Sight distances at all project driveways are adequate. To ensure sight lines remain unobstructed, parking should be prohibited for approximately 50 feet immediately north of the northern Franz Kafka Avenue driveway. Landscaping at all project driveways should be maintained to provide clear sight lines. As proposed, the two-way left-turn lanes on Petaluma Hill Road and on the Farmers Lane extension should be installed along the project's frontages.

Emergency vehicle access and circulation was evaluated and determined to be adequate for the proposed layout.

The proposed on-site parking supply of 277 spaces for the residential component is adequate to satisfy the anticipated parking demand. Street parking along the project frontage on Franz Kafka Avenue should be provided as part of the project for traffic calming purposes and to reinforce the residential character of the road.

Introduction

This report presents an analysis of the potential traffic impacts that would be associated with a proposed 172-unit apartment development separately as well as with 21,000 square feet of community shopping center and ancillary retail uses at 2660 Petaluma Hill Road 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 approved by City staff, and is consistent with standard traffic engineering techniques.

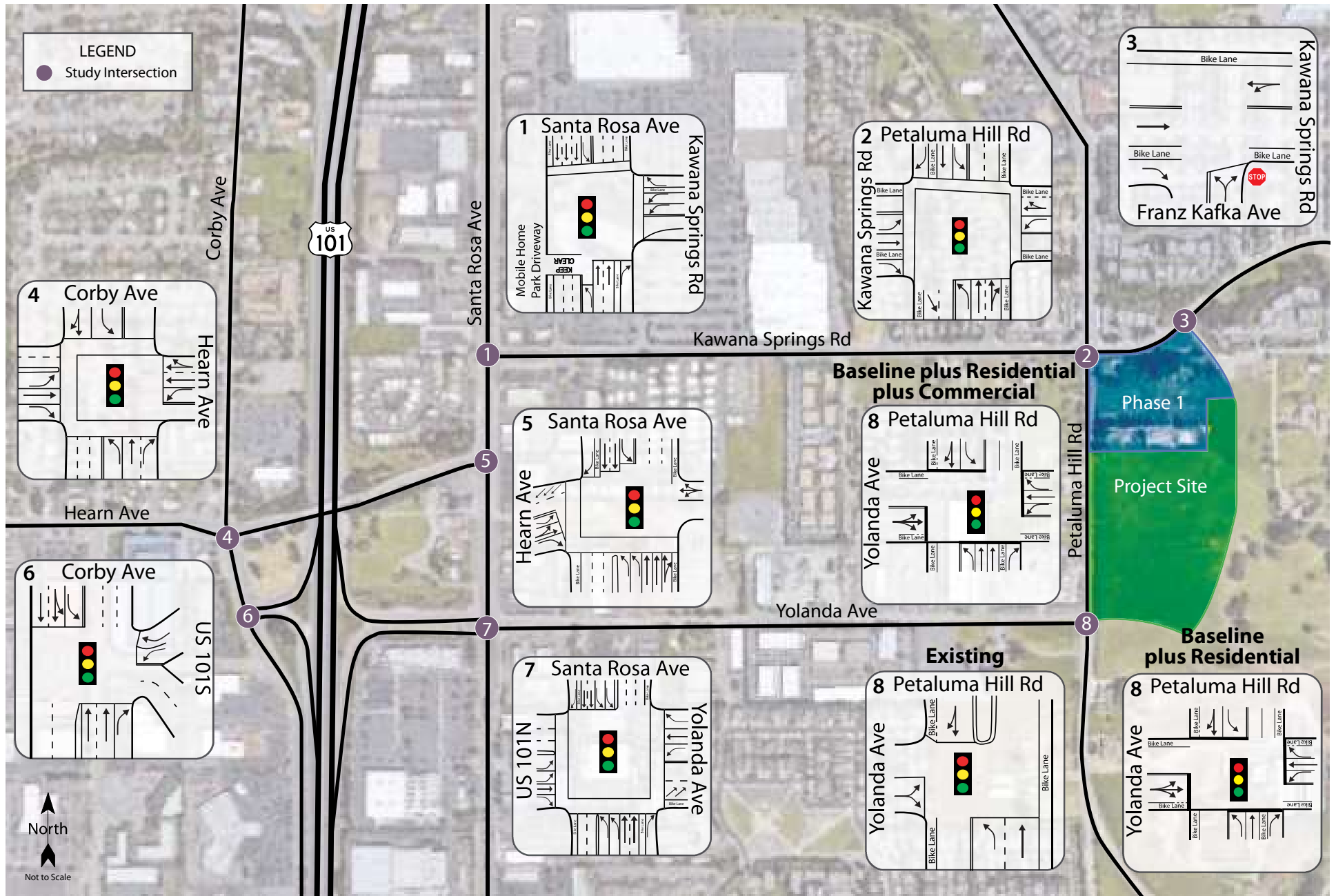
Prelude

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 proposed project includes the development of 172 apartment units and a 21,000 square-foot community shopping center on a vacant 10.9-acre parcel. It is noted that the shopping center would include 1,000 square feet of ancillary retail uses such as a café, floral arrangement services, and/or a limited-service bank. The community shopping center will be processed as a separate project. While it is anticipated that the proposed residential component would be constructed upon approval, both a short-term "residential only" analysis and longer-term "residential and commercial" conditions were evaluated. The proposed 38 Degrees North Phase 2 project would connect to the adjacent 38 Degrees North Phase 1 project and would have shared access. Phase 1 will be accessed via two driveways, one on Franz Kafka Avenue and one on Kawana Springs Road. Phase 2 would have a driveway on each frontage with two along Franz Kafka Avenue, for a total of six driveways between the two projects.

The project site is located at 2660 Petaluma Hill Road, as shown in Figure 1.



Traffic Impact Study for the 38 Degrees North Phase 2 Project
Figure 1 – Study Area and Lane Configurations

Transportation Setting

Operational Analysis

Study Area and Periods

The study area selected with input from City staff consists of the section of Petaluma Hill Road fronting the project site and the project access points as well as the following intersections.

1. Kawana Springs Road/Santa Rosa Avenue
2. Kawana Springs Road/Petaluma Hill Road
3. Kawana Springs Road/Franz Kafka Avenue
4. Hearn Avenue/Corby Avenue
5. Hearn Avenue/Santa Rosa Avenue
6. US 101 South Ramps/Corby Avenue
7. Yolanda Avenue-US 101 North Ramps/Santa Rosa Avenue
8. Yolanda Avenue/Petaluma Hill Road

Operating conditions during the 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

Kawana Springs Road/Santa Rosa Avenue is a four-legged signalized intersection with protected left-turn phasing on the northbound and southbound approaches and split phasing on the eastbound private driveways and westbound Kawana Springs Road approaches as well as right-turn overlaps on the westbound and northbound approaches. Marked pedestrian crosswalks and phasing are provided on the north and east legs.

Kawana Springs Road/Petaluma Hill Road is a signalized four-legged intersection with protected-permitted left-turn phasing on each approach. There are right-turn overlaps in the southbound and eastbound directions. There are crosswalks with pedestrian phasing on all but the south leg.

Kawana Springs Road/Franz Kafka Avenue is a tee intersection stop-controlled on the northbound Franz Kafka approach.

Hearn Avenue/Corby Avenue is a signalized four-legged intersection. All approaches have protected left-turn phasing, and the northbound Corby Avenue approach has a right-turn overlap phase. Crosswalks are provided on the north, south and west legs.

Hearn Avenue/Santa Rosa Avenue is a skewed signalized four-legged intersection. Protected left-turn phasing is provided for the northbound and southbound approaches. The southbound Santa Rosa Avenue and eastbound Hearn Avenue approaches have right-turn overlap phasing and the westbound and eastbound Hearn Avenue approaches operate with split-phasing. The east leg of the intersection is a private commercial driveway. Crosswalks are provided on the south and west legs.

US 101 South Ramps/Corby Avenue is a signalized tee-intersection with split phasing for Corby Avenue. The US 101 South off-ramp approach has a right-turn overlap phase and the southbound on-ramp includes a ramp meter.

Yolanda Avenue-US 101 North Ramps/Santa Rosa Avenue is a four-legged, signalized intersection with protected left-turn phasing on all approaches and a right-turn overlap phase on the southbound Santa Rosa Avenue approach. The northbound US 101 on-ramp includes ramp metering during peak traffic hours. There are marked crosswalks on the south, east, and west legs.

Yolanda Avenue/Petaluma Hill Road is a signalized tee-intersection that includes protected left-turn phasing for the movement from northbound Petaluma Hill Road. Construction is currently underway to construct a new east leg of the intersection called the Farmers Lane Extension.

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 June 1, 2013 through May 31, 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). Calculated collision rates for the study intersections were lower than the statewide average at five of the eight study intersections, indicating that there is no apparent safety concern at these locations. 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. Kawana Springs Rd/Santa Rosa Ave	14	0.27	0.27
2. Kawana Springs Rd/Petaluma Hill Rd	17	0.36	0.27
3. Kawana Springs Rd/Franz Kafka Ave	2	0.14	0.18
4. Hearn Ave/Corby Ave	29	0.51	0.27
5. Hearn Ave/Santa Rosa Ave	19	0.26	0.27
6. US 101S Ramps/Corby Ave	4	0.11	0.21
7. Yolanda Ave-US 101N Ramps/Santa Rosa Ave	27	0.38	0.27
8. Yolanda Ave/Petaluma Hill Rd	10	0.25	0.27

Note: c/mve = collisions per million vehicles entering; **bold** text = collision rate is higher than the statewide average

Because the collision rate for Kawana Springs Road/Petaluma Hill Road was at least marginally higher than the statewide average, the collisions at this location were reviewed in greater detail. The most common types of collisions that occurred at this location were rear-end and broadside with the primary cause being right-of-way violation and unsafe speeds. While rear-end collisions are generally common for busy signalized intersections, broadside collisions may be associated with the permitted left-turn phasing that is present on all approaches. It is noted that more than half of the collisions at the intersection occurred where vehicles were traveling on Petaluma Hill Road. Though it would lead to increased delay at the intersection, it is recommended that protected left-turn phasing be considered if this trend of collisions continues. Alternatively, the City may wish to consider changing to the Flashing Yellow Arrow indications if the experience of nearby communities that are using them, including Petaluma and Windsor, indicates that driver compliance is superior with this type of display.

Of the 29 reported collisions that occurred at the intersection of Hearn Avenue/Corby Avenue, 13 were rear-end collisions and 11 were broadside collisions. These collisions generally resulted from unsafe speed and are typical of conditions at a congested intersection. The percent of collisions resulting in injuries was 48.3 percent for the study period, compared to a 41.9 percent average Statewide. The City of Santa Rosa Capital Improvement Program identifies improvements to the Hearn Avenue interchange at US 101 that would ease traffic congestion and improve operation. The improved operation associated with these planned modifications would reasonably be expected to enhance operation.

Further review of the collisions recorded at Yolanda Avenue-US 101 North Ramps/Santa Rosa Avenue indicates that sixteen of the 27 collisions were rear-end collisions, fourteen of which occurred on the northbound and southbound approaches to the intersection. This type of crash is common at signalized intersections where there is congestion, especially during peak periods. Given that the collisions occurred under the existing traffic volumes and intersection lane configurations, they are unrelated to the proposed project and it is therefore suggested that the City consider investigating improvements to coordination on Santa Rosa Avenue and increasing enforcement in the area to address this situation.

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. In general, a network of sidewalks, crosswalks, pedestrian signals, and curb ramps provide access for pedestrians north of the proposed project site; however, sidewalk gaps, obstacles, and barriers can be found in the immediate vicinity of the project area.

- **Kawana Springs Road** – Intermittent sidewalk coverage is provided on Kawana Springs Road, with large gaps on the south side of the road between Santa Rosa Avenue and Franz Kafka Avenue. Lighting is provided by overhead lights, mainly on the north side of the street.
- **Yolanda Avenue** – Intermittent sidewalk coverage exists on Yolanda Avenue with significant gaps on both sides of the street between Santa Rosa Avenue and Petaluma Hill Road. Lighting is provided by overhead streetlights.
- **Petaluma Hill Road** – Partial sidewalk coverage is provided on the west side of Petaluma Hill Road between Kawana Springs Road and Yolanda Avenue.

Bicycle Facilities

The *Highway Design Manual*, Caltrans, 2017, classifies bikeways into three categories used in Santa Rosa:

- **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.

There are existing Class II bike lanes along Petaluma Hill Road and Kawana Springs Road and future bicycle facilities are planned along several streets in the immediate project vicinity. Table 2 summarizes the existing and planned bicycle facilities in the project vicinity, as contained in the *Santa Rosa Bicycle and Pedestrian Master Plan*.

Table 2 – Bicycle Facility Summary

Status Facility	Class	Length (miles)	Begin Point	End Point
Existing				
Colgan Creek Trail	I	0.60	Colgan Ave	Petaluma Hill Rd
Kawana Springs Rd	II	0.50	Petaluma Hill Rd	Brookwood Ave
Kawana Springs Rd (WB)	II	0.50	Santa Rosa Ave	Petaluma Hill Rd
Petaluma Hill Rd	II	1.40	Pressley St	Southern City Limits
Santa Rosa Ave	II	3.68	Todd Rd	Maple Ave
Planned				
Colgan Creek	I	0.69	Kawana Springs Rd	Farmers Ln Extension
Taylor Mountain Regional Park Trail	I	3.00	Petaluma Hill Rd	Bennett Valley Rd
Farmers Ln Extension	II	0.84	Colgan Creek	Petaluma Hill Rd/Yolanda Ave
Kawana Springs Rd	II	0.50	Brookwood Ave	Sonoma Academy
Santa Rosa Ave	II	1.02	Bellevue Ave	Todd Rd
Yolanda Ave	II	0.50	Petaluma Hill Rd	Santa Rosa Ave

Source: *Santa Rosa Bicycle and Pedestrian Master Plan*, City of Santa Rosa, 2018

Transit Facilities

Transit Services in the City of Santa Rosa, and throughout Sonoma County, are provided by Santa Rosa “CityBus” and Sonoma County Transit (SCT). There are four transit stops within what is typically considered acceptable walking distance (one quarter-mile) of the site. CityBus Route 5 provides loop service to destinations throughout Santa Rosa and stops on Petaluma Hill Road near the Kawana Springs intersection. This route operates Monday through Friday with 30-minute headways between 6:00 a.m. and 8:00 p.m. Saturday and Sunday service operates with approximately one-hour headways between 6:30 a.m. and 8:00 p.m. and 10:30 a.m. and 5:00 p.m., respectively.

SCT Route 46 provides regional service to destinations throughout Santa Rosa and Rohnert Park. This route operates on weekdays during commute hours between 7:00 and 8:00 a.m. and between 4:00 and 6:00 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.

Dial-a-ride, also known as paratransit, or door-to-door service, is available for those who are unable to independently use the transit system due to a physical or mental disability. SCT Paratransit is designed to serve the needs of individuals with disabilities within Sonoma and the greater County of Sonoma area.

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, 2010. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle.

The Levels of Service for the intersection of Kawana Springs Road/Franz Kafka Avenue, which includes a side-street stop-control, was analyzed using the “Two-Way Stop-Controlled” intersection capacity method from the HCM. This methodology determines a level of service for each minor turning movement by estimating the level of average delay in seconds per vehicle. Results are presented for individual movements together with the weighted overall average delay for the intersection.

The remaining study intersections were analyzed 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. For purposes of this study, delays were calculated using signal timing obtained from Caltrans and the City of Santa Rosa for intersections under their respective jurisdictions. The ranges of delay associated with the various levels of service are indicated in Table 3.

Table 3 – Intersection Level of Service Criteria

LOS	Two-Way Stop-Controlled	Signalized
A	Delay of 0 to 10 seconds. Gaps in traffic are readily available for drivers exiting the minor street.	Delay of 0 to 10 seconds. Most vehicles arrive during the green phase, so do not stop at all.
B	Delay of 10 to 15 seconds. Gaps in traffic are somewhat less readily available than with LOS A, but no queuing occurs on the minor street.	Delay of 10 to 20 seconds. More vehicles stop than with LOS A, but many drivers still do not have to stop.
C	Delay of 15 to 25 seconds. Acceptable gaps in traffic are less frequent, and drivers may approach while another vehicle is already waiting to exit the side street.	Delay of 20 to 35 seconds. The number of vehicles stopping is significant, although many still pass through without stopping.
D	Delay of 25 to 35 seconds. There are fewer acceptable gaps in traffic, and drivers may enter a queue of one or two vehicles on the side street.	Delay of 35 to 55 seconds. The influence of congestion is noticeable, and most vehicles have to stop.
E	Delay of 35 to 50 seconds. Few acceptable gaps in traffic are available, and longer queues may form on the side street.	Delay of 55 to 80 seconds. Most, if not all, vehicles must stop and drivers consider the delay excessive.
F	Delay of more than 50 seconds. Drivers may wait for long periods before there is an acceptable gap in traffic for exiting the side streets, creating long queues.	Delay of more than 80 seconds. Vehicles may wait through more than one cycle to clear the intersection.

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

Traffic Operation Standards

City of Santa Rosa

The City of Santa Rosa's adopted Level of Service (LOS) Standard is contained in *Santa Rosa General Plan 2035*. Standard TD-1 states that the City will try to maintain a Level of Service (LOS) D or better along all major corridors. Exceptions to meeting this standard are allowed where attainment would result in significant environmental degradation; where topography or environmental impacts make the improvement impossible; or where attainment would ensure loss of an area's unique character.

While a corridor level of service is applied by the City in its analysis of the entire City as part of the environmental documentation supporting the General Plan, this type of analysis only provides relevant data when performed on much longer segments than the ones included in the study area for the project. Therefore, although the City's standard does not specify criteria for intersections, for the purposes of this study, as is standard practice for such studies, a minimum operation of LOS D for the overall operation of signalized intersections was applied.

Caltrans

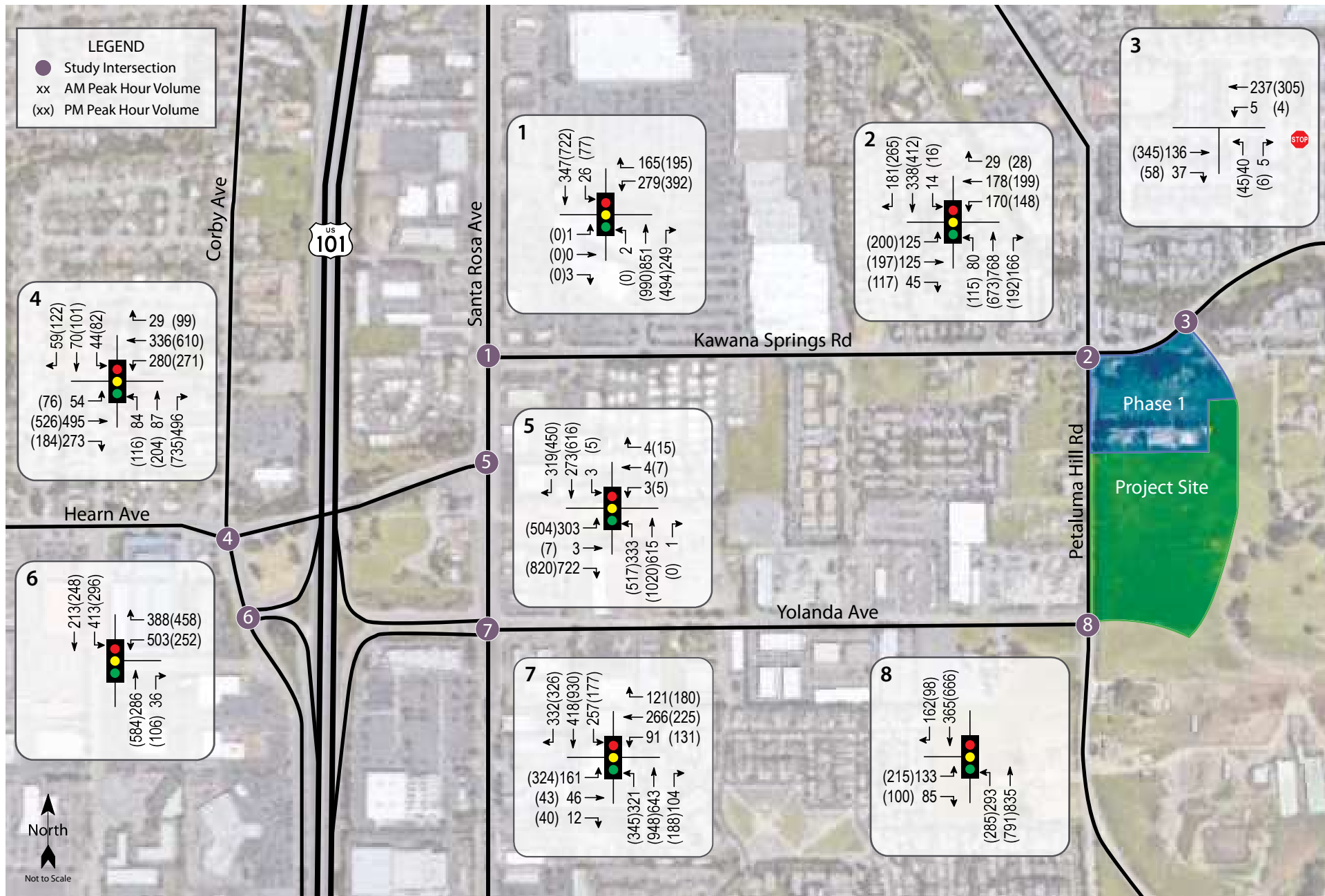
For the two study intersections that include freeway ramps, and are therefore under the jurisdiction of Caltrans, for analysis purposes the City's operational standard was applied, as is typically the case for locations that are crucial to a local jurisdiction's circulation system.

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 periods. This condition does not include project-generated traffic volumes. Volume data was collected in March 2017, June 2018, and September 2018. Copies of the count data are on file with the City.

Intersection Levels of Service

The study intersections are currently operating acceptably at LOS D or better during both peak periods studied. The existing traffic volumes are shown in Figure 2. A summary of the intersection level of service calculations is contained in Table 4, and copies of the Level of Service calculations are provided in Appendix B.



Traffic Impact Study for the 38 Degrees North Phase 2 Project
Figure 2 – Existing Traffic Volumes

Table 4– Existing Peak Hour Intersection Levels of Service

Study Intersection Approach	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. Kawana Springs Rd/Santa Rosa Ave	17.0	B	15.1	B
2. Kawana Springs Rd/Petaluma Hill Rd	23.6	C	24.7	C
3. Kawana Springs Rd/Franz Kafka Ave <i>Northbound (Franz Kafka Ave) Approach</i>	1.2 <i>11.0</i>	A <i>B</i>	1.0 <i>14.1</i>	A <i>B</i>
4. Hearn Ave/Corby Ave	32.4	C	38.1	D
5. Hearn Ave/Santa Rosa Ave	19.3	B	33.2	C
6. US 101S Ramps/Corby Ave	15.4	B	16.8	B
7. Yolanda Ave-US 101N Ramps/Santa Rosa Ave	25.7	C	30.6	C
8. Yolanda Ave/Petaluma Hill Rd	13.4	B	36.0	D

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*

Baseline Conditions

Baseline (Existing plus Approved plus Pending) operating conditions were determined with traffic from approved and pending projects in and near the study area added to the existing volumes. Approved projects are defined as those that have been through the City's review process and have received approval, while pending projects are going through the approval process, but assumed to receive approval. As directed by staff, the following projects contained in the March 2018 "Citywide Summary of Pending Development Report" were considered for the Baseline Conditions. Standard rates as published in the *Trip Generation Manual*, 10th Edition, 2017, Institute of Transportation Engineers (ITE) were applied. The pattern used to allocate new project trips to the street network was determined based on familiarity with the surrounding area. The distribution assumptions are shown in Table 5.

Table 5 – Trip Distribution Assumptions

Route	Percent
From/to south via US 101 at Hearn Ave/Yolanda Ave	45
From/to north via US 101 at Hearn Ave/Yolanda Ave	30
From/to north via Santa Rosa Ave	15
From/to north via Petaluma Hill Rd	5
From/to south via Petaluma Hill Rd	5
TOTAL	100

Kawana Springs Senior Assisted Living Center was a proposed 112-unit assisted living facility to be located at 450 and 500 Kawana Springs Road; however, the application was withdrawn in 2018, subsequent to its inclusion in the list of projects for which trips were to be added for this analysis. Within the building, 71 suites would be provided for senior assisted care and 31 suites for senior memory care, for a total of 119 beds. Additionally, there would be ten single-bedroom apartments available to rent for employees. Based on trip generation rates, the project is expected to generate 381 new trips per day, including 28 trips during the morning peak hour and 37 trips during the evening peak hour. Inclusion of these trips results in a more conservative analysis.

Kawana Meadows Subdivision is an approved 62 single family unit and 93 multifamily unit residential development that would be located at 1162 Kawana Springs Road. Based on the use of ITE rates, the project would

be expected to generate 1,266 daily trips on average, with 89 trips during the morning peak hour and 113 trips during the evening peak hour. The approved Kawana Meadows Subdivision project will construct the eastern half of the Franz Kafka Avenue extension and will also construct improvements at the intersection of Yolanda Avenue/Petaluma Hill Road including:

- The eastern Farmers Lane leg with a through lane in each direction and a center two-way left-turn lane;
- The addition of a southbound left-turn pocket; and
- Widening of the northbound approach to include a left-turn pocket, a through lane, and a right-turn pocket; and
- Modifying the signal timing to include split phasing for the Yolanda Avenue and Farmers Lane Extension approaches.

The Farmstead is an approved multifamily residential development that would include 20 dwelling units located at 1315 Lia Lane. This project would be expected to generate 146 daily trips, with nine trips during the a.m. peak hour and eleven trips during the p.m. peak hour, per ITE rates.

Kawana Springs Apartment Homes (also known as 38 Degrees North Phase 1) is a 120-unit multifamily residential development that is currently under construction at 2604 Petaluma Hill Road. The trip generation for this project was estimated using standard ITE rates for “Multifamily Housing (Mid-Rise)” (LU #221). The estimated trip generation would include 653 daily trips on average, with 43 trips during the morning peak period and 53 trips during the evening peak period.

Green Trove Wellness Cultivation and Manufacturing is a pending 24,000 square foot cannabis cultivation and manufacturing facility that would be located at 368 Yolanda Avenue. It was determined that cannabis cultivation is most closely aligned with what would be considered a light industrial use so standard rates for “General Light Industrial” (LU #110) were applied to the project. Based on these standard rates, the project would be anticipated to generate 119 daily trips on average, with 17 trips during the morning peak period and 15 trips during the evening peak period.

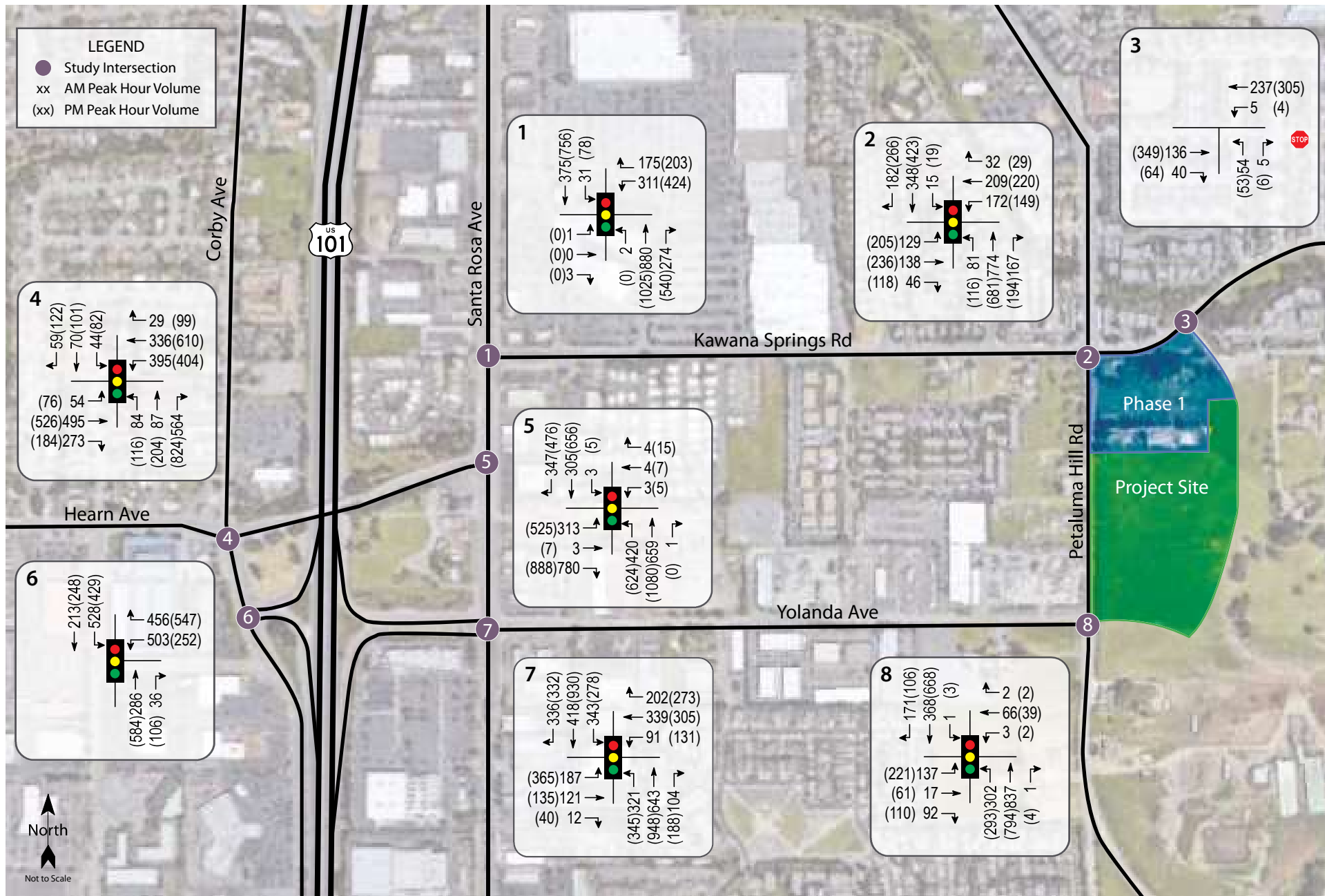
Yolanda Apartments is an approved project located at 325 Yolanda Avenue that includes the development of 252 multifamily units on a site that is currently vacant. Based on application of standard ITE rates, the project would be expected to generate 1,371 daily trips, with 91 trips during the a.m. peak hour and 111 trips during the p.m. peak hour.

In-N-Out Burger is a pending 3,867 square-foot restaurant to be located at 2532 Santa Rosa Avenue. The project would be expected to generate 2,259 daily trips, with 118 trips during the morning peak and 168 trips during the evening peak.

Santa Rosa Farms is a pending project made up of 83,600 square feet of indoor cannabis cultivation, 28,700 square feet of non-volatile manufacturing, and 4,500 square feet of warehousing to be located at 800 Yolanda Avenue. Based on trip generation rates, the project is expected to generate 579 new trips per day, including 82 trips during the morning peak hour and 74 trips during the evening peak hour.

NT Ventures Inc. is a pending Yolanda Avenue project that would include 1,500 square feet of volatile manufacturing, approximately 730 square feet of warehousing, and 444 square feet of shipping and distribution. Application of standard rates for “General Light Industrial” (LU #110) results in an estimated 13 daily trips, with 2 trips during both the morning and evening peaks.

Upon adding trips from the approved and pending projects to existing volumes, and with baseline project improvements added to the intersection configurations and controls, the study intersections are expected to operate at acceptable service levels. Baseline volumes are shown in Figure 3 and these results are summarized in Table 6.



Traffic Impact Study for the 38 Degrees North Phase 2 Project
Figure 3 – Baseline Traffic Volumes

Table 6 – Baseline Peak Hour Intersection Levels of Service

Study Intersection Approach	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. Kawana Springs Rd/Santa Rosa Ave	20.3	C	15.3	B
2. Kawana Springs Rd/Petaluma Hill Rd	24.2	C	25.3	C
3. Kawana Springs Rd/Franz Kafka Ave <i>Northbound (Franz Kafka Ave) Approach</i>	1.5 <i>11.2</i>	A <i>B</i>	1.1 <i>14.4</i>	A <i>B</i>
4. Hearn Ave/Corby Ave	34.8	C	43.2	D
5. Hearn Ave/Santa Rosa Ave	20.3	C	35.2	D
6. US 101S Ramps/Corby Ave	15.8	B	18.1	B
7. Yolanda Ave-US 101N Ramps/Santa Rosa Ave	32.2	C	35.2	D
8. Yolanda Ave/Petaluma Hill Rd	26.9	C	53.3	D

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

Future (Cumulative) Conditions

A future conditions scenario was considered for evaluation of the project's impact on the surrounding network with planned future development. The City of Santa Rosa is in the process of updating the transportation element for the General Plan, as well as their Traffic Impact Study Guidelines. Since the proposed project is consistent with the site's zoning and General Plan land use designation, its traffic would be included in volumes projected for analysis of the General Plan, so analysis of a future scenario would not be required under the policies contained in the draft traffic study guidelines. It is noted that at the discretion of the Public Works staff such a scenario could be requested, though one was not for this project.

Project Description

The proposed project includes the development of 172 apartment units and a 21,000 square-foot community shopping center with ancillary retail uses on a site that is currently vacant. The existing jurisdictional waters would split the site into two areas connected by a pedestrian bridge. The project would set aside 1.04 acres along the southwestern boundary for the future shopping center. The proposed 38 Degrees North Phase 2 project would connect to the adjacent 120-unit apartment development known as the 38 Degrees North Phase 1 project. The proposed Phase 2 development would be accessed via a total of six driveways, two of which would be constructed as part of the Phase 1 development. The Phase 2 development would widen the three-lane segment of the Farmers Lane Extension, to be constructed by the Kawana Meadows Subdivision Project, to a four-lane segment by constructing a westbound right-turn lane fronting the southern project boundary. Additionally, the Phase 2 development would widen Petaluma Hill Road to include a two-way left-turn lane and two northbound through lanes between Yolanda Avenue and Kawana Springs Road. The western half of the Franz Kafka Avenue extension fronting the eastern project boundary would also be completed as part of the project. The proposed project site plan is shown in Figure 4. Additional details regarding the proposed improvements to adjacent roads and intersections associated with the residential and commercial components of the project are provided below with the results of the analyses for each.

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. The rates for “Multi-Family Housing (Mid-Rise)” (Land Use #221) were applied to the residential units, while rates for “Supermarket” (Land Use

#850) were applied to the proposed community shopping center. Given that the 1,000 square feet of ancillary retail uses would be in the same building as the community shopping center and draw from the same clientele, the supermarket land use was applied. Further, the supermarket land use is described as a free-standing retail store which may also contain products and services such as bakeries, dry cleaning, floral arrangements, limited-service banks, pharmacies, photo centers, etc.

Internal Capture Trips

The *Trip Generation Manual* also includes data and methodologies that can be applied to determine the proportion of internal trips that may occur within a development area that includes a variety of land uses. Internal trips occur at mixed-use developments and, in the case of the proposed project, would consist of residents patronizing the adjacent community shopping center. Most of these trips would be made by walking, and the few that would be made by automobile would only travel on-site, so would not affect the adjacent street network. Based on discussions with City staff, an internal capture rate of five percent was applied to the daily trips and p.m. peak hour trips.

Total Project Trip Generation

Based on application of these assumptions, the proposed project would be expected to generate an average of 3,178 trips per day, including 142 a.m. peak hour trips and 270 trips during the p.m. peak hour. After deductions are made to reflect internal trips, the project would be expected to generate 3,019 net new trips daily, with 142 occurring during the a.m. peak hour and 257 during the p.m. peak hour. Taken individually, the proposed residences would be expected to generate an average of 936 trips daily, with 62 of these occurring during the morning peak hour and 76 during the evening peak hour. These results are summarized in Table 7.

Table 7 – Trip Generation Summary

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Supermarket	21 ksf	106.78	2,242	3.82	80	48	32	9.24	194	99	95
Multi-family Housing	172 du	5.44	936	0.36	62	16	46	0.44	76	46	30
Subtotal			3,178		142	64	78		270	145	125
Internal Capture		-5%	-159	0%	0	0	0	-5%	-13	-7	-6
Total			3,019		142	64	78		257	138	119

Note: ksf = 1,000 square feet; du = dwelling unit

Trip Distribution

Like the trips for the approved and pending projects, trips for the proposed project were allocated to the surrounding street network based on the assumptions indicated in Table 5.

Vehicle Miles Traveled

While the City has not yet adopted a policy regarding vehicle miles traveled (VMT), the project's contribution was estimated for informational purposes only. Vehicle miles traveled associated with the project were calculated by multiplying the estimated number of trips and the average trip distance for the Traffic Analysis Zone (TAZ) in which the project is located. Using the daily trips generated for 172 dwelling units (du) as determined above using the standard trip generation rate, and an average distance of 10.09 miles traveled per daily trip in the project's location as available from the Sonoma County Transportation Authority (SCTA) 2016 *Comprehensive Transportation Plan* (CTP), the estimated VMT for the residential component of the project is 9,445 vehicle miles traveled. These results are shown in Table 8.

Table 8 – VMT Summary			
Land Use	Daily Trips	Average Trip Length	Calculated Daily VMT
Multi-family Housing	936	10.09 mi	9,445

It is emphasized that VMT thresholds have not yet been established by the City of Santa Rosa; such standards are not required to be in place until July 1, 2020. However, as stated in the Proposed CEQA Guidelines Section 15064.3, Subdivision (b)(1), a document issued by the State of California Governor's Office of Planning and Research (OPR) to guide local agencies in developing their own standards, projects including residential, retail, and office space, as well as projects that are a mix of these uses, that are located within one-half mile of an existing major transit stop or an existing stop along a high-quality transit corridor will have a less-than-significant impact on VMT.

Finding – The calculated total daily VMT for the project is 9,445 miles and the project is located approximately one-half mile from Santa Rosa Avenue, a high-quality transit corridor. The project is therefore presumed to have a less-than-significant impact on vehicle miles traveled.

Intersection Operation

Existing plus Residential (plus Commercial) Conditions

The Existing conditions scenario provides an evaluation of current operation without any additional projected volumes or planned improvements; however, improvements to the roadway network are currently under construction as part of the Kawana Meadows Subdivision project. As mentioned in the Baseline Conditions summary, these improvements would include construction of the Farmers Lane leg at the intersection of Yolanda Avenue/Petaluma Hill Road. While an "Existing plus Project" conditions scenario is typically included in an operational analysis, given that both the residential and commercial components of the project would be constructed only after these bonded improvements are completed and because traffic generated by both components would use the Farmers Lane extension, traffic volumes generated by either component cannot be reasonably distributed to the intersection under its existing tee-intersection configuration. It was therefore concluded that the "Existing plus Residential" and the "Existing plus Residential plus Commercial" scenarios would not be representative of realistic conditions and they were therefore not included in the analysis.

Baseline plus Residential Conditions

The following roadway improvements would be constructed with the residential component of the project and are included in the modeling conducted for Baseline "plus Residential" and "plus Residential plus Commercial" conditions:

Farmers Lane Extension – The intersection of Yolanda Avenue/Petaluma Hill Road is the southern terminus for the Farmers Lane extension. As planned, Farmers Lane would have a four-lane cross-section and would be the east leg of the intersection. It is noted that the three-lane segment of Farmers Lane will be constructed by the

Kawana Meadows Subdivision and the residential component of the proposed Phase 2 development would widen Farmers Lane to a four-lane cross-section by constructing a westbound right-turn lane.

Franz Kafka Avenue Extension – As noted above, the Kawana Meadows Subdivision will extend Franz Kafka Avenue from Kawana Terrace south towards the Farmers Lane extension; however, it will only construct the eastern half of the extension. The residential component of the proposed Phase 2 project would construct the western half of the Franz Kafka Avenue extension.

Petaluma Hill Road – The project would include widening of Petaluma Hill Road between the Farmers Lane Extension and the Phase 1 project frontage to provide a second lane in the northbound direction. It is noted that because there would still be only one northbound lane on Petaluma Hill Road south of Yolanda Avenue, the second approach and receiving lane in the northbound direction are not reflected in the Baseline plus Residential conditions calculations.

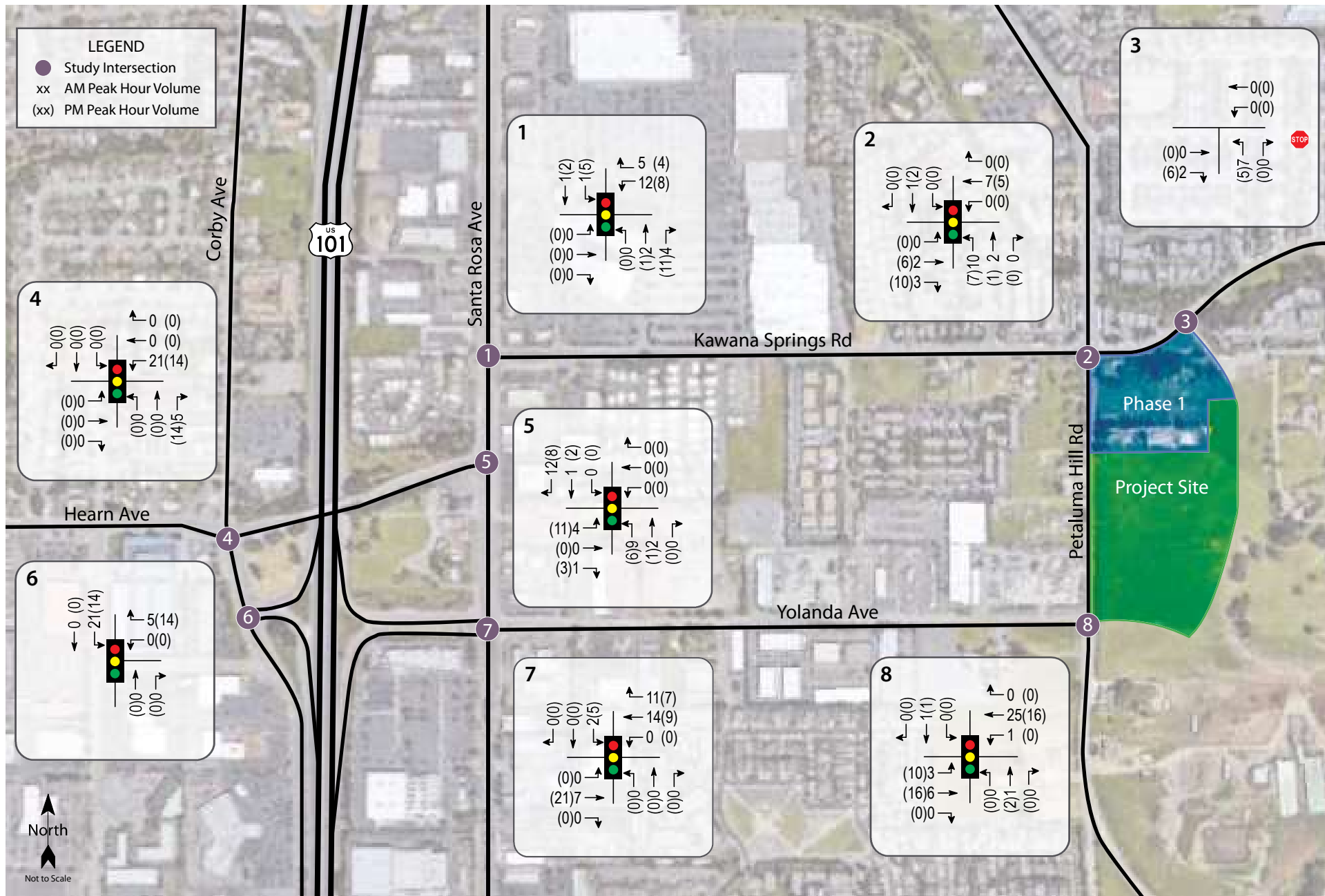
Petaluma Hill Road/Yolanda Avenue-Farmers Lane Extension – The residential component of the proposed project would construct a westbound right-turn lane. With this improvement added to the baseline improvements that are currently under construction, the four-legged intersection would have a dedicated left-turn pocket and a shared through/right-turn lane on the southbound approach, a shared left-turn/through/right-turn lane on the eastbound approach, and separate left-turn, through, and right-turn lanes in the northbound and westbound directions. To accommodate the new eastern leg (Farmers Lane), the existing traffic signal would be modified by the approved Kawana Meadows Subdivision project and would include split phasing for the Yolanda Avenue and Farmers Lane Extension approaches.

With traffic generated by the residential component of the project added to Baseline volumes, and with the residential component-related improvements and the bonded improvements to be made to the street network by the baseline projects, the study intersections are expected to operate acceptably at LOS D or better, with the exception of Yolanda Avenue-Farmers Lane/Petaluma Hill Road, which is projected to operate unacceptably at LOS E during the p.m. peak hour. These results are summarized in Table 9. Traffic volumes related to the residential portion of the project are shown in Figure 5.

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

Study Intersection <i>Approach</i>	Baseline Conditions				Baseline plus Residential			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Kawana Springs Rd/Santa Rosa Ave	20.3	C	15.3	B	20.6	C	15.5	B
2. Kawana Springs Rd/Petaluma Hill Rd	24.2	C	25.3	C	23.7	C	25.0	C
3. Kawana Springs Rd/Franz Kafka Ave <i>NB (Franz Kafka Ave) Approach</i>	1.5 <i>11.2</i>	A <i>B</i>	1.1 <i>14.4</i>	A <i>B</i>	1.6 <i>11.3</i>	A <i>B</i>	1.2 <i>14.6</i>	A <i>B</i>
4. Hearn Ave/Corby Ave	34.8	C	43.2	D	39.9	D	49.7	D
5. Hearn Ave/Santa Rosa Ave	20.3	C	35.2	D	20.4	C	35.2	D
6. US 101S Ramps/Corby Ave	15.8	B	18.1	B	16.0	B	18.3	B
7. Yolanda Ave-US 101N Ramps/Santa Rosa Ave	32.2	C	35.2	D	39.8	D	40.0	D
8. Yolanda Ave-Farmers Ln/Petaluma Hill Rd	26.9	C	53.3	D	29.6	C	60.8	E
<i>With EB Left-Turn and Protected Phasing</i>	-	-	-	-	27.4	C	40.6	D

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



Traffic Impact Study for the 38 Degrees North Phase 2 Project
Figure 5 – Residential Component Traffic Volumes

It should be noted that with the addition of residential project-related traffic volumes to Baseline conditions, average delay at the intersection of Kawana Springs Road/Petaluma Hill Road would be expected to decrease during both peak hours. 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 adds traffic predominantly to the northbound left-turn and eastbound right-turn movements, which have average delays that are lower than the average for the intersection, resulting in a slight reduction in the overall average delay. The conclusion could incorrectly be drawn that the project 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, so drivers will experience little, if any, change in conditions because of the project.

To achieve acceptable operation, an eastbound left-turn pocket should be constructed at the intersection of Yolanda Avenue-Farmers Lane/ Petaluma Hill Road and the traffic signal modified to include protected left-turn phasing for both the Yolanda Avenue and Farmers Lane extension approaches. It is noted that the City has future plans to widen Yolanda Avenue between Santa Rosa Avenue and Petaluma Hill Road to accommodate traffic from the Farmers Lane Extension. The road as planned would include two travel lanes in the eastbound direction, a center two-way left-turn lane, and one westbound lane together with six-foot wide bicycle lanes and sidewalks on both sides; however, the timing of these improvements is unknown.

Finding – Upon the addition of traffic generated by the residential component of the project to Baseline conditions, operation of the study intersection of Yolanda Avenue-Farmers Lane/ Petaluma Hill Road is expected to deteriorate to an unacceptable LOS E during the p.m. peak hour. This is a potentially significant impact.

Recommendation – To mitigate the project's impact at the intersection of Yolanda Avenue-Farmers Lane/ Petaluma Hill Road, the applicant should be responsible for constructing the eastbound left-turn lane and implementing protected left-turn phasing for the eastbound and westbound approaches to the intersection if these improvements have not already been built by others.

Baseline plus Residential plus Commercial Conditions

The commercial component of the project (to be constructed only after improvements are made by the residential component) would include the additional improvement at the intersection of Yolanda Avenue-Farmers Lane/Petaluma Hill Road of restriping to provide a second northbound through lane.

With the residential and commercial-generated traffic added to Baseline volumes, and with improvements that would be made to the street network by the baseline projects and by both components of the proposed project, all study intersections are expected to operate acceptably at LOS D or better with the exception of Yolanda Avenue-Farmers Lane/Petaluma Hill Road, which would deteriorate to unacceptable LOS F during the p.m. peak hour. Residential and commercial traffic volumes are shown in Figure 6. These results are summarized in Table 10.

Table 10 – Baseline and Baseline plus Residential plus Commercial Peak Hour Intersection Levels of Service

Study Intersection Approach	Baseline Conditions				Baseline plus Residential plus Commercial			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Kawana Springs Rd/Santa Rosa Ave	20.3	C	15.3	B	20.5	C	15.4	B
2. Kawana Springs Rd/Petaluma Hill Rd	24.2	C	25.3	C	24.2	C	25.4	C
3. Kawana Springs Rd/Franz Kafka Ave	1.5	A	1.1	A	1.6	A	1.2	A
<i>NB (Franz Kafka Ave) Approach</i>	<i>11.2</i>	<i>B</i>	<i>14.4</i>	<i>B</i>	<i>11.3</i>	<i>B</i>	<i>14.6</i>	<i>B</i>
4. Hearn Ave/Corby Ave	34.8	C	43.2	D	42.3	D	51.9	D
5. Hearn Ave/Santa Rosa Ave	20.3	C	35.2	D	20.7	C	34.2	C
6. US 101S Ramps/Corby Ave	15.8	B	18.1	B	16.0	B	18.9	B
7. Yolanda Ave-US 101N Ramps/Santa Rosa Ave	32.2	C	35.2	D	41.6	D	47.1	D
8. Yolanda Ave-Farmers Ln/Petaluma Hill Rd	26.9	C	53.3	D	31.4	C	86.8	F
<i>With EB Left-Turn and Protected Phasing</i>	-	-	-	-	25.1	C	48.5	D

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

With the addition of residential and commercial project-related traffic volumes to Baseline conditions, average delay at the intersection of Hearn Avenue/Santa Rosa Avenue would be expected to decrease during the p.m. peak hour. This can be attributed to the project adding traffic predominantly to the northbound and southbound through movements, which have average delays that are lower than the average for the intersection, resulting in a slight reduction in the overall average delay.

The intersection of Yolanda Avenue-Farmers Lane/Petaluma Hill Road would operate acceptably with the addition of improvements described above. Again, these include the addition of an eastbound left-turn pocket and modification to the traffic signal to include protected left-turn phasing for the eastbound and westbound approaches.

Finding – Upon the addition of traffic generated by the commercial project component to Baseline plus Residential conditions, and with the improvements proposed as part of the project, the study intersections would be expected to continue operating acceptably at LOS D or better during both peak periods except for Yolanda Avenue-Farmers Lane/Petaluma Hill Road, which is projected to operate at LOS F during the p.m. peak hour.

Recommendation – As described for Baseline plus Residential conditions, the applicant should be responsible for constructing an eastbound left-turn lane and coordinating with the City to implement protected left-turn phasing for the eastbound and westbound approaches to the intersection of Yolanda Avenue-Farmers Lane/Petaluma Hill Road if these improvements have not already been constructed.

Queuing

Signalized Intersection

Under each scenario, the projected 95th percentile queues for the recommended eastbound left-turn pocket to be added at Yolanda Avenue-Farmers Lane/Petaluma Hill Road were determined to identify the necessary stacking

space required under plus project conditions. The 95th percentile queue is the projected length that the queue will be at or less than 95 percent of the time. Summarized in Table 11 are the predicted queue lengths for the eastbound left-turn movement. Copies of the SIMTRAFFIC queuing projections are included in Appendix B.

Table 11 – Projected 95th Percentile Queues

Study Intersection Approach	AM Peak Hour		PM Peak Hour	
	B+R	B+R+C	B+R	B+R+C
Petaluma Hill Rd/Yolanda Ave-Farmers Ln EB Left-turn lane	79	79	75	177

Notes: All distances are measured in feet; B+R = baseline plus residential conditions; B+R+C = baseline plus residential plus commercial conditions

Finding – The maximum projected 95th percentile queue on the recommended eastbound left-turn lane at the intersection of Petaluma Hill Road/Yolanda Avenue-Farmers Lane is expected to be 79 feet (approximately three vehicles) under plus residential project component conditions and 177 feet (approximately seven vehicles) under conditions with residential and commercial component volumes added.

Recommendation – It is understood that the commercial component would be processed under a separate application at a later date. The residential component of the proposed project should therefore include construction of the eastbound left-turn lane, which should be designed to accommodate a 95th percentile queue of at least three vehicles. Should the commercial component move forward prior to completion of planned improvements to widen this section of Yolanda Avenue, it is recommended that the left-turn pocket be extended 98 feet in conjunction with the construction of the commercial phase of the project.

Pedestrian Facilities

Given that the site is located within approximately one-quarter-mile of numerous commercial land uses, it is reasonable to assume that some project residents will want to walk, bicycle, and/or use transit to reach their destinations. The proposed sidewalks that would be constructed on Petaluma Hill Road and on the Farmers Lane and Franz Kafka Avenue extensions along the project frontages would effectively connect the site to the surrounding pedestrian network on Kawana Springs Road. Additionally, the proposed pedestrian bridge would facilitate pedestrian travel within the site. In general, the pedestrian network north and northwest of the project site is well-connected and provides adequate access for pedestrians.

Finding – Upon completion of the sidewalks that are part of the proposed project, pedestrian facilities serving the project site will be adequate and will be tied into the areawide network of facilities.

Bicycle Facilities

Existing bike lanes on Petaluma Hill Road and Kawana Springs Road would be maintained with the planned project frontage improvements. These existing facilities, along with planned future bicycle facilities, provide adequate access for bicyclists. Residents of the proposed development may wish to bike to the commercial uses along Santa Rosa Avenue or recreationally along Petaluma Hill Road; therefore, the project should be responsible for installing Class II bike lanes along its frontages on both Petaluma Hill Road and the Farmers Lane Extension, as proposed.

Finding – Bicycle facilities serving the project site are generally adequate.

Recommendation – The applicant should provide Class II bike lanes along the Petaluma Hill Road and Farmers Lane Extension frontages to implement planned facilities for this roadway, as proposed.

Bicycle Storage

The project site plan indicates that 26 bicycle parking spaces would be provided, three of which are designated short-term and 23 of which are designated long-term spaces. According to the City of Santa Rosa's Municipal Code, Chapter 20.36.040, multifamily dwellings are required to provide bicycle storage at the rate of one space per four units if the units do not have a private garage or private storage space. The proposed project provides 68 private garages with sufficient storage space to accommodate bicycles. The remaining 104 units require bicycle parking, translating to a requirement of 26 total spaces which would be provided by the residential project component.

Finding – The proposed bicycle parking supply is adequate to meet the City's requirement.

Transit

Existing transit routes are adequate to accommodate project-generated transit trips. Existing stops are within a quarter-mile, which is considered an acceptable walking distance, of the site. Additionally, the project would construct a new bus stop along its frontage on Petaluma Hill Road just north of Yolanda Avenue-Farmers Lane.

Finding – Transit facilities serving the project site are adequate.

Site Access

Site Access

The proposed 38 Degrees North Phase 2 residential development would have shared access with the Phase 1 development. The Phase 1 development will construct three driveways, with one driveway on each frontage; however, the Petaluma Hill Road driveway would be restricted to emergency vehicle access only. The Phase 2 development would have one driveway on Petaluma Hill Road, one on Farmers Lane, and two on Franz Kafka Avenue. All driveways would be full access; however, it is noted that the Farmers Lane driveway would only be full access in the interim condition. Under planned buildout conditions of the Farmers Lane extension or at the direction of the City, this driveway would be converted from full access to right-turn in/out only.

Sight Distance

At driveways a substantially clear line of sight should be maintained between the driver of a vehicle waiting on the driveway and the driver of an approaching vehicle. Adequate time should be provided for the waiting vehicle to either cross, turn left, or turn right, without requiring the through traffic to radically alter their speed. Sight distances along Petaluma Hill Road and the Farmers Lane and Franz Kafka Avenue extensions were evaluated based on sight distance criteria contained in the *Highway Design Manual* published by Caltrans. The recommended sight distance for driveway approaches is based on stopping sight distance for the approach travel speeds. Additionally, the 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 the stopping sight distance criterion and the approach speed on the major street.

Based on the posted speed limit of 45 mph on Petaluma Hill Road, a stopping sight distance of 360 feet is recommended at the project driveway. Sight lines along Petaluma Hill Road from the proposed project driveway extend approximately 600 feet north to the intersection with Kawana Springs Road and 500 feet south to the intersection with Yolanda Avenue, which is sufficient to accommodate speeds of up to 55 mph. Given that the project would provide a two-way left-turn lane along Petaluma Hill Road, southbound drivers could enter the two-way left-turn lane and wait to turn left into the driveway. Stopping sight distance for following vehicles was therefore not considered given that left-turning vehicles could pull out of traffic and into the two-way left-turn lane while being visible to following drivers.

For the proposed driveways on the Farmers Lane and Franz Kafka Avenue extensions, the lines of sight were reviewed using Google Earth aeriels and the site plan provided in Figure 4. Given the 35-mph posted speed limit on Yolanda Avenue, a 35-mph speed limit was assumed for the Farmers Lane extension; therefore, a stopping sight distance of 250 feet would be required at the Farmers Lane driveway. Sight lines would be adequate, extending west to the intersection with Petaluma Hill Road and east through the intersection with Franz Kafka Avenue.

Based on the posted speed limit of 25 mph on Franz Kafka Avenue, a stopping sight distance of 150 feet is recommended at both driveways. Sight lines at the proposed northern Franz Kafka Avenue driveway are clear for 150 feet in both directions and 250 feet both directions at the southern driveway. Similarly, drivers on Franz Kafka Avenue will have visibility of a vehicle stopped to turn left into the driveways for at least 150 feet. It is noted that at the northern Franz Kafka Avenue driveway sight lines towards the critical southbound approach could be obstructed by vehicles parked along the project frontage. Parking on the north side of this driveway should therefore be prohibited by installing red curb for at least 50 feet, or about two vehicle spaces.

Finding – Stopping sight distances at and approaching the project driveways are adequate to meet the applied criteria for both entering and exiting movements.

Recommendation – Because landscaping and signs can impede clear sight lines, any new plantings or signs to be located along the street frontages should be designed to ensure that adequate sight lines will be maintained. Red curb markings should be installed to prohibit parking for at least 50 feet north of the northern Franz Kafka Avenue driveway.

Access Analysis

Left-Turn Lanes

The widening of Petaluma Hill Road, which includes the addition of a two-way left-turn lane, is a planned project improvement. It is noted that the residential project component would also construct a two-way left-turn lane on the Farmers Lane extension along the project frontage. The need for a left-turn lane on Franz Kafka Avenue at the project driveways 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.

A sensitivity analysis was performed to evaluate the need for left-turn channelization in the form of a left-turn pocket on Franz Kafka Avenue during the morning and evening peaks. Conservatively assuming that a quarter of the inbound peak hour trips would access the site via one of the Franz Kafka Avenue driveways, a left-turn lane would not be warranted for volumes of up to 750 vehicles in the opposing and advancing directions. Per the Sonoma County Model, these traffic volume thresholds far exceed projected future volumes for the year 2040; therefore, a left-turn lane is not warranted on Franz Kafka Avenue.

Site Circulation

The AutoTURN application of AutoCAD was used to evaluate the adequacy of access for emergency vehicles for both the restaurant and residential development sites. As designed, there would be no anticipated issues with fire truck access. Exhibits showing the expected travel paths are provided in Appendix C.

Finding – On-site circulation is expected to operate acceptably.

Parking

The parking for the residential component was analyzed to determine if the proposed off-street parking supply would be sufficient for the anticipated parking demand. The residential site as proposed would provide 172 covered and 98 uncovered parking spaces for a total of 270 on-site parking spaces.

The City of Santa Rosa parking supply requirements are based on the City's Municipal Code, Chapter 20-36, Parking and Loading Standards. Per the City Code, multifamily developments are required to provide parking at a rate of one-and-a-half spaces per single bedroom unit and two-and-a-half spaces for units with two or more bedrooms, with at least one covered space per unit. Based on these rates, a total of 350 spaces, with at least 172 covered spaces, would be required. As proposed, the project would experience a shortfall of 80 spaces based on the City rates. It is noted that the applicant is proposing a 22.9 percent parking reduction from the City requirement.

Because the supply as proposed does not meet the City's requirements and given that vehicle ownership patterns are changing from what was typical decades ago when these standards were developed, parking demand for the residential development was estimated using peak 85th percentile rates published for "Multifamily Housing (Mid-Rise) (ITE LU#221) by ITE in *Parking Generation*, 5th Edition, 2019. It is noted that the City has accepted use of ITE rates for other projects. These rates were developed through the collection of data at various sites and are representative of the most up-to-date parking demand observations per land use. The expected parking demand for the proposed project is 253 parking spaces, which would be satisfied by the proposed on-site parking supply.

The parking analysis is summarized in Table 12.

Table 12 – Parking Analysis			
Land Use	Units	Rate	Parking Spaces
City Required Parking			
Multifamily Dwelling – 1 Bedroom Units	80 du	1.5 space/unit with 1 covered space	80 covered, 40 uncovered
Multifamily Dwelling – 2+ Bedroom Units	92 du	2.5 space/unit with 1 covered space	92 covered, 138 uncovered
<i>City Required Parking Total</i>			350
ITE Parking Demand			
Multifamily Housing (Mid-Rise)	172 du	1.47 space/du	253
Proposed Parking Supply			
Residential			270

Notes: du = dwelling unit

Per the City's Code, visitor spaces may be on-street abutting the site, except on streets identified by the General Plan as regional streets. The extension of Franz Kafka Road is considered a transitional street in the General Plan Land Use Diagram; therefore, any on-street parking abutting the proposed project would contribute towards the total parking supply. It is recommended that parking be permitted along the Phase 2 street frontage on Franz Kafka Road for traffic calming purposes and to establish the residential character of the road. The length of the project frontage on Franz Kafka Avenue could accommodate approximately 29 additional vehicle parking spaces, bringing the total parking supply from 270 to 299 spaces, including both on- and off-site parking. This increased supply would be deficient by 51 spaces to meet the City requirement.

Because the proposed parking supply, with and without on-street parking, is less than that required by the City, consideration was given to the residential use of alternative modes. The proposed project is within walking

distance of two bus stops and within a half-mile of Santa Rosa Marketplace. Additionally, there are bicycle facilities that connect the site to nearby destinations and to the greater surrounding network. These Transportation Demand Management techniques can all be expected to contribute to lower vehicle ownership by residents of the proposed project.

Finding – The proposed parking supply for the project would not meet the City requirement; however, it would be sufficient to accommodate the anticipated parking demand based on ITE rates for the proposed land use. Additionally, based on the abundance of access via alternative modes, including walking, biking, and transit, it is anticipated that the parking needs of this project can be met by the on-site supply.

Recommendation – The applicant should provide on-street parking spaces along the project frontage on Franz Kafka Avenue.

Conclusions and Recommendations

Conclusions for the Residential Component

- The residential component alone would generate 936 trips daily on average, with 62 of these during the a.m. peak hour and 76 during the p.m. peak hour.
- Under Existing and Baseline conditions, the study intersections operate or are expected to operate acceptably at LOS D or better during both peak periods.
- With the addition of traffic generated by only the residential component of the project, the study intersections would be expected to continue operating acceptably, with the exception of Yolanda Avenue-Farmers Lane/Petaluma Hill Road which would operate unacceptably at LOS E during the p.m. peak hour.
- Access for pedestrians and transit riders is generally adequate and would be improved with the proposed frontage improvements.
- Access for bicyclists and the proposed on-site bicycle parking supply are adequate.
- Sight distances at the project driveways are adequate.
- Fire truck access and circulation is expected to operate acceptably for the proposed residential development layout.
- Based on ITE's parking demand, the proposed vehicle parking supply is expected to be adequate.

Recommendations for the Residential Component

- The residential component of the project should provide improvements to the intersection of Yolanda Avenue/Petaluma Hill Road as proposed and as listed below:
 - Widen Petaluma Hill Road between the Farmers Lane Extension and the Phase 1 project frontage to provide a second lane in the northbound direction.
 - Construct a westbound right-turn lane.
- To mitigate the project's potentially significant impact at Yolanda Avenue-Farmers Lane/Petaluma Hill Road, the project should include construction of a left-turn pocket on the eastbound approach with stacking for three vehicles and implementation of the associated signal phasing modifications to the intersection if these improvements have not already been built by the City or others.
- As the residential component of the project would include widening Petaluma Hill Road between Yolanda Avenue and the Phase 1 project frontage to provide two northbound lanes, the off-site improvements made as part of the residential component should also include restriping the northbound approach at Yolanda Avenue/Petaluma Hill Road to include a left-turn pocket, two through lanes, a right-turn pocket and a bike lane, as proposed.
- Improvements along the frontage should be constructed to complete the Class II bike lanes on Petaluma Hill Boulevard and the Farmers Lane extension, as proposed.
- Landscaping should be maintained such that tree canopies are at least seven feet above the ground. Low-lying vegetation should no greater than three feet in height. Any signs or monuments planned along the project's frontage should not obstruct sight distance at the project driveway.

- On-street parking should be provided along the project frontage on Franz Kafka Avenue; however, red curb markings should be installed 50 feet immediately north of the northern Franz Kafka Avenue driveway.
- The two-way left-turn lane on Petaluma Hill Road along the project frontage should be installed, as proposed.

Conclusions for Residential plus Commercial Components

- The proposed residential and commercial components of the project are expected to generate an average of 3,019 net new trips per day, including 142 a.m. peak hour trips and 257 trips during the p.m. peak hour.
- With the addition of traffic from the commercial project component to Baseline plus Residential volumes, and with improvements made to the street network by the baseline projects and proposed as part of both project components, the study intersections would be expected to operate acceptably at LOS D or better during both peak hours with the exception of Yolanda Avenue-Farmers Lane/Petaluma Hill Road, which would deteriorate to unacceptable LOS F operation.

Recommendations for Residential plus Commercial Components

- While the required mitigation for the residential component of the proposed project consists of improvements that include widening the Yolanda Avenue approach to include an eastbound left-turn pocket and implementing protected left-turn phasing for the eastbound and westbound approaches, if the left-turn pocket has not already been extended to provide stacking for seven vehicles by the City or other applicants prior to construction of the commercial component, this improvement would be required at that time.

Study Participants and References

Study Participants

Principal in Charge	Dalene J. Whitlock, PE, PTOE
Assistant Engineer	Kevin Rangel, EIT
Graphics	Katia Wolfe
Editing/Formatting	Alex Scrobonia
Quality Control	Dalene J. Whitlock, PE, PTOE



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Communications

Nicholson, Amy "Re: 38* North Phase 2 Traffic Scope Comments." Message to Dalene Whitlock regarding scope of work, study area and periods. October 9, 2018. Email.
Nicholson, Amy "FW: 38* North – Pre Application Meeting." Message to Dalene Whitlock and Kevin Rangel regarding baseline projects. October 10, 2018. Email.
Adams, Nancy "Re: 38* North – Pre Application Meeting." Message to Amy Nicholson regarding application of internal capture rate. October 18, 2018. Email.
Adams, Nancy. Phone call regarding the City's Public Facilities Fee and mitigation measures. September 25, 2019. Phone call.

SRO460

Appendix A

Collision Rate Calculations



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Intersection Collision Rate Calculations

Yolanda Apartments TIS

Intersection # 1: Kawana Springs Road & Santa Rosa Avenue

Date of Count: Thursday, September 20, 2018

Number of Collisions: 14

Number of Injuries: 6

Number of Fatalities: 0

ADT: 28700

Start Date: June 1, 2013

End Date: May 31, 2018

Number of Years: 5

Intersection Type: Four-Legged

Control Type: Signals

Area: Urban

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

$$\text{collision rate} = \frac{14}{28,700} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.27 c/mve	0.0%	42.9%
Statewide Average*	0.27 c/mve	0.4%	41.9%

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: Kawana Springs Road & Petaluma Hill Road

Date of Count: Thursday, September 20, 2018

Number of Collisions: 17

Number of Injuries: 10

Number of Fatalities: 0

ADT: 25600

Start Date: June 1, 2013

End Date: May 31, 2018

Number of Years: 5

Intersection Type: Four-Legged

Control Type: Signals

Area: Urban

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

$$\text{collision rate} = \frac{17}{25,600} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.36 c/mve	0.0%	58.8%
Statewide Average*	0.27 c/mve	0.4%	41.9%

ADT = average daily total vehicles entering intersection

c/mve = collisions per million vehicles entering intersection

* 2013 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Calculations

Yolanda Apartments TIS

Intersection # 3: Kawana Springs Road & Franz Kafka Avenue

Date of Count: Tuesday, June 27, 2017

Number of Collisions: 2

Number of Injuries: 1

Number of Fatalities: 0

ADT: 7600

Start Date: June 1, 2013

End Date: May 31, 2018

Number of Years: 5

Intersection Type: Tee

Control Type: Stop & Yield Controls

Area: Urban

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

$$\text{collision rate} = \frac{2}{7,600} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.14 c/mve	0.0%	50.0%
Statewide Average*	0.18 c/mve	0.7%	36.4%

ADT = average daily total vehicles entering intersection

c/mve = collisions per million vehicles entering intersection

* 2013 Collision Data on California State Highways, Caltrans

Intersection # 4: Hearn Avenue & Corby Avenue

Date of Count: Thursday, June 21, 2018

Number of Collisions: 29

Number of Injuries: 14

Number of Fatalities: 0

ADT: 31300

Start Date: June 1, 2013

End Date: May 31, 2018

Number of Years: 5

Intersection Type: Four-Legged

Control Type: Signals

Area: Urban

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

$$\text{collision rate} = \frac{29}{31,300} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.51 c/mve	0.0%	48.3%
Statewide Average*	0.27 c/mve	0.4%	41.9%

ADT = average daily total vehicles entering intersection

c/mve = collisions per million vehicles entering intersection

* 2013 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Calculations

Yolanda Apartments TIS

Intersection # 5: Hearn Avenue & Santa Rosa Avenue

Date of Count: Thursday, June 21, 2018

Number of Collisions: 19

Number of Injuries: 11

Number of Fatalities: 0

ADT: 39700

Start Date: June 1, 2013

End Date: May 31, 2018

Number of Years: 5

Intersection Type: Four-Legged

Control Type: Signals

Area: Urban

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

$$\text{collision rate} = \frac{19}{39,700} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.26 c/mve	0.0%	57.9%
Statewide Average*	0.27 c/mve	0.4%	41.9%

ADT = average daily total vehicles entering intersection

c/mve = collisions per million vehicles entering intersection

* 2013 Collision Data on California State Highways, Caltrans

Intersection # 6: US 101 South Ramps & Corby Avenue

Date of Count: Thursday, June 21, 2018

Number of Collisions: 4

Number of Injuries: 3

Number of Fatalities: 0

ADT: 19400

Start Date: June 1, 2013

End Date: May 31, 2018

Number of Years: 5

Intersection Type: Tee

Control Type: Signals

Area: Urban

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

$$\text{collision rate} = \frac{4}{19,400} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.11 c/mve	0.0%	75.0%
Statewide Average*	0.21 c/mve	0.3%	42.4%

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 Calculations

Yolanda Apartments TIS

Intersection # 7: Yolanda Avenue - US 101 N & Santa Rosa Avenue

Date of Count: Thursday, June 21, 2018

Number of Collisions: 27

Number of Injuries: 15

Number of Fatalities: 0

ADT: 38600

Start Date: June 1, 2013

End Date: May 31, 2018

Number of Years: 5

Intersection Type: Four-Legged

Control Type: Signals

Area: Urban

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

$$\text{collision rate} = \frac{27}{38,600} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.38 c/mve	0.0%	55.6%
Statewide Average*	0.27 c/mve	0.4%	41.9%

ADT = average daily total vehicles entering intersection

c/mve = collisions per million vehicles entering intersection

* 2013 Collision Data on California State Highways, Caltrans

Intersection # 8: Yolanda Avenue & Petaluma Hill Road

Date of Count: Tuesday, March 14, 2017

Number of Collisions: 10

Number of Injuries: 6

Number of Fatalities: 0

ADT: 21600

Start Date: June 1, 2013

End Date: May 31, 2018

Number of Years: 5

Intersection Type: Tee

Control Type: Signals

Area: Suburban

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

$$\text{collision rate} = \frac{10}{21,600} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.25 c/mve	0.0%	60.0%
Statewide Average*	0.27 c/mve	0.6%	37.3%

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 and Queuing Report



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HCM 2010 Signalized Intersection Summary
1: Santa Rosa Ave & Kawana Springs Rd

08/14/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	1	0	3	311	0	175	2	880	274	31	375	0
Future Volume (veh/h)	1	0	3	311	0	175	2	880	274	31	375	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	15	0	3	0	18	3	4	9	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	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	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	1	0	2	311	0	107	2	880	154	31	375	0
Adj No. of Lanes	0	1	0	2	0	1	1	2	1	1	3	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	0
Cap, veh/h	2	0	4	588	0	294	5	2263	1254	65	3494	0
Arrive On Green	0.00	0.00	0.00	0.15	0.00	0.15	0.00	0.44	0.44	0.03	0.69	0.00
Sat Flow, veh/h	535	0	1070	3548	0	1553	1774	3539	1542	1774	5253	0
Grp Volume(v), veh/h	3	0	0	311	0	107	2	880	154	31	375	0
Grp Sat Flow(s), veh/h/ln	1605	0	0	1774	0	1553	1774	1770	1542	1774	1695	0
Q Serve(g_s), s	0.2	0.0	0.0	7.3	0.0	5.4	0.1	15.1	3.0	1.6	2.2	0.0
Cycle Q Clear(g_c), s	0.2	0.0	0.0	7.3	0.0	5.4	0.1	15.1	3.0	1.6	2.2	0.0
Prop In Lane	0.33		0.67	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	6	0	0	588	0	294	5	2263	1254	65	3494	0
V/C Ratio(X)	0.47	0.00	0.00	0.53	0.00	0.36	0.42	0.39	0.12	0.47	0.11	0.00
Avail Cap(c_a), veh/h	125	0	0	1029	0	498	138	2319	1255	126	3504	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.98	0.98	0.98	1.00	1.00	0.00
Uniform Delay (d), s/veh	44.7	0.0	0.0	35.0	0.0	32.1	44.8	14.5	3.2	42.9	4.9	0.0
Incr Delay (d2), s/veh	18.2	0.0	0.0	1.6	0.0	1.6	19.5	0.5	0.2	5.2	0.1	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	10.0	0.0	1.2	0.0	0.7	0.0	51.1	0.1	0.0
%ile BackOfQ(50%), veh/ln	0.1	0.0	0.0	5.3	0.0	2.9	0.1	8.9	2.7	2.2	1.4	0.0
LnGrp Delay(d), s/veh	62.9	0.0	0.0	46.6	0.0	34.9	64.4	15.7	3.4	99.3	5.0	0.0
LnGrp LOS	E			D		C	E	B	A	F	A	
Approach Vol, veh/h	3				418			1036			406	
Approach Delay, s/veh	62.9				43.6			14.0			12.2	
Approach LOS	E				D			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2	3	4			6	7	8				
Phs Duration (G+Y+Rc), s	3.4	3.2	65.6			17.8	6.3	62.6				
Change Period (Y+Rc), s	3.0	3.0	3.6			3.9	3.6	3.6				
Max Green Setting (Gmax), s	7.0	7.0	36.4			26.1	6.4	36.4				
Max Q Clear Time (g_c+1), s	2.2	2.1	4.2			9.3	3.6	17.1				
Green Ext Time (p_c), s	0.0	0.0	2.6			2.9	0.0	6.5				
Intersection Summary												
HCM 2010 Ctrl Delay			20.3									
HCM 2010 LOS			C									
Notes												

38° North Phase II TIS
AM Baseline

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
2: Petaluma Hill Rd & Kawana Springs Rd

08/14/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	129	138	46	172	209	32	81	774	167	15	348	182
Future Volume (veh/h)	129	138	46	172	209	32	81	774	167	15	348	182
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	12	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	129	138	6	172	209	21	81	774	140	15	348	110
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	414	527	519	495	498	50	429	1441	261	285	844	807
Arrive On Green	0.07	0.28	0.28	0.09	0.30	0.30	0.05	0.48	0.48	0.02	0.45	0.45
Sat Flow, veh/h	1774	1863	1557	1774	1663	167	1774	2984	540	1774	1863	1544
Grp Volume(v), veh/h	129	138	6	172	0	230	81	459	455	15	348	110
Grp Sat Flow(s), veh/h/ln	1863	1557	1774	0	1830	1774	1770	1754	1774	1863	1544	
Q Serve(g_s), s	5.6	6.3	0.3	7.4	0.0	11.1	2.5	19.9	19.9	0.5	13.8	4.0
Cycle Q Clear(g_c), s	5.6	6.3	0.3	7.4	0.0	11.1	2.5	19.9	19.9	0.5	13.8	4.0
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.31	1.00		1.00
Lane Grp Cap(c), veh/h	414	527	519	495	0	548	429	854	847	285	844	807
V/C Ratio(X)	0.31	0.26	0.01	0.35	0.00	0.42	0.19	0.54	0.54	0.05	0.41	0.14
Avail Cap(c_a), veh/h	486	527	519	538	0	548	563	854	847	443	844	807
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.4	30.6	24.6	24.0	0.0	30.8	15.5	19.9	19.9	16.7	21.2	13.6
Incr Delay (d2), s/veh	0.2	1.2	0.0	0.2	0.0	2.3	0.1	2.4	2.4	0.0	1.5	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0
%ile BackOfQ(50%), veh/ln	2.7	3.4	0.1	3.6	0.0	6.0	1.2	10.3	10.2	0.2	9.8	1.8
LnGrp Delay(d), s/veh	25.6	31.8	24.6	24.1	0.0	33.2	15.6	22.3	22.3	16.7	25.2	13.9
LnGrp LOS	C	C	C	C		C	B	C	C	B	C	B
Approach Vol, veh/h	273				402			995			473	
Approach Delay, s/veh	28.7				29.3			21.7			22.3	
Approach LOS	C				C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	35.0	8.5	54.1	10.5	36.9	5.2	57.4					
Change Period (Y+Rc), s	3.0	3.9	3.0	* 4.3	3.0	3.9	3.0	4.3				
Max Green Setting (Gmax), s	31.1	12.0	* 41	12.0	31.1	12.0	40.7					
Max Q Clear Time (g_c+1), s	8.3	4.5	15.8	7.6	13.1	2.5	21.9					
Green Ext Time (p_c), s	0.1	0.7	0.0	1.5	0.1	1.2	0.0	3.9				
Intersection Summary												
HCM 2010 Ctrl Delay			24.2									
HCM 2010 LOS			C									
Notes												

38° North Phase II TIS
AM Baseline

Synchro 10 Report
W-Trans

HCM 2010 TWSC
3: Franz Kafka Ave & Kawana Springs Rd

08/14/2019

Intersection						
Int Delay, s/veh	1.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑		↑	↑	
Traffic Vol, veh/h	136	40	5	237	54	5
Future Vol, veh/h	136	40	5	237	54	5
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	80	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	136	40	5	237	54	5
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	176	0	383	137
Stage 1	-	-	-	-	136	-
Stage 2	-	-	-	-	247	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1400	-	620	911
Stage 1	-	-	-	-	890	-
Stage 2	-	-	-	-	794	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1400	-	618	910
Mov Cap-2 Maneuver	-	-	-	-	618	-
Stage 1	-	-	-	-	886	-
Stage 2	-	-	-	-	794	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0.2		11.2		
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	635	-	-	1400	-	
HCM Lane V/C Ratio	0.093	-	-	0.004	-	
HCM Control Delay (s)	11.2	-	-	7.6	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.3	-	-	0	-	

38* North Phase II TIS
AM Baseline

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HCM 2010 Signalized Intersection Summary
4: Corby Avenue & Hearn Avenue

08/14/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	495	273	395	336	29	84	87	564	44	70	59
Future Volume (veh/h)	54	495	273	395	336	29	84	87	564	44	70	59
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	3	0	2	1	0	1	0	2	0	2	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99	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	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	54	495	263	395	336	28	84	87	518	44	70	59
Adj No. of Lanes	1	1	1	1	2	0	1	1	1	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	78	652	544	435	1818	150	319	475	785	72	117	79
Arrive On Green	0.04	0.35	0.35	0.25	0.55	0.55	0.19	0.25	0.25	0.04	0.10	0.10
Sat Flow, veh/h	1774	1863	1554	1774	3304	274	1774	1863	1563	1774	931	785
Grp Volume(v), veh/h	54	495	263	395	179	185	84	87	518	44	0	129
Grp Sat Flow(s),veh/h/ln	1774	1863	1554	1774	1770	1808	1774	1863	1563	1774	0	1716
Q Serve(g_s), s	3.3	25.9	9.0	23.8	5.6	5.6	4.4	4.0	27.4	2.7	0.0	8.0
Cycle Q Clear(g_c), s	3.3	25.9	9.0	23.8	5.6	5.6	4.4	4.0	27.4	2.7	0.0	8.0
Prop In Lane	1.00		1.00	1.00		0.15	1.00		1.00	1.00		0.46
Lane Grp Cap(c), veh/h	78	652	544	435	974	995	319	475	785	72	0	183
V/C Ratio(X)	0.69	0.76	0.48	0.91	0.18	0.19	0.26	0.18	0.66	0.62	0.00	0.71
Avail Cap(c_a), veh/h	129	650	542	435	974	994	338	471	784	145	0	452
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.95	0.95	0.95	0.92	0.92	0.92	1.00	0.00	1.00
Uniform Delay (d), s/veh	51.8	32.0	11.3	40.5	12.4	12.4	39.0	32.0	20.8	51.9	0.0	47.7
Incr Delay (d2), s/veh	4.0	8.1	3.1	24.3	0.4	0.4	0.1	0.1	1.5	3.2	0.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.6	0.0	1.6	0.0	0.0	0.1	0.0	0.1	0.0	0.0	2.9
%ile BackOfQ(50%),veh/ln	1.7	15.4	4.4	15.1	2.9	3.0	2.3	2.1	12.4	1.4	0.0	4.3
LnGrp Delay(d),s/veh	55.8	40.7	14.4	66.4	12.8	12.8	39.2	32.1	22.5	55.1	0.0	52.5
LnGrp LOS	E	D	B	E	B	B	D	C	C	E		D
Approach Vol, veh/h	812				759				689			
Approach Delay, s/veh	33.2				40.7				25.7			
Approach LOS	C				D				C			
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	30.0	41.6	24.2	14.3	7.8	63.7	7.4	31.0				
Change Period (Y+Rc), s	3.0	3.2	3.2	* 3	3.0	3.2	3.0	3.2				
Max Green Setting (Gmax), s	27.0	33.8	8.0	* 29	8.0	52.8	9.0	27.8				
Max Q Clear Time (g_c+I1), s	25.8	27.9	6.4	10.0	5.3	7.6	4.7	29.4				
Green Ext Time (p_c), s	0.2	3.3	0.0	0.4	0.0	2.3	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay	34.8											
HCM 2010 LOS	C											
Notes												

38* North Phase II TIS
AM Baseline

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HCM 2010 Signalized Intersection Summary
5: Santa Rosa Avenue & Hearn Avenue/Private Driveway

08/14/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↱	↱	↰	↱	↱	↰	↱	↱
Traffic Volume (veh/h)	313	3	780	3	4	4	420	659	1	3	305	347
Future Volume (veh/h)	313	3	780	3	4	4	420	659	1	3	305	347
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	1	1	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	315	0	626	3	4	3	420	659	1	3	305	344
Adj No. of Lanes	2	0	1	0	1	0	2	3	0	1	2	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1057	0	855	6	9	6	841	2839	4	7	1050	933
Arrive On Green	0.30	0.00	0.30	0.01	0.01	0.01	0.24	0.54	0.54	0.00	0.10	0.10
Sat Flow, veh/h	3548	0	1571	523	698	523	3442	5243	8	1774	3539	1554
Grp Volume(v), veh/h	315	0	626	10	0	0	420	426	234	3	305	344
Grp Sat Flow(s), veh/h/ln	1774	0	1571	1744	0	0	1721	1695	1861	1774	1770	1554
Q Serve(g_s), s	6.2	0.0	5.0	0.5	0.0	0.0	9.5	5.9	5.9	0.2	7.2	11.2
Cycle Q Clear(g_c), s	6.2	0.0	5.0	0.5	0.0	0.0	9.5	5.9	5.9	0.2	7.2	11.2
Prop In Lane	1.00		1.00	0.30		0.30	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	1057	0	855	21	0	0	841	1836	1008	7	1050	933
V/C Ratio(X)	0.30	0.00	0.73	0.47	0.00	0.00	0.50	0.23	0.23	0.42	0.29	0.37
Avail Cap(c_a), veh/h	1057	0	855	116	0	0	841	1836	1008	114	1050	933
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	0.33
Upstream Filter(I)	0.63	0.00	0.63	1.00	0.00	0.00	0.86	0.86	0.86	0.98	0.98	0.98
Uniform Delay (d), s/veh	24.4	0.0	15.7	44.2	0.0	0.0	29.3	10.8	10.8	44.8	31.8	12.4
Incr Delay (d2), s/veh	0.5	0.0	3.5	5.8	0.0	0.0	0.4	0.3	0.5	13.8	0.1	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	8.1	0.0	3.0	0.3	0.0	0.0	4.5	2.8	3.2	0.1	3.6	8.4
LnGrp Delay(d), s/veh	24.8	0.0	19.2	49.9	0.0	0.0	29.7	11.1	11.3	58.6	31.9	12.6
LnGrp LOS	C		B	D			C	B	B	E	C	B
Approach Vol, veh/h	941				10		1080			652		
Approach Delay, s/veh	21.1				49.9		18.3			21.9		
Approach LOS	C				D		B			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2	3	4			6	7	8				
Phs Duration (G+Y+Rc), s	30.0	25.6	30.3			4.1	3.6	52.3				
Change Period (Y+Rc), s	3.2	3.6	* 3.6			3.0	3.2	3.6				
Max Green Setting (Gmax), s	26.8	21.8	* 22			6.0	5.8	38.4				
Max Q Clear Time (g_c+I1), s	8.2	11.5	13.2			2.5	2.2	7.9				
Green Ext Time (p_c), s	3.6	1.1	2.3			0.0	0.0	4.7				
Intersection Summary												
HCM 2010 Ctrl Delay				20.3								
HCM 2010 LOS				C								
Notes												

38° North Phase II TIS
AM Baseline

Synchro 10 Report
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HCM 2010 Signalized Intersection Summary
6: Corby Avenue & US 101 SB Ramps

08/14/2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	503	456	286	36	528	213		
Future Volume (veh/h)	503	456	286	36	528	213		
Number	7	14	6	16	5	2		
Initial Q (Qb), veh	1	1	1	0	0	1		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.98	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	503	447	286	36	528	213		
Adj No. of Lanes	1	1	2	1	2	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	631	924	683	299	809	425		
Arrive On Green	0.36	0.36	0.19	0.19	0.23	0.23		
Sat Flow, veh/h	1774	1583	3632	1546	3548	1863		
Grp Volume(v), veh/h	503	447	286	36	528	213		
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1546	1774	1863		
Q Serve(g_s), s	13.1	8.4	3.6	1.0	6.9	5.1		
Cycle Q Clear(g_c), s	13.1	8.4	3.6	1.0	6.9	5.1		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	631	924	683	299	809	425		
V/C Ratio(X)	0.80	0.48	0.42	0.12	0.65	0.50		
Avail Cap(c_a), veh/h	1071	1316	1516	662	1520	798		
HCM Platoon Ratio	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		
Uniform Delay (d), s/veh	15.3	6.3	18.3	17.2	18.2	17.5		
Incr Delay (d2), s/veh	2.4	0.4	0.4	0.2	0.9	0.9		
Initial Q Delay(d3),s/veh	0.1	0.0	0.0	0.0	0.0	0.1		
%ile BackOfQ(50%),veh/ln	7.0	5.8	1.9	0.4	3.5	2.9		
LnGrp Delay(d),s/veh	17.7	6.7	18.7	17.4	19.1	18.5		
LnGrp LOS	B	A	B	B	B	B		
Approach Vol, veh/h	950		322		741			
Approach Delay, s/veh	12.5		18.6		18.9			
Approach LOS	B		B		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		15.7		21.8		13.9		
Change Period (Y+Rc), s		4.0		3.5		4.0		
Max Green Setting (Gmax), s		22.0		31.0		22.0		
Max Q Clear Time (g_c+I1), s		8.9		15.1		5.6		
Green Ext Time (p_c), s		2.8		3.2		1.7		
Intersection Summary								
HCM 2010 Ctrl Delay			15.8					
HCM 2010 LOS			B					
Notes								

38° North Phase II TIS
AM Baseline

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
7: Santa Rosa Avenue & US 101 NB Ramps/Yolanda Ave

08/14/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 		 	 		 	 	 	 	 	 	
Traffic Volume (veh/h)	187	121	12	91	339	202	321	643	104	343	418	336
Future Volume (veh/h)	187	121	12	91	339	202	321	643	104	343	418	336
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	2	2	0	1	1	1	0	1	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	187	121	11	91	339	191	321	643	104	343	418	299
Adj No. of Lanes	2	1	1	1	1	1	2	2	1	2	2	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	257	166	141	361	403	340	390	1530	663	424	1577	808
Arrive On Green	0.07	0.09	0.09	0.20	0.21	0.21	0.11	0.43	0.43	0.12	0.45	0.45
Sat Flow, veh/h	3442	1863	1583	1774	1863	1583	3442	3539	1535	3442	3539	1553
Grp Volume(v), veh/h	187	121	11	91	339	191	321	643	104	343	418	299
Grp Sat Flow(s),veh/h/ln	1721	1863	1583	1774	1863	1583	1721	1770	1535	1721	1770	1553
Q Serve(g_s), s	5.3	6.3	0.5	4.3	17.5	8.0	9.1	12.6	4.1	9.7	7.4	11.4
Cycle Q Clear(g_c), s	5.3	6.3	0.5	4.3	17.5	8.0	9.1	12.6	4.1	9.7	7.4	11.4
Prop In Lane	1.00			1.00	1.00		1.00	1.00		1.00		1.00
Lane Grp Cap(c), veh/h	257	166	141	361	403	340	390	1530	663	424	1577	808
V/C Ratio(X)	0.73	0.73	0.08	0.25	0.84	0.56	0.82	0.42	0.16	0.81	0.27	0.37
Avail Cap(c_a), veh/h	385	596	507	358	540	459	427	1534	665	564	1578	811
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.62	0.62	0.62	1.00	1.00	1.00	0.76	0.76	0.76
Uniform Delay (d), s/veh	45.3	44.4	26.5	33.6	37.7	19.4	43.4	19.7	17.4	42.7	17.5	14.3
Incr Delay (d2), s/veh	3.9	6.0	0.2	0.2	5.7	0.9	11.5	0.8	0.5	5.0	0.3	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.3	1.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.2	3.5	0.2	2.4	9.9	3.6	5.0	6.4	2.0	4.9	3.7	5.1
LnGrp Delay(d),s/veh	49.2	50.3	26.7	34.1	44.5	20.3	55.2	20.6	17.9	47.6	17.8	15.3
LnGrp LOS	D	D	C	C	D	C	E	C	B	D	B	B
Approach Vol, veh/h	319			621			1068			1060		
Approach Delay, s/veh	48.8			35.5			30.7			26.8		
Approach LOS	D			D			C			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	24.1	12.5	14.9	48.5	11.4	25.2	16.2	47.2				
Change Period (Y+Rc), s	3.9	3.6	3.6	3.9	3.9	* 3.9	3.9	* 3.9				
Max Green Setting (Gmax), s	32.0	12.4	32.4	11.2	* 29	16.4	* 28					
Max Q Clear Time (g_c+1), s	8.3	8.3	11.1	13.4	7.3	19.5	11.7	14.6				
Green Ext Time (p_c), s	0.0	0.6	0.2	3.7	0.2	1.8	0.5	4.0				
Intersection Summary												
HCM 2010 Ctrl Delay	32.2											
HCM 2010 LOS	C											
Notes												

38° North Phase II TIS
AM Baseline

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
8: Petaluma Hill Rd & Yolanda Ave

08/14/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	137	17	92	3	66	2	302	837	1	1	368	171
Future Volume (veh/h)	137	17	92	3	66	2	302	837	1	1	368	171
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	1	0	0	0	0	0	0	0	0	0	5	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	137	17	53	3	66	2	302	837	1	1	368	146
Adj No. of Lanes	0	1	0	1	1	0	1	1	1	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	176	19	61	97	98	3	353	973	827	3	453	161
Arrive On Green	0.15	0.15	0.15	0.06	0.06	0.06	0.20	0.52	0.52	0.00	0.34	0.34
Sat Flow, veh/h	1143	142	442	1774	1799	55	1774	1863	1583	1774	1261	500
Grp Volume(v), veh/h	207	0	0	3	0	68	302	837	1	1	0	514
Grp Sat Flow(s),veh/h/ln	1728	0	0	1774	0	1853	1774	1863	1583	1774	0	1761
Q Serve(g_s), s	7.7	0.0	0.0	0.1	0.0	2.4	10.8	26.0	0.0	0.0	0.0	17.9
Cycle Q Clear(g_c), s	7.7	0.0	0.0	0.1	0.0	2.4	10.8	26.0	0.0	0.0	0.0	17.9
Prop In Lane	0.66		0.26	1.00		0.03	1.00		1.00	1.00		0.28
Lane Grp Cap(c), veh/h	256	0	0	97	0	101	353	973	827	3	0	614
V/C Ratio(X)	0.81	0.00	0.00	0.03	0.00	0.67	0.85	0.86	0.00	0.38	0.00	0.84
Avail Cap(c_a), veh/h	337	0	0	484	0	505	484	1289	1096	134	0	912
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.0	0.0	0.0	30.3	0.0	31.4	26.2	14.0	7.7	33.7	0.0	20.6
Incr Delay (d2), s/veh	10.4	0.0	0.0	0.1	0.0	7.4	10.6	4.8	0.0	70.2	0.0	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9
%ile BackOfQ(50%),veh/ln	4.6	0.0	0.0	0.1	0.0	1.4	6.5	14.7	0.0	0.1	0.0	10.7
LnGrp Delay(d),s/veh	38.4	0.0	0.0	30.4	0.0	38.8	36.8	18.7	7.7	103.9	0.0	28.1
LnGrp LOS	D			C		D	D	B	A	F		C
Approach Vol, veh/h	207			71			1140			515		
Approach Delay, s/veh	38.4			38.5			23.5			28.2		
Approach LOS	D			D			C			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		13.4	16.2	28.4		8.1	4.6	40.0				
Change Period (Y+Rc), s		3.6	3.0	5.8		4.5	4.5	5.8				
Max Green Setting (Gmax), s		12.9	18.0	34.2		18.0	5.0	45.7				
Max Q Clear Time (g_c+1), s		9.7	12.8	19.9		4.4	2.0	28.0				
Green Ext Time (p_c), s		0.3	0.4	2.6		0.2	0.0	5.3				
Intersection Summary												
HCM 2010 Ctrl Delay	26.9											
HCM 2010 LOS	C											

38° North Phase II TIS
AM Baseline

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
1: Santa Rosa Ave & Kawana Springs Rd

08/14/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	0	0	0	424	0	203	0	1025	540	87	756	0
Future Volume (veh/h)	0	0	0	424	0	203	0	1025	540	87	756	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	15	0	3	0	8	3	4	9	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.96	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	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	0	0	0	424	0	88	0	1025	328	87	756	0
Adj No. of Lanes	0	1	0	2	0	1	1	2	1	1	3	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	0
Cap, veh/h	0	2	0	634	0	364	1	2384	1300	121	3910	0
Arrive On Green	0.00	0.00	0.00	0.17	0.00	0.17	0.00	1.00	1.00	0.06	0.77	0.00
Sat Flow, veh/h	0	1863	0	3548	0	1561	1774	3539	1526	1774	5253	0
Grp Volume(v), veh/h	0	0	0	424	0	88	0	1025	328	87	756	0
Grp Sat Flow(s),veh/h/ln	0	1863	0	1774	0	1561	1774	1770	1526	1774	1695	0
Q Serve(g_s), s	0.0	0.0	0.0	13.6	0.0	5.5	0.0	0.0	0.0	5.8	4.8	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	13.6	0.0	5.5	0.0	0.0	0.0	5.8	4.8	0.0
Prop In Lane	0.00		0.00	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	0	2	0	634	0	364	1	2384	1300	121	3910	0
V/C Ratio(X)	0.00	0.00	0.00	0.67	0.00	0.24	0.00	0.43	0.25	0.72	0.19	0.00
Avail Cap(c_a), veh/h	0	109	0	949	0	515	103	2401	1300	169	3917	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.92	0.92	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	46.9	0.0	37.8	0.0	0.0	0.0	55.3	3.9	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.6	0.0	0.7	0.0	0.5	0.4	8.5	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	12.1	0.0	0.6	0.0	0.1	0.1	27.7	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	9.0	0.0	2.9	0.0	0.2	0.7	4.6	2.8	0.0
LnGrp Delay(d),s/veh	0.0	0.0	0.0	61.6	0.0	39.2	0.0	0.7	0.5	91.5	4.1	0.0
LnGrp LOS				E		D		A	A	F	A	
Approach Vol, veh/h		0			512			1353			843	
Approach Delay, s/veh		0.0			57.8			0.6			13.1	
Approach LOS					E			A			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		0.0	0.0	96.0		24.0	11.0	85.0				
Change Period (Y+Rc), s		3.0	3.0	3.6		3.9	3.6	3.6				
Max Green Setting (Gmax), s		7.0	7.0	60.4		32.1	11.4	55.4				
Max Q Clear Time (g_c+1), s		0.0	0.0	6.8		15.6	7.8	2.0				
Green Ext Time (p_c), s		0.0	0.0	6.1		3.7	0.1	11.4				
Intersection Summary												
HCM 2010 Ctrl Delay				15.3								
HCM 2010 LOS				B								
Notes												

38° North Phase II TIS
PM Baseline

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
2: Petaluma Hill Rd & Kawana Springs Rd

08/14/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	205	236	118	149	220	29	116	681	194	19	423	266
Future Volume (veh/h)	205	236	118	149	220	29	116	681	194	19	423	266
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	12	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		0.97	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	205	236	65	149	220	25	116	681	175	19	423	139
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	472	618	609	458	509	58	327	1188	305	270	732	756
Arrive On Green	0.10	0.33	0.33	0.08	0.31	0.31	0.06	0.43	0.43	0.02	0.39	0.39
Sat Flow, veh/h	1774	1863	1562	1774	1638	186	1774	2790	716	1774	1863	1536
Grp Volume(v), veh/h	205	236	65	149	0	245	116	432	424	19	423	139
Grp Sat Flow(s),veh/h/ln	1774	1863	1562	1774	0	1824	1774	1770	1736	1774	1863	1536
Q Serve(g_s), s	7.6	9.7	2.7	5.6	0.0	10.7	3.7	18.5	18.6	0.6	17.8	5.1
Cycle Q Clear(g_c), s	7.6	9.7	2.7	5.6	0.0	10.7	3.7	18.5	18.6	0.6	17.8	5.1
Prop In Lane	1.00		1.00	1.00		0.10	1.00		0.41	1.00		1.00
Lane Grp Cap(c), veh/h	472	618	609	458	0	567	327	754	740	270	732	756
V/C Ratio(X)	0.43	0.38	0.11	0.33	0.00	0.43	0.35	0.57	0.57	0.07	0.58	0.18
Avail Cap(c_a), veh/h	514	618	609	537	0	567	466	754	740	439	732	756
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.0	25.6	19.5	20.9	0.0	27.4	18.2	21.8	21.8	18.3	24.8	14.3
Incr Delay (d2), s/veh	0.2	1.8	0.4	0.2	0.0	2.4	0.2	3.2	3.2	0.0	3.3	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	0.0
%ile BackOfQ(50%),veh/ln	7.7	5.3	1.2	2.8	0.0	5.8	1.8	9.7	9.5	0.3	12.5	2.2
LnGrp Delay(d),s/veh	20.2	27.4	19.8	21.0	0.0	29.8	18.5	24.9	25.0	18.4	32.7	14.9
LnGrp LOS	C	C	B	C		C	B	C	C	B	C	B
Approach Vol, veh/h		506			394			972			581	
Approach Delay, s/veh		23.5			26.5			24.2			28.0	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		1	2	3	4	5	6	7	8			
Phs Duration (G+Y+Rc), s		37.1	8.8	43.6	12.6	35.0	5.5	46.9				
Change Period (Y+Rc), s		3.0	3.9	3.0	* 4.3	3.0	3.9	3.0	4.3			
Max Green Setting (Gmax), s		31.1	12.0	* 31	12.0	31.1	12.0	30.7				
Max Q Clear Time (g_c+1), s		11.7	5.7	19.8	9.6	12.7	2.6	20.6				
Green Ext Time (p_c), s		0.1	1.5	0.1	1.6	0.1	1.3	0.0	2.8			
Intersection Summary												
HCM 2010 Ctrl Delay				25.3								
HCM 2010 LOS				C								
Notes												

38° North Phase II TIS
PM Baseline

Synchro 10 Report
W-Trans

HCM 2010 TWSC
3: Franz Kafka Ave & Kawana Springs Rd

08/14/2019

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↗	
Traffic Vol, veh/h	349	64	4	305	53	6
Future Vol, veh/h	349	64	4	305	53	6
Conflicting Peds, #/hr	0	0	0	0	2	8
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	80	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	349	64	4	305	53	6
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	413	0	664	357
Stage 1	-	-	-	-	349	-
Stage 2	-	-	-	-	315	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1146	-	426	687
Stage 1	-	-	-	-	714	-
Stage 2	-	-	-	-	740	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1146	-	423	682
Mov Cap-2 Maneuver	-	-	-	-	423	-
Stage 1	-	-	-	-	711	-
Stage 2	-	-	-	-	739	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.1		14.4	
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	440	-	-	1146	-	
HCM Lane V/C Ratio	0.134	-	-	0.003	-	
HCM Control Delay (s)	14.4	-	-	8.2	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.5	-	-	0	-	

38* North Phase II TIS
PM Baseline

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
4: Corby Avenue & Hearn Avenue

08/14/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	76	526	184	404	610	99	116	204	824	82	101	122
Future Volume (veh/h)	76	526	184	404	610	99	116	204	824	82	101	122
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	1	7	4	1	1	0	0	2	3	0	1	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	76	526	174	404	610	96	116	204	771	82	101	121
Adj No. of Lanes	1	1	1	1	2	0	1	1	1	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	100	628	514	452	1621	254	113	455	797	104	174	143
Arrive On Green	0.05	0.33	0.33	0.25	0.53	0.53	0.14	0.24	0.24	0.06	0.16	0.16
Sat Flow, veh/h	1774	1863	1548	1774	3055	480	1774	1863	1581	1774	765	917
Grp Volume(v), veh/h	76	526	174	404	353	353	116	204	771	82	0	222
Grp Sat Flow(s), veh/h/ln	1774	1863	1548	1774	1770	1766	1774	1863	1581	1774	0	1682
Q Serve(g_s), s	4.7	29.0	6.5	24.2	12.9	12.9	6.6	10.2	26.8	5.0	0.0	14.1
Cycle Q Clear(g_c), s	4.7	29.0	6.5	24.2	12.9	12.9	6.6	10.2	26.8	5.0	0.0	14.1
Prop In Lane	1.00		1.00	1.00	0.27	1.00		1.00	1.00	1.00		0.55
Lane Grp Cap(c), veh/h	100	628	514	452	938	936	113	455	797	104	0	268
V/C Ratio(X)	0.76	0.84	0.34	0.89	0.38	0.38	1.03	0.45	0.97	0.79	0.00	0.83
Avail Cap(c_a), veh/h	161	615	511	452	938	936	257	454	788	145	0	443
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.77	0.77	0.77	0.79	0.79	0.79	1.00	0.00	1.00
Uniform Delay (d), s/veh	51.3	34.4	14.1	39.7	15.2	15.2	51.5	35.5	26.9	51.1	0.0	44.9
Incr Delay (d2), s/veh	4.4	12.7	1.8	18.7	0.9	0.9	28.6	0.2	21.0	11.4	0.0	2.5
Initial Q Delay(d3), s/veh	3.0	5.5	0.7	0.3	0.0	0.0	0.4	0.3	3.2	0.0	0.0	0.6
%ile BackOfQ(50%), veh/ln	2.6	19.1	3.6	14.3	6.6	6.6	4.3	5.6	28.6	2.8	0.0	6.9
LnGrp Delay(d), s/veh	58.6	52.6	16.5	58.7	16.1	16.1	80.5	35.9	51.0	62.5	0.0	48.0
LnGrp LOS	E	D	B	E	B	B	F	D	D	E		D
Approach Vol, veh/h	776				1110			1091			304	
Approach Delay, s/veh	45.1				31.6			51.3			51.9	
Approach LOS	D				C			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	31.0	39.5	19.1	20.3	9.0	61.5	9.5	30.0				
Change Period (Y+Rc), s	3.0	3.2	3.2	* 3	3.0	3.2	3.0	3.2				
Max Green Setting (Gmax), s	28.0	33.8	7.0	* 29	10.0	51.8	9.0	26.8				
Max Q Clear Time (g_c+1t), s	26.2	31.0	8.6	16.1	6.7	14.9	7.0	28.8				
Green Ext Time (p_c), s	0.3	1.6	0.0	0.7	0.0	5.1	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay	43.2											
HCM 2010 LOS	D											
Notes												

38* North Phase II TIS
PM Baseline

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
5: Santa Rosa Avenue & Hearn Avenue/Private Driveway

08/14/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲		↰	↱	↰	↱	↲	↰	↱	↲
Traffic Volume (veh/h)	525	7	888	5	7	15	624	1080	0	5	656	476
Future Volume (veh/h)	525	7	888	5	7	15	624	1080	0	5	656	476
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	1	1	0	0	0	1	1	0	0	0	1
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	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	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	530	0	717	5	7	11	624	1080	0	5	656	463
Adj No. of Lanes	2	0	1	0	1	0	2	3	0	1	2	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	822	0	693	8	12	18	707	3210	0	11	1515	1037
Arrive On Green	0.23	0.00	0.23	0.02	0.02	0.02	0.20	0.63	0.00	0.00	0.29	0.29
Sat Flow, veh/h	3548	0	1559	370	518	813	3442	5253	0	1774	3539	1560
Grp Volume(v), veh/h	530	0	717	23	0	0	624	1080	0	5	656	463
Grp Sat Flow(s), veh/h/ln	1774	0	1559	1701	0	0	1721	1695	0	1774	1770	1560
Q Serve(g_s), s	16.2	0.0	27.8	1.6	0.0	0.0	21.1	11.9	0.0	0.3	18.1	18.8
Cycle Q Clear(g_c), s	16.2	0.0	27.8	1.6	0.0	0.0	21.1	11.9	0.0	0.3	18.1	18.8
Prop In Lane	1.00		1.00	0.22		0.48	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	822	0	693	38	0	0	707	3210	0	11	1515	1037
V/C Ratio(X)	0.64	0.00	1.04	0.61	0.00	0.00	0.88	0.34	0.00	0.44	0.43	0.45
Avail Cap(c_a), veh/h	822	0	685	128	0	0	855	3210	0	130	1521	1037
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	0.30	0.00	0.30	1.00	0.00	0.00	0.68	0.68	0.00	0.96	0.96	0.96
Uniform Delay (d), s/veh	41.6	0.0	33.4	58.1	0.0	0.0	46.3	10.4	0.0	59.5	30.9	12.6
Incr Delay (d2), s/veh	0.5	0.0	28.6	5.7	0.0	0.0	6.6	0.2	0.0	9.3	0.9	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	5.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	0.0	0.0	18.4	0.8	0.0	0.0	10.8	5.6	0.0	0.2	9.1	14.2
LnGrp Delay(d), s/veh	42.2	0.0	67.0	63.8	0.0	0.0	53.1	10.6	0.0	68.8	31.8	14.0
LnGrp LOS	D		F	E			D	B		E	C	B
Approach Vol, veh/h	1247				23		1704			1124		
Approach Delay, s/veh	56.5				63.8		26.1			24.6		
Approach LOS	E				E		C			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		31.0	28.2	55.2		5.7	4.0	79.4				
Change Period (Y+Rc), s		3.2	3.6	* 3.6		3.0	3.2	3.6				
Max Green Setting (Gmax), s		27.8	29.8	* 40		9.0	8.8	61.4				
Max Q Clear Time (g_c+1t), s		29.8	23.1	20.8		3.6	2.3	13.9				
Green Ext Time (p_c), s		0.0	1.4	6.4		0.0	0.0	10.1				
Intersection Summary												
HCM 2010 Ctrl Delay					35.2							
HCM 2010 LOS					D							
Notes												

38° North Phase II TIS
PM Baseline

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
6: Corby Avenue & US 101 SB Ramps

08/14/2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	252	547	584	106	429	248		
Future Volume (veh/h)	252	547	584	106	429	248		
Number	7	14	6	16	5	2		
Initial Q (Qb), veh	13	0	0	0	0	1		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.98	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	252	541	584	104	429	248		
Adj No. of Lanes	1	1	2	1	2	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	579	849	925	405	749	384		
Arrive On Green	0.32	0.32	0.26	0.26	0.21	0.21		
Sat Flow, veh/h	1774	1583	3632	1549	3548	1863		
Grp Volume(v), veh/h	252	541	584	104	429	248		
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1549	1774	1863		
Q Serve(g_s), s	6.2	13.6	8.1	2.9	6.1	6.8		
Cycle Q Clear(g_c), s	6.2	13.6	8.1	2.9	6.1	6.8		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	579	849	925	405	749	384		
V/C Ratio(X)	0.44	0.64	0.63	0.26	0.57	0.65		
Avail Cap(c_a), veh/h	864	1096	2235	978	1408	739		
HCM Platoon Ratio	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		
Uniform Delay (d), s/veh	16.4	9.3	18.8	16.8	20.2	20.3		
Incr Delay (d2), s/veh	0.5	0.8	0.7	0.3	0.7	1.8		
Initial Q Delay(d3),s/veh	6.4	0.0	0.0	0.0	0.0	0.1		
%ile BackOfQ(50%),veh/ln	6.6	8.6	4.1	1.3	3.1	3.8		
LnGrp Delay(d),s/veh	23.3	10.1	19.5	17.1	20.9	22.3		
LnGrp LOS	C	B	B	B	C	C		
Approach Vol, veh/h	793		688		677			
Approach Delay, s/veh	14.3		19.1		21.4			
Approach LOS	B		B		C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		15.4		21.4		18.6		
Change Period (Y+Rc), s		4.0		3.5		4.0		
Max Green Setting (Gmax), s		22.0		27.0		35.0		
Max Q Clear Time (g_c+1t), s		8.8		15.6		10.1		
Green Ext Time (p_c), s		2.6		2.4		4.6		
Intersection Summary								
HCM 2010 Ctrl Delay			18.1					
HCM 2010 LOS			B					
Notes								

38° North Phase II TIS
PM Baseline

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
7: Santa Rosa Avenue & US 101 NB Ramps/Yolanda Ave

08/14/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (veh/h)	365	135	40	131	305	273	345	948	188	278	930	332
Future Volume (veh/h)	365	135	40	131	305	273	345	948	188	278	930	332
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	2	0	0	1	1	0	2	1	0	0	0	1
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00	0.97	1.00		0.98	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	365	135	33	131	305	254	345	948	184	278	930	316
Adj No. of Lanes	2	1	1	1	1	1	2	2	1	2	2	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	431	178	151	400	363	310	411	1559	675	346	1504	858
Arrive On Green	0.12	0.10	0.10	0.22	0.19	0.19	0.12	0.44	0.44	0.10	0.42	0.42
Sat Flow, veh/h	3442	1863	1583	1774	1863	1583	3442	3539	1532	3442	3539	1556
Grp Volume(v), veh/h	365	135	33	131	305	254	345	948	184	278	930	316
Grp Sat Flow(s), veh/h/ln	1721	1863	1583	1774	1863	1583	1721	1770	1532	1721	1770	1556
Q Serve(g_s), s	11.4	7.8	1.7	6.8	17.4	13.4	10.8	22.5	8.4	8.7	22.5	12.6
Cycle Q Clear(g_c), s	11.4	7.8	1.7	6.8	17.4	13.4	10.8	22.5	8.4	8.7	22.5	12.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	431	178	151	400	363	310	411	1559	675	346	1504	858
V/C Ratio(X)	0.85	0.76	0.22	0.33	0.84	0.82	0.84	0.61	0.27	0.80	0.62	0.37
Avail Cap(c_a), veh/h	472	542	461	399	491	417	451	1560	675	432	1504	858
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.27	0.27	0.27	1.00	1.00	1.00	0.52	0.52	0.52
Uniform Delay (d), s/veh	47.2	48.5	29.4	35.7	42.8	26.5	47.5	23.6	19.6	48.4	24.7	14.1
Incr Delay (d2), s/veh	12.6	6.5	0.7	0.1	2.8	2.7	12.4	1.8	1.0	4.6	1.0	0.6
Initial Q Delay(d3), s/veh	1.0	0.0	0.0	0.1	0.3	0.0	1.1	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	6.4	4.3	0.8	3.5	9.3	6.1	6.0	11.4	3.7	4.3	11.2	5.7
LnGrp Delay(d), s/veh	60.8	55.0	30.1	35.9	45.9	29.2	61.0	25.3	20.6	53.0	25.7	14.7
LnGrp LOS	E	D	C	D	D	C	E	C	C	D	C	B
Approach Vol, veh/h	533			690			1477			1524		
Approach Delay, s/veh	57.4			37.9			33.1			28.4		
Approach LOS	E			D			C			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	28.6	14.1	16.6	50.6	17.6	25.2	14.9	52.4				
Change Period (Y+Rc), s	3.9	3.6	3.6	3.9	3.9	* 3.9	3.9	* 3.9				
Max Green Setting (Gmax), s	32.0	14.4	36.5	15.1	* 29	13.8	* 37					
Max Q Clear Time (g_c+1), s	9.8	12.8	24.5	13.4	19.4	10.7	24.5					
Green Ext Time (p_c), s	0.1	0.7	0.2	6.0	0.2	1.9	0.3	5.9				
Intersection Summary												
HCM 2010 Ctrl Delay				35.2								
HCM 2010 LOS				D								
Notes												

38° North Phase II TIS
PM Baseline

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
8: Petaluma Hill Rd & Yolanda Ave

08/14/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (veh/h)	221	61	110	2	39	2	293	794	4	3	668	106
Future Volume (veh/h)	221	61	110	2	39	2	293	794	4	3	668	106
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	1	0	0	0	0	0	0	0	0	0	5	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	221	61	81	2	39	2	293	794	4	3	668	100
Adj No. of Lanes	0	1	0	1	1	0	1	1	1	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	269	52	68	53	53	3	308	1126	957	7	727	87
Arrive On Green	0.22	0.22	0.22	0.03	0.03	0.03	0.18	0.60	0.60	0.00	0.44	0.44
Sat Flow, veh/h	1060	293	389	1774	1757	90	1774	1863	1583	1774	1578	236
Grp Volume(v), veh/h	363	0	0	2	0	41	293	794	4	3	0	768
Grp Sat Flow(s), veh/h/ln	1741	0	0	1774	0	1847	1774	1863	1583	1774	0	1814
Q Serve(g_s), s	26.9	0.0	0.0	0.1	0.0	2.9	21.4	38.7	0.1	0.2	0.0	53.6
Cycle Q Clear(g_c), s	26.9	0.0	0.0	0.1	0.0	2.9	21.4	38.7	0.1	0.2	0.0	53.6
Prop In Lane	0.61		0.22	1.00		0.05	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	389	0	0	53	0	56	308	1126	957	7	0	813
V/C Ratio(X)	0.93	0.00	0.00	0.04	0.00	0.74	0.95	0.71	0.00	0.43	0.00	0.94
Avail Cap(c_a), veh/h	403	0	0	243	0	253	311	1123	955	68	0	853
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	50.9	0.0	0.0	62.5	0.0	63.8	54.3	18.1	10.4	65.9	0.0	35.8
Incr Delay (d2), s/veh	27.9	0.0	0.0	0.3	0.0	17.1	38.2	2.0	0.0	36.5	0.0	18.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9
%ile BackOfQ(50%), veh/ln	16.5	0.0	0.0	0.1	0.0	1.8	13.9	20.6	0.1	0.2	0.0	33.4
LnGrp Delay(d), s/veh	78.8	0.0	0.0	62.8	0.0	80.9	92.5	20.1	10.4	102.4	0.0	59.0
LnGrp LOS	E			E		F	F	C	B	F		E
Approach Vol, veh/h	363			43			1091			771		
Approach Delay, s/veh	78.8			80.1			39.5			59.2		
Approach LOS	E			F			D			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2	3	4		6	7	8					
Phs Duration (G+Y+Rc), s	32.8	26.0	64.0		8.5	5.0	84.9					
Change Period (Y+Rc), s	3.6	3.0	5.8		4.5	4.5	5.8					
Max Green Setting (Gmax), s	30.4	23.0	61.7		18.0	5.0	78.2					
Max Q Clear Time (g_c+1), s	28.9	23.4	55.6		4.9	2.2	40.7					
Green Ext Time (p_c), s	0.3	0.0	2.5		0.1	0.0	6.1					
Intersection Summary												
HCM 2010 Ctrl Delay				53.3								
HCM 2010 LOS				D								
Notes												

38° North Phase II TIS
PM Baseline

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
1: Santa Rosa Ave & Kawana Springs Rd

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	1	0	3	323	0	180	2	882	278	32	376	0
Future Volume (veh/h)	1	0	3	323	0	180	2	882	278	32	376	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	15	0	3	0	18	3	4	9	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	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	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	1	0	2	323	0	112	2	882	158	32	376	0
Adj No. of Lanes	0	1	0	2	0	1	1	2	1	1	3	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	0
Cap, veh/h	2	0	4	600	0	301	5	2249	1253	66	3475	0
Arrive On Green	0.00	0.00	0.00	0.16	0.00	0.16	0.00	0.44	0.44	0.03	0.69	0.00
Sat Flow, veh/h	535	0	1070	3548	0	1553	1774	3539	1542	1774	5253	0
Grp Volume(v), veh/h	3	0	0	323	0	112	2	882	158	32	376	0
Grp Sat Flow(s), veh/h/ln	1605	0	0	1774	0	1553	1774	1770	1542	1774	1695	0
Q Serve(g_s), s	0.2	0.0	0.0	7.6	0.0	5.7	0.1	15.2	3.1	1.6	2.3	0.0
Cycle Q Clear(g_c), s	0.2	0.0	0.0	7.6	0.0	5.7	0.1	15.2	3.1	1.6	2.3	0.0
Prop In Lane	0.33		0.67	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	6	0	0	600	0	301	5	2249	1253	66	3475	0
V/C Ratio(X)	0.47	0.00	0.00	0.54	0.00	0.37	0.42	0.39	0.13	0.48	0.11	0.00
Avail Cap(c_a), veh/h	125	0	0	1029	0	499	138	2303	1254	126	3485	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.98	0.98	0.98	1.00	1.00	0.00
Uniform Delay (d), s/veh	44.7	0.0	0.0	34.8	0.0	31.8	44.8	14.7	3.2	42.9	5.0	0.0
Incr Delay (d2), s/veh	18.2	0.0	0.0	1.6	0.0	1.6	19.5	0.5	0.2	5.3	0.1	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	9.7	0.0	1.1	0.0	0.8	0.0	50.2	0.1	0.0
%ile BackOfQ(50%), veh/ln	0.1	0.0	0.0	5.4	0.0	3.0	0.1	9.0	2.8	2.2	1.4	0.0
LnGrp Delay(d), s/veh	62.9	0.0	0.0	46.2	0.0	34.6	64.4	16.0	3.5	98.4	5.2	0.0
LnGrp LOS	E			D		C	E	B	A	F	A	
Approach Vol, veh/h	3				435			1042			408	
Approach Delay, s/veh	62.9				43.2			14.2			12.5	
Approach LOS	E				D			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2	3	4			6	7	8				
Phs Duration (G+Y+Rc), s	3.4	3.2	65.3			18.1	6.4	62.2				
Change Period (Y+Rc), s	3.0	3.0	3.6			3.9	3.6	3.6				
Max Green Setting (Gmax), s	7.0	7.0	36.4			26.1	6.4	36.4				
Max Q Clear Time (g_c+1), s	2.2	2.1	4.3			9.6	3.6	17.2				
Green Ext Time (p_c), s	0.0	0.0	2.6			3.0	0.0	6.5				
Intersection Summary												
HCM 2010 Ctrl Delay			20.6									
HCM 2010 LOS			C									
Notes												

38° North Phase II TIS
AM Baseline plus Residential

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
2: Petaluma Hill Rd & Kawana Springs Rd

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	129	140	49	172	216	32	91	776	167	15	349	182
Future Volume (veh/h)	129	140	49	172	216	32	91	776	167	15	349	182
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	12	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	129	140	9	172	216	21	91	776	140	15	349	110
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	409	527	516	493	500	49	429	1441	260	284	841	806
Arrive On Green	0.07	0.28	0.28	0.09	0.30	0.30	0.05	0.48	0.48	0.02	0.45	0.45
Sat Flow, veh/h	1774	1863	1539	1774	1668	162	1774	2985	539	1774	1863	1544
Grp Volume(v), veh/h	129	140	9	172	0	237	91	460	456	15	349	110
Grp Sat Flow(s), veh/h/ln	1863	1539	1774	0	1831	1774	1770	1754	1774	1863	1544	
Q Serve(g_s), s	5.6	6.4	0.4	7.4	0.0	11.5	2.8	20.0	20.0	0.5	13.9	4.1
Cycle Q Clear(g_c), s	5.6	6.4	0.4	7.4	0.0	11.5	2.8	20.0	20.0	0.5	13.9	4.1
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.31	1.00		1.00
Lane Grp Cap(c), veh/h	409	527	516	493	0	549	429	854	847	284	841	806
V/C Ratio(X)	0.32	0.27	0.02	0.35	0.00	0.43	0.21	0.54	0.54	0.05	0.41	0.14
Avail Cap(c_a), veh/h	481	527	516	535	0	549	561	854	847	442	841	806
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.52	0.52	0.52	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.5	30.6	24.5	24.0	0.0	31.0	15.6	19.9	19.9	16.8	21.3	13.6
Incr Delay (d2), s/veh	0.2	1.2	0.1	0.2	0.0	2.5	0.0	1.3	1.3	0.0	1.5	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0
%ile BackOfQ(50%), veh/ln	2.7	3.5	0.2	3.6	0.0	6.2	1.4	10.0	9.9	0.2	9.9	1.8
LnGrp Delay(d), s/veh	25.6	31.8	24.6	24.2	0.0	33.5	15.7	21.1	21.2	16.8	25.3	14.0
LnGrp LOS	C	C	C	C		C	B	C	C	B	C	B
Approach Vol, veh/h	278				409			1007			474	
Approach Delay, s/veh	28.7				29.5			20.7			22.4	
Approach LOS	C				C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	35.0	8.6	54.0	10.5	36.9	5.2	57.4					
Change Period (Y+Rc), s	3.0	3.9	3.0	* 4.3	3.0	3.9	3.0	4.3				
Max Green Setting (Gmax), s	31.1	12.0	* 41	12.0	31.1	12.0	40.7					
Max Q Clear Time (g_c+1), s	8.4	4.8	15.9	7.6	13.5	2.5	22.0					
Green Ext Time (p_c), s	0.1	0.7	0.1	1.6	0.1	1.2	0.0	3.9				
Intersection Summary												
HCM 2010 Ctrl Delay			23.7									
HCM 2010 LOS			C									
Notes												

38° North Phase II TIS
AM Baseline plus Residential

Synchro 10 Report
W-Trans

HCM 2010 TWSC
3: Franz Kafka Ave & Kawana Springs Rd

10/01/2019

Intersection						
Int Delay, s/veh	1.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↗	
Traffic Vol, veh/h	136	42	5	237	61	5
Future Vol, veh/h	136	42	5	237	61	5
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	80	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	136	42	5	237	61	5
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	178	0	383	137
Stage 1	-	-	-	-	136	-
Stage 2	-	-	-	-	247	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1398	-	620	911
Stage 1	-	-	-	-	890	-
Stage 2	-	-	-	-	794	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1398	-	618	910
Mov Cap-2 Maneuver	-	-	-	-	618	-
Stage 1	-	-	-	-	886	-
Stage 2	-	-	-	-	794	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.2		11.3	
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	633	-	-	1398	-	
HCM Lane V/C Ratio	0.104	-	-	0.004	-	
HCM Control Delay (s)	11.3	-	-	7.6	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.3	-	-	0	-	

38* North Phase II TIS
AM Baseline plus Residential

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
4: Corby Avenue & Hearn Avenue

10/01/2019

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	54	495	273	416	336	29	84	87	569	44	70	59		
Future Volume (veh/h)	54	495	273	416	336	29	84	87	569	44	70	59		
Number	5	2	12	1	6	16	3	8	18	7	4	14		
Initial Q (Qb), veh	0	3	0	2	1	0	1	0	2	0	2	0		
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99	1.00		1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1900		
Adj Flow Rate, veh/h	54	495	263	416	336	28	84	87	523	44	70	59		
Adj No. of Lanes	1	1	1	1	2	0	1	1	1	1	1	0		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2		
Cap, veh/h	78	653	549	435	1818	150	97	476	785	72	252	184		
Arrive On Green	0.04	0.35	0.35	0.25	0.55	0.55	0.05	0.25	0.25	0.04	0.24	0.24		
Sat Flow, veh/h	1774	1863	1554	1774	3304	274	1774	1863	1563	1774	934	787		
Grp Volume(v), veh/h	54	495	263	416	179	185	84	87	523	44	0	129		
Grp Sat Flow(s),veh/h/ln	1774	1863	1554	1774	1770	1808	1774	1863	1563	1774	0	1720		
Q Serve(g_s), s	3.3	25.9	14.6	25.4	5.6	5.6	5.2	4.0	27.8	2.7	0.0	6.8		
Cycle Q Clear(g_c), s	3.3	25.9	14.6	25.4	5.6	5.6	5.2	4.0	27.8	2.7	0.0	6.8		
Prop In Lane	1.00		1.00	1.00		0.15	1.00		1.00	1.00		0.46		
Lane Grp Cap(c), veh/h	78	653	549	435	974	995	97	476	785	72	0	412		
V/C Ratio(X)	0.69	0.76	0.48	0.96	0.18	0.19	0.87	0.18	0.67	0.62	0.00	0.31		
Avail Cap(c_a), veh/h	129	650	542	435	974	994	97	471	784	113	0	454		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	0.95	0.95	0.95	0.92	0.92	0.92	1.00	0.00	1.00		
Uniform Delay (d), s/veh	51.8	31.9	27.7	41.2	12.4	12.4	51.7	32.0	21.0	51.9	0.0	34.6		
Incr Delay (d2), s/veh	4.0	8.0	3.0	32.2	0.4	0.4	47.2	0.1	1.6	3.2	0.0	0.2		
Initial Q Delay(d3),s/veh	0.0	0.6	0.0	3.4	0.0	0.0	5.8	0.0	0.1	0.0	0.0	0.2		
%ile BackOfQ(50%), veh/ln	1.7	15.4	6.7	17.1	2.9	3.0	4.1	2.1	12.7	1.4	0.0	3.5		
LnGrp Delay(d),s/veh	55.8	40.5	30.7	76.7	12.8	12.8	104.8	32.0	22.7	55.1	0.0	35.0		
LnGrp LOS	E	D	C	E	B	B	F	C	C	E		D		
Approach Vol, veh/h	812				780			694			173			
Approach Delay, s/veh	38.4				46.9			33.8			40.1			
Approach LOS	D				D			C			D			
Timer	1	2	3	4	5	6	7	8						
Assigned Phs	1	2	3	4	5	6	7	8						
Phs Duration (G+Y+Rc), s	30.0	41.6	9.0	29.4	7.8	63.7	7.4	31.0						
Change Period (Y+Rc), s	3.0	3.2	3.0	* 3.2	3.0	3.2	3.0	3.2						
Max Green Setting (Gmax), s	27.0	35.8	6.0	* 29	8.0	54.8	7.0	27.8						
Max Q Clear Time (g_c+1t), s	27.4	27.9	7.2	8.8	5.3	7.6	4.7	29.8						
Green Ext Time (p_c), s	0.0	4.2	0.0	0.4	0.0	2.3	0.0	0.0						
Intersection Summary														
HCM 2010 Ctrl Delay	39.9													
HCM 2010 LOS	D													
Notes														

38* North Phase II TIS
AM Baseline plus Residential

Synchro 10 Report
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HCM 2010 Signalized Intersection Summary
5: Santa Rosa Avenue & Hearn Avenue/Private Driveway

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Traffic Volume (veh/h)	317	3	781	3	4	4	429	661	1	3	306	359
Future Volume (veh/h)	317	3	781	3	4	4	429	661	1	3	306	359
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	1	1	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	319	0	627	3	4	3	429	661	1	3	306	356
Adj No. of Lanes	2	0	1	0	1	0	2	3	0	1	2	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1057	0	849	6	9	6	829	2839	4	7	1062	938
Arrive On Green	0.30	0.00	0.30	0.01	0.01	0.01	0.24	0.54	0.54	0.00	0.10	0.10
Sat Flow, veh/h	3548	0	1571	523	698	523	3442	5243	8	1774	3539	1555
Grp Volume(v), veh/h	319	0	627	10	0	0	429	427	235	3	306	356
Grp Sat Flow(s), veh/h/ln	1774	0	1571	1744	0	0	1721	1695	1861	1774	1770	1555
Q Serve(g_s), s	6.2	0.0	5.6	0.5	0.0	0.0	9.7	6.0	6.0	0.2	7.2	11.5
Cycle Q Clear(g_c), s	6.2	0.0	5.6	0.5	0.0	0.0	9.7	6.0	6.0	0.2	7.2	11.5
Prop In Lane	1.00		1.00	0.30		0.30	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	1057	0	849	21	0	0	829	1836	1008	7	1062	938
V/C Ratio(X)	0.30	0.00	0.74	0.47	0.00	0.00	0.52	0.23	0.23	0.42	0.29	0.38
Avail Cap(c_a), veh/h	1057	0	849	116	0	0	834	1836	1008	114	1062	938
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	0.63	0.00	0.63	1.00	0.00	0.00	0.85	0.85	0.85	0.98	0.98	0.98
Uniform Delay (d), s/veh	24.4	0.0	15.9	44.2	0.0	0.0	29.6	10.8	10.8	44.8	31.6	12.4
Incr Delay (d2), s/veh	0.5	0.0	3.7	5.8	0.0	0.0	0.5	0.3	0.5	13.7	0.1	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	8.1	0.0	3.2	0.3	0.0	0.0	4.6	2.9	3.2	0.1	3.6	8.7
LnGrp Delay(d), s/veh	24.8	0.0	19.7	49.9	0.0	0.0	30.1	11.1	11.3	58.6	31.8	12.6
LnGrp LOS	C		B	D			C	B	B	E	C	B
Approach Vol, veh/h	946				10		1091			665		
Approach Delay, s/veh	21.4				49.9		18.6			21.6		
Approach LOS	C				D		B			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2	3	4			6	7	8				
Phs Duration (G+Y+Rc), s	30.0	25.3	30.6			4.1	3.6	52.3				
Change Period (Y+Rc), s	3.2	3.6	* 3.6			3.0	3.2	3.6				
Max Green Setting (Gmax), s	26.8	21.8	* 22			6.0	5.8	38.4				
Max Q Clear Time (g_c+1t), s	8.2	11.7	13.5			2.5	2.2	8.0				
Green Ext Time (p_c), s	3.7	1.2	2.3			0.0	0.0	4.7				
Intersection Summary												
HCM 2010 Ctrl Delay				20.4								
HCM 2010 LOS				C								
Notes												

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AM Baseline plus Residential

Synchro 10 Report
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HCM 2010 Signalized Intersection Summary
6: Corby Avenue & US 101 SB Ramps

10/01/2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	503	461	286	36	549	213		
Future Volume (veh/h)	503	461	286	36	549	213		
Number	7	14	6	16	5	2		
Initial Q (Qb), veh	1	1	1	0	0	1		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.98	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	503	452	286	36	549	213		
Adj No. of Lanes	1	1	2	1	2	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	630	931	676	296	827	434		
Arrive On Green	0.36	0.36	0.19	0.19	0.23	0.23		
Sat Flow, veh/h	1774	1583	3632	1546	3548	1863		
Grp Volume(v), veh/h	503	452	286	36	549	213		
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1546	1774	1863		
Q Serve(g_s), s	13.3	8.6	3.7	1.0	7.3	5.1		
Cycle Q Clear(g_c), s	13.3	8.6	3.7	1.0	7.3	5.1		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	630	931	676	296	827	434		
V/C Ratio(X)	0.80	0.49	0.42	0.12	0.66	0.49		
Avail Cap(c_a), veh/h	1059	1313	1499	655	1503	789		
HCM Platoon Ratio	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		
Uniform Delay (d), s/veh	15.5	6.2	18.6	17.5	18.2	17.5		
Incr Delay (d2), s/veh	2.4	0.4	0.4	0.2	0.9	0.9		
Initial Q Delay(d3),s/veh	0.1	0.0	0.0	0.0	0.0	0.1		
%ile BackOfQ(50%),veh/ln	7.1	6.0	1.9	0.4	3.7	2.8		
LnGrp Delay(d),s/veh	17.9	6.6	19.0	17.7	19.2	18.4		
LnGrp LOS	B	A	B	B	B	B		
Approach Vol, veh/h	955		322		762			
Approach Delay, s/veh	12.6		18.9		19.0			
Approach LOS	B		B		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		16.1		22.0		13.9		
Change Period (Y+Rc), s		4.0		3.5		4.0		
Max Green Setting (Gmax), s		22.0		31.0		22.0		
Max Q Clear Time (g_c+1t), s		9.3		15.3		5.7		
Green Ext Time (p_c), s		2.8		3.2		1.7		
Intersection Summary								
HCM 2010 Ctrl Delay			16.0					
HCM 2010 LOS			B					
Notes								

38° North Phase II TIS
AM Baseline plus Residential

Synchro 10 Report
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HCM 2010 Signalized Intersection Summary
7: Santa Rosa Avenue & US 101 NB Ramps/Yolanda Ave

10/01/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 			 			 	 		 	 	
Traffic Volume (veh/h)	187	128	12	91	353	213	321	643	104	345	418	336
Future Volume (veh/h)	187	128	12	91	353	213	321	643	104	345	418	336
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	2	2	0	1	1	1	0	1	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	187	128	11	91	353	202	321	643	104	345	418	299
Adj No. of Lanes	2	1	1	1	1	1	2	2	1	2	2	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	269	173	147	263	298	253	401	1641	712	463	1684	857
Arrive On Green	0.08	0.09	0.09	0.15	0.16	0.16	0.12	0.46	0.46	0.21	0.79	0.79
Sat Flow, veh/h	3442	1863	1583	1774	1863	1583	3442	3539	1536	3442	3539	1554
Grp Volume(v), veh/h	187	128	11	91	353	202	321	643	104	345	418	299
Grp Sat Flow(s),veh/h/ln	1721	1863	1583	1774	1863	1583	1721	1770	1536	1721	1770	1554
Q Serve(g_s), s	4.8	6.0	0.4	4.1	14.4	8.3	8.2	10.7	3.5	8.6	2.7	4.5
Cycle Q Clear(g_c), s	4.8	6.0	0.4	4.1	14.4	8.3	8.2	10.7	3.5	8.6	2.7	4.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	269	173	147	263	298	253	401	1641	712	463	1684	857
V/C Ratio(X)	0.70	0.74	0.07	0.35	1.18	0.80	0.80	0.39	0.15	0.75	0.25	0.35
Avail Cap(c_a), veh/h	539	339	289	263	298	253	474	1642	713	627	1684	863
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67
Upstream Filter(I)	1.00	1.00	1.00	0.60	0.60	0.60	1.00	1.00	1.00	0.76	0.76	0.76
Uniform Delay (d), s/veh	40.4	39.7	22.7	34.6	37.8	19.8	38.8	15.9	14.0	33.5	5.1	4.1
Incr Delay (d2), s/veh	3.2	6.0	0.2	0.5	102.1	10.4	8.1	0.7	0.4	2.5	0.3	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.6	20.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	3.4	0.2	2.3	17.8	4.3	4.4	5.4	1.7	4.1	1.4	2.0
LnGrp Delay(d),s/veh	43.7	45.8	22.9	35.7	160.0	30.1	47.1	16.6	14.4	36.0	5.4	4.9
LnGrp LOS	D	D	C	D	F	C	D	B	B	D	A	A
Approach Vol, veh/h	326			646			1068			1062		
Approach Delay, s/veh	43.8			101.9			25.5			15.2		
Approach LOS	D			F			C			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.0	14.0	46.7	10.9	18.3	15.1	45.7					
Change Period (Y+Rc), s	3.9	3.6	3.6	3.9	3.9	* 3.9	3.9	* 3.9				
Max Green Setting (Gmax), s	16.4	12.4	34.1	14.1	* 14	16.4	* 30					
Max Q Clear Time (g_c+I1), s	8.0	10.2	6.5	6.8	16.4	10.6	12.7					
Green Ext Time (p_c), s	0.1	0.4	0.3	4.1	0.3	0.0	0.6	4.5				
Intersection Summary												
HCM 2010 Ctrl Delay	39.8											
HCM 2010 LOS	D											
Notes												

38° North Phase II TIS
AM Baseline plus Residential

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
8: Petaluma Hill Rd & Yolanda Ave

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↕	↕	↔	↕	↕	↔	↕	
Traffic Volume (veh/h)	140	23	92	4	91	2	302	838	1	1	369	171
Future Volume (veh/h)	140	23	92	4	91	2	302	838	1	1	369	171
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	1	0	0	0	0	0	0	0	0	0	5	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	140	23	53	4	91	2	302	838	1	1	369	146
Adj No. of Lanes	0	1	0	1	1	1	1	1	1	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	181	26	59	121	127	108	350	964	820	3	450	157
Arrive On Green	0.15	0.15	0.15	0.07	0.07	0.07	0.20	0.51	0.51	0.00	0.34	0.34
Sat Flow, veh/h	1122	184	425	1774	1863	1583	1774	1863	1583	1774	1262	499
Grp Volume(v), veh/h	216	0	0	4	91	2	302	838	1	1	0	515
Grp Sat Flow(s),veh/h/ln	1732	0	0	1774	1863	1583	1774	1863	1583	1774	0	1761
Q Serve(g_s), s	8.4	0.0	0.0	0.1	3.3	0.1	11.4	27.7	0.0	0.0	0.0	19.0
Cycle Q Clear(g_c), s	8.4	0.0	0.0	0.1	3.3	0.1	11.4	27.7	0.0	0.0	0.0	19.0
Prop In Lane	0.65		0.25	1.00		1.00	1.00		1.00	1.00		0.28
Lane Grp Cap(c), veh/h	266	0	0	121	127	108	350	964	820	3	0	607
V/C Ratio(X)	0.81	0.00	0.00	0.03	0.71	0.02	0.86	0.87	0.00	0.39	0.00	0.85
Avail Cap(c_a), veh/h	344	0	0	460	483	410	460	1202	1022	128	0	845
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.3	0.0	0.0	31.0	32.5	30.9	27.6	15.0	8.3	35.5	0.0	22.0
Incr Delay (d2), s/veh	10.9	0.0	0.0	0.1	7.2	0.1	12.4	5.9	0.0	77.3	0.0	5.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.0	0.1	2.0	0.0	6.9	15.7	0.0	0.1	0.0	11.5
LnGrp Delay(d),s/veh	40.2	0.0	0.0	31.1	39.7	31.0	40.0	20.9	8.3	112.8	0.0	31.2
LnGrp LOS	D			C	D	C	D	C	A	F		C
Approach Vol, veh/h	216			97			1141			516		
Approach Delay, s/veh	40.2			39.2			26.0			31.4		
Approach LOS	D			D			C			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2		3	4		6	7	8				
Phs Duration (G+Y+Rc), s	14.2	16.8	29.3			9.3	4.6	41.4				
Change Period (Y+Rc), s	3.6	3.0	5.8			4.5	4.5	5.8				
Max Green Setting (G_max), s	13.8	18.0	33.3			18.0	5.0	44.8				
Max Q Clear Time (g_c+I1), s	10.4	13.4	21.0			5.3	2.0	29.7				
Green Ext Time (p_c), s	0.3	0.4	2.5			0.3	0.0	5.0				
Intersection Summary												
HCM 2010 Ctrl Delay	29.6											
HCM 2010 LOS	C											

38° North Phase II TIS
AM Baseline plus Residential

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
8: Petaluma Hill Rd & Yolanda Ave

10/01/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	23	92	4	91	2	302	838	1	1	369	171
Future Volume (veh/h)	140	23	92	4	91	2	302	838	1	1	369	171
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	1	0	0	0	0	0	0	0	0	0	5	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	140	23	53	4	91	2	302	838	1	1	369	146
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	178	52	119	136	147	125	353	968	822	3	451	159
Arrive On Green	0.10	0.10	0.10	0.08	0.08	0.08	0.20	0.51	0.51	0.00	0.34	0.34
Sat Flow, veh/h	1774	502	1157	1774	1863	1583	1774	1863	1583	1774	1262	499
Grp Volume(v), veh/h	140	0	76	4	91	2	302	838	1	1	0	515
Grp Sat Flow(s),veh/h/ln	1774	0	1659	1774	1863	1583	1774	1863	1583	1774	0	1761
Q Serve(g_s), s	4.9	0.0	2.7	0.1	3.0	0.1	10.4	25.2	0.0	0.0	0.0	17.3
Cycle Q Clear(g_c), s	4.9	0.0	2.7	0.1	3.0	0.1	10.4	25.2	0.0	0.0	0.0	17.3
Prop In Lane	1.00		0.70	1.00		1.00	1.00		1.00	1.00		0.28
Lane Grp Cap(c), veh/h	178	0	171	136	147	125	353	968	822	3	0	611
V/C Ratio(X)	0.79	0.00	0.44	0.03	0.62	0.02	0.86	0.87	0.00	0.36	0.00	0.84
Avail Cap(c_a), veh/h	227	0	235	503	529	449	448	1163	989	140	0	836
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.4	0.0	27.2	27.6	28.8	27.4	25.0	13.5	7.4	32.2	0.0	19.9
Incr Delay (d2), s/veh	13.1	0.0	1.8	0.1	4.2	0.1	12.4	6.1	0.0	65.0	0.0	5.8
Initial Q Delay(d3),s/veh	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1
%ile BackOfQ(50%),veh/ln	3.2	0.0	1.4	0.1	1.7	0.0	6.4	14.5	0.0	0.1	0.0	10.5
LnGrp Delay(d),s/veh	42.5	0.0	29.0	27.7	33.0	27.5	37.4	19.7	7.4	97.2	0.0	28.7
LnGrp LOS	D		C	C	C	C	D	B	A	F		C
Approach Vol, veh/h	216			97			1141			516		
Approach Delay, s/veh	37.8			32.6			24.3			28.9		
Approach LOS	D			C			C			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.4	11.0	15.7	27.4	10.8	9.5	4.6	38.5				
Change Period (Y+Rc), s	4.5	* 4.5	3.0	5.8	4.5	4.5	4.5	5.8				
Max Green Setting (Gmax), s	18.0	* 9	16.0	30.1	8.1	18.0	5.0	39.6				
Max Q Clear Time (g_c+1t), s	2.1	4.7	12.4	19.3	6.9	5.0	2.0	27.2				
Green Ext Time (p_c), s	0.0	0.1	0.3	2.3	0.0	0.3	0.0	4.5				
Intersection Summary												
HCM 2010 Ctrl Delay	27.4											
HCM 2010 LOS	C											
Notes												

38° North Phase II TIS
AM Baseline plus Residential - with LT Pocket

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
1: Santa Rosa Ave & Kawana Springs Rd

10/01/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	432	0	207	0	1026	551	92	758	0
Future Volume (veh/h)	0	0	0	432	0	207	0	1026	551	92	758	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	15	0	3	0	8	3	4	9	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.96	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	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	0	0	0	432	0	92	0	1026	339	92	758	0
Adj No. of Lanes	0	1	0	2	0	1	1	2	1	1	3	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	0
Cap, veh/h	0	2	0	642	0	373	1	2365	1295	127	3898	0
Arrive On Green	0.00	0.00	0.00	0.17	0.00	0.17	0.00	1.00	1.00	0.07	0.77	0.00
Sat Flow, veh/h	0	1863	0	3548	0	1561	1774	3539	1526	1774	5253	0
Grp Volume(v), veh/h	0	0	0	432	0	92	0	1026	339	92	758	0
Grp Sat Flow(s),veh/h/ln	0	1863	0	1774	0	1561	1774	1770	1526	1774	1695	0
Q Serve(g_s), s	0.0	0.0	0.0	13.8	0.0	5.8	0.0	0.0	0.0	6.1	4.9	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	13.8	0.0	5.8	0.0	0.0	0.0	6.1	4.9	0.0
Prop In Lane	0.00		0.00	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	0	2	0	642	0	373	1	2365	1295	127	3898	0
V/C Ratio(X)	0.00	0.00	0.00	0.67	0.00	0.25	0.00	0.43	0.26	0.73	0.19	0.00
Avail Cap(c_a), veh/h	0	109	0	949	0	521	103	2381	1295	169	3905	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.92	0.92	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	46.7	0.0	37.4	0.0	0.0	0.0	55.1	4.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.6	0.0	0.7	0.0	0.5	0.5	10.1	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	12.0	0.0	0.6	0.0	0.1	0.1	26.4	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	9.1	0.0	3.0	0.0	0.2	0.7	4.8	2.8	0.0
LnGrp Delay(d),s/veh	0.0	0.0	0.0	61.4	0.0	38.7	0.0	0.7	0.5	91.6	4.2	0.0
LnGrp LOS				E		D		A	A	F	A	
Approach Vol, veh/h	0			524			1365			850		
Approach Delay, s/veh	0.0			57.4			0.6			13.6		
Approach LOS				E			A			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		0.0	0.0	95.7		24.3	11.4	84.3				
Change Period (Y+Rc), s		3.0	3.0	3.6		3.9	3.6	3.6				
Max Green Setting (Gmax), s		7.0	7.0	60.4		32.1	11.4	55.4				
Max Q Clear Time (g_c+1t), s		0.0	0.0	6.9		15.8	8.1	2.0				
Green Ext Time (p_c), s		0.0	0.0	6.1		3.7	0.1	11.5				
Intersection Summary												
HCM 2010 Ctrl Delay	15.5											
HCM 2010 LOS	B											
Notes												

38° North Phase II TIS
PM Baseline plus Residential

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
2: Petaluma Hill Rd & Kawana Springs Rd

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (veh/h)	205	242	128	149	225	29	123	682	194	19	425	266
Future Volume (veh/h)	205	242	128	149	225	29	123	682	194	19	425	266
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	12	0
Ped-Bike Adj(A_pbT)	0.99		0.98	1.00		0.97	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	205	242	75	149	225	25	123	682	175	19	425	139
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	468	618	606	452	511	57	326	1189	305	270	731	756
Arrive On Green	0.10	0.33	0.33	0.08	0.31	0.31	0.06	0.43	0.43	0.02	0.39	0.39
Sat Flow, veh/h	1774	1863	1548	1774	1642	182	1774	2790	716	1774	1863	1536
Grp Volume(v), veh/h	205	242	75	149	0	250	123	432	425	19	425	139
Grp Sat Flow(s), veh/h/ln	1774	1863	1548	1774	0	1825	1774	1770	1736	1774	1863	1536
Q Serve(g_s), s	7.6	10.0	3.1	5.6	0.0	10.9	3.9	18.6	18.6	0.6	18.0	5.1
Cycle Q Clear(g_c), s	7.6	10.0	3.1	5.6	0.0	10.9	3.9	18.6	18.6	0.6	18.0	5.1
Prop In Lane	1.00		1.00	1.00		0.10	1.00		0.41	1.00		1.00
Lane Grp Cap(c), veh/h	468	618	606	452	0	567	326	754	740	270	731	756
V/C Ratio(X)	0.44	0.39	0.12	0.33	0.00	0.44	0.38	0.57	0.57	0.07	0.58	0.18
Avail Cap(c_a), veh/h	510	618	606	530	0	567	464	754	740	439	731	756
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.64	0.64	0.64	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.0	25.7	19.6	20.9	0.0	27.5	18.4	21.8	21.8	18.4	24.9	14.4
Incr Delay (d2), s/veh	0.2	1.9	0.4	0.2	0.0	2.5	0.2	2.0	2.1	0.0	3.4	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	0.0
%ile BackOfQ(50%), veh/ln	8.7	5.4	1.4	2.8	0.0	5.9	1.9	9.4	9.3	0.3	12.5	2.2
LnGrp Delay(d), s/veh	20.3	27.5	20.0	21.0	0.0	30.0	18.5	23.8	23.9	18.4	32.9	14.9
LnGrp LOS	C	C	B	C		C	B	C	C	B	C	B
Approach Vol, veh/h	522				399			980			583	
Approach Delay, s/veh	23.6				26.6			23.2			28.2	
Approach LOS	C				C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	37.1	8.8	43.5	12.6	35.0	5.5	46.9					
Change Period (Y+Rc), s	3.0	3.9	3.0	* 4.3	3.0	3.9	3.0	4.3				
Max Green Setting (Gmax), s	31.1	12.0	* 31	12.0	31.1	12.0	30.7					
Max Q Clear Time (g_c+1/ff), s	12.0	5.9	20.0	9.6	12.9	2.6	20.6					
Green Ext Time (p_c), s	0.1	1.5	0.1	1.6	0.1	1.3	0.0	2.8				
Intersection Summary												
HCM 2010 Ctrl Delay				25.0								
HCM 2010 LOS				C								
Notes												

38* North Phase II TIS
PM Baseline plus Residential

Synchro 10 Report
W-Trans

HCM 2010 TWSC
3: Franz Kafka Ave & Kawana Springs Rd

10/01/2019

Intersection						
Int Delay, s/veh	1.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱		↰	↰	↱
Traffic Vol, veh/h	349	70	4	305	58	6
Future Vol, veh/h	349	70	4	305	58	6
Conflicting Peds, #/hr	0	0	0	0	2	8
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	80	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	349	70	4	305	58	6
Major/Minor						
Major1	Major2		Minor1			
Conflicting Flow All	0	0	419	0	664	357
Stage 1	-	-	-	-	349	-
Stage 2	-	-	-	-	315	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1140	-	426	687
Stage 1	-	-	-	-	714	-
Stage 2	-	-	-	-	740	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1140	-	423	682
Mov Cap-2 Maneuver	-	-	-	-	423	-
Stage 1	-	-	-	-	711	-
Stage 2	-	-	-	-	739	-
Approach						
EB	WB		NB			
HCM Control Delay, s	0		0.1		14.6	
HCM LOS					B	
Minor Lane/Major Mvmt						
NBLn1	EBT	EBR	WBL	WBT		
Capacity (veh/h)	439	-	-	1140	-	-
HCM Lane V/C Ratio	0.146	-	-	0.004	-	-
HCM Control Delay (s)	14.6	-	-	8.2	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.5	-	-	0	-	

38* North Phase II TIS
PM Baseline plus Residential

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
4: Corby Avenue & Hearn Avenue

10/01/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	76	526	184	418	610	99	116	204	838	82	101	122
Future Volume (veh/h)	76	526	184	418	610	99	116	204	838	82	101	122
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	1	7	4	1	1	0	0	2	3	0	1	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	76	526	174	418	610	96	116	204	785	82	101	121
Adj No. of Lanes	1	1	1	1	2	0	1	1	1	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	100	655	541	452	1676	262	113	422	779	104	218	200
Arrive On Green	0.05	0.35	0.35	0.25	0.55	0.55	0.06	0.23	0.23	0.06	0.22	0.22
Sat Flow, veh/h	1774	1863	1549	1774	3055	480	1774	1863	1581	1774	766	918
Grp Volume(v), veh/h	76	526	174	418	353	353	116	204	785	82	0	222
Grp Sat Flow(s),veh/h/ln	1774	1863	1549	1774	1770	1766	1774	1863	1581	1774	0	1684
Q Serve(g_s), s	4.7	28.2	9.1	25.3	12.4	12.4	7.0	10.5	24.8	5.0	0.0	13.0
Cycle Q Clear(g_c), s	4.7	28.2	9.1	25.3	12.4	12.4	7.0	10.5	24.8	5.0	0.0	13.0
Prop In Lane	1.00		1.00	1.00		0.27	1.00		1.00	1.00		0.55
Lane Grp Cap(c), veh/h	100	655	541	452	970	968	113	422	779	104	0	373
V/C Ratio(X)	0.76	0.80	0.32	0.93	0.36	0.36	1.03	0.48	1.01	0.79	0.00	0.59
Avail Cap(c_a), veh/h	161	649	540	452	970	968	113	420	760	177	0	444
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.76	0.76	0.76	0.78	0.78	0.78	1.00	0.00	1.00
Uniform Delay (d), s/veh	51.3	32.9	26.6	40.1	14.1	14.1	51.5	37.1	27.9	51.1	0.0	38.5
Incr Delay (d2), s/veh	4.4	10.0	1.6	22.6	0.8	0.8	82.3	0.2	30.5	4.8	0.0	0.6
Initial Q Delay(d3),s/veh	3.0	4.2	0.6	0.5	0.0	0.0	0.4	0.3	13.7	0.0	0.0	0.1
%ile BackOfQ(50%),veh/ln	2.6	18.2	4.7	15.4	6.3	6.3	6.0	5.7	33.0	2.6	0.0	6.2
LnGrp Delay(d),s/veh	58.6	47.1	28.8	63.2	14.9	14.9	134.2	37.7	72.1	55.9	0.0	39.2
LnGrp LOS	E	D	C	E	B	B	F	D	F	E		D
Approach Vol, veh/h	776			1124			1105			304		
Approach Delay, s/veh	44.2			32.8			72.3			43.7		
Approach LOS	D			C			E			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	31.0	41.5	10.0	27.5	9.0	63.5	9.5	28.0				
Change Period (Y+Rc), s	3.0	3.2	3.0	* 3.2	3.0	3.2	3.0	3.2				
Max Green Setting (Gmax), s	28.0	33.8	7.0	* 29	10.0	51.8	11.0	24.8				
Max Q Clear Time (g_c+I1), s	27.3	30.2	9.0	15.0	6.7	14.4	7.0	26.8				
Green Ext Time (p_c), s	0.1	2.1	0.0	0.7	0.0	5.1	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay	49.7											
HCM 2010 LOS	D											
Notes												

38° North Phase II TIS
PM Baseline plus Residential

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
5: Santa Rosa Avenue & Hearn Avenue/Private Driveway

10/01/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	536	7	891	5	7	15	630	1081	0	5	658	484
Future Volume (veh/h)	536	7	891	5	7	15	630	1081	0	5	658	484
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	1	1	0	0	0	1	1	0	0	0	1
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	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	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	541	0	720	5	7	11	630	1081	0	5	658	471
Adj No. of Lanes	2	0	1	0	1	0	2	3	0	1	2	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	822	0	696	8	12	18	713	3210	0	11	1510	1034
Arrive On Green	0.23	0.00	0.23	0.02	0.02	0.02	0.21	0.63	0.00	0.00	0.29	0.29
Sat Flow, veh/h	3548	0	1559	370	518	813	3442	5253	0	1774	3539	1560
Grp Volume(v), veh/h	541	0	720	23	0	0	630	1081	0	5	658	471
Grp Sat Flow(s),veh/h/ln	1774	0	1559	1701	0	0	1721	1695	0	1774	1770	1560
Q Serve(g_s), s	16.6	0.0	27.8	1.6	0.0	0.0	21.3	11.9	0.0	0.3	18.2	19.3
Cycle Q Clear(g_c), s	16.6	0.0	27.8	1.6	0.0	0.0	21.3	11.9	0.0	0.3	18.2	19.3
Prop In Lane	1.00		1.00	0.22		0.48	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	822	0	696	38	0	0	713	3210	0	11	1510	1034
V/C Ratio(X)	0.66	0.00	1.04	0.61	0.00	0.00	0.88	0.34	0.00	0.44	0.44	0.46
Avail Cap(c_a), veh/h	822	0	688	128	0	0	855	3210	0	130	1515	1035
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	0.28	0.00	0.28	1.00	0.00	0.00	0.69	0.69	0.00	0.96	0.96	0.96
Uniform Delay (d), s/veh	41.8	0.0	33.3	58.1	0.0	0.0	46.2	10.4	0.0	59.5	31.1	12.8
Incr Delay (d2), s/veh	0.6	0.0	28.0	5.7	0.0	0.0	6.9	0.2	0.0	9.3	0.9	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	5.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	18.3	0.8	0.0	0.0	10.9	5.6	0.0	0.2	9.1	14.5
LnGrp Delay(d),s/veh	42.3	0.0	66.3	63.8	0.0	0.0	53.3	10.6	0.0	68.8	32.0	14.2
LnGrp LOS	D		F	E			D	B		E	C	B
Approach Vol, veh/h	1261			23			1711			1134		
Approach Delay, s/veh	56.0			63.8			26.3			24.8		
Approach LOS	E			E			C			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		31.0	28.4	55.0		5.7	4.0	79.4				
Change Period (Y+Rc), s		3.2	3.6	* 3.6		3.0	3.2	3.6				
Max Green Setting (Gmax), s		27.8	29.8	* 40		9.0	8.8	61.4				
Max Q Clear Time (g_c+I1), s		29.8	23.3	21.3		3.6	2.3	13.9				
Green Ext Time (p_c), s		0.0	1.4	6.3		0.0	0.0	10.2				
Intersection Summary												
HCM 2010 Ctrl Delay	35.2											
HCM 2010 LOS	D											
Notes												

38° North Phase II TIS
PM Baseline plus Residential

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
6: Corby Avenue & US 101 SB Ramps

10/01/2019

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations			 			 		
Traffic Volume (veh/h)	252	561	584	106	443	248		
Future Volume (veh/h)	252	561	584	106	443	248		
Number	7	14	6	16	5	2		
Initial Q (Qb), veh	13	0	0	0	0	1		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.98	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	252	555	584	104	443	248		
Adj No. of Lanes	1	1	2	1	2	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	588	856	919	402	747	383		
Arrive On Green	0.33	0.33	0.26	0.26	0.20	0.20		
Sat Flow, veh/h	1774	1583	3632	1549	3548	1863		
Grp Volume(v), veh/h	252	555	584	104	443	248		
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1549	1774	1863		
Q Serve(g_s), s	6.3	14.2	8.2	3.0	6.4	6.9		
Cycle Q Clear(g_c), s	6.3	14.2	8.2	3.0	6.4	6.9		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	588	856	919	402	747	383		
V/C Ratio(X)	0.43	0.65	0.64	0.26	0.59	0.65		
Avail Cap(c_a), veh/h	850	1082	2198	962	1385	727		
HCM Platoon Ratio	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		
Uniform Delay (d), s/veh	16.4	9.4	19.1	17.1	20.6	20.7		
Incr Delay (d2), s/veh	0.5	0.9	0.7	0.3	0.8	1.8		
Initial Q Delay(d3),s/veh	6.2	0.0	0.0	0.0	0.0	0.1		
%ile BackOfQ(50%),veh/ln	6	9.0	4.2	1.4	3.3	3.8		
LnGrp Delay(d),s/veh	23.1	10.3	19.9	17.5	21.4	22.7		
LnGrp LOS	C	B	B	B	C	C		
Approach Vol, veh/h	807		688		691			
Approach Delay, s/veh	14.3		19.5		21.8			
Approach LOS	B		B		C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		15.5		22.1		18.8		
Change Period (Y+Rc), s		4.0		3.5		4.0		
Max Green Setting (Gmax), s		22.0		27.0		35.0		
Max Q Clear Time (g_c+I1), s		8.9		16.2		10.2		
Green Ext Time (p_c), s		2.6		2.4		4.6		
Intersection Summary								
HCM 2010 Ctrl Delay			18.3					
HCM 2010 LOS			B					
Notes								

38° North Phase II TIS
PM Baseline plus Residential

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
7: Santa Rosa Avenue & US 101 NB Ramps/Yolanda Ave

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↩	↩	↩	↩	↩	↩	↩	↩	↩	↩	↩	↩
Traffic Volume (veh/h)	365	156	40	131	314	280	345	948	188	283	930	332
Future Volume (veh/h)	365	156	40	131	314	280	345	948	188	283	930	332
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	2	0	0	1	1	0	2	1	0	0	0	1
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	365	156	33	131	314	261	345	948	184	283	930	316
Adj No. of Lanes	2	1	1	1	1	1	2	2	1	2	2	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	426	192	163	341	317	269	409	1687	743	369	1673	914
Arrive On Green	0.12	0.10	0.10	0.19	0.17	0.17	0.12	0.48	0.48	0.10	0.46	0.46
Sat Flow, veh/h	3442	1863	1583	1774	1863	1583	3442	3539	1534	3442	3539	1557
Grp Volume(v), veh/h	365	156	33	131	314	261	345	948	184	283	930	316
Grp Sat Flow(s), veh/h/ln	1721	1863	1583	1774	1863	1583	1721	1770	1534	1721	1770	1557
Q Serve(g_s), s	12.5	9.8	1.8	7.7	20.2	15.7	11.8	23.0	8.6	9.7	23.0	12.7
Cycle Q Clear(g_c), s	12.5	9.8	1.8	7.7	20.2	15.7	11.8	23.0	8.6	9.7	23.0	12.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	426	192	163	341	317	269	409	1687	743	369	1673	914
V/C Ratio(X)	0.86	0.81	0.20	0.38	0.99	0.97	0.84	0.56	0.25	0.77	0.56	0.35
Avail Cap(c_a), veh/h	462	317	269	341	317	269	470	1687	731	470	1635	914
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.29	0.29	0.29	1.00	1.00	1.00	0.52	0.52	0.52
Uniform Delay (d), s/veh	51.7	52.7	32.9	42.4	49.8	32.7	51.9	22.5	18.1	52.1	22.7	13.0
Incr Delay (d2), s/veh	14.0	8.1	0.6	0.2	24.9	22.1	11.7	1.4	0.8	3.0	0.7	0.5
Initial Q Delay(d3), s/veh	1.1	0.0	0.0	0.1	7.6	0.0	1.1	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	7.0	5.5	0.8	4.0	13.3	8.6	6.5	11.6	3.7	4.7	11.2	5.7
LnGrp Delay(d), s/veh	66.8	60.7	33.5	42.7	82.3	54.8	64.7	23.8	18.9	55.1	23.4	13.6
LnGrp LOS	E	E	C	D	F	D	E	C	B	E	C	B
Approach Vol, veh/h	554			706			1477				1529	
Approach Delay, s/veh	63.1			64.8			32.8				27.2	
Approach LOS	E			E			C				C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	27.0	16.0	17.7	59.3	18.6	24.3	16.0	61.1				
Change Period (Y+Rc), s	3.9	3.6	3.6	3.9	3.9	* 3.9	3.9	* 3.9				
Max Green Setting (Gmax), s	16.0	16.0	16.4	52.1	16.1	* 20	16.4	* 52				
Max Q Clear Time (g_c+I1), s	11.8	13.8	25.0	14.5	22.2	11.7	25.0					
Green Ext Time (p_c), s	0.2	0.5	0.3	9.0	0.2	0.0	0.4	8.5				
Intersection Summary												
HCM 2010 Ctrl Delay				40.0								
HCM 2010 LOS				D								
Notes												

38° North Phase II TIS
PM Baseline plus Residential

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
8: Petaluma Hill Rd & Yolanda Ave

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	231	77	110	2	55	2	293	796	4	3	669	106
Future Volume (veh/h)	231	77	110	2	55	2	293	796	4	3	669	106
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	1	0	0	0	0	0	0	0	0	0	5	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1900	
Adj Flow Rate, veh/h	231	77	81	2	55	2	293	796	4	3	669	100
Adj No. of Lanes	0	1	0	1	1	1	1	1	1	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	320	46	48	71	75	63	297	1093	929	7	732	63
Arrive On Green	0.23	0.23	0.23	0.04	0.04	0.04	0.17	0.59	0.59	0.00	0.43	0.43
Sat Flow, veh/h	1037	346	364	1774	1863	1583	1774	1863	1583	1774	1578	236
Grp Volume(v), veh/h	389	0	0	2	55	2	293	796	4	3	0	769
Grp Sat Flow(s), veh/h/ln	1747	0	0	1774	1863	1583	1774	1863	1583	1774	0	1814
Q Serve(g_s), s	30.0	0.0	0.0	0.1	4.0	0.2	22.5	42.2	0.1	0.2	0.0	57.0
Cycle Q Clear(g_c), s	30.0	0.0	0.0	0.1	4.0	0.2	22.5	42.2	0.1	0.2	0.0	57.0
Prop In Lane	0.59		0.21	1.00		1.00	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	414	0	0	71	75	63	297	1093	929	7	0	795
V/C Ratio(X)	0.94	0.00	0.00	0.03	0.74	0.03	0.99	0.73	0.00	0.43	0.00	0.97
Avail Cap(c_a), veh/h	413	0	0	233	245	208	298	1093	929	65	0	791
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	52.2	0.0	0.0	63.3	65.2	63.3	57.0	20.5	11.8	68.2	0.0	38.6
Incr Delay (d2), s/veh	29.6	0.0	0.0	0.2	13.1	0.2	48.0	2.5	0.0	36.7	0.0	24.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6
%ile BackOfQ(50%), veh/ln	18.7	0.0	0.0	0.1	2.3	0.1	15.0	22.4	0.1	0.2	0.0	36.8
LnGrp Delay(d), s/veh	81.8	0.0	0.0	63.5	78.3	63.5	105.0	23.0	11.8	104.9	0.0	71.3
LnGrp LOS	F			E	E	E	F	C	B	F		E
Approach Vol, veh/h	389				59		1093			772		
Approach Delay, s/veh	81.8				77.3		44.9			71.4		
Approach LOS	F				E		D			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		35.7	26.0	65.2		10.0	5.0	86.1				
Change Period (Y+Rc), s		3.6	3.0	5.8		4.5	4.5	5.8				
Max Green Setting (Gmax), s		32.4	23.0	59.7		18.0	5.0	76.2				
Max Q Clear Time (g_c+I1), s		32.0	24.5	59.0		6.0	2.2	44.2				
Green Ext Time (p_c), s		0.1	0.0	0.3		0.1	0.0	5.9				
Intersection Summary												
HCM 2010 Ctrl Delay					60.8							
HCM 2010 LOS					E							

38* North Phase II TIS
PM Baseline plus Residential

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
8: Petaluma Hill Rd & Yolanda Ave

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	231	77	110	2	55	2	293	796	4	3	669	106
Future Volume (veh/h)	231	77	110	2	55	2	293	796	4	3	669	106
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	1	0	0	0	0	0	0	0	0	0	5	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	231	77	81	2	55	2	293	796	4	3	669	100
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	264	127	133	82	91	77	322	1153	980	7	731	92
Arrive On Green	0.15	0.15	0.15	0.05	0.05	0.05	0.18	0.62	0.62	0.00	0.45	0.45
Sat Flow, veh/h	1774	832	876	1774	1863	1583	1774	1863	1583	1774	1578	236
Grp Volume(v), veh/h	231	0	158	2	55	2	293	796	4	3	0	769
Grp Sat Flow(s), veh/h/ln	1774	0	1708	1774	1863	1583	1774	1863	1583	1774	0	1814
Q Serve(g_s), s	13.6	0.0	9.2	0.1	3.1	0.1	17.2	30.4	0.1	0.2	0.0	42.8
Cycle Q Clear(g_c), s	13.6	0.0	9.2	0.1	3.1	0.1	17.2	30.4	0.1	0.2	0.0	42.8
Prop In Lane	1.00		0.51	1.00		1.00	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	264	0	260	82	91	77	322	1153	980	7	0	830
V/C Ratio(X)	0.87	0.00	0.61	0.02	0.61	0.03	0.91	0.69	0.00	0.42	0.00	0.93
Avail Cap(c_a), veh/h	312	0	315	300	315	268	350	1207	1026	83	0	929
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	44.8	0.0	42.8	49.3	50.4	49.0	43.4	13.7	7.9	53.8	0.0	28.5
Incr Delay (d2), s/veh	20.7	0.0	2.3	0.1	6.4	0.1	25.7	1.6	0.0	35.7	0.0	14.0
Initial Q Delay(d3), s/veh	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5
%ile BackOfQ(50%), veh/ln	8.4	0.0	4.6	0.1	1.8	0.1	10.9	16.2	0.0	0.2	0.0	26.8
LnGrp Delay(d), s/veh	66.3	0.0	45.2	49.4	56.8	49.2	69.1	15.3	7.9	89.4	0.0	46.0
LnGrp LOS	E		D	D	E	D	E	B	A	F		D
Approach Vol, veh/h	389				59		1093			772		
Approach Delay, s/veh	57.7				56.3		29.7			46.2		
Approach LOS	E				E		C			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		1	2	3	4	5	6	7	8			
Phs Duration (G+Y+Rc), s		9.5	20.5	22.4	54.1	20.3	9.7	4.9	71.6			
Change Period (Y+Rc), s		4.5	* 4.5	3.0	5.8	4.5	4.5	4.5	5.8			
Max Green Setting (Gmax), s		18.0	* 20	21.0	54.5	18.7	18.0	5.0	69.0			
Max Q Clear Time (g_c+I1), s		2.1	11.2	19.2	44.8	15.6	5.1	2.2	32.4			
Green Ext Time (p_c), s		0.0	0.5	0.2	3.5	0.2	0.1	0.0	6.1			
Intersection Summary												
HCM 2010 Ctrl Delay					40.6							
HCM 2010 LOS					D							
Notes												

38* North Phase II TIS
PM Baseline plus Residential - with LT Pocket

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
1: Santa Rosa Ave & Kawana Springs Rd

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	1	0	3	323	0	180	2	887	278	32	384	0
Future Volume (veh/h)	1	0	3	323	0	180	2	887	278	32	384	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	15	0	3	0	18	3	4	9	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	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	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	1	0	2	323	0	112	2	887	158	32	384	0
Adj No. of Lanes	0	1	0	2	0	1	1	2	1	1	3	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	0
Cap, veh/h	2	0	4	600	0	301	5	2248	1253	66	3475	0
Arrive On Green	0.00	0.00	0.00	0.16	0.00	0.16	0.00	0.44	0.44	0.03	0.69	0.00
Sat Flow, veh/h	535	0	1070	3548	0	1553	1774	3539	1542	1774	5253	0
Grp Volume(v), veh/h	3	0	0	323	0	112	2	887	158	32	384	0
Grp Sat Flow(s), veh/h/ln	1605	0	0	1774	0	1553	1774	1770	1542	1774	1695	0
Q Serve(g_s), s	0.2	0.0	0.0	7.6	0.0	5.7	0.1	15.3	3.1	1.6	2.3	0.0
Cycle Q Clear(g_c), s	0.2	0.0	0.0	7.6	0.0	5.7	0.1	15.3	3.1	1.6	2.3	0.0
Prop In Lane	0.33		0.67	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	6	0	0	600	0	301	5	2248	1253	66	3475	0
V/C Ratio(X)	0.47	0.00	0.00	0.54	0.00	0.37	0.42	0.39	0.13	0.48	0.11	0.00
Avail Cap(c_a), veh/h	125	0	0	1029	0	499	138	2303	1254	126	3485	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.98	0.98	0.98	1.00	1.00	0.00
Uniform Delay (d), s/veh	44.7	0.0	0.0	34.8	0.0	31.8	44.8	14.7	3.2	42.9	5.0	0.0
Incr Delay (d2), s/veh	18.2	0.0	0.0	1.6	0.0	1.6	19.5	0.5	0.2	5.3	0.1	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	9.7	0.0	1.1	0.0	0.8	0.0	50.2	0.1	0.0
%ile BackOfQ(50%), veh/ln	0.1	0.0	0.0	5.4	0.0	3.0	0.1	9.1	2.8	2.2	1.4	0.0
LnGrp Delay(d), s/veh	62.9	0.0	0.0	46.2	0.0	34.6	64.4	16.0	3.5	98.4	5.2	0.0
LnGrp LOS	E			D		C	E	B	A	F	A	
Approach Vol, veh/h	3			435			1047			416		
Approach Delay, s/veh	62.9			43.2			14.2			12.3		
Approach LOS	E			D			B			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2	3	4			6	7	8				
Phs Duration (G+Y+Rc), s	3.4	3.2	65.3			18.1	6.4	62.2				
Change Period (Y+Rc), s	3.0	3.0	3.6			3.9	3.6	3.6				
Max Green Setting (Gmax), s	7.0	7.0	36.4			26.1	6.4	36.4				
Max Q Clear Time (g_c+1), s	2.2	2.1	4.3			9.6	3.6	17.3				
Green Ext Time (p_c), s	0.0	0.0	2.7			3.0	0.0	6.6				
Intersection Summary												
HCM 2010 Ctrl Delay			20.5									
HCM 2010 LOS			C									
Notes												

38° North Phase II TIS
AM Baseline plus Residential plus Commercial

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
2: Petaluma Hill Rd & Kawana Springs Rd

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	129	140	49	172	216	32	91	778	167	15	351	182
Future Volume (veh/h)	129	140	49	172	216	32	91	778	167	15	351	182
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	12	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	129	140	9	172	216	21	91	778	140	15	351	110
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	409	527	516	493	500	49	427	1442	259	283	841	806
Arrive On Green	0.07	0.28	0.28	0.09	0.30	0.30	0.05	0.48	0.48	0.02	0.45	0.45
Sat Flow, veh/h	1774	1863	1539	1774	1668	162	1774	2987	537	1774	1863	1544
Grp Volume(v), veh/h	129	140	9	172	0	237	91	461	457	15	351	110
Grp Sat Flow(s), veh/h/ln	1863	1539	1774	0	1831	1774	1770	1755	1774	1863	1544	
Q Serve(g_s), s	5.6	6.4	0.4	7.4	0.0	11.5	2.8	20.0	20.0	0.5	14.0	4.1
Cycle Q Clear(g_c), s	5.6	6.4	0.4	7.4	0.0	11.5	2.8	20.0	20.0	0.5	14.0	4.1
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.31	1.00		1.00
Lane Grp Cap(c), veh/h	409	527	516	493	0	549	427	854	847	283	841	806
V/C Ratio(X)	0.32	0.27	0.02	0.35	0.00	0.43	0.21	0.54	0.54	0.05	0.42	0.14
Avail Cap(c_a), veh/h	481	527	516	535	0	549	560	854	847	441	841	806
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.89	0.89	0.89	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.5	30.6	24.5	24.0	0.0	31.0	15.7	19.9	19.9	16.8	21.3	13.6
Incr Delay (d2), s/veh	0.2	1.2	0.1	0.2	0.0	2.5	0.1	2.2	2.2	0.0	1.5	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0
%ile BackOfQ(50%), veh/ln	2.7	3.5	0.2	3.6	0.0	6.2	1.4	10.2	10.2	0.2	9.9	1.8
LnGrp Delay(d), s/veh	25.6	31.8	24.6	24.2	0.0	33.5	15.7	22.1	22.1	16.8	25.4	14.0
LnGrp LOS	C	C	C	C		C	B	C	C	B	C	B
Approach Vol, veh/h	278			409		1009				476		
Approach Delay, s/veh	28.7			29.5		21.5				22.5		
Approach LOS	C			C		C				C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	35.0	8.6	54.0	10.5	36.9	5.2	57.4					
Change Period (Y+Rc), s	3.0	3.9	3.0	* 4.3	3.0	3.9	3.0	4.3				
Max Green Setting (Gmax), s	31.1	12.0	* 41	12.0	31.1	12.0	40.7					
Max Q Clear Time (g_c+1), s	8.4	4.8	16.0	7.6	13.5	2.5	22.0					
Green Ext Time (p_c), s	0.1	0.7	0.1	1.6	0.1	1.2	0.0	3.9				
Intersection Summary												
HCM 2010 Ctrl Delay			24.2									
HCM 2010 LOS			C									
Notes												

38° North Phase II TIS
AM Baseline plus Residential plus Commercial

Synchro 10 Report
W-Trans

HCM 2010 TWSC
3: Franz Kafka Ave & Kawana Springs Rd

10/01/2019

Intersection						
Int Delay, s/veh	1.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↗	
Traffic Vol, veh/h	136	42	5	237	61	5
Future Vol, veh/h	136	42	5	237	61	5
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	80	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	136	42	5	237	61	5
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	178	0	383	137
Stage 1	-	-	-	-	136	-
Stage 2	-	-	-	-	247	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1398	-	620	911
Stage 1	-	-	-	-	890	-
Stage 2	-	-	-	-	794	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1398	-	618	910
Mov Cap-2 Maneuver	-	-	-	-	618	-
Stage 1	-	-	-	-	886	-
Stage 2	-	-	-	-	794	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.2		11.3	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	633	-	-	1398	-	
HCM Lane V/C Ratio	0.104	-	-	0.004	-	
HCM Control Delay (s)	11.3	-	-	7.6	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.3	-	-	0	-	

38* North Phase II TIS
AM Baseline plus Residential plus Commercial

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HCM 2010 Signalized Intersection Summary
4: Corby Avenue & Hearn Avenue

10/01/2019

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations															
Traffic Volume (veh/h)	54	495	273	429	336	29	84	87	583	44	70	59			
Future Volume (veh/h)	54	495	273	429	336	29	84	87	583	44	70	59			
Number	5	2	12	1	6	16	3	8	18	7	4	14			
Initial Q (Qb), veh	0	3	0	2	1	0	1	0	2	0	2	0			
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1900			
Adj Flow Rate, veh/h	54	495	263	429	336	28	84	87	537	44	70	59			
Adj No. of Lanes	1	1	1	1	2	0	1	1	1	1	1	0			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2			
Cap, veh/h	78	653	554	435	1818	150	97	480	785	72	273	184			
Arrive On Green	0.04	0.35	0.35	0.25	0.55	0.55	0.05	0.25	0.25	0.04	0.24	0.24			
Sat Flow, veh/h	1774	1863	1554	1774	3304	274	1774	1863	1563	1774	934	787			
Grp Volume(v), veh/h	54	495	263	429	179	185	84	87	537	44	0	129			
Grp Sat Flow(s),veh/h/ln	1774	1863	1554	1774	1770	1808	1774	1863	1563	1774	0	1720			
Q Serve(g_s), s	3.3	25.9	14.6	26.5	5.6	5.6	5.2	4.0	27.8	2.7	0.0	6.8			
Cycle Q Clear(g_c), s	3.3	25.9	14.6	26.5	5.6	5.6	5.2	4.0	27.8	2.7	0.0	6.8			
Prop In Lane	1.00		1.00	1.00		0.15	1.00		1.00	1.00		0.46			
Lane Grp Cap(c), veh/h	78	653	554	435	974	995	97	480	785	72	0	412			
V/C Ratio(X)	0.69	0.76	0.47	0.99	0.18	0.19	0.87	0.18	0.68	0.62	0.00	0.31			
Avail Cap(c_a), veh/h	129	650	542	435	974	994	97	471	784	113	0	454			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	1.00	0.95	0.95	0.95	0.91	0.91	0.91	1.00	0.00	1.00			
Uniform Delay (d), s/veh	51.8	31.9	27.5	41.5	12.4	12.4	51.7	31.8	21.2	51.9	0.0	34.6			
Incr Delay (d2), s/veh	4.0	8.0	2.9	38.4	0.4	0.4	47.1	0.1	1.9	3.2	0.0	0.2			
Initial Q Delay(d3),s/veh	0.0	0.6	0.0	9.9	0.0	0.0	5.8	0.0	0.1	0.0	0.0	0.2			
%ile BackOfQ(50%),veh/ln	1.7	15.4	6.6	19.0	2.9	3.0	4.1	2.1	13.2	1.4	0.0	3.5			
LnGrp Delay(d),s/veh	55.8	40.5	30.4	89.8	12.8	12.8	104.7	31.8	23.3	55.1	0.0	35.0			
LnGrp LOS	E	D	C	F	B	B	F	C	C	E		D			
Approach Vol, veh/h	812				793			708		173					
Approach Delay, s/veh	38.3				54.5			34.0		40.1					
Approach LOS	D				D			C		D					
Timer	1	2	3	4	5	6	7	8							
Assigned Phs	1	2	3	4	5	6	7	8							
Phs Duration (G+Y+Rc), s	30.0	41.6	9.0	29.4	7.8	63.7	7.4	31.0							
Change Period (Y+Rc), s	3.0	3.2	3.0	* 3.2	3.0	3.2	3.0	3.2							
Max Green Setting (Gmax), s	27.0	35.8	6.0	* 29	8.0	54.8	7.0	27.8							
Max Q Clear Time (g_c+1), s	28.5	27.9	7.2	8.8	5.3	7.6	4.7	29.8							
Green Ext Time (p_c), s	0.0	4.2	0.0	0.4	0.0	2.3	0.0	0.0							
Intersection Summary															
HCM 2010 Ctrl Delay	42.3														
HCM 2010 LOS	D														
Notes															

38* North Phase II TIS
AM Baseline plus Residential plus Commercial

Synchro 10 Report
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HCM 2010 Signalized Intersection Summary
5: Santa Rosa Avenue & Hearn Avenue/Private Driveway

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↱	↱	↰	↱	↱	↰	↱	↱
Traffic Volume (veh/h)	317	3	795	3	4	4	442	666	1	3	314	359
Future Volume (veh/h)	317	3	795	3	4	4	442	666	1	3	314	359
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	1	1	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	319	0	641	3	4	3	442	666	1	3	314	356
Adj No. of Lanes	2	0	1	0	1	0	2	3	0	1	2	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1057	0	849	6	9	6	828	2839	4	7	1063	938
Arrive On Green	0.30	0.00	0.30	0.01	0.01	0.01	0.24	0.54	0.54	0.00	0.10	0.10
Sat Flow, veh/h	3548	0	1571	523	698	523	3442	5243	8	1774	3539	1555
Grp Volume(v), veh/h	319	0	641	10	0	0	442	431	236	3	314	356
Grp Sat Flow(s), veh/h/ln	1774	0	1571	1744	0	0	1721	1695	1861	1774	1770	1555
Q Serve(g_s), s	6.2	0.0	6.7	0.5	0.0	0.0	10.1	6.0	6.0	0.2	7.4	11.5
Cycle Q Clear(g_c), s	6.2	0.0	6.7	0.5	0.0	0.0	10.1	6.0	6.0	0.2	7.4	11.5
Prop In Lane	1.00		1.00	0.30		0.30	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	1057	0	849	21	0	0	828	1836	1008	7	1063	938
V/C Ratio(X)	0.30	0.00	0.76	0.47	0.00	0.00	0.53	0.23	0.23	0.42	0.30	0.38
Avail Cap(c_a), veh/h	1057	0	849	116	0	0	834	1836	1008	114	1063	938
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	0.33
Upstream Filter(I)	0.63	0.00	0.63	1.00	0.00	0.00	0.84	0.84	0.84	0.98	0.98	0.98
Uniform Delay (d), s/veh	24.4	0.0	16.2	44.2	0.0	0.0	29.8	10.8	10.8	44.8	31.7	12.3
Incr Delay (d2), s/veh	0.5	0.0	3.9	5.8	0.0	0.0	0.5	0.3	0.5	13.7	0.2	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	18.1	0.0	3.7	0.3	0.0	0.0	4.9	2.9	3.2	0.1	3.7	8.7
LnGrp Delay(d), s/veh	24.8	0.0	20.2	49.9	0.0	0.0	30.3	11.1	11.3	58.6	31.9	12.6
LnGrp LOS	C		C	D			C	B	B	E	C	B
Approach Vol, veh/h	960				10		1109			673		
Approach Delay, s/veh	21.7				49.9		18.8			21.8		
Approach LOS	C				D		B			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2	3	4			6	7	8				
Phs Duration (G+Y+Rc), s	30.0	25.3	30.6			4.1	3.6	52.3				
Change Period (Y+Rc), s	3.2	3.6	* 3.6			3.0	3.2	3.6				
Max Green Setting (Gmax), s	26.8	21.8	* 22			6.0	5.8	38.4				
Max Q Clear Time (g_c+I1), s	8.7	12.1	13.5			2.5	2.2	8.0				
Green Ext Time (p_c), s	3.7	1.2	2.3			0.0	0.0	4.7				
Intersection Summary												
HCM 2010 Ctrl Delay					20.7							
HCM 2010 LOS					C							
Notes												

38° North Phase II TIS
AM Baseline plus Residential plus Commercial

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HCM 2010 Signalized Intersection Summary
6: Corby Avenue & US 101 SB Ramps

10/01/2019

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	503	475	286	36	562	213		
Future Volume (veh/h)	503	475	286	36	562	213		
Number	7	14	6	16	5	2		
Initial Q (Qb), veh	1	1	1	0	0	1		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.98	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	503	466	286	36	562	213		
Adj No. of Lanes	1	1	2	1	2	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	631	936	671	294	838	440		
Arrive On Green	0.36	0.36	0.19	0.19	0.24	0.24		
Sat Flow, veh/h	1774	1583	3632	1546	3548	1863		
Grp Volume(v), veh/h	503	466	286	36	562	213		
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1546	1774	1863		
Q Serve(g_s), s	13.4	8.9	3.7	1.0	7.5	5.2		
Cycle Q Clear(g_c), s	13.4	8.9	3.7	1.0	7.5	5.2		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	631	936	671	294	838	440		
V/C Ratio(X)	0.80	0.50	0.43	0.12	0.67	0.48		
Avail Cap(c_a), veh/h	1050	1311	1487	649	1490	782		
HCM Platoon Ratio	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		
Uniform Delay (d), s/veh	15.6	6.2	18.8	17.7	18.3	17.5		
Incr Delay (d2), s/veh	2.4	0.4	0.4	0.2	0.9	0.8		
Initial Q Delay(d3),s/veh	0.1	0.0	0.0	0.0	0.0	0.1		
%ile BackOfQ(50%),veh/ln	7.1	6.3	1.9	0.4	3.8	2.9		
LnGrp Delay(d),s/veh	18.0	6.7	19.3	17.9	19.3	18.4		
LnGrp LOS	B	A	B	B	B	B		
Approach Vol, veh/h	969		322		775			
Approach Delay, s/veh	12.6		19.1		19.0			
Approach LOS	B		B		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		16.4		22.1		13.9		
Change Period (Y+Rc), s		4.0		3.5		4.0		
Max Green Setting (Gmax), s		22.0		31.0		22.0		
Max Q Clear Time (g_c+I1), s		9.5		15.4		5.7		
Green Ext Time (p_c), s		2.8		3.2		1.7		
Intersection Summary								
HCM 2010 Ctrl Delay			16.0					
HCM 2010 LOS			B					
Notes								

38° North Phase II TIS
AM Baseline plus Residential plus Commercial

Synchro 10 Report
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HCM 2010 Signalized Intersection Summary
7: Santa Rosa Avenue & US 101 NB Ramps/Yolanda Ave

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↘	↔	↑	↘	↔	↑	↘	↔	↑	↘
Traffic Volume (veh/h)	187	150	12	91	363	231	321	643	104	367	418	336
Future Volume (veh/h)	187	150	12	91	363	231	321	643	104	367	418	336
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	2	2	0	1	1	1	0	1	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	187	150	11	91	363	220	321	643	104	367	418	299
Adj No. of Lanes	2	1	1	1	1	1	2	2	1	2	2	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	269	196	166	242	298	253	401	1620	703	480	1684	857
Arrive On Green	0.08	0.10	0.10	0.14	0.16	0.16	0.12	0.46	0.46	0.22	0.79	0.79
Sat Flow, veh/h	3442	1863	1583	1774	1863	1583	3442	3539	1536	3442	3539	1554
Grp Volume(v), veh/h	187	150	11	91	363	220	321	643	104	367	418	299
Grp Sat Flow(s), veh/h/ln	1721	1863	1583	1774	1863	1583	1721	1770	1536	1721	1770	1554
Q Serve(g_s), s	4.8	7.1	0.4	4.2	14.4	9.0	8.2	10.8	3.5	9.1	2.7	4.5
Cycle Q Clear(g_c), s	4.8	7.1	0.4	4.2	14.4	9.0	8.2	10.8	3.5	9.1	2.7	4.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	269	196	166	242	298	253	401	1620	703	480	1684	857
V/C Ratio(X)	0.70	0.77	0.07	0.38	1.22	0.87	0.80	0.40	0.15	0.76	0.25	0.35
Avail Cap(c_a), veh/h	539	339	289	242	298	253	474	1620	703	627	1684	863
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67
Upstream Filter(I)	1.00	1.00	1.00	0.48	0.48	0.48	1.00	1.00	1.00	0.75	0.75	0.75
Uniform Delay (d), s/veh	40.4	39.2	21.9	35.6	37.8	19.7	38.8	16.2	14.3	33.2	5.1	4.1
Incr Delay (d2), s/veh	3.2	6.2	0.2	0.5	112.1	14.3	8.1	0.7	0.4	3.1	0.3	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.8	19.6	0.0	0.2	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	4.0	0.2	2.3	18.7	4.9	4.4	5.5	1.7	4.4	1.4	2.0	
LnGrp Delay(d), s/veh	43.7	45.4	22.1	36.8	169.5	34.0	47.1	16.9	14.7	36.2	5.4	4.9
LnGrp LOS	D	D	C	D	F	C	D	B	B	D	A	A
Approach Vol, veh/h	348			674			1068			1084		
Approach Delay, s/veh	43.7			107.3			25.8			15.7		
Approach LOS	D			F			C			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	14.0	46.7	10.9	18.3	15.7	45.1					
Change Period (Y+Rc), s	3.9	3.6	3.6	3.9	3.9	* 3.9	3.9	* 3.9				
Max Green Setting (Gmax), s	16.4	12.4	34.1	14.1	* 14	16.4	* 30					
Max Q Clear Time (g_c+1), s	9.1	10.2	6.5	6.8	16.4	11.1	12.8					
Green Ext Time (p_c), s	0.1	0.4	0.3	4.1	0.3	0.0	0.6	4.5				
Intersection Summary												
HCM 2010 Ctrl Delay				41.6								
HCM 2010 LOS				D								
Notes												

38° North Phase II TIS
AM Baseline plus Residential plus Commercial

Synchro 10 Report
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HCM 2010 Signalized Intersection Summary
8: Petaluma Hill Rd & Yolanda Ave

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↘	↔	↑	↘	↔	↑	↘	↔	↑	↘
Traffic Volume (veh/h)	140	67	92	6	119	4	302	838	3	3	369	171
Future Volume (veh/h)	140	67	92	6	119	4	302	838	3	3	369	171
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	1	0	0	0	0	0	0	0	0	0	5	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	140	67	53	6	119	4	302	838	3	3	369	146
Adj No. of Lanes	0	1	0	1	1	1	1	2	1	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	186	70	55	155	162	138	342	1772	793	7	442	145
Arrive On Green	0.17	0.17	0.17	0.09	0.09	0.09	0.19	0.50	0.50	0.00	0.33	0.33
Sat Flow, veh/h	944	452	357	1774	1863	1583	1774	3539	1583	1774	1262	499
Grp Volume(v), veh/h	260	0	0	6	119	4	302	838	3	3	0	515
Grp Sat Flow(s), veh/h/ln	1753	0	0	1774	1863	1583	1774	1770	1583	1774	0	1761
Q Serve(g_s), s	11.2	0.0	0.0	0.2	4.9	0.2	12.9	12.1	0.1	0.1	0.0	21.6
Cycle Q Clear(g_c), s	11.2	0.0	0.0	0.2	4.9	0.2	12.9	12.1	0.1	0.1	0.0	21.6
Prop In Lane	0.54		0.20	1.00		1.00	1.00		1.00	1.00		0.28
Lane Grp Cap(c), veh/h	310	0	0	155	162	138	342	1772	793	7	0	587
V/C Ratio(X)	0.84	0.00	0.00	0.04	0.73	0.03	0.88	0.47	0.00	0.42	0.00	0.88
Avail Cap(c_a), veh/h	378	0	0	410	431	366	387	1900	850	114	0	708
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	32.0	0.0	0.0	33.3	35.5	33.3	31.3	13.0	9.9	39.6	0.0	25.6
Incr Delay (d2), s/veh	13.0	0.0	0.0	0.1	6.3	0.1	19.1	0.2	0.0	34.7	0.0	10.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3
%ile BackOfQ(50%), veh/ln	0.0	0.0	0.1	2.8	0.1	8.3	6.1	0.0	0.1	0.0	0.0	13.7
LnGrp Delay(d), s/veh	45.0	0.0	0.0	33.4	41.8	33.4	50.5	13.2	9.9	74.3	0.0	40.4
LnGrp LOS	D			C	D	C	D	B	A	E		D
Approach Vol, veh/h	260			129			1143			518		
Approach Delay, s/veh	45.0			41.1			23.0			40.6		
Approach LOS	D			D			C			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2	3	4		6	7	8					
Phs Duration (G+Y+Rc), s	17.2	18.1	31.3		11.3	4.8	44.5					
Change Period (Y+Rc), s	3.6	3.0	5.8		4.5	4.5	5.8					
Max Green Setting (Gmax), s	16.8	17.0	31.3		18.0	5.0	41.8					
Max Q Clear Time (g_c+1), s	13.2	14.9	23.6		6.9	2.1	14.1					
Green Ext Time (p_c), s	0.5	0.2	1.9		0.4	0.0	5.8					
Intersection Summary												
HCM 2010 Ctrl Delay				31.4								
HCM 2010 LOS				C								
Notes												

38° North Phase II TIS
AM Baseline plus Residential plus Commercial

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
8: Petaluma Hill Rd & Yolanda Ave

10/01/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	67	92	6	119	4	302	838	3	3	369	171
Future Volume (veh/h)	140	67	92	6	119	4	302	838	3	3	369	171
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	1	0	0	0	0	0	0	0	0	0	5	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	140	67	53	6	119	4	302	838	3	3	369	146
Adj No. of Lanes	1	1	0	1	1	1	1	2	1	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	179	119	94	131	180	153	351	1809	809	7	444	155
Arrive On Green	0.10	0.12	0.12	0.07	0.10	0.10	0.20	0.51	0.51	0.00	0.34	0.34
Sat Flow, veh/h	1774	965	763	1774	1863	1583	1774	3539	1583	1774	1262	499
Grp Volume(v), veh/h	140	0	120	6	119	4	302	838	3	3	0	515
Grp Sat Flow(s),veh/h/ln	1774	0	1728	1774	1863	1583	1774	1770	1583	1774	0	1761
Q Serve(g_s), s	5.1	0.0	4.3	0.2	4.1	0.2	10.9	10.1	0.1	0.1	0.0	18.2
Cycle Q Clear(g_c), s	5.1	0.0	4.3	0.2	4.1	0.2	10.9	10.1	0.1	0.1	0.0	18.2
Prop In Lane	1.00		0.44	1.00		1.00	1.00		1.00	1.00		0.28
Lane Grp Cap(c), veh/h	179	0	213	131	180	153	351	1809	809	7	0	603
V/C Ratio(X)	0.78	0.00	0.56	0.05	0.66	0.03	0.86	0.46	0.00	0.42	0.00	0.85
Avail Cap(c_a), veh/h	233	0	251	482	506	430	429	2085	933	134	0	785
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.5	0.0	27.8	29.0	29.4	27.5	26.1	10.5	8.0	33.4	0.0	21.0
Incr Delay (d2), s/veh	12.2	0.0	2.3	0.1	4.1	0.1	14.0	0.2	0.0	34.3	0.0	7.2
Initial Q Delay(d3),s/veh	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4
%ile BackOfQ(50%),veh/ln	3.3	0.0	2.2	0.1	2.3	0.1	6.7	5.0	0.0	0.1	0.0	11.2
LnGrp Delay(d),s/veh	42.7	0.0	30.1	29.1	33.5	27.6	40.1	10.7	8.0	67.7	0.0	31.6
LnGrp LOS	D		C	C	C	C	D	B	A	E		C
Approach Vol, veh/h	260			129			1143			518		
Approach Delay, s/veh	36.9			33.1			18.5			31.8		
Approach LOS	D			C			B			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.5	12.6	16.1	28.1	11.1	10.9	4.8	39.4				
Change Period (Y+Rc), s	4.5	* 4.5	3.0	5.8	4.5	4.5	4.5	5.8				
Max Green Setting (Gmax), s	18.0	* 9.6	16.0	29.5	8.7	18.0	5.0	39.0				
Max Q Clear Time (g_c+1t), s	2.2	6.3	12.9	20.2	7.1	6.1	2.1	12.1				
Green Ext Time (p_c), s	0.0	0.1	0.3	2.1	0.1	0.4	0.0	5.8				
Intersection Summary												
HCM 2010 Ctrl Delay	25.1											
HCM 2010 LOS	C											
Notes												

38° North Phase II TIS
AM Baseline plus Residential plus Commercial - with LT Pocket

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
1: Santa Rosa Ave & Kawana Springs Rd

10/01/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	432	0	207	0	1039	551	92	772	0
Future Volume (veh/h)	0	0	0	432	0	207	0	1039	551	92	772	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	15	0	3	0	8	3	4	9	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	0.99	1.00		0.96	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	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	0	0	0	432	0	92	0	1039	339	92	772	0
Adj No. of Lanes	0	1	0	2	0	1	1	2	1	1	3	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	0
Cap, veh/h	0	2	0	642	0	373	1	2365	1295	127	3898	0
Arrive On Green	0.00	0.00	0.00	0.17	0.00	0.17	0.00	1.00	1.00	0.07	0.77	0.00
Sat Flow, veh/h	0	1863	0	3548	0	1561	1774	3539	1526	1774	5253	0
Grp Volume(v), veh/h	0	0	0	432	0	92	0	1039	339	92	772	0
Grp Sat Flow(s),veh/h/ln	0	1863	0	1774	0	1561	1774	1770	1526	1774	1695	0
Q Serve(g_s), s	0.0	0.0	0.0	13.8	0.0	5.8	0.0	0.0	0.0	6.1	5.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	13.8	0.0	5.8	0.0	0.0	0.0	6.1	5.0	0.0
Prop In Lane	0.00		0.00	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	0	2	0	642	0	373	1	2365	1295	127	3898	0
V/C Ratio(X)	0.00	0.00	0.00	0.67	0.00	0.25	0.00	0.44	0.26	0.73	0.20	0.00
Avail Cap(c_a), veh/h	0	109	0	949	0	521	103	2381	1295	169	3905	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.92	0.92	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	46.7	0.0	37.4	0.0	0.0	0.0	55.1	4.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.6	0.0	0.7	0.0	0.5	0.5	10.1	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	12.0	0.0	0.6	0.0	0.1	0.1	26.4	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	9.1	0.0	3.0	0.0	0.2	0.7	4.8	2.8	0.0
LnGrp Delay(d),s/veh	0.0	0.0	0.0	61.4	0.0	38.7	0.0	0.7	0.5	91.6	4.2	0.0
LnGrp LOS				E		D		A	A	F	A	
Approach Vol, veh/h	0			524			1378			864		
Approach Delay, s/veh	0.0			57.4			0.6			13.5		
Approach LOS				E			A			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		0.0	0.0	95.7		24.3	11.4	84.3				
Change Period (Y+Rc), s		3.0	3.0	3.6		3.9	3.6	3.6				
Max Green Setting (Gmax), s		7.0	7.0	60.4		32.1	11.4	55.4				
Max Q Clear Time (g_c+1t), s		0.0	0.0	7.0		15.8	8.1	2.0				
Green Ext Time (p_c), s		0.0	0.0	6.2		3.7	0.1	11.7				
Intersection Summary												
HCM 2010 Ctrl Delay	15.4											
HCM 2010 LOS	B											
Notes												

38° North Phase II TIS
PM Baseline plus Project

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
2: Petaluma Hill Rd & Kawana Springs Rd

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (veh/h)	205	242	128	149	225	29	123	686	194	19	430	266
Future Volume (veh/h)	205	242	128	149	225	29	123	686	194	19	430	266
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	12	0
Ped-Bike Adj(A_pbT)	0.99		0.98	1.00		0.97	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	205	242	75	149	225	25	123	686	175	19	430	139
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	468	618	606	452	511	57	323	1190	303	268	731	756
Arrive On Green	0.10	0.33	0.33	0.08	0.31	0.31	0.06	0.43	0.43	0.02	0.39	0.39
Sat Flow, veh/h	1774	1863	1548	1774	1642	182	1774	2794	712	1774	1863	1536
Grp Volume(v), veh/h	205	242	75	149	0	250	123	434	427	19	430	139
Grp Sat Flow(s), veh/h/ln	1774	1863	1548	1774	0	1825	1774	1770	1737	1774	1863	1536
Q Serve(g_s), s	7.6	10.0	3.1	5.6	0.0	10.9	3.9	18.7	18.7	0.6	18.2	5.1
Cycle Q Clear(g_c), s	7.6	10.0	3.1	5.6	0.0	10.9	3.9	18.7	18.7	0.6	18.2	5.1
Prop In Lane	1.00		1.00	1.00		0.10	1.00		0.41	1.00		1.00
Lane Grp Cap(c), veh/h	468	618	606	452	0	567	323	754	740	268	731	756
V/C Ratio(X)	0.44	0.39	0.12	0.33	0.00	0.44	0.38	0.58	0.58	0.07	0.59	0.18
Avail Cap(c_a), veh/h	510	618	606	530	0	567	461	754	740	438	731	756
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.92	0.92	0.92	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.0	25.7	19.6	20.9	0.0	27.5	18.4	21.8	21.8	18.4	25.0	14.4
Incr Delay (d2), s/veh	0.2	1.9	0.4	0.2	0.0	2.5	0.3	2.9	3.0	0.0	3.5	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	0.0
%ile BackOfQ(50%), veh/ln	8.7	5.4	1.4	2.8	0.0	5.9	1.9	9.7	9.5	0.3	12.7	2.2
LnGrp Delay(d), s/veh	20.3	27.5	20.0	21.0	0.0	30.0	18.7	24.8	24.8	18.4	33.2	14.9
LnGrp LOS	C	C	B	C		C	B	C	C	B	C	B
Approach Vol, veh/h	522				399			984			588	
Approach Delay, s/veh	23.6				26.6			24.0			28.4	
Approach LOS	C				C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	37.1	8.8	43.5	12.6	35.0	5.5	46.9					
Change Period (Y+Rc), s	3.0	3.9	3.0	* 4.3	3.0	3.9	3.0	4.3				
Max Green Setting (Gmax), s	31.1	12.0	* 31	12.0	31.1	12.0	30.7					
Max Q Clear Time (g_c+1/ff), s	12.0	5.9	20.2	9.6	12.9	2.6	20.7					
Green Ext Time (p_c), s	0.1	1.5	0.1	1.6	0.1	1.3	0.0	2.8				
Intersection Summary												
HCM 2010 Ctrl Delay				25.4								
HCM 2010 LOS				C								
Notes												

38* North Phase II TIS
PM Baseline plus Project

Synchro 10 Report
W-Trans

HCM 2010 TWSC
3: Franz Kafka Ave & Kawana Springs Rd

10/01/2019

Intersection						
Int Delay, s/veh	1.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱		↰	↰	↱
Traffic Vol, veh/h	349	70	4	305	58	6
Future Vol, veh/h	349	70	4	305	58	6
Conflicting Peds, #/hr	0	0	0	0	2	8
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	80	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	349	70	4	305	58	6
Major/Minor						
Major1	Major2		Minor1			
Conflicting Flow All	0	0	419	0	664	357
Stage 1	-	-	-	-	349	-
Stage 2	-	-	-	-	315	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1140	-	426	687
Stage 1	-	-	-	-	714	-
Stage 2	-	-	-	-	740	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1140	-	423	682
Mov Cap-2 Maneuver	-	-	-	-	423	-
Stage 1	-	-	-	-	711	-
Stage 2	-	-	-	-	739	-
Approach						
EB	WB		NB			
HCM Control Delay, s	0		0.1		14.6	
HCM LOS					B	
Minor Lane/Major Mvmt						
NBLn1	EBT	EBR	WBL	WBT		
Capacity (veh/h)	439	-	-	1140	-	
HCM Lane V/C Ratio	0.146	-	-	0.004	-	
HCM Control Delay (s)	14.6	-	-	8.2	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.5	-	-	0	-	

38* North Phase II TIS
PM Baseline plus Project

Synchro 10 Report
W-Trans

HCM 2010 Signalized Intersection Summary
4: Corby Avenue & Hearn Avenue

10/01/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	76	526	184	459	610	99	116	204	866	82	101	122
Future Volume (veh/h)	76	526	184	459	610	99	116	204	866	82	101	122
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	1	7	4	1	1	0	0	2	3	0	1	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	76	526	174	459	610	96	116	204	813	82	101	121
Adj No. of Lanes	1	1	1	1	2	0	1	1	1	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	100	655	541	452	1676	262	113	422	815	104	259	200
Arrive On Green	0.05	0.35	0.35	0.25	0.55	0.55	0.06	0.23	0.23	0.06	0.22	0.22
Sat Flow, veh/h	1774	1863	1549	1774	3055	480	1774	1863	1581	1774	766	918
Grp Volume(v), veh/h	76	526	174	459	353	353	116	204	813	82	0	222
Grp Sat Flow(s),veh/h/ln	1774	1863	1549	1774	1770	1766	1774	1863	1581	1774	0	1684
Q Serve(g_s), s	4.7	28.2	9.1	28.0	12.4	12.4	7.0	10.5	24.8	5.0	0.0	13.0
Cycle Q Clear(g_c), s	4.7	28.2	9.1	28.0	12.4	12.4	7.0	10.5	24.8	5.0	0.0	13.0
Prop In Lane	1.00		1.00	1.00		0.27	1.00		1.00	1.00		0.55
Lane Grp Cap(c), veh/h	100	655	541	452	970	968	113	422	815	104	0	373
V/C Ratio(X)	0.76	0.80	0.32	1.02	0.36	0.36	1.03	0.48	1.00	0.79	0.00	0.59
Avail Cap(c_a), veh/h	161	649	540	452	970	968	113	420	760	177	0	444
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.73	0.73	0.73	0.77	0.77	0.77	1.00	0.00	1.00
Uniform Delay (d), s/veh	51.3	32.9	26.6	41.0	14.1	14.1	51.5	37.1	26.7	51.1	0.0	38.5
Incr Delay (d2), s/veh	4.4	10.0	1.6	40.3	0.8	0.8	81.6	0.2	26.9	4.8	0.0	0.6
Initial Q Delay(d3),s/veh	3.0	4.2	0.6	7.8	0.0	0.0	0.4	0.3	11.9	0.0	0.0	0.1
%ile BackOfQ(50%),veh/ln	2.6	18.2	4.7	19.7	6.3	6.3	6.0	5.7	33.3	2.6	0.0	6.2
LnGrp Delay(d),s/veh	58.6	47.1	28.8	89.1	14.8	14.8	133.5	37.7	65.5	55.9	0.0	39.2
LnGrp LOS	E	D	C	F	B	B	F	D	E	E	D	D
Approach Vol, veh/h	776			1165			1133			304		
Approach Delay, s/veh	44.2			44.1			67.4			43.7		
Approach LOS	D			D			E			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	31.0	41.5	10.0	27.5	9.0	63.5	9.5	28.0				
Change Period (Y+Rc), s	3.0	3.2	3.0	* 3.2	3.0	3.2	3.0	3.2				
Max Green Setting (Gmax), s	28.0	33.8	7.0	* 29	10.0	51.8	11.0	24.8				
Max Q Clear Time (g_c+I1), s	30.0	30.2	9.0	15.0	6.7	14.4	7.0	26.8				
Green Ext Time (p_c), s	0.0	2.1	0.0	0.7	0.0	5.1	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay	51.9											
HCM 2010 LOS	D											
Notes												

38° North Phase II TIS
PM Baseline plus Project

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HCM 2010 Signalized Intersection Summary
5: Santa Rosa Avenue & Hearn Avenue/Private Driveway

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱		↰	↑	↱	↰	↑	↱	↰	↑
Traffic Volume (veh/h)	536	7	919	5	7	15	671	1094	0	5	672	484
Future Volume (veh/h)	536	7	919	5	7	15	671	1094	0	5	672	484
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	1	1	0	0	0	1	1	0	0	0	1
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	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	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	541	0	748	5	7	11	671	1094	0	5	672	471
Adj No. of Lanes	2	0	1	0	1	0	2	3	0	1	2	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	822	0	736	8	12	18	749	3210	0	11	1459	1017
Arrive On Green	0.23	0.00	0.23	0.02	0.02	0.02	0.22	0.63	0.00	0.00	0.28	0.28
Sat Flow, veh/h	3548	0	1559	370	518	813	3442	5253	0	1774	3539	1560
Grp Volume(v), veh/h	541	0	748	23	0	0	671	1094	0	5	672	471
Grp Sat Flow(s),veh/h/ln	1774	0	1559	1701	0	0	1721	1695	0	1774	1770	1560
Q Serve(g_s), s	16.6	0.0	27.8	1.6	0.0	0.0	22.8	12.1	0.0	0.3	18.8	19.7
Cycle Q Clear(g_c), s	16.6	0.0	27.8	1.6	0.0	0.0	22.8	12.1	0.0	0.3	18.8	19.7
Prop In Lane	1.00		1.00	0.22		0.48	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	822	0	736	38	0	0	749	3210	0	11	1459	1017
V/C Ratio(X)	0.66	0.00	1.02	0.61	0.00	0.00	0.90	0.34	0.00	0.44	0.46	0.46
Avail Cap(c_a), veh/h	822	0	705	128	0	0	855	3210	0	130	1477	1018
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	0.24	0.00	0.24	1.00	0.00	0.00	0.67	0.67	0.00	0.96	0.96	0.96
Uniform Delay (d), s/veh	41.8	0.0	31.8	58.1	0.0	0.0	45.7	10.4	0.0	59.5	32.4	13.5
Incr Delay (d2), s/veh	0.5	0.0	20.5	5.7	0.0	0.0	7.8	0.2	0.0	9.3	1.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	4.8	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	16.9	0.8	0.0	0.0	11.7	5.8	0.0	0.2	9.4	14.7
LnGrp Delay(d),s/veh	42.3	0.0	57.1	63.8	0.0	0.0	53.6	10.6	0.0	68.8	33.4	15.0
LnGrp LOS	D		F	E			D	B		E	C	B
Approach Vol, veh/h	1289			23			1765			1148		
Approach Delay, s/veh	50.9			63.8			27.0			26.0		
Approach LOS	D			E			C			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		31.0	29.6	53.7		5.7	4.0	79.4				
Change Period (Y+Rc), s		3.2	3.6	* 3.6		3.0	3.2	3.6				
Max Green Setting (Gmax), s		27.8	29.8	* 40		9.0	8.8	61.4				
Max Q Clear Time (g_c+I1), s		29.8	24.8	21.7		3.6	2.3	14.1				
Green Ext Time (p_c), s		0.0	1.3	6.4		0.0	0.0	10.3				
Intersection Summary												
HCM 2010 Ctrl Delay	34.2											
HCM 2010 LOS	C											
Notes												

38° North Phase II TIS
PM Baseline plus Project

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HCM 2010 Signalized Intersection Summary
6: Corby Avenue & US 101 SB Ramps

10/01/2019

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	252	589	584	106	484	248		
Future Volume (veh/h)	252	589	584	106	484	248		
Number	7	14	6	16	5	2		
Initial Q (Qb), veh	13	0	0	0	0	1		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.98	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	252	583	584	104	484	248		
Adj No. of Lanes	1	1	2	1	2	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	602	873	907	397	753	387		
Arrive On Green	0.34	0.34	0.26	0.26	0.21	0.21		
Sat Flow, veh/h	1774	1583	3632	1549	3548	1863		
Grp Volume(v), veh/h	252	583	584	104	484	248		
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1549	1774	1863		
Q Serve(g_s), s	6.4	15.5	8.6	3.1	7.3	7.1		
Cycle Q Clear(g_c), s	6.4	15.5	8.6	3.1	7.3	7.1		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	602	873	907	397	753	387		
V/C Ratio(X)	0.42	0.67	0.64	0.26	0.64	0.64		
Avail Cap(c_a), veh/h	818	1057	2115	926	1333	700		
HCM Platoon Ratio	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		
Uniform Delay (d), s/veh	16.5	9.5	20.0	17.9	21.5	21.4		
Incr Delay (d2), s/veh	0.5	1.2	0.8	0.3	0.9	1.8		
Initial Q Delay(d3),s/veh	5.8	0.0	0.0	0.0	0.0	0.1		
%ile BackOfQ(50%),veh/ln	6	9.8	4.4	1.4	3.7	4.0		
LnGrp Delay(d),s/veh	22.8	10.7	20.8	18.2	22.5	23.3		
LnGrp LOS	C	B	C	B	C	C		
Approach Vol, veh/h	835		688		732			
Approach Delay, s/veh	14.4		20.4		22.7			
Approach LOS	B		C		C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		16.1		23.4		19.1		
Change Period (Y+Rc), s		4.0		3.5		4.0		
Max Green Setting (Gmax), s		22.0		27.0		35.0		
Max Q Clear Time (g_c+I1), s		9.3		17.5		10.6		
Green Ext Time (p_c), s		2.7		2.3		4.5		
Intersection Summary								
HCM 2010 Ctrl Delay			18.9					
HCM 2010 LOS			B					
Notes								

38° North Phase II TIS
PM Baseline plus Project

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HCM 2010 Signalized Intersection Summary
7: Santa Rosa Avenue & US 101 NB Ramps/Yolanda Ave

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↩	↩	↩	↩	↩	↩	↩	↩	↩	↩	↩	↩
Traffic Volume (veh/h)	365	197	40	131	341	334	345	948	188	325	930	332
Future Volume (veh/h)	365	197	40	131	341	334	345	948	188	325	930	332
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	2	0	0	1	1	0	2	1	0	0	0	1
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	365	197	33	131	341	315	345	948	184	325	930	316
Adj No. of Lanes	2	1	1	1	1	1	2	2	1	2	2	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	426	232	197	303	317	269	409	1646	738	410	1695	914
Arrive On Green	0.12	0.12	0.12	0.17	0.17	0.17	0.12	0.46	0.46	0.11	0.46	0.46
Sat Flow, veh/h	3442	1863	1583	1774	1863	1583	3442	3539	1533	3442	3539	1557
Grp Volume(v), veh/h	365	197	33	131	341	315	345	948	184	325	930	316
Grp Sat Flow(s), veh/h/ln	1721	1863	1583	1774	1863	1583	1721	1770	1533	1721	1770	1557
Q Serve(g_s), s	12.5	12.4	1.8	7.9	20.4	16.0	11.8	23.5	8.8	11.1	23.0	12.7
Cycle Q Clear(g_c), s	12.5	12.4	1.8	7.9	20.4	16.0	11.8	23.5	8.8	11.1	23.0	12.7
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	426	232	197	303	317	269	409	1646	738	410	1695	914
V/C Ratio(X)	0.86	0.85	0.17	0.43	1.08	1.17	0.84	0.58	0.25	0.79	0.55	0.35
Avail Cap(c_a), veh/h	462	317	269	303	317	269	470	1645	713	470	1635	914
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.09	0.09	0.09	1.00	1.00	1.00	0.47	0.47	0.47
Uniform Delay (d), s/veh	51.7	51.4	31.7	44.7	49.8	37.0	51.9	23.5	18.4	51.4	22.1	13.0
Incr Delay (d2), s/veh	14.0	14.6	0.4	0.1	40.7	80.6	11.7	1.5	0.8	3.9	0.6	0.5
Initial Q Delay(d3), s/veh	1.1	0.0	0.0	0.1	10.5	0.0	1.1	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	7.0	7.3	0.8	4.1	15.0	13.7	6.5	11.9	3.7	5.5	11.0	5.7
LnGrp Delay(d), s/veh	66.8	66.0	32.1	44.9	101.0	117.6	64.7	25.0	19.2	55.3	22.7	13.5
LnGrp LOS	E	E	C	D	F	F	E	C	B	E	C	B
Approach Vol, veh/h	595			787			1477				1571	
Approach Delay, s/veh	64.6			98.3			33.5				27.6	
Approach LOS	E			F			C				C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	24.4	18.6	17.7	59.3	18.6	24.3	17.4	59.7				
Change Period (Y+Rc), s	3.9	3.6	3.6	3.9	3.9	* 3.9	3.9	* 3.9				
Max Green Setting (Gmax), s	16.1	20.4	16.4	52.1	16.1	* 20	16.4	* 52				
Max Q Clear Time (g_c+I1), s	14.4	13.8	25.0	14.5	22.4	13.1	25.5					
Green Ext Time (p_c), s	0.1	0.5	0.3	9.0	0.2	0.0	0.4	8.5				
Intersection Summary												
HCM 2010 Ctrl Delay				47.1								
HCM 2010 LOS				D								
Notes												

38° North Phase II TIS
PM Baseline plus Project

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HCM 2010 Signalized Intersection Summary
8: Petaluma Hill Rd & Yolanda Ave

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	231	160	110	6	136	6	293	796	9	8	669	106
Future Volume (veh/h)	231	160	110	6	136	6	293	796	9	8	669	106
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	1	0	0	0	0	0	0	0	0	0	5	0
Ped-Bike Adj(A_pbT)	1.00			1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1900	
Adj Flow Rate, veh/h	231	160	81	6	136	6	293	796	9	8	669	100
Adj No. of Lanes	0	1	0	1	1	1	1	2	1	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	350	64	32	155	163	139	258	1855	830	17	696	39
Arrive On Green	0.25	0.25	0.25	0.09	0.09	0.09	0.15	0.52	0.52	0.01	0.40	0.40
Sat Flow, veh/h	864	599	303	1774	1863	1583	1774	3539	1583	1774	1578	236
Grp Volume(v), veh/h	472	0	0	6	136	6	293	796	9	8	0	769
Grp Sat Flow(s), veh/h/ln	1766	0	0	1774	1863	1583	1774	1770	1583	1774	0	1814
Q Serve(g_s), s	36.4	0.0	0.0	0.4	10.4	0.5	21.0	20.0	0.4	0.6	0.0	57.7
Cycle Q Clear(g_c), s	36.4	0.0	0.0	0.4	10.4	0.5	21.0	20.0	0.4	0.6	0.0	57.7
Prop In Lane	0.49			0.17	1.00		1.00	1.00		1.00		0.13
Lane Grp Cap(c), veh/h	446	0	0	155	163	139	258	1855	830	17	0	735
V/C Ratio(X)	1.06	0.00	0.00	0.04	0.83	0.04	1.14	0.43	0.01	0.47	0.00	1.05
Avail Cap(c_a), veh/h	444	0	0	221	232	197	258	1855	830	61	0	724
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	54.1	0.0	0.0	60.4	65.0	60.5	61.8	21.1	16.5	71.3	0.0	43.5
Incr Delay (d2), s/veh	59.2	0.0	0.0	0.1	16.1	0.1	98.3	0.2	0.0	19.3	0.0	45.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.1
%ile BackOfQ(50%), veh	25.0	0.0	0.0	0.2	6.1	0.2	17.3	9.8	0.2	0.4	0.0	43.6
LnGrp Delay(d), s/veh	113.4	0.0	0.0	60.5	81.1	60.6	160.2	21.3	16.5	90.5	0.0	112.5
LnGrp LOS	F			E	F	E	F	C	B	F		F
Approach Vol, veh/h	472				148		1098			777		
Approach Delay, s/veh	113.4				79.4		58.3			112.3		
Approach LOS	F				E		E			F		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2	3	4			6	7	8				
Phs Duration (G+Y+Rc), s	40.0	24.0	63.5			17.2	5.9	81.6				
Change Period (Y+Rc), s	3.6	3.0	5.8			4.5	4.5	5.8				
Max Green Setting (Gmax), s	36.4	21.0	57.7			18.0	5.0	72.2				
Max Q Clear Time (g_c+1t), s	38.4	23.0	59.7			12.4	2.6	22.0				
Green Ext Time (p_c), s	0.0	0.0	0.0			0.3	0.0	5.9				
Intersection Summary												
HCM 2010 Ctrl Delay					86.8							
HCM 2010 LOS					F							

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PM Baseline plus Project

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HCM 2010 Signalized Intersection Summary
8: Petaluma Hill Rd & Yolanda Ave

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	231	160	110	6	136	6	293	796	9	8	669	106
Future Volume (veh/h)	231	160	110	6	136	6	293	796	9	8	669	106
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	1	0	0	0	0	0	0	0	0	0	5	0
Ped-Bike Adj(A_pbT)	1.00			1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	231	160	81	6	136	6	293	796	9	8	669	100
Adj No. of Lanes	1	1	0	1	1	1	1	2	1	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	259	231	117	69	167	142	314	2133	954	17	721	86
Arrive On Green	0.15	0.20	0.20	0.04	0.09	0.09	0.18	0.60	0.60	0.01	0.45	0.45
Sat Flow, veh/h	1774	1167	591	1774	1863	1583	1774	3539	1583	1774	1578	236
Grp Volume(v), veh/h	231	0	241	6	136	6	293	796	9	8	0	769
Grp Sat Flow(s), veh/h/ln	1774	0	1758	1774	1863	1583	1774	1770	1583	1774	0	1814
Q Serve(g_s), s	16.2	0.0	16.2	0.4	9.1	0.4	20.6	14.6	0.3	0.6	0.0	51.6
Cycle Q Clear(g_c), s	16.2	0.0	16.2	0.4	9.1	0.4	20.6	14.6	0.3	0.6	0.0	51.6
Prop In Lane	1.00			0.34	1.00		1.00	1.00		1.00		0.13
Lane Grp Cap(c), veh/h	259	0	348	69	167	142	314	2133	954	17	0	816
V/C Ratio(X)	0.89	0.00	0.69	0.09	0.81	0.04	0.93	0.37	0.01	0.47	0.00	0.94
Avail Cap(c_a), veh/h	290	0	344	252	265	225	322	2153	963	70	0	867
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	53.5	0.0	47.7	59.3	57.2	53.2	51.9	13.0	10.2	63.1	0.0	34.7
Incr Delay (d2), s/veh	25.7	0.0	5.9	0.5	9.9	0.1	32.6	0.1	0.0	18.4	0.0	17.7
Initial Q Delay(d3), s/veh	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7
%ile BackOfQ(50%), veh/ln	10.1	0.0	8.5	0.2	5.2	0.2	13.1	7.2	0.1	0.4	0.0	32.5
LnGrp Delay(d), s/veh	80.2	0.0	53.7	59.9	67.1	53.4	84.5	13.1	10.2	81.5	0.0	57.1
LnGrp LOS	F		D	E	E	D	F	B	B	F		E
Approach Vol, veh/h	472				148		1098			777		
Approach Delay, s/veh	66.6				66.2		32.2			57.3		
Approach LOS	E				E		C			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.5	29.3	25.6	62.2	22.9	15.9	5.7	82.1				
Change Period (Y+Rc), s	4.5	* 4.5	3.0	5.8	4.5	4.5	4.5	5.8				
Max Green Setting (Gmax), s	18.0	* 22	23.0	60.5	20.7	18.0	5.0	77.0				
Max Q Clear Time (g_c+1t), s	2.4	18.2	22.6	53.6	18.2	11.1	2.6	16.6				
Green Ext Time (p_c), s	0.0	0.4	0.0	2.8	0.2	0.3	0.0	5.9				
Intersection Summary												
HCM 2010 Ctrl Delay					48.5							
HCM 2010 LOS					D							
Notes												

38° North Phase II TIS
PM Baseline plus Residential plus Commercial - with LT Pocket

Synchro 10 Report
W-Trans

Queuing and Blocking Report
AM Baseline plus Residential - with LT Pocket

01/13/2020

Intersection: 8: Petaluma Hill Rd & Yolanda Ave

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	L	TR	L	T	L	T	TR
Maximum Queue (ft)	74	315	28	160	190	632	481
Average Queue (ft)	70	165	6	94	186	510	281
95th Queue (ft)	79	346	23	165	198	771	510
Link Distance (ft)	2525		412		580		1056
Upstream Blk Time (%)						28	
Queuing Penalty (veh)						0	
Storage Bay Dist (ft)	50	100		165			
Storage Blk Time (%)	57	5	7		15	21	43
Queuing Penalty (veh)	66	6	0		130	64	0

Queuing and Blocking Report
AM Baseline plus Residential plus Commercial - with LT Pocket

01/13/2020

Intersection: 8: Petaluma Hill Rd & Yolanda Ave

Movement	EB	EB	WB	WB	NB	NB	NB	SB
Directions Served	L	TR	L	T	L	T	T	TR
Maximum Queue (ft)	74	180	27	112	189	380	374	320
Average Queue (ft)	71	116	4	69	163	217	141	229
95th Queue (ft)	79	166	20	120	218	379	329	375
Link Distance (ft)	2525		400		580		580	1056
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	50	100		165				
Storage Blk Time (%)	35	16	3		23	2	30	
Queuing Penalty (veh)	56	22	0		98	7	1	

Queuing and Blocking Report
PM Baseline plus Residential - with LT Pocket

01/13/2020

Intersection: 8: Petaluma Hill Rd & Yolanda Ave

Movement	EB	EB	WB	WB	NB	NB	NB	SB
Directions Served	L	TR	T	R	L	T	R	TR
Maximum Queue (ft)	74	326	96	27	189	595	30	456
Average Queue (ft)	74	165	40	4	180	354	6	370
95th Queue (ft)	75	299	85	20	198	706	24	471
Link Distance (ft)		2525	394	394		580		1057
Upstream Blk Time (%)						17		
Queuing Penalty (veh)						0		
Storage Bay Dist (ft)	50				165		200	
Storage Blk Time (%)	44	36			30	5		35
Queuing Penalty (veh)	83	83			236	16		1

Queuing and Blocking Report
PM Baseline plus Residential plus Commercial - with LT Pocket

01/13/2020

Intersection: 8: Petaluma Hill Rd & Yolanda Ave

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	TR	L	T	L	T	T	R	L	TR
Maximum Queue (ft)	174	454	27	197	190	632	599	29	23	885
Average Queue (ft)	166	265	4	136	187	484	400	0	5	705
95th Queue (ft)	177	506	19	225	195	741	654	0	18	942
Link Distance (ft)		2525		383		580	580			1058
Upstream Blk Time (%)						18	1			
Queuing Penalty (veh)						0	0			
Storage Bay Dist (ft)	150		100		165			200	100	
Storage Blk Time (%)	35	9		32	53	1	2			52
Queuing Penalty (veh)	94	20		4	212	4	0			4

Appendix C

Site Circulation

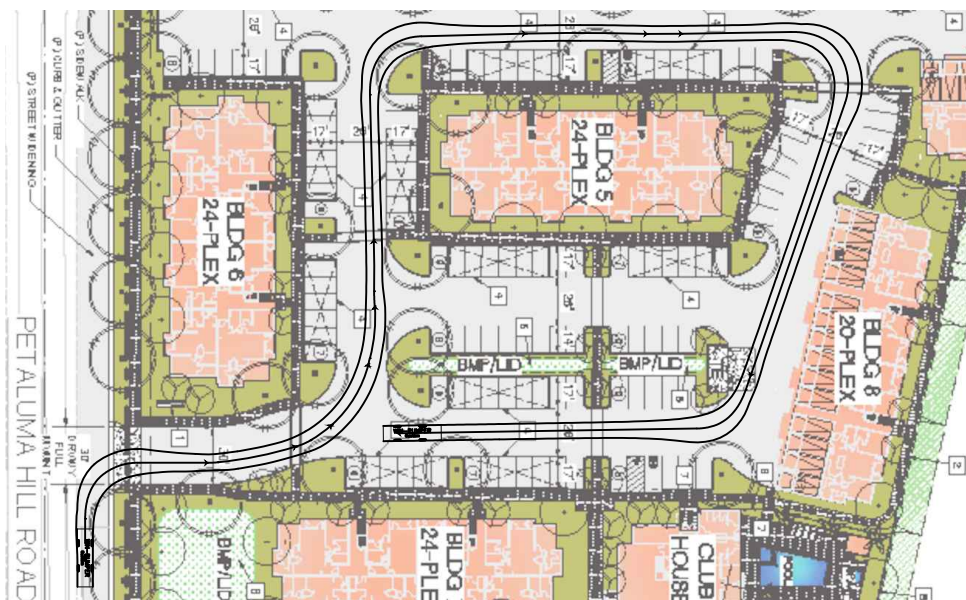




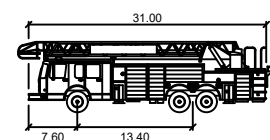
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Inbound from Franz Kafka Road



Inbound from Petaluma Hill Road



WINFIRE-TYPE1

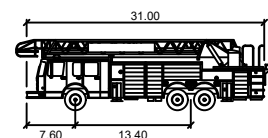
	feet
Width	: 8.20
Track	: 8.20
Lock to Lock Time	: 6.0
Steering Angle	: 26.4



Inbound from Farmers Lane Extension



Inbound from Franz Kafka Avenue



WINFIRE-TYPE1

	feet
Width	: 8.20
Track	: 8.20
Lock to Lock Time	: 6.0
Steering Angle	: 26.4