Traffic Impact Analysis Report

717 Donohoe Street

14-Unit Condominium Development

East Palo Alto, California

November 13, 2023

TJKM

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EXECUTIVE SUMMARY

This report summarizes the results of the Traffic Impact Analysis (TIA) conducted for the 10-unit condominium development located at 717 Donohoe Street in the City of East Palo Alto. The project site is located within the Weeks Neighborhood of the City of East Palo Alto and adjacent to the Gateway District (where IKEA and Ravenswood Shopping Center are located). The project proposes to develop 14 condominiums over three stories. Eight condominium units will have a 2-vehicle carport and 6 units with a 1-vehicle carport. Ten visitor parking spaces are identified along the driveway.

The report also includes evaluations and recommendations concerning project site access and on-site circulation for vehicles, bicycles, and pedestrians; evaluation of on-site vehicle parking, and queueing analysis at the study intersections. Additional analyses include intersection level of service (LOS) related to the project.

To evaluate the impacts on the transportation infrastructure due to the addition of traffic from the proposed project, 2 study intersections were evaluated during the weekday morning (a.m.) peak hour and evening (p.m.) peak hour under 2 study scenarios. The study intersections were evaluated under *No Project* and *plus Project* scenarios for Existing Conditions. For the purposes of this analysis, potential traffic operational effects from the proposed project are identified based on established traffic operational thresholds for the City of East Palo Alto.

Project Trip Generation

The proposed project is expected to generate approximately 5 weekday a.m. peak hour trips (1 inbound trips, 4 outbound trips) and 5 weekday p.m. peak hour trips (3 inbound trips, 2 outbound trips).

Level of Service (LOS) Standards

The City standard for signalized intersections in the City of East Palo Alto is LOS D.

Existing Conditions

Under this scenario, all of the study intersections operate within applicable jurisdictional standards of LOS D or better during the a.m. and p.m. peak hours with the exception of Donohoe Street/Cooley Avenue during the p.m. peak hour.

Existing plus Project Conditions

Under this scenario, all of the study intersections operate within applicable jurisdictional standards of LOS D or better during the a.m. and p.m. peak hours.

Based on the City impact criteria, the project is expected to have a **less-than-significant** impact at all of the study intersections.

Queueing Analysis

The proposed project *does not create a significant impact* by itself on the expected through movement queues at the study intersections.

Pedestrian Impacts

The proposed project will provide internal lighting for the walkways and driveways. The project will not conflict with existing and planned pedestrian facilities. However it is recommended to that proposed pedestrian facilities within the site meet American Disability Act (ADA) standards.

Bicycle Impacts

The project is does not conflict with existing and planned bicycle facilities; therefore, the impact to bicycle facilities is ***less than significant***.

Transit Impacts

The project site is within walking distance to two SamTrans bus stops, which can connect users to Redwood City Transit Center, Menlo Park Caltrain Station, and Palo Alto Transit Center, all of which provides access to the peninsula and southbay. Impacts to transit service are expected to be ***less than significant.***

Site Access and On-Site Circulation

The proposed driveway will be located between the intersections of Donohoe Street/Cooley Avenue and Donohoe Street/E. Bayshore Road. The driveway would serve vehicles and emergency vehicles. The proposed driveway can accommodate two-way travel. "KEEP CLEAR" pavements markings in front of the driveway will allow vehicles to exit due to the fact that Donohoe Street experiences congestion in the a.m. and p.m. peak period.

Alternative Driveway Access

If the proposed driveway is moved to an existing driveway on the northeast corner of Donohoe Street/E. Bayshore Road, there is no impact to the level of service, queues, and site access. However, the circulation and geometry from the driveway into the proposed site may be affected by the location of the condominiums. It may also affect fire-truck access into the project site.

Vehicle Miles Traveled

The project is expected to generate approximately 65 daily trips, which is under the 110 trip threshold. Therefore, this project is expected to have a **less than significant** impact on VMT.

1.0 INTRODUCTION

This report summarizes the results of the Traffic Impact Analysis (TIA) for the proposed 10-unit condominium development located at 717 Donohoe Street in the City of East Palo Alto, California.

1.1 Project Description

The project proposes to develop 14 condominiums over three stories. Eight condominium units will have a 2-vehicle carport and 6 units with a 1-vehicle carport. Ten visitor parking spaces are identified along the driveway.

The project is located across from IKEA and adjacent to Ravenswood Shopping Center. The project site is surrounded by single-family homes and an office complex. The proposed development is located near US-101 and University Avenue, which provide regional connectivity. Currently, the project site has not been developed. There are two SamTrans bus stops conveniently located along Donohoe Street that future residents can utilize.

The project site is located within the Weeks Neighborhood of the City of East Palo Alto and adjacent to the Gateway District (where IKEA and Ravenswood Shopping Center are located). The proposed land use is Medium Density Residential and follows the characteristics of the neighborhood, which include Low and Medium Density Residential land uses.

The following section discusses the TIA Purpose, study intersections, and analysis scenarios.

1.2 Project Purpose

The purpose of the Traffic Impact Analysis is to evaluate the impacts on the transportation infrastructure due to the addition of the traffic from the proposed project. The report also includes evaluations and recommendations concerning project site access and on-site circulation for vehicles, bicycles, and pedestrians, evaluation of the proposed ingress/egress of the proposed site, and queuing analysis and at the study intersections. An alternative driveway was also evaluated where an existing driveway located at the northeast corner of Donohoe Street and East Bayshore Road instead of the proposed driveway.

1.3 Study Area

The study area is bounded by Donohoe Street, Cooley Avenue, and East Bayshore Road. The project site is located near two SamTrans bus stops, which serves routes 280 and 296. The impacts of the proposed project were evaluated for the intersections discussed below.

TJKM evaluated traffic conditions at 2 study intersections during the a.m. and p.m. peak hours for a typical weekday. The study intersections were selected in consultation with the City of East Palo Alto staff. The peak periods observed were between 7:00-9:00 a.m. and 4:00-6:00 p.m. The study intersections and associated traffic controls are as follows:

1. Donohoe Street/Cooley Avenue (Signal)
2. Donohoe Street/East Bayshore Road (Signal)

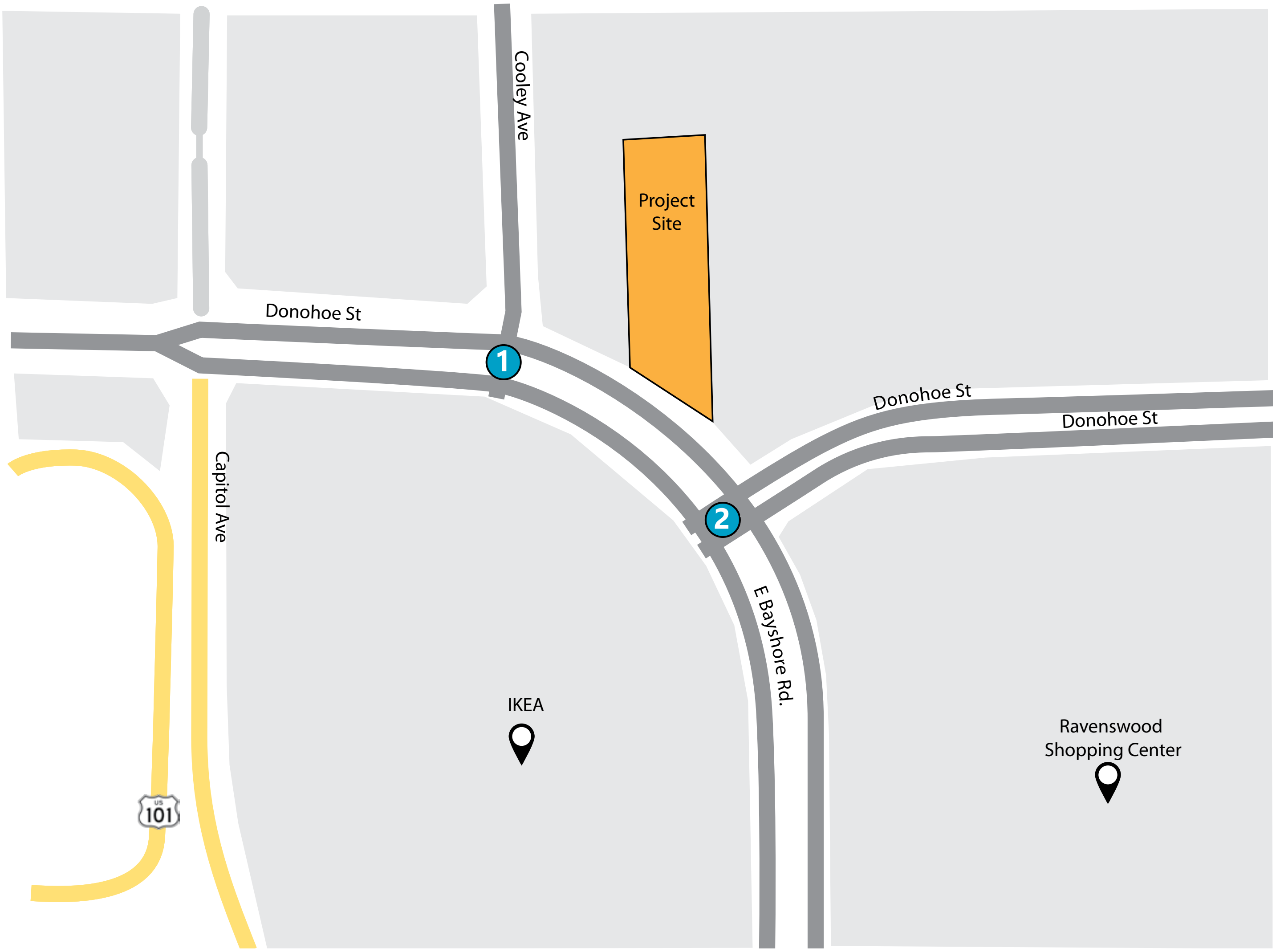
Figure 1 illustrates the study intersections and the vicinity map of the proposed project. **Figure 2** shows the proposed project site plan.

1.4 Analysis Scenarios

This study addresses the following six traffic scenarios:

- **Existing Conditions** – This scenario evaluates the study intersections based on existing traffic volumes, lane geometry, and traffic controls.
- **Existing plus Project Conditions** – This scenario is identical to Existing Conditions, but with the addition of traffic from the proposed project.

Figure 1: Vicinity Map

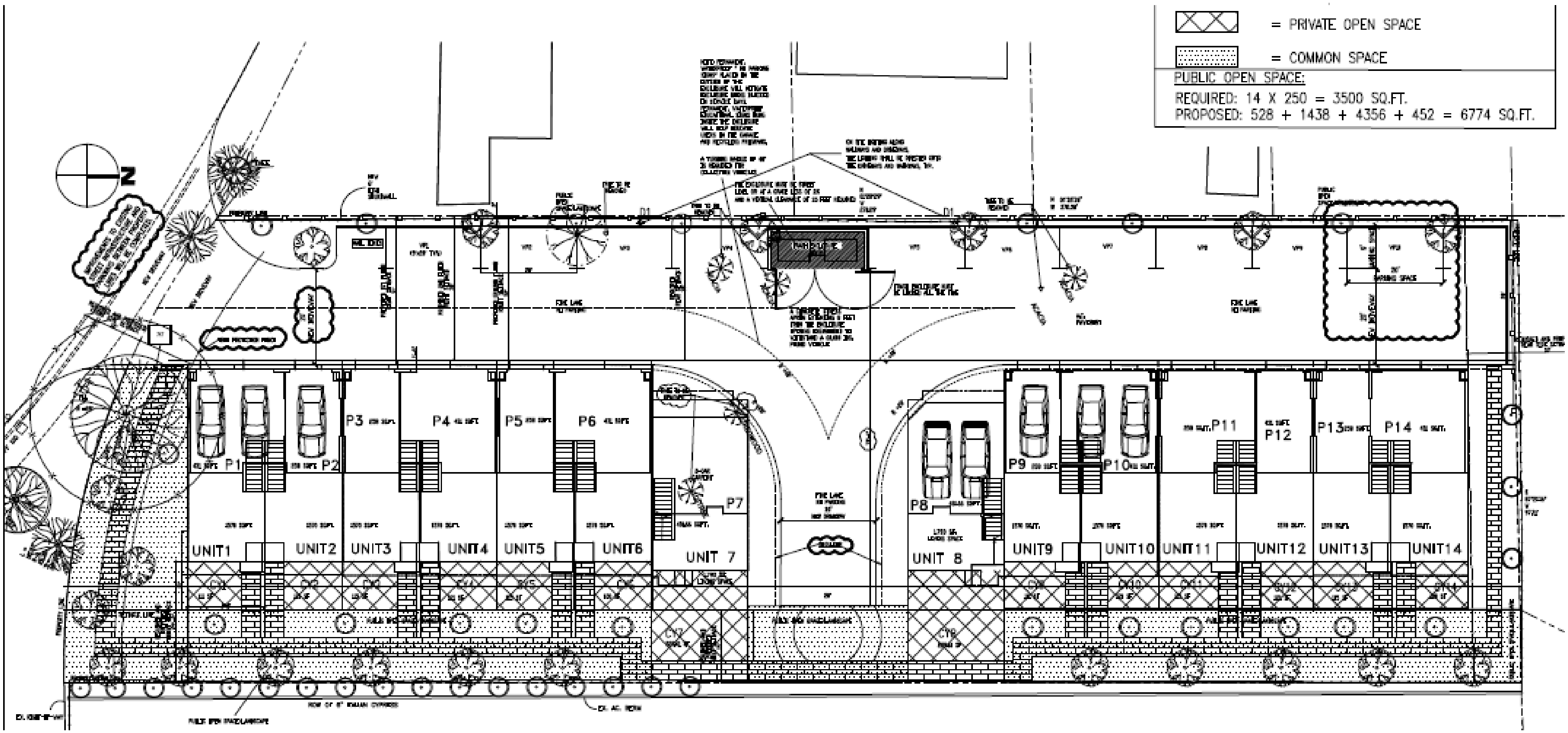


LEGEND

Project Site

Study Intersection

Figure 2: Site Plan



2.0 STUDY METHODOLOGY

This chapter discusses the level of service analysis methodology for study intersections and roadway segments and criteria used to identify significant impacts.

2.1 Level of Service Analysis Methodology

LOS is a qualitative measure that describes operational conditions as they relate to the traffic stream and perceptions by motorists and passengers. The LOS generally describes these conditions in terms of such factors as speed and travel time, delays, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. The operational LOS are given letter designations from A to F, with A representing the best operating conditions (free-flow) and F the worst (severely-congested flow with high delays). Intersections generally are the capacity-controlling locations with respect to traffic operations on arterial and collector streets.

Signalized Intersections

The study intersections under traffic signal control were analyzed using the 2000 Highway Capacity Manual (HCM) Operations Methodology for signalized intersections described in Chapter 16 (HCM 2000). This methodology determines LOS based on average control delay per vehicle for the overall intersection during peak-hour intersection operating conditions. The LOS methodology is approved and adopted by the City. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The average control delay for signalized intersections was calculated using Synchro 10 analysis software and was correlated to a LOS designation as shown in **Appendix A**. The LOS methodology for signalized intersections is described in detail in **Appendix A**.

2.2 Significant Impact Criteria/Level of Service Standards

Signalized Intersections

In general, according to the City LOS standard (minimum acceptable operations) for signalized intersections is LOS D or better.

According to the City of East Palo Alto, a projected-generated increase in traffic is considered to have a significant impact at a signalized intersection if it meets either of the following criteria:

- Intersection operations degrade from LOS D or better to unacceptable LOS E or F;
- Or exacerbates LOS E or F conditions by increasing critical delay by >4 seconds and increasing volume-to-capacity (v/c) ratio by 0.01;
- Or increases the v/c ratio by 0.01 at an intersection that exhibits unacceptable operations, even if the calculated LOS is acceptable.

Appropriate mitigation measures will be required to improve roadways to where projected-generated traffic will degrade the operations at the study intersections.

3.0 EXISTING CONDITIONS

This section describes existing conditions in the immediate project site vicinity, including roadway facilities, bicycle and pedestrian facilities, and available transit service. In addition, existing traffic volumes and operations are presented for the study intersections, including the results of LOS calculations.

3.1 Existing Setting and Roadway System

Regional roadway facilities providing access to the proposed mixed-use development is provided via US 101. Local access to the proposed project is provided via University Avenue, Donohoe Street, Cooley Avenue, and East Bayshore Road. Descriptions of the existing roadways are provided as follows:

US 101 is a north-south, eight-lane freeway with three mixed-flow lanes and one High Occupancy Vehicle (HOV) lane in each direction in the vicinity of the project. HOV Lanes, also known as diamond or carpool lanes, are restricted for use by vehicles occupied by two or more persons between 5 - 9 a.m. and between 3-7 p.m. HOV includes carpools, vanpools, and buses. US 101 is located south of the project site and provides regional freeway access north through the City of San Francisco and south through the City of San Jose. Near the project site, US 101 is oriented in a north-south direction. Access from US 101 to the project site is provided via the University Avenue interchange.

University Avenue is a north-south major thoroughfare between Bayfront Expressway and Downtown Palo Alto. University Avenue is primarily a four lane divided arterial in East Palo Alto. University Avenue connects directly to State Route 84, a major route for commuters in Alameda County travelling towards the peninsula and cities within San Mateo County. University Avenue also connects to the US 101 freeway which allows commuters to travel between regions in the Bay Area. The posted speed limit for University Avenue in the project vicinity is 25 mph.

Donohoe Street is an east-west major thoroughfare between Euclid Avenue and Clarke Avenue. Donohoe Street connects to University Avenue and provides access to US 101, IKEA, and Ravenswood Shopping Center. The posted speed limit for Donohoe Street is 25 mph. Two SamTrans bus stops are located within the project vicinity.

Cooley Avenue is a two-lane north-south neighborhood street between Donohoe Street and University Avenue. Cooley Avenue runs parallel to University Avenue and provides access to Central East Palo Alto. The posted speed limit is 25 mph.

East Bayshore Road is a four lane divided east-west major thoroughfare between Donohoe Street and Clarke Avenue. East Bayshore Road provides access to IKEA, Ravenswood Shopping Center, and the cities of Palo Alto and Menlo Park. East Bayshore Road runs parallel to US 101 and the posted speed limit is 25 mph

3.2 Existing Pedestrian Facilities

Walkability is defined as the ability to travel easily and safely between various origins and destinations without having to rely on automobiles or other motorized travel. The ideal "walkable" community includes wide sidewalks, a mix of land uses such as residential, employment, and shopping opportunities, a limited number of conflict points with vehicle traffic, easy access to transit facilities and services and a network of pedestrian facilities.

Pedestrian facilities are comprised of crosswalks, sidewalks, pedestrian signals, and off-street paths, which provide safe and convenient routes for pedestrians to access the destinations such as institutions, businesses, public transportation, and recreation facilities. In front of the proposed site, the sidewalk width is approximately six feet. The sidewalk widths in the project vicinity ranges from six to ten feet. In the project vicinity, all signalized study intersections are equipped with countdown pedestrian signal heads. Most of the study intersections have crosswalks with curb ramps. The roadway segments surrounding project vicinity have sidewalk along the both sides.

The existing pedestrian facilities in the study area are shown in **Figure 3**. Existing peak-hour pedestrian counts are provided in **Appendix B**.

3.3 Existing Bicycle Facilities

The 2017 Bicycle Transportation Plan describes the three bikeway classifications in the City of East Palo Alto. The Bicycle Transportation Plan also provides a list of existing and planned bicycle infrastructure improvements. These bicycle facility types are described below.

- **Class I Bike Path**: Class I bikeways are also referred to as multi-use or shared-use paths. They provide completely separated, exclusive right of way for people to walk and bike. There are currently 3.55 miles of Class I bicycle facilities in the City of East Palo Alto, which includes the Bay Trail and Rail Spur.
- **Class II Bike Lanes**: Class II bikeways are striped lanes on roadways for one-way bicycle travel. Some Class II bikeways can also have painted buffers that add a few feet of separation between the bike lane and the traffic lane. Bike lanes already exist on portions of Bay Road and University Avenue. There are currently 2.5 miles of Class II facilities in the City of East Palo Alto.
- **Class III Bikeways/Bike Routes**: Class III bikeways are signed bike routes where bicyclists share a travel lane with motorists. Class III bike routes are appropriate for low-volume streets with slow travel speeds, especially those on which motorist volumes are low enough that passing maneuvers can use the full street width, on roadways with bicycle demand but without adequate space for Class II striped bike lanes, and as "gap fillers" where there are short breaks in Class II lanes due to right-of-way constraints. There are 0.68 miles of Class III bikeways in East Palo Alto. Based on the Bicycle Transportation Plan, there is a proposed Class III facility along Donohoe Street and East Bayshore Road in the project vicinity

3.4 Parking

A total of 22 private parking spots are proposed to be provided with eight condominium units having a 2-vehicle carport and 6 units with a 1-vehicle carport. Ten visitor parking spaces are identified along the driveway.

On-street parking is currently available on Cooley Avenue from Donohoe Street to University Avenue. On-street parking is currently restricted on the segment of Donohoe Street that is directly behind Cardenas Markets and Office Depot building.

3.5 Existing Transit Facilities

Caltrain provides commuter rail service along the San Francisco Bay Area peninsula between Gilroy, through the south bay in San Jose, to San Francisco. There are no Caltrain stations in the City of East Palo Alto, however, SamTrans Route 280 and 296 provide connectivity to Redwood City Transit Center, Menlo Palo Caltrain Station, and Palo Alto Transit Center. At Redwood City Transit Center, users can transfer to Caltrain and other SamTrans services. At Menlo Park Caltrain Station, users can connect to Caltrain and other SamTrans service route. The Palo Alto Transit Center can connect users to VTA service, Dumbarton Express, Marguerite Shuttle, SamTrans, and Caltrain. **Table 1** summarizes existing Caltrain Service. **Table 2** summarizes existing SamTrans services in the City of East Palo Alto. **Figure 4** illustrates the existing transit facilities in the study area.

Table 1: Existing Caltrain Service

Direction	***Weekdays***		***Weekends***	
	Operating Hours	***Headway (minutes)***	***Operating Hours***	***Headway (minutes)***
Northbound	4:49 AM–10:49 PM	25-60	8:19 AM–9:19 PM (7:19 AM–10:49 PM Saturdays)	60
Southbound	6:05 AM–1:11 AM	25-60	9:31 AM–10:31 PM (extended to 1:17 AM Saturdays)	60
Northbound (Baby Bullet)	6:01 AM-8:05 AM, 4:38 PM -6:34 PM	AM-60 PM- 20-35	10:06 AM 5:36 PM	N/A
Southbound (Baby Bullet)	7:28 AM-9:28 AM 4:56 PM- 7:03 PM	AM- 22-38 PM 60	12:54 PM 8:24 PM	N/A

Notes: Source Caltrain Website 2019 * The weekend Baby Bullet only offers two express times in each direction during the weekend day.

Table 2: Existing SamTrans Service

Route	From	To	Closest Stop to Project Site	Weekdays Operating Hours	Weekdays Headway (minutes)	Weekends Operating Hours	Weekends Headway (minutes)
280	Stanford Shopping Center	Purdue Avenue/Fordham Street	Donohoe Street/Capitol Avenue	5:36 AM – 10:40 PM	47-60	7:41 AM– 8:11 PM	60
296	Redwood City Transit Center	Palo Alto Transit Center	East Bayshore Road/Donohoe Street	3:40 AM– 2:44 AM	20	3:45 AM – 2:20 AM	30

Notes: Source SamTrans Website 2019

3.6 Field Observations

Traffic conditions in the field were observed in order to identify existing operational deficiencies and to confirm the accuracy of calculated levels of service. The purpose of this effort was (1) to identify any existing traffic problems that may not be directly related to intersection level of service, and (2) to identify any locations where the level of service analysis does not accurately reflect level of service in the field.

Field observations showed that some operational problems currently occur at the following locations near the project site:

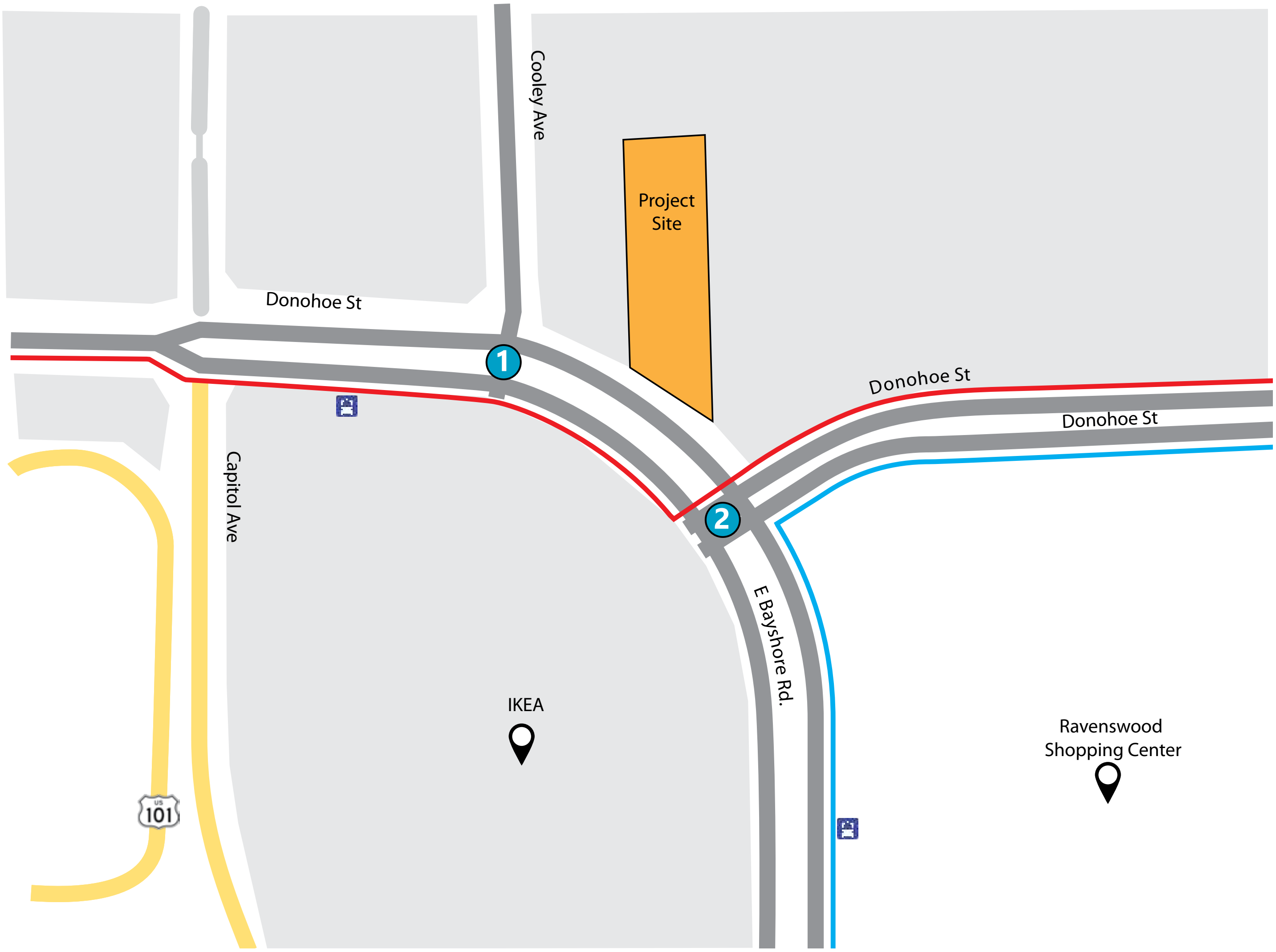
Donohoe Street: During the a.m. peak period, it was observed that there are heavy left-turn and through movements in the westbound direction at the intersection of University Avenue/Donohoe Street. Queue spillback was also observed from US 101 NB off-ramp into Cooley Avenue and from Cooley Avenue into Bayshore Road in the westbound direction. During the peak period, there were multiple instances where the queue at the intersection of University Avenue/Donohoe Street spilled back into the intersection of Donohoe Street/US 101 NB Ramps. Also, it was observed that left-turn queue at the intersection of Donohoe Street/Cooley Avenue in the eastbound direction often spilled over into the through lanes.

Figure 3: Existing Pedestrian Facilities

LEGEND

- Project Site
- Study Intersection
- Crosswalks
- Sidewalks

Figure 4: Existing Transit Facilities



LEGEND
- Project Site
- Study Intersection
- Bus Stop
- Sam Trans 296
- Sam Trans 280

3.7 Existing Peak Hour Traffic Volumes And Lane Configurations

The existing operations of the study intersections were evaluated for the highest one-hour volumes during weekday morning and evening peak periods. Recent turning movement counts for vehicles, bicycles, and pedestrians were conducted during the weekday a.m. peak period (7:00-9:00 a.m.) and p.m. peak period (4:00-6:00 p.m.) at the study intersections in September 2019. **Appendix B** includes all data sheets for the collected vehicle, bicycle, and pedestrian counts. **Figures 5** illustrates the existing lane geometry, and traffic controls at the study intersections. **Figures 6** illustrates the existing a.m. and p.m. peak hour pedestrian and bicycle volumes at the study intersections. **Figure 7** illustrates the existing a.m. and p.m. peak hour vehicle turning movement volumes at the study intersections.

3.8 Intersection Level of Service Analysis – Existing Conditions

Existing intersection lane configurations, signal timings, and turning movement volumes are used to calculate the level of service for the study intersections during each peak hour. The results of the LOS analysis using the Synchro software program for Existing Conditions are summarized in **Table 3**.

The Existing Conditions LOS analysis for purpose of this TIA is based on an isolated intersection analysis of traffic volumes, rather than analysis of the corridor as a whole. The standalone LOS results sometimes can be misleading if a corridor operates under forced flow, or congested, traffic conditions. Forced flow traffic operations can reduce overall vehicle throughput per hour at intersections, leading to LOS analysis results that suggest there is less corridor congestion than is actually occurring under existing field conditions. Where there is known congestion, additional analysis of field conditions becomes necessary in order to review and evaluate the extent of forced flow operations.

Table 3 below summarizes peak hour LOS at the study intersections under Existing Conditions. Under this scenario, all of the study intersections operate at acceptable service levels (LOS D or better) during the a.m. and p.m. peak period. LOS worksheets are provided in **Appendix C**.

Table 3: Intersection Level of Service Analysis – Existing Conditions

#	Study Intersections	Control	Peak Hour	Existing Conditions		
				Delay[1]	LOS[2]	V/C[3]
1	Donohoe Street/Cooley Avenue	Signalized	AM	20.9	C	0.38
			PM	21.5	C	0.66
2	Donohoe Street/E. Bayshore Road	Signalized	AM	27.8	C	0.39
			PM	26.5	C	0.63

Notes:
1. AM – morning peak hour, PM – evening peak hour
2. Delay – Whole intersection weighted average control delay expressed in seconds per vehicle for signalized and all-way stop controlled intersections. Total control delay for the worst movement is presented for side-street stop – controlled intersections. LOS – Level of Service. **Bold** indicates unacceptable LOS, Delay, and V/C Ratio.
3. Critical volume to capacity ratio

Figure 5: Existing Lane Geometry and Traffic Controls

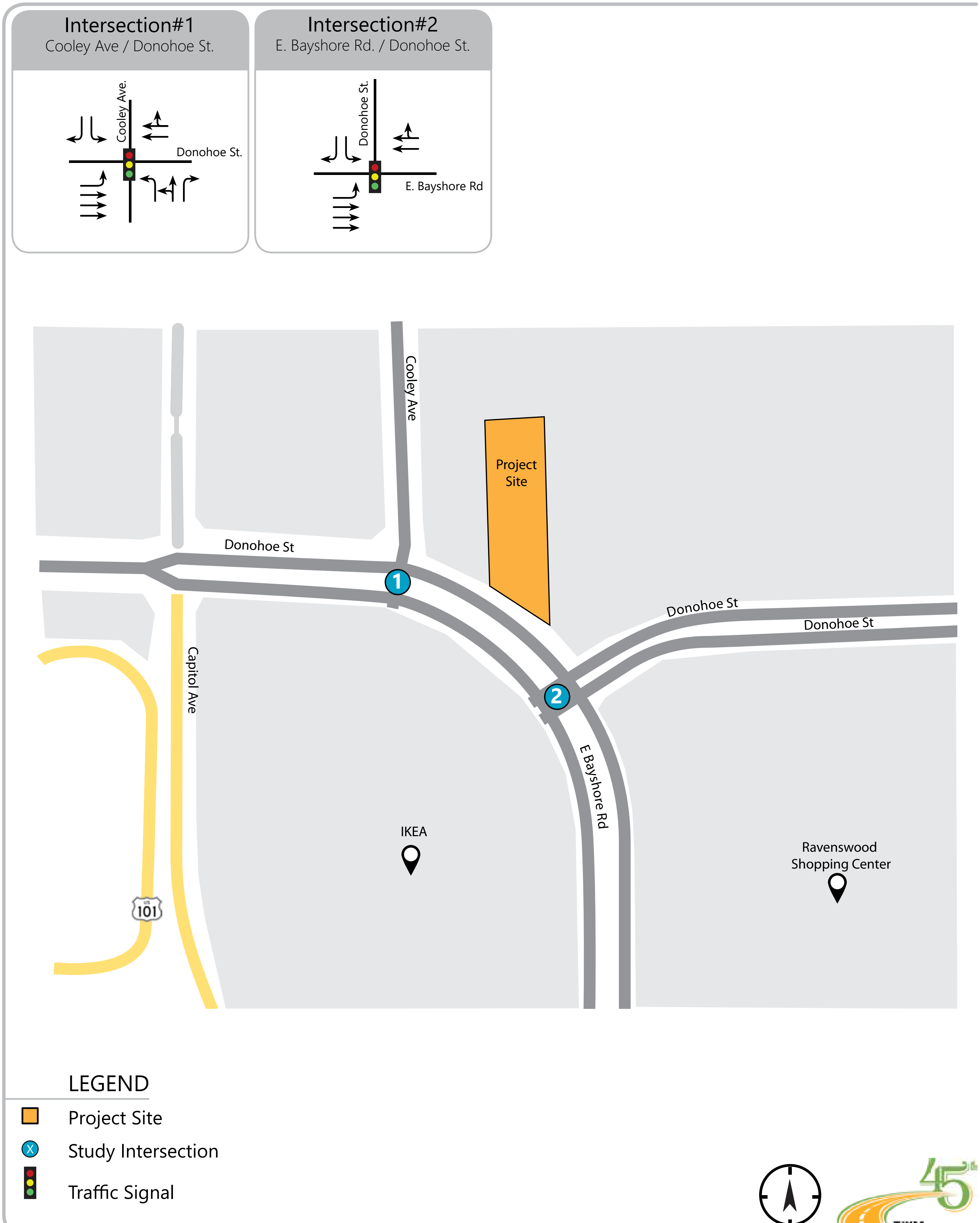
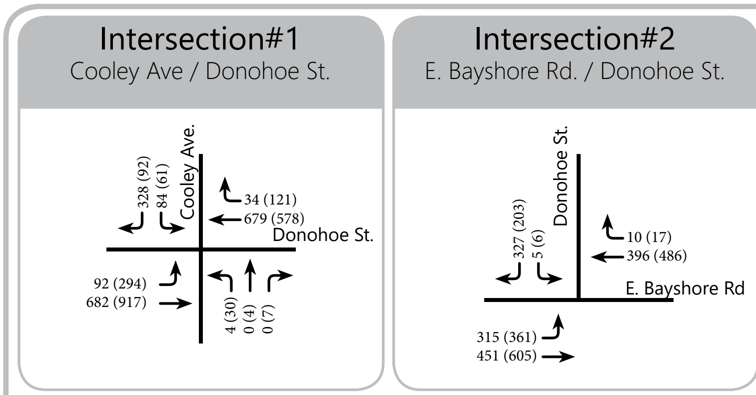


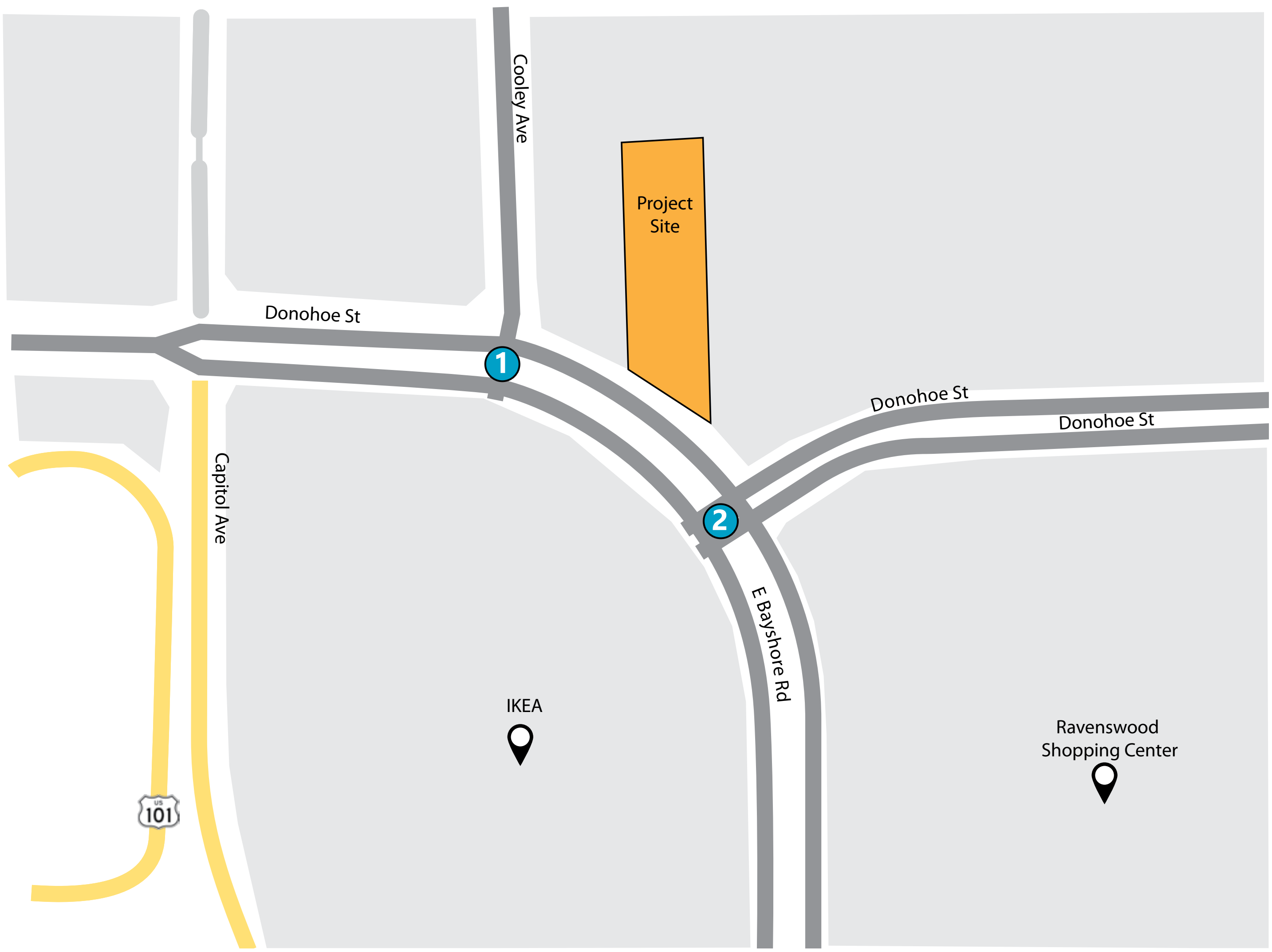
Figure 6: Bicycle and Pedestrian Peak Hour Volumes

LEGEND

- Project Site
- Study Intersection
- XX AM Peak Hour Project Trips
- (XX) PM Peak Hour Project Trips

Figure 7: Existing Peak Hour Traffic Volumes





LEGEND

Project Site

Study Intersection

XX AM Peak Hour Project Volumes

(XX) PM Peak Hour Project Volumes

4.0 EXISTING PLUS PROJECT CONDITIONS

The impacts of the proposed project on the transportation system are discussed in this chapter. First, the method used to estimate the amount of traffic generated by the project is described. Then, the results of the level of service calculations for Existing plus Project Conditions are presented. (Existing plus Project Conditions are defined as Existing Conditions plus traffic generated by the proposed project). A comparison of intersections under Existing plus Project Conditions and Existing Conditions is presented and the impacts of the project on the study intersections are discussed. Project impacts on roadway segments are also addressed.

The amount of traffic added to the roadway system by the proposed development is estimated using a three-step process.

- Trip Generation – Estimates the amount of traffic added to the roadway network,
- Trip Distribution – Estimates the direction of travel to and from the project site,
- Trip Assignment – The new trips are assigned to specific street segments and intersection turning movements.

4.1 Project Trip Generation

TJKM developed estimated project trip generation for the proposed project based on published trip generation rates from the *Institute of Transportation Engineers' (ITE) publication Trip Generation (11th Edition).*

TJKM used published trip rates for the ITE land use Multifamily Housing (Mid-Rise), General Urban/Suburban (ITE Code 221), as this land use most closely matches the trip characteristics of the proposed mixed use development.

Table 4 shows the trip generation expected to be generated by the proposed project. The proposed project is expected to generate approximately 64 daily trips, 5 weekday a.m. peak hour trips (1 inbound trips, 4 outbound trips), and 5 weekday p.m. peak hour trips (3 inbound trips, 2 outbound trips).

Table 4: Project Trip Generation

Land Use (ITE Code)	Size	Unit	Daily		A.M. Peak Hour					P.M. Peak Hour				
			Rate	Trips	Rate	In:Out	In	Out	Total	Rate	In:Out	In	Out	Total
Multi Family Housing - Mid Rise (221)[1]	14	DU	4.54	64	0.37	23:77	1	4	5	0.39	61:39	3	2	5
Net Trips (A-B)				**64**			**1**	**4**	**5**			**3**	**2**	**5**

Source - ITE Trip Generation Manual, 11th Edition
[1]Multifamily Housing (Mid-Rise), General Urban/Suburban (ITE Land Use Code 221) vehicle trip rates are based upon number of dwelling units.

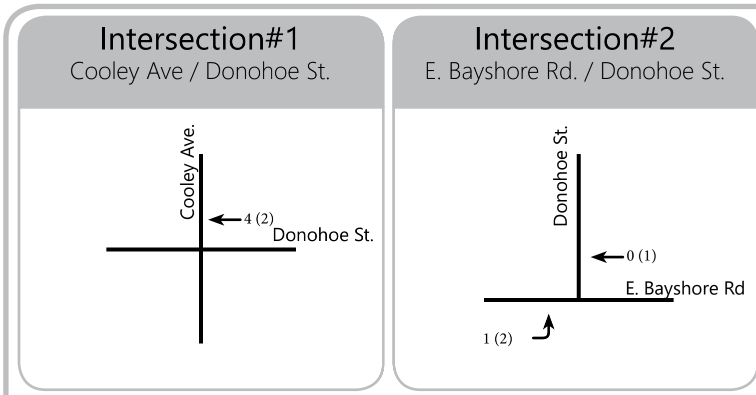
4.2 Project Trip Distribution and Assignment

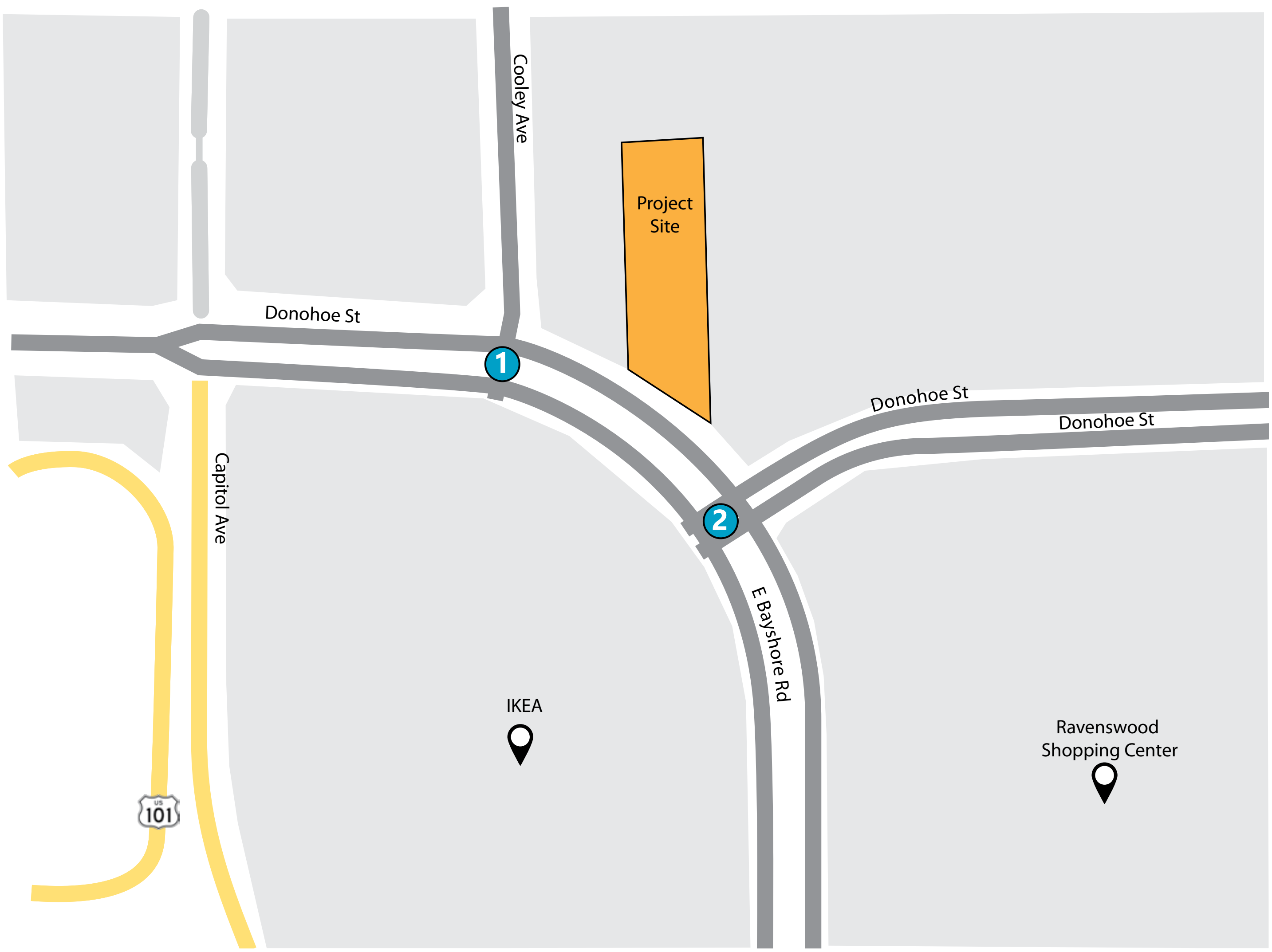
Trip distribution is a process that determines in what proportion vehicles would be expected to travel between the project site and various destinations outside the project study area and also determines the various routes that vehicles would take from the project site to each destination using the calculated trip distribution. Trip distribution assumptions for the proposed project were developed based on existing travel patterns, knowledge of the study area, and consultation with City staff.

Figure 8 illustrates the trip distribution percentages developed for the proposed condominium project and **Figure 9** illustrates the trip assignment project volumes developed for the proposed project. The assigned project trips were then added to traffic volumes under Existing Conditions to generate Existing plus Project Conditions traffic volumes.

Figure 8: Project Trip Distribution

Figure 9: Project Trip Assignment





LEGEND

- Project Site
- Study Intersection
- XX AM Peak Hour Project Volumes
- (XX) PM Peak Hour Project Volumes

4.3 Intersection Level of Service Analysis – Existing plus Project Conditions

The intersection LOS analysis results for Existing plus Project Conditions are summarized in **Table 5**. Detailed calculation sheets for Existing plus Project Conditions are contained in **Appendix D**. All intersections are expected to continue operating within applicable jurisdictional standards of LOS D.

Based on the City of East Palo Alto's impact criteria, the project is expected to have a **less-than-significant impact** at all the study intersections evaluated in this TIA.

Figures 10 displays projected peak hour turning movement volumes at all of the study intersections for Existing plus Project Conditions.

The results for Existing Conditions are included for comparison purposes, along with the projected increases in critical delay and critical V/C ratios.

Table 5: Intersection Level of Service Analysis – Existing plus Project Conditions

#	Study Intersections	Control	Peak Hour	Existing Conditions		Existing plus Project Conditions		*Change in*	
				Delay[1]	LOS[2]	Delay[1]	LOS[2]	Critical V/C[3]	Critical Delay[4]
1	Donohoe Street/Cooley Avenue	Signalized	AM	20.9	C	20.8	C	0.00	-0.10
			PM	21.5	C	22.5	C	0.01	1.00
2	Donohoe Street/E. Bayshore Road	Signalized	AM	27.8	C	27.7	C	0.00	-0.10
			PM	26.5	C	27.1	C	0.00	0.60

Notes:
1. AM – morning peak hour, PM – evening peak hour
2. Delay – Whole intersection weighted average control delay expressed in seconds per vehicle for signalized and all-way stop controlled intersections. Total control delay for the worst movement is presented for side-street stop – controlled intersections.
LOS – Level of Service. **Bold** indicates unacceptable Level of Service.
3. Change in critical volume to capacity ratio between Existing and Existing plus Project Conditions
4. Change in average critical movement delay between Existing and Existing plus Project Conditions

Figure 10: Existing plus Project Peak Hour Traffic Volumes

LEGEND

Project Site

Study Intersection

XX AM Peak Hour Project Volumes

(XX) PM Peak Hour Project Volumes

5.0 ADDITIONAL ANALYSES

The following sections provide additional analyses of other transportation issues associated with the project site, including:

- Operational analysis – vehicle queuing analysis;
- Site access and onsite circulation;
- Alternative Driveway Access
- Pedestrian, Bicycle, and Transit Impacts

Unlike the LOS impact methodology, which is adopted by the City Council, the analyses in these sections is based on professional judgment in accordance with the standards and methods employed by traffic engineers. Although operational issues are not considered CEQA impacts, they do describe traffic conditions that are relevant to describing the project environment.

5.1 Queuing Analysis

Queuing Analysis at Study Intersections

TJKM conducted a vehicle queuing and storage analysis for all through movements at study intersections where project traffic is added under Existing plus Project Conditions. The 95th percentile (maximum) queues were analyzed using the HCM 2000 Queue methodology contained in Synchro software. Detailed calculations are included in the LOS appendices corresponding to each analysis scenario. **Table 6** summarizes the 95th percentile queue lengths at selected study intersections under Existing and Existing plus Project Conditions scenarios. The proposed project *does not create a significant impact* by itself the through movements at the study intersections.

Table 6: 95th Percentile Queues

#	Study Intersections	Lane Group	Storage Length	Existing		Existing plus Project		Change	
				AM	PM	AM	PM	AM	PM
1	Donohoe Street/Cooley Ave	EBL	105	126	585	126	585	0	0
		EBT	-	127	174	127	174	0	0
		WBT	-	367	130	367	163	0	33
		SBL	100	99	76	99	76	0	0
		SBR	-	74	42	74	42	0	0
2	Donohoe Street/E. Bayshore Road	EBL	-	347	677	348	682	1	5
		EBT	-	114	18	110	26	-4	8
		WBT	-	180	217	180	217	0	0
		SBL	-	14	15	14	15	0	0
		SBR	-	78	61	78	61	0	0

Notes: Storage length and 95th percentile queue is expressed in feet per lane
AM – morning peak hour, PM – evening peak hour
Bold indicates queue lengths exceeding capacity

5.2 Site Access and On-Site Circulation

Site Access

This section analyzes site access and internal circulation for vehicles, pedestrians and bicycles based on the site plan presented on **Figure 2**. TJKM reviewed internal and external access for the project site for vehicles, pedestrians, and bicycles.

The site access and on-site circulation is considered adequate with a proposed driveway located along Donohoe Street.

On-Site Circulation

In terms of external access, the project conceptual plan (dated June 19, 2019) shows the driveways that the proposed project would use. The driveway on Donohoe Street serves right-in and right-out movements only. The driveway to access the condominiums is proposed to be 20 feet wide, which can accommodate two-way travel.

From the site plan, it appears that fire-truck access is provided by the fire lanes provided on-site. Parking will be restricted along the fire lanes. New fire hydrants will present throughout the site.

Based on a preliminary review of the project site plan, the project driveways will be located between the intersections of Donohoe Street/Cooley Avenue and Donohoe Street/E. Bayshore Road. There may be some queuing issues on Donohoe Street which may block vehicles from exiting the driveway. "KEEP CLEAR" pavement markings in front of the driveway may prevent vehicles on Donohoe Street from queueing in front of the driveway.

5.3 Alternative Driveway Access

This section analyzes LOS, queues, site access and circulation of an alternate driveway access from an existing driveway on the northeast corner of the intersection of Donohoe Street/East Bayshore Road instead of the proposed driveway on Donohoe Street.

Level of Service

The intersection LOS analysis results for Existing plus Project Conditions (Alternative Driveway Access) are summarized in **Table 7**. Detailed calculation sheets for Existing plus Project Conditions are contained in **Appendix E**. All intersections are expected to continue operating within applicable jurisdictional standards of LOS D.

Based on the City of East Palo Alto's impact criteria, the project is expected to have a **less-than-significant impact** at all the study intersections evaluated if the proposed driveway were to be relocated.

The results for Existing Conditions are included for comparison purposes, along with the projected increases in critical delay and critical V/C ratios.

Table 7: Intersection Level of Service Analysis – Existing plus Project Conditions (Alternative Driveway Access)

#	Study Intersections	Control	Peak Hour	Existing Conditions		Existing plus Project Conditions		*Change in*	
				Delay[1]	LOS[2]	Delay[1]	LOS[2]	Critical V/C[3]	Critical Delay[4]
1	Donohoe Street/Cooley Avenue	Signalized	AM	20.9	C	20.9	C	0.00	0.00
			PM	21.5	C	21.6	C	0.01	0.10
2	Donohoe Street/E. Bayshore Road	Signalized	AM	27.8	C	27.8	C	0.00	0.00
			PM	26.5	C	26.9	C	0.00	0.40

Notes:
1. AM – morning peak hour, PM – evening peak hour
2. Delay – Whole intersection weighted average control delay expressed in seconds per vehicle for signalized and all-way stop controlled intersections. Total control delay for the worst movement is presented for side-street stop – controlled intersections.
LOS – Level of Service. **Bold** indicates unacceptable Level of Service.
3. Change in critical volume to capacity ratio between Existing and Existing plus Project Conditions
4. Change in average critical movement delay between Existing and Existing plus Project Conditions

Queueing

Queueing was analyzed for the lane groups that project trips were assigned to for Existing Condition and Existing Plus Project (Alternative Driveway Access). **Table 8** summarizes the 95th percentile queue lengths at selected study intersections under Existing and Existing plus Project Conditions (Alternative Driveway Alternative) scenarios. The proposed project *does not create a significant impact* by itself at the through movements at the study intersections. However, it would be recommended to install "KEEP CLEAR" pavement markings in front of the driveway to allow residents to exit the site.

Table 8: 95th Percentile Queues

#	Study Intersections	Lane Group	Storage Length	Existing		Existing plus Project (Alternative Driveway)		Change	
				AM	PM	AM	PM	AM	PM
1	Donohoe Street/Cooley Ave	EBL	105	126	585	126	585	0	0
		EBT	-	127	174	127	174	0	0
		WBT	-	367	130	369	131	2	1
		SBL	100	99	76	99	76	0	0
		SBR	-	74	42	74	42	0	0
2	Donohoe Street/E. Bayshore Road	EBL	-	347	677	347	681	0	4
		EBT	-	114	18	114	18	0	0
		WBT	-	180	217	180	217	0	0
		SBL	-	14	15	14	15	0	0
		SBR	-	78	61	78	61	0	0

Notes: Storage length and 95th percentile queue is expressed in feet per lane
AM – morning peak hour, PM – evening peak hour
Bold indicates queue lengths exceeding capacity

Site Access and Circulation

Site access is considered to not be impacted if the driveway to the site is relocated to the northeast corner of Donohoe Street/E. Bayshore Road. The driveway to the existing site is about 25 feet wide, which can accommodate two-way vehicle travel. However, the location of the condominium units may affect the geometry and circulation from the driveway into the proposed site. It may also affect fire-truck access into the project site since the travel lane from the access road is approximately 14 feet from the neighboring East Palo Alto Apostolic Church. The proposed site plan may have to be altered to accommodate a driveway access that runs parallel to Donohoe Street. Additionally, a turning radius analysis would need to be performed in order for emergency and service vehicles to access the site.

5.4 Pedestrian, Bicycle, and Transit impacts

Pedestrian Access

Pedestrian access to the project site will be facilitated by existing sidewalks on Donohoe Street, East Bayshore Road, and Cooley Avenue, as well as proposed walkways within the project site. There is existing street lighting that is adequate. The proposed project will also provide internal lighting for the walkways and driveways. The proposed project does not conflict with existing and planned pedestrian facilities; therefore, the impact to pedestrian facilities is ***less than significant***.

Bicycle Access

In terms of bicycle access to the project site, there is a planned Class III bicycle facility along Donohoe Street and Cooley Avenue. The planned facilities are described in the *2017 Bicycle Transportation Plan*. The planned facilities should provide access to the proposed site. The project does not conflict with existing and planned bicycle facilities; therefore, the impact to bicycle facilities is ***less than significant***

Transit Access

The project site is directly across the street and within walking distance to two samTrans bus stops, which can connect users to Redwood City Transit Center, Menlo Park Caltrain Station, and Palo Alto Transit Center, all of which provides access to the peninsula and south bay. These bus routes operate near the project site with stops located within walking distance of the proposed development. The existing pedestrian facilities in the project vicinity provide adequate connectivity for pedestrians to the transit stops. Impacts to transit service are expected to be ***less than significant.***

5.5 Vehicle Miles Traveled Analysis

The City of East Palo Alto have not yet developed specific VMT guidelines, so the Office of Planning and Research (OPR) guidelines, circulated on December 2018 and titled *Technical Advisory on Evaluating Transportation Impacts in CEQA* was used for this project.

Within the guidelines, there are various screening criteria which exempt a project from VMT significance analysis. A "small project" exemption is one where if a residential project generates fewer than 110 motor vehicle trips daily, then its VMT impacts are insignificant.

The 717 Donohoe project is expected to generate approximately **65 daily trips**, which is under the 110 trip threshold. Therefore, TJKM finds this project to have an **insignificant** impact on VMT.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Project Trip Generation

The proposed project is expected to generate approximately 5 weekday a.m. peak hour trips (1 inbound trips, 4 outbound trips) and 5 weekday p.m. peak hour trips (3 inbound trips, 2 outbound trips).

Level of Service (LOS) Standards

The City standard for signalized intersections in the City of East Palo Alto is LOS D.

Existing Conditions

Under this scenario, all of the study intersections operate within applicable jurisdictional standards of LOS D or better during the a.m. and p.m. peak hours with the exception of Donohoe Street/Cooley Avenue during the p.m. peak hour.

Existing plus Project Conditions

Under this scenario, all of the study intersections operate within applicable jurisdictional standards of LOS D or better during the a.m. and p.m. peak hours. Based on the City impact criteria, the project is expected to have a **less-than-significant** impact at all of the study intersections.

Queueing Analysis

The proposed project *does not create a significant impact* by itself on the expected through movement queues at the study intersections.

Pedestrian Impacts

The proposed project will provide internal lighting for the walkways and driveways. The project will not conflict with existing and planned pedestrian facilities. However it is recommended to that proposed pedestrian facilities within the site meet American Disability Act (ADA) standards.

Bicycle Impacts

The project is does not conflict with existing and planned bicycle facilities; therefore, the impact to bicycle facilities is ***less than significant***.

Transit Impacts

The project site is within walking distance to two samTrans bus stops, which can connect users to Redwood City Transit Center, Menlo Park Caltrain Station, and Palo Alto Transit Center, all of which provides access to the peninsula and southbay. Impacts to transit service are expected to be ***less than significant***

Site Access and On-Site Circulation

The proposed driveway will be located between the intersections of Donohoe Street/Cooley Avenue and Donohoe Street/E. Bayshore Road. The driveway would serve vehicles and emergency vehicles. The proposed driveway can accommodate two-way travel. "KEEP CLEAR" pavements markings in front of the driveway will allow vehicles to exit due to the fact that Donohoe Street experiences congestion in the a.m. and p.m. peak period.

Alternative Driveway Access

If the proposed driveway is moved to an existing driveway on the northeast corner of Donohoe Street/E. Bayshore Road, there is no impact to the level of service, queues, and site access. However, the circulation and geometry from the driveway into the proposed site may be affected by the location of the condominiums. It may also affect fire-truck access into the project site.

Vehicle Miles Traveled

The project is expected to generate approximately **65 daily trips**, which is under the 110 trip threshold. Therefore, this project is expected to have an **insignificant** impact on VMT.

Appendix A – Level of Service Methodology

APPENDIX A

LEVEL OF SERVICE

The description and procedures for calculating capacity and level of service are found in Transportation Research Board, *Highway Capacity Manual 2000*. *Highway Capacity Manual 2000* represents the latest research on capacity and quality of service for transportation facilities.

Quality of service requires quantitative measures to characterize operational conditions within a traffic stream. Level of service is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.

Six levels of service are defined for each type of facility that has analysis procedures available. Letters designate each level, from A to F, with level-of-service A representing the best operating conditions and level-of-service F the worst. Each level of service represents a range of operating conditions and the driver's perception of these conditions. Safety is not included in the measures that establish service levels.

A general description of service levels for various types of facilities is shown in Table A-I.

Table A-I

Level of Service Description

	Uninterrupted Flow	**Interrupted Flow**
Facility Type	Freeways Multi-lane Highways Two-lane Highways Urban Streets	Signalized Intersections Unsignalized Intersections Two-way Stop Control All-way Stop Control
LOS		
A	Free-flow	Very low delay.
B	Stable flow. Presence of other users noticeable.	Low delay.
C	Stable flow. Comfort and convenience starts to decline.	Acceptable delay.
D	High density stable flow.	Tolerable delay.
E	Unstable flow.	Limit of acceptable delay.
F	Forced or breakdown flow.	Unacceptable delay

Source: *Highway Capacity Manual 2000*

Urban Streets

The term “urban streets” refers to urban arterials and collectors, including those in downtown areas.

Arterial streets are roads that primarily serve longer through trips. However, providing access to abutting commercial and residential land uses is also an important function of arterials.

Collector streets provide both land access and traffic circulation within residential, commercial and industrial areas. Their access function is more important than that of arterials, and unlike arterials their operation is not always dominated by traffic signals.

Downtown streets are signalized facilities that often resemble arterials. They not only move through traffic but also provide access to local businesses for passenger cars, transit buses, and trucks. Pedestrian conflicts and lane obstructions created by stopping or standing buses, trucks and parking vehicles that cause turbulence in the traffic flow are typical of downtown streets.

The speed of vehicles on urban streets is influenced by three main factors, street environment, interaction among vehicles and traffic control. As a result, these factors also affect quality of service.

The street environment includes the geometric characteristics of the facility, the character of roadside activity and adjacent land uses. Thus, the environment reflects the number and width of lanes, type of median, driveway density, spacing between signalized intersections, existence of parking, level of pedestrian activity and speed limit.

The interaction among vehicles is determined by traffic density, the proportion of trucks and buses, and turning movements. This interaction affects the operation of vehicles at intersections and, to a lesser extent, between signals.

Traffic control (including signals and signs) forces a portion of all vehicles to slow or stop. The delays and speed changes caused by traffic control devices reduce vehicle speeds, however, such controls are needed to establish right-of-way.

The average travel speed for through vehicles along an urban street is the determinant of the operating level of service. The travel speed along a segment, section or entire length of an urban street is dependent on the running speed between signalized intersections and the amount of control delay incurred at signalized intersections.

Level-of-service A describes primarily free-flow operations. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delay at signalized intersections is minimal.

Level-of-service B describes reasonably unimpeded operations. The ability to maneuver within the traffic stream is only slightly restricted, and control delays at signalized intersections are not significant.

Level-of-service C describes stable operations, however, ability to maneuver and change lanes in midblock location may be more restricted than at level-of-service B. Longer queues, adverse signal coordination, or both may contribute to lower travel speeds.

Level-of-service D borders on a range in which in which small increases in flow may cause substantial increases in delay and decreases in travel speed. Level-of-service D may be due to adverse signal progression, inappropriate signal timing, high volumes, or a combination of these factors.

Level-of-service E is characterized by significant delays and lower travel speeds. Such operations are caused by a combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections, and inappropriate signal timing.

Level-of-service F is characterized by urban street flow at extremely low speeds. Intersection congestion is likely at critical signalized locations, with high delays, high volumes, and extensive queuing.

The methodology to determine level of service stratifies urban streets into four classifications. The classifications are complex, and are related to functional and design categories. Table A-II describes the functional and design categories, while Table A-III relates these to the urban street classification.

Once classified, the urban street is divided into segments for analysis. An urban street segment is a one-way section of street encompassing a series of blocks or links terminating at a signalized intersection. Adjacent segments of urban streets may be combined to form larger street sections, provided that the segments have similar demand flows and characteristics.

Levels of service are related to the average travel speed of vehicles along the urban street segment or section.

Travel times for existing conditions are obtained by field measurements. The maximum-car technique is used. The vehicle is driven at the posted speed limit unless impeded by actual traffic conditions. In the maximum-car technique, a safe level of vehicular operation is maintained by observing proper following distances and by changing speeds at reasonable rates of acceleration and deceleration. The maximum-car technique provides the best base for measuring traffic performance.

An observer records the travel time and locations and duration of delay. The beginning and ending points are the centers of intersections. Delays include times waiting in queues at signalized intersections. The travel speed is determined by dividing the length of the segment by the travel time. Once the travel speed on the arterial is determined, the level of service is found by comparing the speed to the criteria in Table A-IV. Level-of-service criteria vary for the different classifications of urban street, reflecting differences in driver expectations.

Table A-II

Functional and Design Categories for Urban Streets

Criterion	**Functional Category**			
	Principal Arterial		**Minor Arterial**	
Mobility function Access function Points connected Predominant trips served	Very important Very minor Freeways, important activity centers, major traffic generators Relatively long trips between major points and through trips entering, leaving, and passing through city		Important Substantial Principal arterials Trips of moderate length within relatively small geographical areas	
Criterion	**Design Category**			
	High-Speed	**Suburban**	**Intermediate**	**Urban**
Driveway access density	Very low density	Low density	Moderate density	High density
Arterial type	Multilane divided; undivided or two-lane with shoulders	Multilane divided: undivided or two-lane with shoulders	Multilane divided or undivided; one way, two lane	Undivided one way; two way, two or more lanes
Parking	No	No	Some	Usually
Separate left-turn lanes	Yes	Yes	Usually	Some
Signals per mile	0.5 to 2	1 to 5	4 to 10	6 to 12
Speed limits	45 to 55 mph	40 to 45 mph	30 to 40 mph	25 to 35 mph
Pedestrian activity	Very little	Little	Some	Usually
Roadside development	Low density	Low to medium density	Medium to moderate density	High density

Source: *Highway Capacity Manual 2000*

Table A-III

Urban Street Class based on Function and Design Categories

Design Category	**Functional Category**	
	Principal Arterial	**Minor Arterial**
High-Speed	I	Not applicable
Suburban	II	II
Intermediate	II	III or IV
Urban	III or IV	IV

Source: *Highway Capacity Manual 2000*

Table A-IV

Urban Street Levels of Service by Class

Urban Street Class	**I**	**II**	**III**	**IV**
Range of Free Flow Speeds (mph)	45 to 55	35 to 45	30 to 35	25 to 35
Typical Free Flow Speed (mph)	50	40	33	30
Level of Service	**Average Travel Speed (mph)**			
A	>42	>35	>30	>25
B	>34	>28	>24	>19
C	>27	>22	>18	>13
D	>21	>17	>14	>9
E	>16	>13	>10	>7
F	≤16	≤13	≤10	≤7

Source: *Highway Capacity Manual 2000*

Interrupted Flow

One of the more important elements limiting, and often interrupting the flow of traffic on a highway is the intersection. Flow on an interrupted facility is usually dominated by points of fixed operation such as traffic signals, stop and yield signs. These all operate quite differently and have differing impacts on overall flow.

Signalized Intersections

The capacity of a highway is related primarily to the geometric characteristics of the facility, as well as to the composition of the traffic stream on the facility. Geometrics are a fixed, or non-varying, characteristic of a facility.

At the signalized intersection, an additional element is introduced into the concept of capacity: time allocation. A traffic signal essentially allocates time among conflicting traffic movements seeking use of the same physical space. The way in which time is allocated has a significant impact on the operation of the intersection and on the capacity of the intersection and its approaches.

Level of service for signalized intersections is defined in terms of control delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions, *i. e.,* in the absence of traffic control, geometric delay, any incidents, and any other vehicles. Specifically, level of service criteria for traffic signals are stated in terms of average control delay per vehicle, typically for a 15-minute analysis period. Delay is a complex measure and depends on a number of variables, including the quality of progression, the cycle length, the ratio of green time to cycle length and the volume to capacity ratio for the lane group.

For each intersection analyzed the average control delay per vehicle per approach is determined for the peak hour. A weighted average of control delay per vehicle is then determined for the intersection. A level of service designation is given to the control delay to better describe the level of operation. A description of levels of service for signalized intersections can be found in Table A-V.

Table A-V

Description of Level of Service for Signalized Intersections

Level of Service	Description
A	Very low control delay, up to 10 seconds per vehicle. Progression is extremely favorable, and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.
B	Control delay greater than 10 and up to 20 seconds per vehicle. There is good progression or short cycle lengths or both. More vehicles stop causing higher levels of delay.
C	Control delay greater than 20 and up to 35 seconds per vehicle. Higher delays are caused by fair progression or longer cycle lengths or both. Individual cycle failures may begin to appear. Cycle failure occurs when a given green phase doe not serve queued vehicles, and overflow occurs. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.
D	Control delay greater than 35 and up to 55 seconds per vehicle. The influence of congestions becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volumes. Many vehicles stop, the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Control delay greater than 55 and up to 80 seconds per vehicle. The limit of acceptable delay. High delays usually indicate poor progression, long cycle lengths, and high volumes. Individual cycle failures are frequent.
F	Control delay in excess of 80 seconds per vehicle. Unacceptable to most drivers. Oversaturation, arrival flow rates exceed the capacity of the intersection. Many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to higher delay.

Source: *Highway Capacity Manual 2000*

The use of control delay, which may also be referred to as signal delay, was introduced in the 1997 update to the *Highway Capacity Manual*, and represents a departure from previous updates. In the third edition, published in 1985 and the 1994 update to the third edition, delay only included stopped delay. Thus, the level of service criteria listed in Table A-V differs from earlier criteria.

Unsignalized Intersections

The current procedures on unsignalized intersections were first introduced in the 1997 update to the *Highway Capacity Manual* and represent a revision of the methodology published in the 1994 update to the 1985 *Highway Capacity Manual*. The revised procedures use control delay as a measure of effectiveness to determine level of service. Delay is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions, *i. e.,* in the absence of traffic control, geometric delay, any incidents, and any other vehicles. Control delay is the increased time of travel for a vehicle approaching and passing through an unsignalized intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection.

Two-Way Stop Controlled Intersections

Two-way stop controlled intersections in which stop signs are used to assign the right-of-way, are the most prevalent type of intersection in the United States. At two-way stop-controlled intersections the stop-controlled approaches are referred as the minor street approaches and can be either public streets or private driveways. The approaches that are not controlled by stop signs are referred to as the major street approaches.

The capacity of movements subject to delay are determined using the "critical gap" method of capacity analysis. Expected average control delay based on movement volume and movement capacity is calculated. A level of service designation is given to the expected control delay for each minor movement. Level of service is not defined for the intersection as a whole. Control delay is the increased time of travel for a vehicle approaching and passing through a stop-controlled intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection. A description of levels of service for two-way stop-controlled intersections is found in Table A-VI.

Table A-VI

Description of Level of Service for Two-Way Stop Controlled Intersections

Level of Service	Description
A	Very low control delay less than 10 seconds per vehicle for each movement subject to delay.
B	Low control delay greater than 10 and up to 15 seconds per vehicle for each movement subject to delay.
C	Acceptable control delay greater than 15 and up to 25 seconds per vehicle for each movement subject to delay.
D	Tolerable control delay greater than 25 and up to 35 seconds per vehicle for each movement subject to delay.
E	Limit of tolerable control delay greater than 35 and up to 50 seconds per vehicle for each movement subject to delay.
F	Unacceptable control delay in excess of 50 seconds per vehicle for each movement subject to delay.

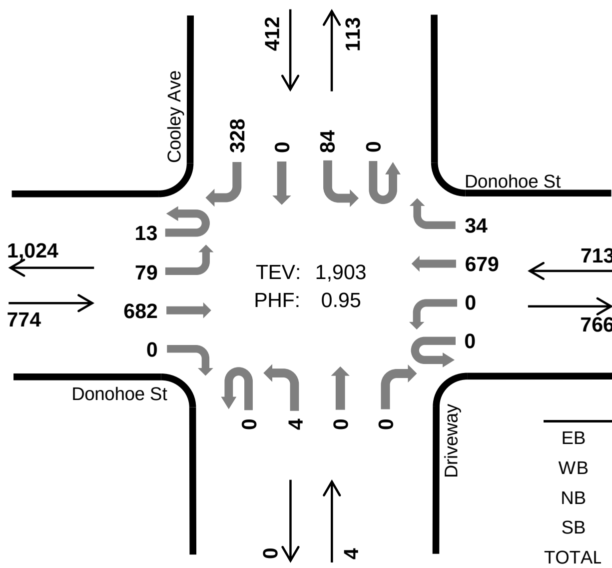
Source: *Highway Capacity Manual 2000*

Appendix B – Existing Traffic Counts

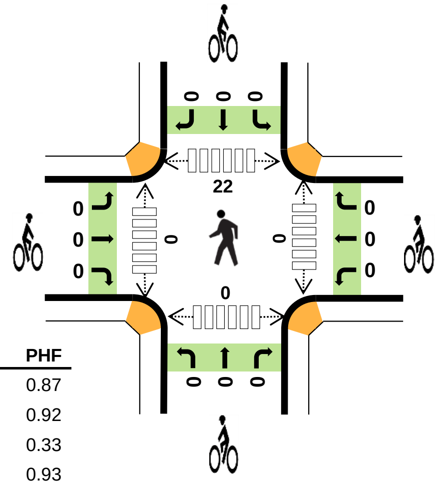
Cooley Ave
Donohoe St

Date: 10/26/2023
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM

Peak Hour



	HV %:	PHF
EB	2.3%	0.87
WB	3.1%	0.92
NB	0.0%	0.33
SB	1.2%	0.93
TOTAL	2.4%	0.95



Two-Hour Count Summaries

Interval Start	Donohoe St Eastbound UT	LT	TH	RT	Donohoe St Westbound UT	LT	TH	RT	Driveway Northbound UT	LT	TH	RT	Cooley Ave Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
7:00 AM	3	12	110	0	0	0	100	4	0	0	0	0	0	13	0	31	273	0
7:15 AM	2	8	131	0	0	0	127	11	0	1	0	0	0	19	0	57	356	0
7:30 AM	**0**	**14**	**128**	**0**	**0**	**0**	**186**	**7**	**0**	**0**	**0**	**0**	**0**	**17**	**0**	**93**	**445**	0
7:45 AM	**7**	**20**	**162**	**0**	**0**	**0**	**168**	**4**	**0**	**0**	**0**	**0**	**0**	**22**	**0**	**82**	**465**	1,539
8:00 AM	**3**	**21**	**196**	**0**	**0**	**0**	**153**	**15**	**0**	**1**	**0**	**0**	**0**	**23**	**0**	**88**	**500**	1,766
8:15 AM	**3**	**24**	**196**	**0**	**0**	**0**	**172**	**8**	**0**	**3**	**0**	**0**	**0**	**22**	**0**	**65**	**493**	**1,903**
8:30 AM	9	18	150	0	0	0	159	19	0	1	1	0	0	17	0	68	442	1,900
8:45 AM	8	19	145	0	0	0	127	15	0	0	0	0	0	17	0	41	372	1,807
Count Total	35	136	1,218	0	0	0	1,192	83	0	6	1	0	0	150	0	525	3,346	0
Peak Hour All	**13**	**79**	**682**	**0**	**0**	**0**	**679**	**34**	**0**	**4**	**0**	**0**	**0**	**84**	**0**	**328**	**1,903**	**0**
Peak Hour HV	**0**	**0**	**18**	**0**	**0**	**0**	**22**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**3**	**45**	**0**
Peak Hour HV%	**0%**	**0%**	**3%**	**-**	**-**	**-**	**3%**	**0%**	**-**	**0%**	**-**	**-**	**-**	**2%**	**-**	**1%**	**2%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 AM	8	3	0	3	*14*	0	0	0	0	*0*	0	0	3	0	*3*
7:15 AM	6	2	0	2	*10*	1	0	0	0	*1*	0	0	4	0	*4*
7:30 AM	**3**	**3**	**0**	**0**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**2**	**0**	*2*
7:45 AM	**10**	**8**	**0**	**2**	***20***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**3**	**0**	*3*
8:00 AM	**4**	**4**	**0**	**1**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**10**	**0**	*10*
8:15 AM	**1**	**7**	**0**	**2**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**7**	**0**	***7***
8:30 AM	1	2	0	1	*4*	0	1	0	0	*1*	0	0	4	0	*4*
8:45 AM	5	4	0	2	*11*	0	0	0	0	*0*	0	0	4	0	*4*
Count Total	38	33	0	13	*84*	1	1	0	0	*2*	0	0	37	0	*37*
Peak Hour	**18**	**22**	**0**	**5**	***45***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**22**	**0**	***22***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Donohoe St				Donohoe St				Driveway				Cooley Ave				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	1	7	0	0	0	3	0	0	0	0	0	0	0	0	3	14	0
7:15 AM	0	0	6	0	0	0	2	0	0	0	0	0	0	2	0	0	10	0
7:30 AM	**0**	**0**	**3**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	0
7:45 AM	**0**	**0**	**10**	**0**	**0**	**0**	**8**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**20**	50
8:00 AM	**0**	**0**	**4**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**9**	45
8:15 AM	**0**	**0**	**1**	**0**	**0**	**0**	**7**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**10**	**45**
8:30 AM	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	1	4	43
8:45 AM	0	0	5	0	0	0	3	1	0	0	0	0	0	1	0	1	11	34
Count Total	0	1	37	0	0	0	31	2	0	0	0	0	0	5	0	8	84	0
Peak Hour	**0**	**0**	**18**	**0**	**0**	**0**	**22**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**3**	**45**	**0**

Two-Hour Count Summaries - Bikes

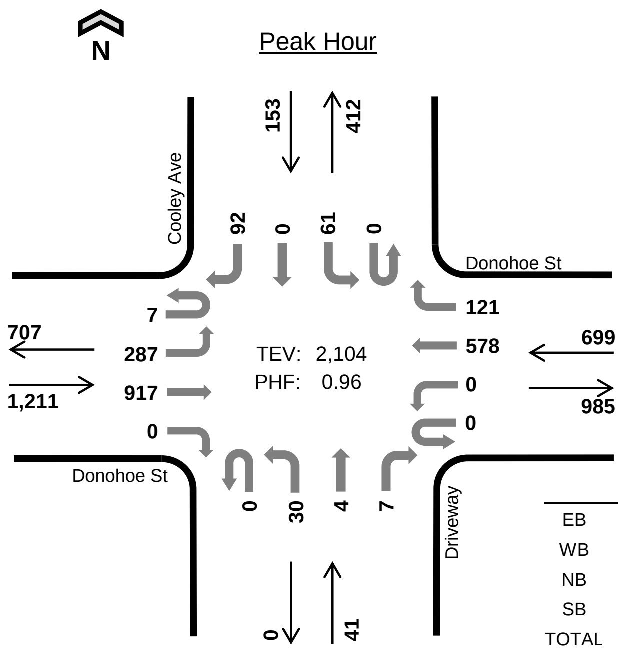
Interval Start	Donohoe St			Donohoe St			Driveway			Cooley Ave			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
8:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
8:30 AM	0	0	0	0	1	0	0	0	0	0	0	0	1	1
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Count Total	0	1	0	0	1	0	0	0	0	0	0	0	2	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

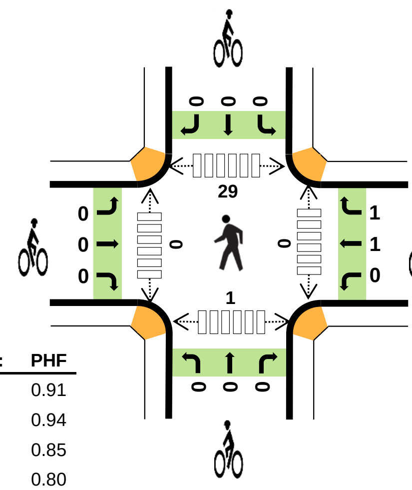
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Cooley Ave
Donohoe St

Date: 10/26/2023
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM

Peak Hour





	HV %:	PHF
EB	1.3%	0.91
WB	1.6%	0.94
NB	0.0%	0.85
SB	2.0%	0.80
TOTAL	1.4%	0.96

Two-Hour Count Summaries

Interval Start		Donohoe St Eastbound UT	LT	TH	RT	Donohoe St Westbound UT	LT	TH	RT	Driveway Northbound UT	LT	TH	RT	Cooley Ave Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
4:00 PM		0	75	236	0	0	0	128	35	0	12	10	7	0	7	0	22	532	0
4:15 PM		1	68	205	0	0	0	120	28	0	22	3	5	0	11	0	25	488	0
4:30 PM		2	62	231	0	0	0	132	18	0	8	0	1	0	12	0	24	490	0
4:45 PM		3	65	203	0	0	0	135	16	0	8	1	4	0	10	0	25	470	1,980
5:00 PM		**2**	**66**	**211**	**0**	**0**	**0**	**141**	**31**	**0**	**5**	**1**	**1**	**0**	**13**	**0**	**35**	**506**	1,954
5:15 PM		**2**	**75**	**225**	**0**	**0**	**0**	**151**	**28**	**0**	**9**	**0**	**2**	**0**	**8**	**0**	**22**	**522**	1,988
5:30 PM		**2**	**66**	**229**	**0**	**0**	**0**	**159**	**26**	**0**	**6**	**3**	**2**	**0**	**17**	**0**	**19**	**529**	2,027
5:45 PM		**1**	**80**	**252**	**0**	**0**	**0**	**127**	**36**	**0**	**10**	**0**	**2**	**0**	**23**	**0**	**16**	**547**	**2,104**
Count Total		13	557	1,792	0	0	0	1,093	218	0	80	18	24	0	101	0	188	4,084	0
Peak Hour	**All**	**7**	**287**	**917**	**0**	**0**	**0**	**578**	**121**	**0**	**30**	**4**	**7**	**0**	**61**	**0**	**92**	**2,104**	**0**
	HV	**0**	**5**	**11**	**0**	**0**	**0**	**10**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**30**	**0**
	HV%	**0%**	**2%**	**1%**	**-**	**-**	**-**	**2%**	**1%**	**-**	**0%**	**0%**	**0%**	**-**	**0%**	**-**	**3%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
4:00 PM	8	1	0	0	*9*	0	0	0	0	*0*	0	0	9	0	*9*
4:15 PM	4	2	0	0	*6*	0	1	0	0	*1*	0	0	8	0	*8*
4:30 PM	9	2	0	1	*12*	0	0	0	0	*0*	0	0	6	0	*6*
4:45 PM	5	3	0	0	*8*	0	1	0	0	*1*	0	0	2	0	*2*
5:00 PM	**3**	**4**	**0**	**2**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**11**	**0**	*11*
5:15 PM	**3**	**2**	**0**	**1**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**4**	**0**	*4*
5:30 PM	**6**	**3**	**0**	**0**	***9***	**0**	**2**	**0**	**0**	***2***	**0**	**0**	**6**	**0**	*6*
5:45 PM	**4**	**2**	**0**	**0**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**8**	**1**	***9***
Count Total	42	19	0	4	*65*	0	4	0	0	*4*	0	0	54	1	*55*
Peak Hour	**16**	**11**	**0**	**3**	***30***	**0**	**2**	**0**	**0**	***2***	**0**	**0**	**29**	**1**	***30***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Donohoe St Eastbound UT	LT	TH	RT	Donohoe St Westbound UT	LT	TH	RT	Driveway Northbound UT	LT	TH	RT	Cooley Ave Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
4:00 PM	0	2	6	0	0	0	1	0	0	0	0	0	0	0	0	0	9	0
4:15 PM	0	1	3	0	0	0	2	0	0	0	0	0	0	0	0	0	6	0
4:30 PM	0	3	6	0	0	0	2	0	0	0	0	0	0	0	0	1	12	0
4:45 PM	0	2	3	0	0	0	3	0	0	0	0	0	0	0	0	0	8	35
5:00 PM	**0**	**1**	**2**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**9**	35
5:15 PM	**0**	**1**	**2**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**6**	35
5:30 PM	**0**	**2**	**4**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9**	32
5:45 PM	**0**	**1**	**3**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**30**
Count Total	0	13	29	0	0	0	18	1	0	0	0	0	0	0	0	4	65	0
Peak Hour	**0**	**5**	**11**	**0**	**0**	**0**	**10**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**30**	**0**

Two-Hour Count Summaries - Bikes

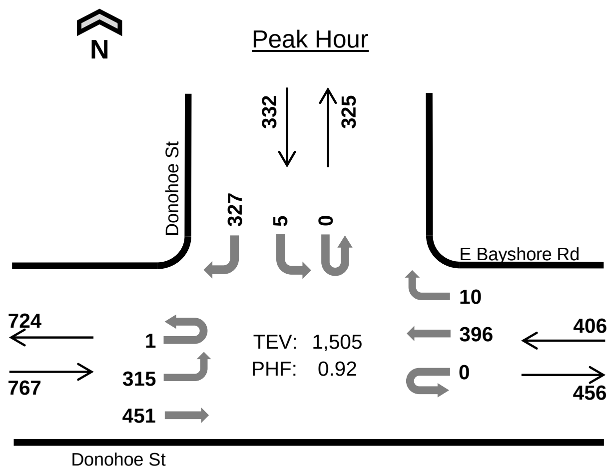
Interval Start	Donohoe St Eastbound LT	TH	RT	Donohoe St Westbound LT	TH	RT	Driveway Northbound LT	TH	RT	Cooley Ave Southbound LT	TH	RT	15-min Total	Rolling One Hour
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	1	2
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	2
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
5:30 PM	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	3
5:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**
Count Total	0	0	0	0	2	2	0	0	0	0	0	0	4	0
Peak Hour	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**

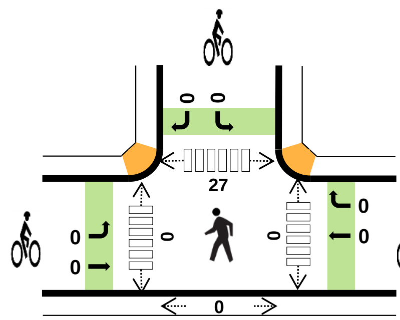
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

www.idaxdata.com

Donohoe St
E Bayshore Rd

Date: 10/26/2023
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM





	HV %:	PHF
EB	2.6%	0.88
WB	4.7%	0.93
NB	-	-
SB	2.1%	0.78
TOTAL	3.1%	0.92

Two-Hour Count Summaries

Interval Start		Donohoe St Eastbound				E Bayshore Rd Westbound				N/A Northbound				Donohoe St Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	30	96	0	0	0	66	3	0	0	0	0	0	0	0	38	233	0
7:15 AM		1	43	103	0	0	0	74	1	0	0	0	0	0	0	0	61	283	0
7:30 AM		**0**	**52**	**89**	**0**	**0**	**0**	**99**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**107**	**349**	0
7:45 AM		**1**	**75**	**113**	**0**	**0**	**0**	**87**	**4**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**82**	**365**	1,230
8:00 AM		**0**	**98**	**120**	**0**	**0**	**0**	**104**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**61**	**384**	1,381
8:15 AM		**0**	**90**	**129**	**0**	**0**	**0**	**106**	**3**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**77**	**407**	**1,505**
8:30 AM		2	62	102	0	0	0	110	4	0	0	0	0	0	2	0	54	336	1,492
8:45 AM		0	47	113	0	0	0	94	1	0	0	0	0	0	1	0	50	306	1,433
Count Total		4	497	865	0	0	0	740	19	0	0	0	0	0	8	0	530	2,663	0
Peak Hour	**All**	**1**	**315**	**451**	**0**	**0**	**0**	**396**	**10**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**327**	**1,505**	**0**
	HV	**0**	**7**	**13**	**0**	**0**	**0**	**15**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**46**	**0**
	HV%	**0%**	**2%**	**3%**	**-**	**-**	**-**	**4%**	**40%**	**-**	**-**	**-**	**-**	**-**	**0%**	**-**	**2%**	**3%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	7	3	0	0	*10*	0	0	0	0	*0*	0	0	4	0	*4*
7:15 AM	8	1	0	2	*11*	1	0	0	0	*1*	0	0	7	0	*7*
7:30 AM	**4**	**3**	**0**	**1**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**5**	**0**	*5*
7:45 AM	**11**	**5**	**0**	**3**	***19***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**5**	**0**	*5*
8:00 AM	**4**	**4**	**0**	**1**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**7**	**0**	*7*
8:15 AM	**1**	**7**	**0**	**2**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**10**	**0**	***10***
8:30 AM	1	3	0	0	*4*	0	1	0	1	*2*	0	0	5	0	*5*
8:45 AM	6	4	0	1	*11*	0	0	0	0	*0*	0	0	3	0	*3*
Count Total	42	30	0	10	*82*	1	1	0	1	*3*	0	0	46	0	*46*
Peak Hr	**20**	**19**	**0**	**7**	***46***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**27**	**0**	***27***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Donohoe St				E Bayshore Rd				N/A				Donohoe St				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	5	2	0	0	0	2	1	0	0	0	0	0	0	0	0	10	0
7:15 AM	0	1	7	0	0	0	0	1	0	0	0	0	0	0	0	2	11	0
7:30 AM	**0**	**2**	**2**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**8**	0
7:45 AM	**0**	**4**	**7**	**0**	**0**	**0**	**4**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**19**	48
8:00 AM	**0**	**1**	**3**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**9**	47
8:15 AM	**0**	**0**	**1**	**0**	**0**	**0**	**5**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**10**	**46**
8:30 AM	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	4	42
8:45 AM	0	1	5	0	0	0	3	1	0	0	0	0	0	0	0	1	11	34
Count Total	0	14	28	0	0	0	23	7	0	0	0	0	0	0	0	10	82	0
Peak Hour	**0**	**7**	**13**	**0**	**0**	**0**	**15**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**46**	**0**

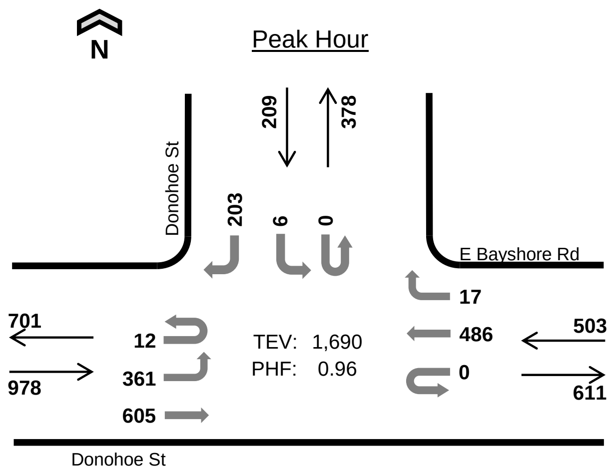
Two-Hour Count Summaries - Bikes

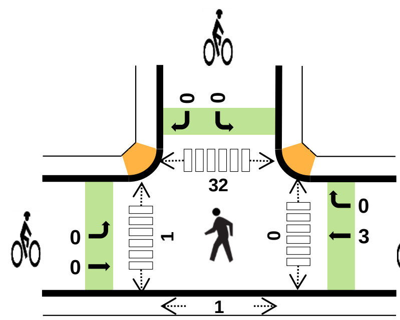
Interval Start	Donohoe St			E Bayshore Rd			N/A			Donohoe St			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
8:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
8:30 AM	0	0	0	0	1	0	0	0	0	0	0	1	2	2
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Count Total	0	1	0	0	1	0	0	0	0	0	0	1	3	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Donohoe St
E Bayshore Rd

Date: 10/26/2023
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM





	HV %:	PHF
EB	1.1%	0.89
WB	2.0%	0.90
NB	-	-
SB	1.4%	0.86
TOTAL	1.4%	0.96

Two-Hour Count Summaries

Interval Start		Donohoe St				E Bayshore Rd				N/A				Donohoe St				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		2	70	180	0	0	0	100	8	0	0	0	0	0	2	0	57	419	0
4:15 PM		3	76	143	0	0	0	113	4	0	0	0	0	0	2	0	33	374	0
4:30 PM		1	99	141	0	0	0	111	5	0	0	0	0	0	3	0	34	394	0
4:45 PM		1	78	143	0	0	0	116	1	0	0	0	0	0	1	0	40	380	1,567
5:00 PM		**5**	**81**	**133**	**0**	**0**	**0**	**113**	**2**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**59**	**395**	1,543
5:15 PM		**2**	**93**	**132**	**0**	**0**	**0**	**131**	**8**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**54**	**421**	1,590
5:30 PM		**3**	**93**	**160**	**0**	**0**	**0**	**121**	**5**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**50**	**433**	1,629
5:45 PM		**2**	**94**	**180**	**0**	**0**	**0**	**121**	**2**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**40**	**441**	**1,690**
Count Total		19	684	1,212	0	0	0	926	35	0	0	0	0	0	14	0	367	3,257	0
Peak Hour	**All**	**12**	**361**	**605**	**0**	**0**	**0**	**486**	**17**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**203**	**1,690**	**0**
	HV	**0**	**7**	**4**	**0**	**0**	**0**	**7**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**24**	**0**
	HV%	**0%**	**2%**	**1%**	**-**	**-**	**-**	**1%**	**18%**	**-**	**-**	**-**	**-**	**-**	**0%**	**-**	**1%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	6	1	0	1	*8*	0	0	0	0	*0*	0	0	11	0	*11*
4:15 PM	3	1	0	2	*6*	0	2	0	0	*2*	0	0	9	0	*9*
4:30 PM	6	2	0	1	*9*	0	0	0	0	*0*	0	0	7	0	*7*
4:45 PM	3	3	0	1	*7*	0	0	0	0	*0*	0	0	11	0	*11*
5:00 PM	**2**	**4**	**0**	**0**	***6***	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**9**	**0**	*9*
5:15 PM	**2**	**2**	**0**	**1**	***5***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**9**	**0**	*9*
5:30 PM	**4**	**3**	**0**	**1**	***8***	**0**	**2**	**0**	**0**	***2***	**0**	**0**	**6**	**0**	*6*
5:45 PM	**3**	**1**	**0**	**1**	***5***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**8**	**1**	***10***
Count Total	29	17	0	8	*54*	0	5	0	0	*5*	0	1	70	1	*72*
Peak Hr	**11**	**10**	**0**	**3**	***24***	**0**	**3**	**0**	**0**	***3***	**0**	**1**	**32**	**1**	***34***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Donohoe St				E Bayshore Rd				N/A				Donohoe St				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	4	2	0	0	0	0	1	0	0	0	0	0	0	0	1	8	0
4:15 PM	0	1	2	0	0	0	0	1	0	0	0	0	0	0	0	2	6	0
4:30 PM	0	3	3	0	0	0	1	1	0	0	0	0	0	0	0	1	9	0
4:45 PM	0	2	1	0	0	0	3	0	0	0	0	0	0	0	0	1	7	30
5:00 PM	**0**	**1**	**1**	**0**	**0**	**0**	**3**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	28
5:15 PM	**0**	**1**	**1**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**5**	27
5:30 PM	**0**	**3**	**1**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**8**	26
5:45 PM	**0**	**2**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**5**	**24**
Count Total	0	17	12	0	0	0	11	6	0	0	0	0	0	0	0	8	54	0
Peak Hour	**0**	**7**	**4**	**0**	**0**	**0**	**7**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**24**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	Donohoe St			E Bayshore Rd			N/A			Donohoe St			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	2	0	0	0	0	0	0	0	2	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:00 PM	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	3
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
5:30 PM	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	3
5:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
Count Total	0	0	0	0	5	0	0	0	0	0	0	0	5	0
Peak Hour	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Appendix C – Existing Conditions Intersections Level of Service Work Sheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	682	0	0	679	34	4	0	0	84	0	328
Future Volume (vph)	92	682	0	0	679	34	4	0	0	84	0	328
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0			5.0		4.6	4.6		4.6		4.6
Lane Util. Factor	1.00	0.91			0.95		0.95	0.95		1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.99		1.00	1.00		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.95		0.95		1.00
Satd. Flow (prot)	1770	5085			3501		1681	1681		1770		1200
Flt Permitted	0.95	1.00			1.00		0.95	0.95		0.95		1.00
Satd. Flow (perm)	1770	5085			3501		1681	1681		1770		1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	97	718	0	0	715	36	4	0	0	88	0	345
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	0	303
Lane Group Flow (vph)	97	718	0	0	749	0	2	2	0	88	0	42
Confl. Peds. (#/hr)						22						
Turn Type	Prot	NA			NA		Split	NA	Perm	Prot		Perm
Protected Phases	5	2			6		8	8		4		
Permitted Phases									8			4
Actuated Green, G (s)	11.1	89.3			74.2		1.8	1.8		14.7		14.7
Effective Green, g (s)	11.1	89.3			74.2		1.8	1.8		14.7		14.7
Actuated g/C Ratio	0.09	0.74			0.62		0.02	0.02		0.12		0.12
Clearance Time (s)	4.0	5.0			5.0		4.6	4.6		4.6		4.6
Vehicle Extension (s)	2.0	3.0			3.0		2.0	2.0		2.0		2.0
Lane Grp Cap (vph)	163	3784			2164		25	25		216		193
v/s Ratio Prot	c0.05	0.14			c0.21		c0.00	0.00		c0.05		
v/s Ratio Perm												0.03
v/c Ratio	0.60	0.19			0.35		0.08	0.08		0.41		0.22
Uniform Delay, d1	52.3	4.6			11.1		58.3	58.3		48.6		47.5
Progression Factor	1.00	1.00			1.40		1.00	1.00		1.00		1.00
Incremental Delay, d2	3.8	0.1			0.4		0.5	0.5		0.5		0.2
Delay (s)	56.1	4.7			16.0		58.8	58.8		49.1		47.7
Level of Service	E	A			B		E	E		D		D
Approach Delay (s)		10.8			16.0			58.8			48.0	
Approach LOS		B			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.2
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	316	451	396	10	5	327
Future Volume (vph)	316	451	396	10	5	327
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	3521		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	3521		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	343	490	430	11	5	355
RTOR Reduction (vph)	0	0	1	0	0	316
Lane Group Flow (vph)	343	490	440	0	5	39
Confl. Peds. (#/hr)				27		
Turn Type	Prot	NA	NA		Perm	Perm
Protected Phases	5	2	6			
Permitted Phases					4	4
Actuated Green, G (s)	27.7	96.7	64.0		13.3	13.3
Effective Green, g (s)	27.7	96.7	64.0		13.3	13.3
Actuated g/C Ratio	0.23	0.81	0.53		0.11	0.11
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	1.0	7.0	3.0		3.0	3.0
Lane Grp Cap (vph)	408	4097	1877		196	175
v/s Ratio Prot	c0.19	0.10	c0.12			
v/s Ratio Perm					0.00	c0.02
v/c Ratio	0.84	0.12	0.23		0.03	0.22
Uniform Delay, d1	44.0	2.5	14.9		47.6	48.6
Progression Factor	0.95	1.44	1.00		1.00	1.00
Incremental Delay, d2	13.8	0.1	0.3		0.1	0.7
Delay (s)	55.8	3.7	15.2		47.6	49.3
Level of Service	E	A	B		D	D
Approach Delay (s)		25.1	15.2		49.3	
Approach LOS		C	B		D	

Intersection Summary			
HCM 2000 Control Delay	27.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	97	718	751	2	2	88	345
v/c Ratio	0.60	0.18	0.33	0.02	0.02	0.41	0.70
Control Delay	66.6	5.3	17.8	52.0	52.0	52.1	12.2
Queue Delay	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Total Delay	66.6	5.4	18.9	52.0	52.0	52.1	12.2
Queue Length 50th (ft)	74	29	100	1	1	67	0
Queue Length 95th (ft)	126	127	367	10	10	99	74
Internal Link Dist (ft)		284	257		286		
Turn Bay Length (ft)	105					100	
Base Capacity (vph)	295	3940	2274	145	145	507	699
Starvation Cap Reductn	0	0	1201	0	0	0	0
Spillback Cap Reductn	0	184	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.19	0.70	0.01	0.01	0.17	0.49

Intersection Summary

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	343	490	441	5	355
v/c Ratio	0.84	0.12	0.23	0.03	0.72
Control Delay	59.8	4.7	17.7	41.8	13.4
Queue Delay	9.5	0.0	0.0	0.0	0.7
Total Delay	69.4	4.7	17.7	41.8	14.0
Queue Length 50th (ft)	258	16	84	4	0
Queue Length 95th (ft)	347	114	180	14	78
Internal Link Dist (ft)		257	470	543	
Turn Bay Length (ft)					
Base Capacity (vph)	437	4095	1877	560	743
Starvation Cap Reductn	69	0	0	0	0
Spillback Cap Reductn	0	0	95	0	146
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.93	0.12	0.25	0.01	0.59

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	294	917	0	0	578	121	30	4	7	61	0	92
Future Volume (vph)	294	917	0	0	578	121	30	4	7	61	0	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0			5.0		4.6	4.6	4.6	4.6		4.6
Lane Util. Factor	1.00	0.91			0.95		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			0.98		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			0.97		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.96	1.00	0.95		1.00
Satd. Flow (prot)	1200	5085			3392		1681	1703	1583	1770		1583
Flt Permitted	0.95	1.00			1.00		0.95	0.96	1.00	0.95		1.00
Satd. Flow (perm)	1770	5085			3392		1681	1703	1583	1770		1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor (vph)	120%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	368	955	0	0	602	126	31	4	7	64	0	96
RTOR Reduction (vph)	0	0	0	0	15	0	0	0	7	0	0	85
Lane Group Flow (vph)	368	955	0	0	713	0	17	18	0	64	0	11
Confl. Peds. (#/hr)			1			29						
Confl. Bikes (#/hr)						2						
Turn Type	Prot	NA			NA		Split	NA	Perm	Prot		Perm
Protected Phases	5	2			6		8	8		4		
Permitted Phases									8			4
Actuated Green, G (s)	45.1	86.1			37.0		5.4	5.4	5.4	14.3		14.3
Effective Green, g (s)	45.1	86.1			37.0		5.4	5.4	5.4	14.3		14.3
Actuated g/C Ratio	0.38	0.72			0.31		0.05	0.05	0.05	0.12		0.12
Clearance Time (s)	4.0	5.0			5.0		4.6	4.6	4.6	4.6		4.6
Vehicle Extension (s)	2.0	3.0			3.0		2.0	2.0	2.0	2.0		2.0
Lane Grp Cap (vph)	451	3648			1045		75	76	71	210		188
v/s Ratio Prot	c0.31	0.19			c0.21		0.01	c0.01		c0.04		
v/s Ratio Perm									0.00			0.01
v/c Ratio	0.82	0.26			0.68		0.23	0.24	0.00	0.30		0.06
Uniform Delay, d1	33.7	5.9			36.4		55.3	55.3	54.7	48.3		46.9
Progression Factor	1.00	1.00			0.51		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	15.0	0.2			1.7		0.6	0.6	0.0	0.3		0.0
Delay (s)	48.7	6.1			20.4		55.8	55.9	54.7	48.6		46.9
Level of Service	D	A			C		E	E	D	D		D
Approach Delay (s)		17.9			20.4			55.7			47.6	
Approach LOS		B			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.2
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	373	605	486	17	6	203
Future Volume (vph)	373	605	486	17	6	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1200	5085	3513		1770	1562
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	3513		1770	1562
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor (vph)	120%	100%	100%	100%	100%	100%
Adj. Flow (vph)	466	630	506	18	6	211
RTOR Reduction (vph)	0	0	2	0	0	188
Lane Group Flow (vph)	466	630	522	0	6	23
Confl. Peds. (#/hr)				32		1
Confl. Bikes (#/hr)				3		
Turn Type	Prot	NA	NA		Perm	Perm
Protected Phases	5	2	6			
Permitted Phases					4	4
Actuated Green, G (s)	52.0	97.0	40.0		13.0	13.0
Effective Green, g (s)	52.0	97.0	40.0		13.0	13.0
Actuated g/C Ratio	0.43	0.81	0.33		0.11	0.11
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	7.0	3.0		3.0	3.0
Lane Grp Cap (vph)	520	4110	1171		191	169
v/s Ratio Prot	c0.39	0.12	c0.15			
v/s Ratio Perm					0.00	c0.01
v/c Ratio	0.90	0.15	0.45		0.03	0.14
Uniform Delay, d1	31.5	2.5	31.3		47.9	48.4
Progression Factor	0.83	0.38	1.00		1.00	1.00
Incremental Delay, d2	17.6	0.1	1.2		0.1	0.4
Delay (s)	43.9	1.0	32.6		47.9	48.8
Level of Service	D	A	C		D	D
Approach Delay (s)		19.2	32.6		48.8	
Approach LOS		B	C		D	

Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	368	955	728	17	18	7	64	96
v/c Ratio	0.78	0.26	0.69	0.13	0.14	0.03	0.30	0.35
Control Delay	47.8	7.1	21.7	54.6	54.7	0.3	49.7	11.5
Queue Delay	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Total Delay	47.8	7.1	21.8	54.6	54.7	0.3	49.7	11.5
Queue Length 50th (ft)	252	81	96	13	13	0	48	0
Queue Length 95th (ft)	#585	174	130	38	40	0	76	42
Internal Link Dist (ft)		284	257		286			
Turn Bay Length (ft)	105						100	
Base Capacity (vph)	470	3728	1060	145	147	224	507	522
Starvation Cap Reductn	0	0	26	0	0	0	0	0
Spillback Cap Reductn	0	119	0	0	0	0	2	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.26	0.70	0.12	0.12	0.03	0.13	0.18

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	466	630	524	6	211
v/c Ratio	0.90	0.15	0.45	0.03	0.59
Control Delay	49.3	1.3	32.6	42.8	12.7
Queue Delay	0.8	0.0	0.0	0.0	0.0
Total Delay	50.1	1.3	32.6	42.8	12.7
Queue Length 50th (ft)	315	13	165	4	0
Queue Length 95th (ft)	#677	18	217	15	61
Internal Link Dist (ft)		257	470	543	
Turn Bay Length (ft)					
Base Capacity (vph)	520	4109	1173	560	638
Starvation Cap Reductn	6	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.91	0.15	0.45	0.01	0.33

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Appendix D – Existing plus Project Conditions Intersections Level of Service Work Sheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	683	0	0	683	34	4	0	0	84	0	328
Future Volume (vph)	92	683	0	0	683	34	4	0	0	84	0	328
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0			5.0		4.6	4.6		4.6		4.6
Lane Util. Factor	1.00	0.91			0.95		0.95	0.95		1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.99		1.00	1.00		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.95		0.95		1.00
Satd. Flow (prot)	1770	5085			3502		1681	1681		1770		1200
Flt Permitted	0.95	1.00			1.00		0.95	0.95		0.95		1.00
Satd. Flow (perm)	1770	5085			3502		1681	1681		1770		1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	97	719	0	0	719	36	4	0	0	88	0	345
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	0	303
Lane Group Flow (vph)	97	719	0	0	753	0	2	2	0	88	0	42
Confl. Peds. (#/hr)						22						
Turn Type	Prot	NA			NA		Split	NA	Perm	Prot		Perm
Protected Phases	5	2			6		8	8		4		
Permitted Phases									8			4
Actuated Green, G (s)	11.1	89.3			74.2		1.8	1.8		14.7		14.7
Effective Green, g (s)	11.1	89.3			74.2		1.8	1.8		14.7		14.7
Actuated g/C Ratio	0.09	0.74			0.62		0.02	0.02		0.12		0.12
Clearance Time (s)	4.0	5.0			5.0		4.6	4.6		4.6		4.6
Vehicle Extension (s)	2.0	3.0			3.0		2.0	2.0		2.0		2.0
Lane Grp Cap (vph)	163	3784			2165		25	25		216		193
v/s Ratio Prot	c0.05	0.14			c0.22		c0.00	0.00		c0.05		
v/s Ratio Perm												0.03
v/c Ratio	0.60	0.19			0.35		0.08	0.08		0.41		0.22
Uniform Delay, d1	52.3	4.6			11.1		58.3	58.3		48.6		47.5
Progression Factor	1.00	1.00			1.39		1.00	1.00		1.00		1.00
Incremental Delay, d2	3.8	0.1			0.4		0.5	0.5		0.5		0.2
Delay (s)	56.1	4.7			15.9		58.8	58.8		49.1		47.7
Level of Service	E	A			B		E	E		D		D
Approach Delay (s)		10.8			15.9			58.8			48.0	
Approach LOS		B			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	20.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.2
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	317	451	396	10	5	327
Future Volume (vph)	317	451	396	10	5	327
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	3521		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	3521		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	345	490	430	11	5	355
RTOR Reduction (vph)	0	0	1	0	0	316
Lane Group Flow (vph)	345	490	440	0	5	39
Confl. Peds. (#/hr)				27		
Turn Type	Prot	NA	NA		Perm	Perm
Protected Phases	5	2	6			
Permitted Phases					4	4
Actuated Green, G (s)	27.9	96.7	63.8		13.3	13.3
Effective Green, g (s)	27.9	96.7	63.8		13.3	13.3
Actuated g/C Ratio	0.23	0.81	0.53		0.11	0.11
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	1.0	7.0	3.0		3.0	3.0
Lane Grp Cap (vph)	411	4097	1871		196	175
v/s Ratio Prot	c0.19	0.10	c0.12			
v/s Ratio Perm					0.00	c0.02
v/c Ratio	0.84	0.12	0.24		0.03	0.22
Uniform Delay, d1	43.9	2.5	15.0		47.6	48.6
Progression Factor	0.96	1.40	1.00		1.00	1.00
Incremental Delay, d2	13.3	0.1	0.3		0.1	0.7
Delay (s)	55.4	3.6	15.3		47.6	49.3
Level of Service	E	A	B		D	D
Approach Delay (s)		25.0	15.3		49.3	
Approach LOS		C	B		D	

Intersection Summary			
HCM 2000 Control Delay	27.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	97	719	755	2	2	88	345
v/c Ratio	0.60	0.18	0.33	0.02	0.02	0.41	0.70
Control Delay	66.6	5.3	17.8	52.0	52.0	52.1	12.2
Queue Delay	0.0	0.0	1.1	0.0	0.0	0.0	0.0
Total Delay	66.6	5.4	18.8	52.0	52.0	52.1	12.2
Queue Length 50th (ft)	74	29	101	1	1	67	0
Queue Length 95th (ft)	126	127	367	10	10	99	74
Internal Link Dist (ft)		284	110		286		
Turn Bay Length (ft)	105					100	
Base Capacity (vph)	295	3940	2274	145	145	507	699
Starvation Cap Reductn	0	0	1200	0	0	0	0
Spillback Cap Reductn	0	185	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.19	0.70	0.01	0.01	0.17	0.49

Intersection Summary

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	345	490	441	5	355
v/c Ratio	0.84	0.12	0.24	0.03	0.72
Control Delay	59.7	4.5	17.8	41.8	13.4
Queue Delay	11.6	0.0	0.0	0.0	0.7
Total Delay	71.3	4.5	17.9	41.8	14.0
Queue Length 50th (ft)	259	16	84	4	0
Queue Length 95th (ft)	348	110	180	14	78
Internal Link Dist (ft)		66	470	543	
Turn Bay Length (ft)					
Base Capacity (vph)	438	4095	1871	560	743
Starvation Cap Reductn	74	0	0	0	0
Spillback Cap Reductn	0	0	91	0	146
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.95	0.12	0.25	0.01	0.59

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	294	919	0	0	580	121	30	4	7	61	0	92
Future Volume (vph)	294	919	0	0	580	121	30	4	7	61	0	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0			5.0		4.6	4.6	4.6	4.6		4.6
Lane Util. Factor	1.00	0.91			0.95		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			0.98		1.00	1.00	1.00	1.00		0.99
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			0.97		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.96	1.00	0.95		1.00
Satd. Flow (prot)	1200	5085			3392		1681	1703	1583	1770		1561
Flt Permitted	0.95	1.00			1.00		0.95	0.96	1.00	0.95		1.00
Satd. Flow (perm)	1770	5085			3392		1681	1703	1583	1770		1561
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor (vph)	120%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	368	957	0	0	604	126	31	4	7	64	0	96
RTOR Reduction (vph)	0	0	0	0	15	0	0	0	7	0	0	85
Lane Group Flow (vph)	368	957	0	0	715	0	17	18	0	64	0	11
Confl. Peds. (#/hr)			1			29						2
Confl. Bikes (#/hr)						2						
Turn Type	Prot	NA			NA		Split	NA	Perm	Prot		Perm
Protected Phases	5	2			6		8	8		4		
Permitted Phases									8			4
Actuated Green, G (s)	45.1	86.1			37.0		5.4	5.4	5.4	14.3		14.3
Effective Green, g (s)	45.1	86.1			37.0		5.4	5.4	5.4	14.3		14.3
Actuated g/C Ratio	0.38	0.72			0.31		0.05	0.05	0.05	0.12		0.12
Clearance Time (s)	4.0	5.0			5.0		4.6	4.6	4.6	4.6		4.6
Vehicle Extension (s)	2.0	3.0			3.0		2.0	2.0	2.0	2.0		2.0
Lane Grp Cap (vph)	451	3648			1045		75	76	71	210		186
v/s Ratio Prot	c0.31	0.19			c0.21		0.01	c0.01		c0.04		
v/s Ratio Perm									0.00			0.01
v/c Ratio	0.82	0.26			0.68		0.23	0.24	0.00	0.30		0.06
Uniform Delay, d1	33.7	5.9			36.4		55.3	55.3	54.7	48.3		46.9
Progression Factor	1.00	1.00			0.59		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	15.0	0.2			1.8		0.6	0.6	0.0	0.3		0.1
Delay (s)	48.7	6.1			23.4		55.8	55.9	54.7	48.6		46.9
Level of Service	D	A			C		E	E	D	D		D
Approach Delay (s)		17.9			23.4			55.7			47.6	
Approach LOS		B			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.2
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	375	605	487	17	6	203
Future Volume (vph)	375	605	487	17	6	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1200	5085	3513		1770	1562
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	3513		1770	1562
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor (vph)	120%	100%	100%	100%	100%	100%
Adj. Flow (vph)	469	630	507	18	6	211
RTOR Reduction (vph)	0	0	2	0	0	188
Lane Group Flow (vph)	469	630	523	0	6	23
Confl. Peds. (#/hr)				32		1
Confl. Bikes (#/hr)				3		
Turn Type	Prot	NA	NA		Perm	Perm
Protected Phases	5	2	6			
Permitted Phases					4	4
Actuated Green, G (s)	52.0	97.0	40.0		13.0	13.0
Effective Green, g (s)	52.0	97.0	40.0		13.0	13.0
Actuated g/C Ratio	0.43	0.81	0.33		0.11	0.11
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	7.0	3.0		3.0	3.0
Lane Grp Cap (vph)	520	4110	1171		191	169
v/s Ratio Prot	c0.39	0.12	c0.15			
v/s Ratio Perm					0.00	c0.01
v/c Ratio	0.90	0.15	0.45		0.03	0.14
Uniform Delay, d1	31.6	2.5	31.3		47.9	48.4
Progression Factor	0.86	0.46	1.00		1.00	1.00
Incremental Delay, d2	18.6	0.1	1.2		0.1	0.4
Delay (s)	45.8	1.2	32.6		47.9	48.8
Level of Service	D	A	C		D	D
Approach Delay (s)		20.3	32.6		48.8	
Approach LOS		C	C		D	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	368	957	730	17	18	7	64	96
v/c Ratio	0.78	0.26	0.69	0.13	0.14	0.03	0.30	0.36
Control Delay	47.8	7.1	24.7	54.6	54.7	0.3	49.7	11.6
Queue Delay	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0
Total Delay	47.8	7.1	25.3	54.6	54.7	0.3	49.7	11.6
Queue Length 50th (ft)	252	81	125	13	13	0	48	0
Queue Length 95th (ft)	#585	174	163	38	40	0	76	42
Internal Link Dist (ft)		284	110		286			
Turn Bay Length (ft)	105						100	
Base Capacity (vph)	470	3728	1060	145	147	224	507	515
Starvation Cap Reductn	0	0	90	0	0	0	0	0
Spillback Cap Reductn	0	126	0	0	0	0	2	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.27	0.75	0.12	0.12	0.03	0.13	0.19

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	469	630	525	6	211
v/c Ratio	0.90	0.15	0.45	0.03	0.59
Control Delay	50.9	1.6	32.6	42.8	12.7
Queue Delay	3.7	0.0	0.0	0.0	0.0
Total Delay	54.6	1.6	32.6	42.8	12.7
Queue Length 50th (ft)	317	14	165	4	0
Queue Length 95th (ft)	#682	26	217	15	61
Internal Link Dist (ft)		66	470	543	
Turn Bay Length (ft)					
Base Capacity (vph)	520	4109	1173	560	638
Starvation Cap Reductn	21	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.94	0.15	0.45	0.01	0.33

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Appendix E – Alternative Driveway Level of Service Work Sheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	683	0	0	683	34	4	0	0	84	0	328
Future Volume (vph)	92	683	0	0	683	34	4	0	0	84	0	328
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0			5.0		4.6	4.6		4.6		4.6
Lane Util. Factor	1.00	0.91			0.95		0.95	0.95		1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.99		1.00	1.00		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.95		0.95		1.00
Satd. Flow (prot)	1770	5085			3502		1681	1681		1770		1200
Flt Permitted	0.95	1.00			1.00		0.95	0.95		0.95		1.00
Satd. Flow (perm)	1770	5085			3502		1681	1681		1770		1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	97	719	0	0	719	36	4	0	0	88	0	345
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	0	303
Lane Group Flow (vph)	97	719	0	0	753	0	2	2	0	88	0	42
Confl. Peds. (#/hr)						22						
Turn Type	Prot	NA			NA		Split	NA	Perm	Prot		Perm
Protected Phases	5	2			6		8	8		4		
Permitted Phases									8			4
Actuated Green, G (s)	11.1	89.3			74.2		1.8	1.8		14.7		14.7
Effective Green, g (s)	11.1	89.3			74.2		1.8	1.8		14.7		14.7
Actuated g/C Ratio	0.09	0.74			0.62		0.02	0.02		0.12		0.12
Clearance Time (s)	4.0	5.0			5.0		4.6	4.6		4.6		4.6
Vehicle Extension (s)	2.0	3.0			3.0		2.0	2.0		2.0		2.0
Lane Grp Cap (vph)	163	3784			2165		25	25		216		193
v/s Ratio Prot	c0.05	0.14			c0.22		c0.00	0.00		c0.05		
v/s Ratio Perm												0.03
v/c Ratio	0.60	0.19			0.35		0.08	0.08		0.41		0.22
Uniform Delay, d1	52.3	4.6			11.1		58.3	58.3		48.6		47.5
Progression Factor	1.00	1.00			1.40		1.00	1.00		1.00		1.00
Incremental Delay, d2	3.8	0.1			0.4		0.5	0.5		0.5		0.2
Delay (s)	56.1	4.7			16.1		58.8	58.8		49.1		47.7
Level of Service	E	A			B		E	E		D		D
Approach Delay (s)		10.8			16.1			58.8			48.0	
Approach LOS		B			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.2
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	317	451	396	10	5	331
Future Volume (vph)	317	451	396	10	5	331
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	3521		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	3521		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	345	490	430	11	5	360
RTOR Reduction (vph)	0	0	1	0	0	320
Lane Group Flow (vph)	345	490	440	0	5	40
Confl. Peds. (#/hr)				27		
Turn Type	Prot	NA	NA		Perm	Perm
Protected Phases	5	2	6			
Permitted Phases					4	4
Actuated Green, G (s)	27.9	96.6	63.7		13.4	13.4
Effective Green, g (s)	27.9	96.6	63.7		13.4	13.4
Actuated g/C Ratio	0.23	0.80	0.53		0.11	0.11
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	1.0	7.0	3.0		3.0	3.0
Lane Grp Cap (vph)	411	4093	1869		197	176
v/s Ratio Prot	c0.19	0.10	c0.12			
v/s Ratio Perm					0.00	c0.03
v/c Ratio	0.84	0.12	0.24		0.03	0.23
Uniform Delay, d1	43.9	2.5	15.1		47.5	48.6
Progression Factor	0.95	1.44	1.00		1.00	1.00
Incremental Delay, d2	13.3	0.1	0.3		0.1	0.7
Delay (s)	55.2	3.7	15.4		47.5	49.3
Level of Service	E	A	B		D	D
Approach Delay (s)		25.0	15.4		49.2	
Approach LOS		C	B		D	

Intersection Summary			
HCM 2000 Control Delay	27.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	97	719	755	2	2	88	345
v/c Ratio	0.60	0.18	0.33	0.02	0.02	0.41	0.70
Control Delay	66.6	5.3	17.9	52.0	52.0	52.1	12.2
Queue Delay	0.0	0.0	1.1	0.0	0.0	0.0	0.0
Total Delay	66.6	5.4	19.0	52.0	52.0	52.1	12.2
Queue Length 50th (ft)	74	29	101	1	1	67	0
Queue Length 95th (ft)	126	127	369	10	10	99	74
Internal Link Dist (ft)		284	257		286		
Turn Bay Length (ft)	105					100	
Base Capacity (vph)	295	3940	2274	145	145	507	699
Starvation Cap Reductn	0	0	1202	0	0	0	0
Spillback Cap Reductn	0	188	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.19	0.70	0.01	0.01	0.17	0.49

Intersection Summary

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	345	490	441	5	360
v/c Ratio	0.84	0.12	0.24	0.03	0.73
Control Delay	59.5	4.7	17.9	41.8	13.4
Queue Delay	10.1	0.0	0.0	0.0	0.7
Total Delay	69.7	4.7	17.9	41.8	14.1
Queue Length 50th (ft)	259	16	84	4	0
Queue Length 95th (ft)	347	114	180	14	78
Internal Link Dist (ft)		257	470	74	
Turn Bay Length (ft)					
Base Capacity (vph)	438	4094	1871	560	747
Starvation Cap Reductn	70	0	0	0	0
Spillback Cap Reductn	0	0	97	0	147
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.94	0.12	0.25	0.01	0.60

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	294	919	0	0	580	121	30	4	7	61	0	92
Future Volume (vph)	294	919	0	0	580	121	30	4	7	61	0	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0			5.0		4.6	4.6	4.6	4.6		4.6
Lane Util. Factor	1.00	0.91			0.95		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			0.98		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			0.97		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.96	1.00	0.95		1.00
Satd. Flow (prot)	1200	5085			3392		1681	1703	1583	1770		1583
Flt Permitted	0.95	1.00			1.00		0.95	0.96	1.00	0.95		1.00
Satd. Flow (perm)	1770	5085			3392		1681	1703	1583	1770		1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor (vph)	120%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	368	957	0	0	604	126	31	4	7	64	0	96
RTOR Reduction (vph)	0	0	0	0	15	0	0	0	7	0	0	85
Lane Group Flow (vph)	368	957	0	0	715	0	17	18	0	64	0	11
Confl. Peds. (#/hr)			1			29						
Confl. Bikes (#/hr)						2						
Turn Type	Prot	NA			NA		Split	NA	Perm	Prot		Perm
Protected Phases	5	2			6		8	8		4		
Permitted Phases									8			4
Actuated Green, G (s)	45.1	86.1			37.0		5.4	5.4	5.4	14.3		14.3
Effective Green, g (s)	45.1	86.1			37.0		5.4	5.4	5.4	14.3		14.3
Actuated g/C Ratio	0.38	0.72			0.31		0.05	0.05	0.05	0.12		0.12
Clearance Time (s)	4.0	5.0			5.0		4.6	4.6	4.6	4.6		4.6
Vehicle Extension (s)	2.0	3.0			3.0		2.0	2.0	2.0	2.0		2.0
Lane Grp Cap (vph)	451	3648			1045		75	76	71	210		188
v/s Ratio Prot	c0.31	0.19			c0.21		0.01	c0.01		c0.04		
v/s Ratio Perm									0.00			0.01
v/c Ratio	0.82	0.26			0.68		0.23	0.24	0.00	0.30		0.06
Uniform Delay, d1	33.7	5.9			36.4		55.3	55.3	54.7	48.3		46.9
Progression Factor	1.00	1.00			0.51		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	15.0	0.2			1.7		0.6	0.6	0.0	0.3		0.0
Delay (s)	48.7	6.1			20.5		55.8	55.9	54.7	48.6		46.9
Level of Service	D	A			C		E	E	D	D		D
Approach Delay (s)		17.9			20.5			55.7			47.6	
Approach LOS		B			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.2
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	375	605	486	18	6	205
Future Volume (vph)	375	605	486	18	6	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1200	5085	3512		1770	1562
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	3512		1770	1562
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor (vph)	120%	100%	100%	100%	100%	100%
Adj. Flow (vph)	469	630	506	19	6	214
RTOR Reduction (vph)	0	0	2	0	0	191
Lane Group Flow (vph)	469	630	523	0	6	23
Confl. Peds. (#/hr)				32		1
Confl. Bikes (#/hr)				3		
Turn Type	Prot	NA	NA		Perm	Perm
Protected Phases	5	2	6			
Permitted Phases					4	4
Actuated Green, G (s)	52.0	97.0	40.0		13.0	13.0
Effective Green, g (s)	52.0	97.0	40.0		13.0	13.0
Actuated g/C Ratio	0.43	0.81	0.33		0.11	0.11
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	7.0	3.0		3.0	3.0
Lane Grp Cap (vph)	520	4110	1170		191	169
v/s Ratio Prot	c0.39	0.12	c0.15			
v/s Ratio Perm					0.00	c0.01
v/c Ratio	0.90	0.15	0.45		0.03	0.14
Uniform Delay, d1	31.6	2.5	31.3		47.9	48.4
Progression Factor	0.83	0.38	1.00		1.00	1.00
Incremental Delay, d2	18.5	0.1	1.2		0.1	0.4
Delay (s)	44.9	1.0	32.6		47.9	48.8
Level of Service	D	A	C		D	D
Approach Delay (s)		19.8	32.6		48.8	
Approach LOS		B	C		D	

Intersection Summary			
HCM 2000 Control Delay	26.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	368	957	730	17	18	7	64	96
v/c Ratio	0.78	0.26	0.69	0.13	0.14	0.03	0.30	0.35
Control Delay	47.8	7.1	21.8	54.6	54.7	0.3	49.7	11.5
Queue Delay	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Total Delay	47.8	7.1	21.9	54.6	54.7	0.3	49.7	11.5
Queue Length 50th (ft)	252	81	97	13	13	0	48	0
Queue Length 95th (ft)	#585	174	131	38	40	0	76	42
Internal Link Dist (ft)		284	257		286			
Turn Bay Length (ft)	105						100	
Base Capacity (vph)	470	3728	1060	145	147	224	507	522
Starvation Cap Reductn	0	0	25	0	0	0	0	0
Spillback Cap Reductn	0	120	0	0	0	0	2	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.27	0.71	0.12	0.12	0.03	0.13	0.18

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	469	630	525	6	214
v/c Ratio	0.90	0.15	0.45	0.03	0.59
Control Delay	50.1	1.3	32.6	42.8	12.7
Queue Delay	0.9	0.0	0.0	0.0	0.0
Total Delay	51.0	1.3	32.6	42.8	12.7
Queue Length 50th (ft)	318	13	165	4	0
Queue Length 95th (ft)	#681	18	217	15	61
Internal Link Dist (ft)		257	470	74	
Turn Bay Length (ft)					
Base Capacity (vph)	520	4109	1173	560	640
Starvation Cap Reductn	6	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.91	0.15	0.45	0.01	0.33

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.