Draft Traffic Impact Analysis Report

2364 Road 20

San Pablo, California

September 22, 2021

TJKM

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EXECUTIVE SUMMARY

This report summarizes the results of the Traffic Impact Analysis (TIA) conducted for the residential development located at 2364 Road 20 in City of San Pablo, CA. The development comprises of a new 64-unit multi-family building, consisting of four levels of dwelling units and one level parking garage. All housing units will be studio or two-bedroom units. The proposed development will be located on the south side of Road 20, approximately 375 feet east of the Road 20/San Pablo Avenue intersection. The proposed development edges single family and multifamily land uses. Other surrounding land uses include a retail center and a middle school.

This report provides the intersection Level of Service (LOS) related to the project. Additionally, the report also includes vehicle miles traveled (VMT), evaluations and recommendations concerning project site access and on-site circulation for vehicles, bicycles, and pedestrians.

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

Project Trip Generation

The proposed project is expected to generate approximately 23 weekday a.m. peak hour trips (6 inbound trips, 17 outbound trips), and 29 weekday p.m. peak hour trips (18 inbound trips, 11 outbound trips).

Existing Conditions

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

Existing plus Project Conditions

Under this scenario, all of the study intersections continue to operate within applicable jurisdictional LOS standards of LOS D or better during both peak hours.

Queueing Analysis

The following are movements where the addition of project trips would further increase the queue lengths that already exceed existing storage lengths:

- San Pablo Avenue/Road 20-23rd Street
    - ✓ Eastbound left-turn lane during the p.m. peak hour only. Eastbound through-left lane during both peak hours.
    - ✓ Westbound through-left lane during both peak hours.
    - ✓ Northbound left-turn lane during the p.m. peak hour only.

- ✓ Southbound left-turn lane during the a.m. peak hour only. Southbound through lane during the p.m. peak hour only. Southbound right-turn lane during the p.m. peak hour only.

Site Access and On-Site Circulation

The proposed vehicular access to the project site is via one project entrance on Road 20. Main driveway access is to the proposed parking garage. From the site plan, it appears that existing sidewalks and on-street parking along the project frontage will be maintained. Sight distance between vehicles travelling westbound on Road 20 and vehicles exiting the project site is clear and visible for at least 200 feet; however, sight distance between vehicles travelling eastbound on Road 20 and vehicles exiting the project site is slightly obstructed by the horizontal curvature of Road 20, west of the project site. TJKM recommends the project use landscaping below eye level to avoid further obstructing sight distance west of the project site.

Based on the current site plan, circulation aisles seem to satisfy the minimum 22 feet requirement from the City of San Pablo Municipal Code. The proposed project should perform a truck turning analysis to confirm a variety of trucks, including garbage trucks and emergency vehicles, can circulate on-site. Based on a preliminary review of the project site plan, the site access and on-site circulation is considered adequate.

Pedestrian Impacts

The proposed project should provide adequate street lighting at the project driveway. The proposed project does not conflict with existing and planned pedestrian facilities; therefore, the impact to pedestrian facilities is ***less than significant***.

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 various AC Transit bus stops on Road 20 and San Pablo Avenue. Impacts to transit service are expected to be ***less than significant.***

Vehicle Miles Traveled

Since the proposed project is exempt from CEQA (CEQA exemption #15332), in accordance to CCTA VMT requirements, it is also not required to conduct a VMT analysis.

1.0 INTRODUCTION

This report summarizes the results of the Traffic Impact Analysis (TIA) for the proposed residential development located in City of San Pablo, California.

1.1 Project Description

The project proposes to develop 42,842 square feet (sq. ft.) of multifamily residential use, including four levels of dwelling units and one level parking garage. The project proposes to provide 72 parking spaces in a one-story parking garage.

The project is located on the south side of Road 20 between San Pablo Avenue and El Portal Drive. The project entrances will consist of one new driveway into the parking garage. The project site is located across from the existing College Center and an existing multifamily development.

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 Vehicle Miles Traveled (VMT), project site access and on-site circulation for vehicles, bicycles, and pedestrians, queuing analysis at the study intersections, and parking supply.

1.3 Study Intersections

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

1. San Pablo Avenue/Road 20 – 23rd Street (Signal)
2. El Portal Drive/Road 20 (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 two 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

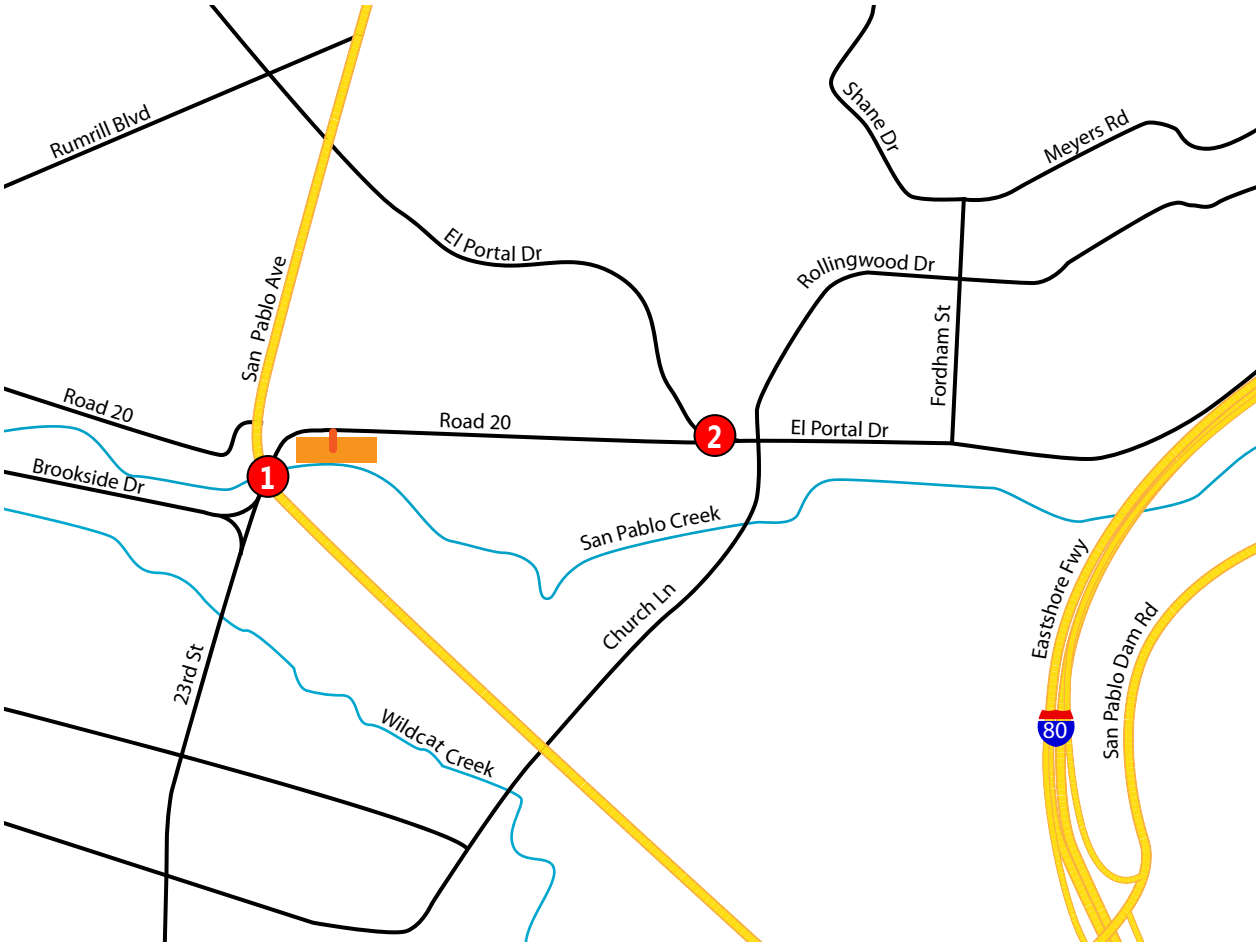
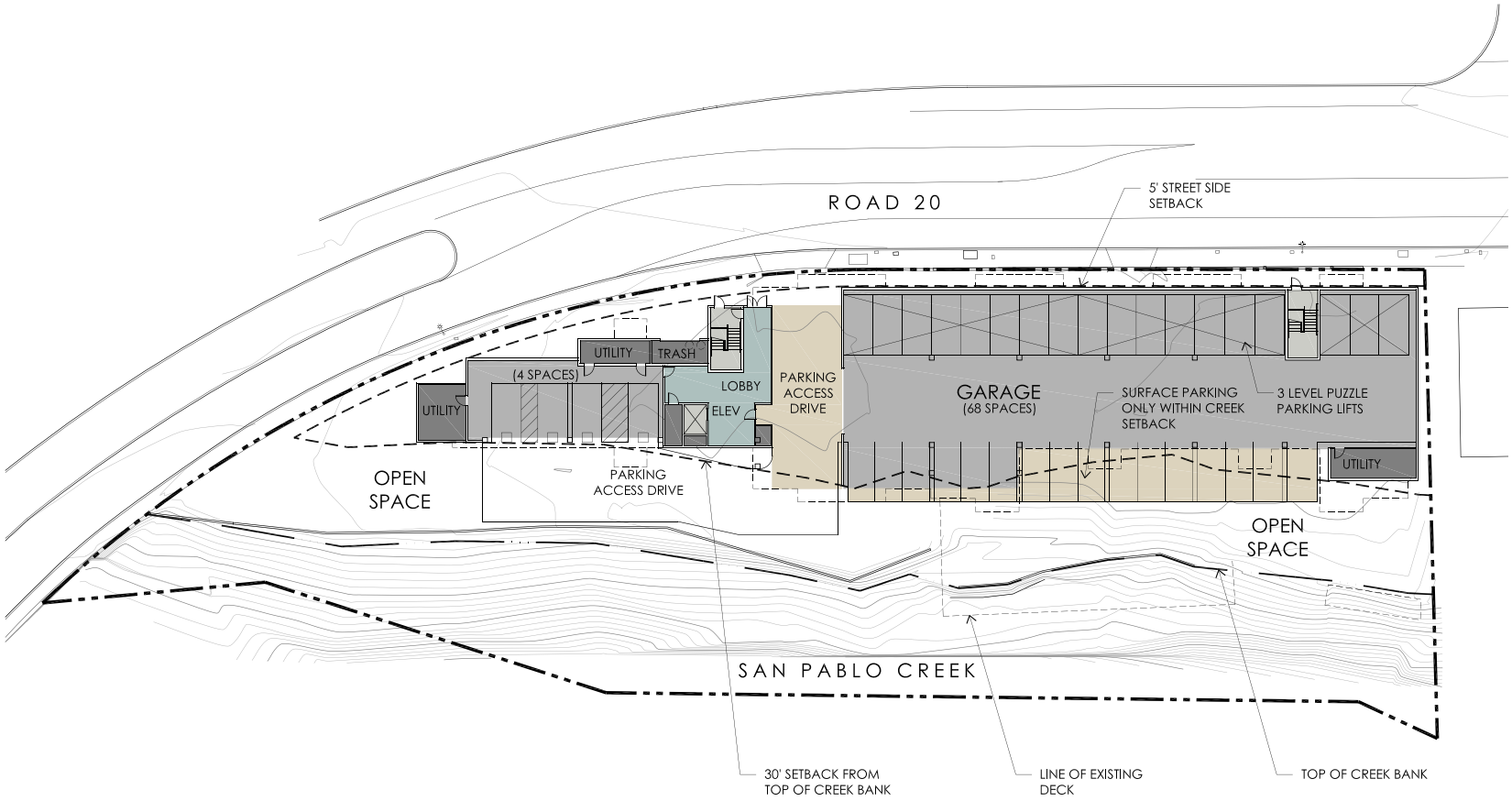


Figure 2: Site Plan



2.0 STUDY METHODOLOGY

Traffic impacts related to the proposed project were evaluated for both compliance with applicable regulatory documents and environmental significance as defined in the California Environmental Quality Act (CEQA). In CEQA published by the Governor's Office of Planning and Research (OPR), the July 1, 2020 Technical Memorandum prepared by Fehr & Peers describing the VMT methodology adopted by the Contra Costa Transportation Authority (CCTA). As of July 1, 2020, intersection level of service (LOS) can no longer be used to determine significant CEQA impacts.

2.1 Level of Service Analysis Methodology

Level of Service (LOS) is a qualitative measure that describes operational conditions as they relate to the traffic stream and perceptions by motorists and passengers. 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). The intersection capacity analysis was conducted using the Synchro 10th Edition software to implement the Highway Capacity Manual, 2000 Edition (Transportation Research Board, 2000) (HCM) methodology to determine the overall intersection delay. The HCM methodology calculates the average delay, in seconds, of a vehicle passing through the intersection in any direction. The average delay is used to determine the intersection LOS according to the LOS definitions provided in **Table 1**.

Table 1: Level of Service Definitions for Intersections

Level of Service	Description	Delay in seconds	
		Signalized Intersections	Unsignalized Intersections
A	EXCELLENT. No vehicle waits longer than one red light and no approach phase is fully used.	≤10.0	0.0-10.0
B	VERY GOOD. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.	>10.0 and ≤20.0	10.1-15.0
C	GOOD. Occasionally drivers may have to wait through more than one red light; backups may develop behind turning vehicles.	>20.0 and ≤35.0	15.1-25.0
D	FAIR. Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.	>35.0 and ≤55.0	25.1-35.0
E	POOR. Represents the most vehicles intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.	>55.0 and ≤80.0	35.1-50.0
F	FAILURE. Backups from nearby locations or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Tremendous delays with continuously increasing queue lengths.	>80.0	>50.0

Source: Highway Capacity Manual 2000 (Transportation Research Board, 2000)

2.2 Significant Impact Criteria/Level of Service Standards

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, Contra Costa County, City of San Pablo plans and policies, and professional standards, a project impact would be considered significant if:

- The project would conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.
- The project conflicts with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.
- If the project substantially increases hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- The project results in inadequate emergency access

The following criteria are not subject to CEQA significance criteria but should be addressed as appropriate in the findings of the traffic study:

- If the project site design does not have adequate parking or circulation capacity to accommodate the anticipated demand
- If the project would result in inadequate internal circulation to accommodate project traffic.

Table 2: Impact Criteria and Significance Thresholds

Intersection Control Type	Significant Impact Threshold
Signalized	The Project •Causes an acceptable LOS (LOS D or better) to decline to an unacceptable LOS (LOS E or F), or •Increases the average delay by more than 5 seconds per vehicle at an intersection having an unacceptable LOS without project traffic.
Unsignalized	The Project •Causes an acceptable LOS to decline to an unacceptable LOS, or •For intersections already operating at an unacceptable LOS without the project, it is considered a significant impact if the project related traffic increases the worst movement/approach delay by more than 5 seconds.

Source: *The San Pablo General Plan 2030 (April 2011)*

2.3 Vehicle Miles Traveled

As the City of San Pablo does not currently have an adopted policy document regarding VMT standards or methodology, this study evaluates project-related VMT as outlined in the draft CCTA VMT

methodology[1]. This methodology includes a screening process, in order to streamline evaluation of projects that can be presumed to generate a less-than-significant impact on VMT by exempting them from further analysis. Absent evidence that the project has characteristics that might lead to a significant amount of VMT, a screened out project can be presumed to have a less-than-significant impact.

If a project meets any of the following screening criteria and does not have characteristics indicating high VMT generation, CCTA does not require further VMT analysis:

- Qualifies for CEQA exemption
- Considered a small project
- Contains only local-serving uses
- Located in Transit Priority Areas (TPAs)
- Located in low VMT areas.

VMT is further discussed in Section 5.4 of this report.

[1] Contra Costa County Transportation Analysis Guidelines

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 residential development is provided via San Pablo Avenue. Local access to the proposed project is provided via Road 20, El Portal Drive and 23rd Street.

San Pablo Avenue is a four-lane, north-south mixed use boulevard in the study area, extending from Hercules in the north to downtown Oakland to the south. In the project vicinity, the roadway features a raised median and on-street parking. San Pablo Avenue provides continuous sidewalks on both sides. Class II bike lanes exist on both sides of the roadway, south of Road 20. Continuous lighting is present via overhead streets lights on both sides of the roadway. The posted speed limit is 35 miles per hour (mph) in the project vicinity.

Road 20 is a two-lane, east-west Avenue in the City of San Pablo, extending between Rumrill Boulevard and El Portal Drive. Road 20 provides direct access to multifamily residential uses and a middle school. The roadway features a two-way left-turn lane median and on-street parking on both sides of the roadway. Continuous sidewalks provide pedestrian access along the roadway. Continuous lighting is present via overhead street lights on both sides of the roadway. The posted speed limit along Road 20 ranges from 15 to 30 mph, however a school zone speed limit of 25 mph is present in the study area.

El Portal Drive is a two- to four-lane, east-west arterial in San Pablo and Richmond. In the City of San Pablo, El Portal Drive is classified as an urban arterial between San Pablo Avenue and Church Lane and an auto arterial between Church Lane and eastern City limits. El Portal Drive provides residents access to and from I-80 to the east. In the project vicinity, the roadway continuous sidewalks on both sides. Class II bike lanes exist on both sides of the roadway, east of Church Lane. Continuous lighting is present via overhead street lights in a raised median. The posted speed limit along El Portal Drive is 30 mph.

23rd Street is a two- to three-lane, north-south mixed use boulevard in the study area, extending from San Pablo Avenue in the north to Cutting Boulevard to the south. This road provides residents access between San Pablo and the City of Richmond. In the project vicinity, the roadway has continuous sidewalks on both sides and Class II bike lanes exist on both sides of the roadway. Continuous lighting is present via overhead street lights on both sides of the roadway. The posted speed limit along 23rd Street is 25 mph in the project vicinity.

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. Along the project frontage on Road 20, the width of the sidewalk is approximately six feet wide. All of the study signalized intersections have marked crosswalks with pedestrian pushbuttons and pedestrian signal heads.

At the intersection of San Pablo Avenue/Road 20-23rd Street and El Portal Drive/Road 20 there are ADA compliant curb-ramps and crosswalk markings. At the El Portal Drive/Road 20 intersection curb ramps at the northeast and southeast quadrants are not ADA-compliant. Throughout the project vicinity, Road 20, San Pablo Avenue, El Portal Drive and 23rd Street feature continuous sidewalks on both sides and high visibility crosswalks.

3.3 Existing Bicycle Facilities

The 2017 City of San Pablo Bicycle and Pedestrian Master Plan outlines goals and objectives to improve the current active transportation system that includes walking and biking. The various bicycle facilities throughout the city are described below.

- **Class I Shared-Use Path**: Class I bikeways are a completely separate right-of-way designed for the exclusive use of cyclists and pedestrians, with minimal crossings for motorists. These paths are often located along creeks, canals, and rail lines.
- **Class II Bike Lanes**: Class II bike lanes use special lane markings, pavement legends, and signage. Bike lanes provide designated street space for bicyclists, typically adjacent to outer vehicle travel lanes. Buffered bike lanes increase separation through painted buffers between vehicle lanes and/or parking, and green paint at conflict zones (e.g., driveways or intersections).
- **Class III Bike Routes**: Bike routes provide enhanced mixed-traffic conditions for bicyclists through signage, sharrow striping, and or traffic calming treatments, and provide continuity to a bikeway network. Bike routes are typically designated along gaps between bike trails or bike lanes, or along low-volume, low-speed streets. Bicycle Boulevards further enhance bike routes by encouraging slower speeds and discouraging non-local vehicle traffic using traffic diverters, chicanes, traffic circles, and speed tables.
- **Class IV Bikeway**: Bikeways are also known as cycle tracks or separated bikeways, are set aside for the exclusive use of bicycles and physically separated from vehicle traffic. Separated bikeways were adopted by Caltrans in 2015. Separation may include grade separation, flexible posts, physical barriers, or on-street parking.

In the vicinity of the project, there are Class II bicycle facilities along 23rd Street, and El Portal Drive. Additionally, the Wildcat Creek Trail, a Class I shared use path, is accessible on 23rd Street, located 0.2 miles southwest of the project site. There are no bicycle facilities that provide direct access to the project site.

3.4 Existing Transit Facilities

AC Transit provides transit service throughout Richmond, San Pablo, and East Contra Costa County. In the project vicinity, transit stops for AC Transit are located along San Pablo Avenue, 23rd Street, Road 20 and El Portal Drive. **Table 3** summarizes the existing AC Transit services in the project vicinity.

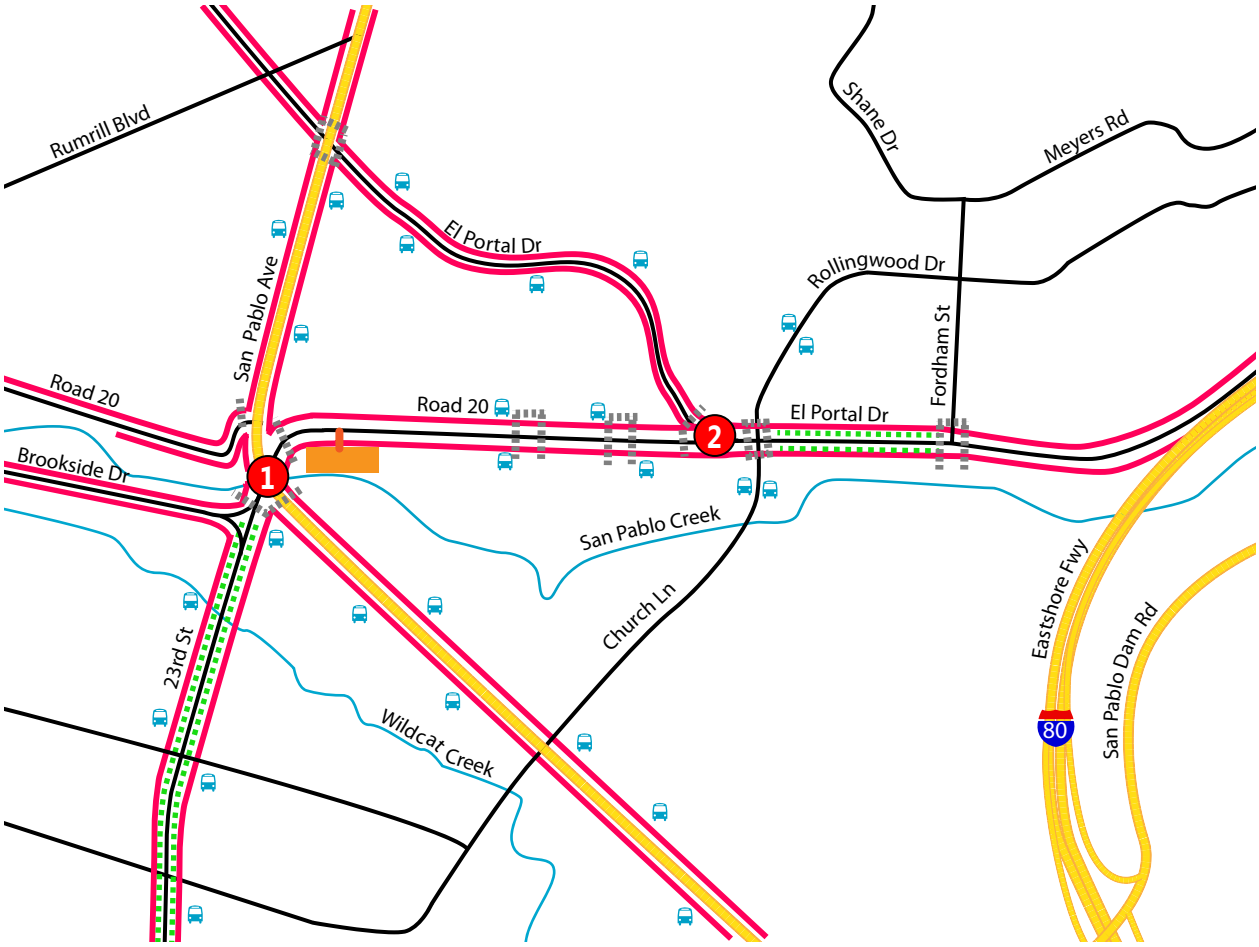
Table 3: Existing Tri Delta Transit Service

Route	From	To	Weekdays		Weekends	
			Operating Hours	Headway (minutes)	Operating Hours	Headway (minutes)
72	Hilltop Mall	Jack London Square	5:07 a.m. – 1:02 a.m.	19-40	4:59 a.m. – 1:28 a.m.	27-40
72R	Jack London Square	Contra Costa College	5:50 a.m. – 8:01 p.m.	6-22	6:59 a.m. – 7:40 p.m.	12-18
74	Castro Ranch Rd/Sherwood Forest Dr	Harbour Way South/Ford Point	6:41 a.m. – 8:16 p.m.	30-60	6:42 a.m. – 8:14 p.m.	30-62
76	El Cerrito Del Norte BART	Richmond Parkway Transit Center	6:17 a.m. – 8:27 p.m.	6-30	6:33 a.m. – 8:27 p.m.	30
607	Richmond High	Point Richmond	7:05 a.m. – 7:39 a.m.	One a.m. cycle only	Not in Service	Not in Service
669	Crespi Middle	San Pablo Dam	7:263 a.m. – 4:51 p.m.	One a.m. cycle; 77 for p.m.	Not in Service	Not in Service
676	De Anza	Rollingwood	7:47 a.m. – 4:19 p.m.	One a.m. cycle; 60-75 for p.m.	Not in Service	Not in Service

Source: AC Transit Website

Figure 3 illustrates existing pedestrian, bicycle and transit facilities in the project vicinity.

Figure 3: Existing Pedestrian, Bike, and Transit Facilitites



3.5 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 a.m.-9:00 a.m.) and p.m. peak period (4:00-6:00 p.m.) at the study intersections on Tuesday, August 31, 2021. TJKM compared the traffic counts at the intersection of San Pablo Avenue/Road 20-23rd Street and El Portal Drive/Road 20 before COVID-19 conditions (March 2019) and present traffic counts (August 2021) during the COVID-19 pandemic conditions. TJKM applied a growth factor of 1.08 during the a.m. peak hour and 1.05 during the p.m. peak hour to the present traffic volumes at San Pablo Avenue/Road 20-23rd Street intersection to establish baseline conditions. Similarly, TJKM applied a growth factor of 1.18 during the a.m. peak hour and 1.24 during the p.m. peak hour to the present traffic volumes at El Portal Drive/Road 20 intersection to establish baseline conditions. These adjustment rates were applied to all volume data including pedestrians and bicyclists at the two study intersections. **Appendix A** includes all data sheets for the collected vehicle, bicycle, and pedestrian counts. **Figure 4** illustrates the existing lane geometry, and traffic controls at the study intersections. **Figure 5** illustrates the existing a.m. and p.m. peak hour vehicle turning movement volumes at the study intersections.

3.6 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. **Table 4** below summarizes peak hour LOS at the study intersections under Existing Conditions. Due to the limitations of HCM 2010 methodology, the study intersections were evaluated using HCM 2000 Methodology.

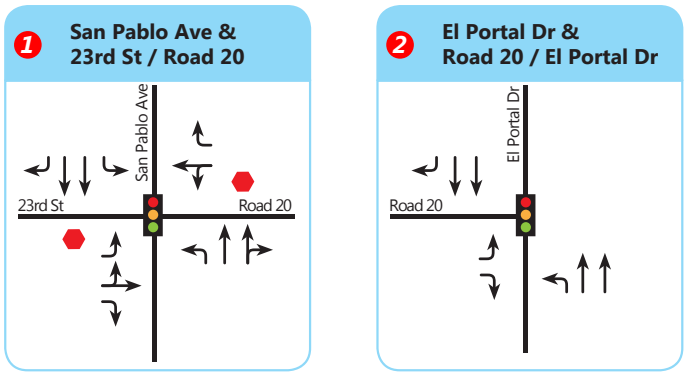
Under this scenario, all of the study intersections operate at the applicable jurisdictional standards of LOS D or better during both peak periods. **Appendix B** contains the detailed LOS calculation sheets for Existing Conditions.

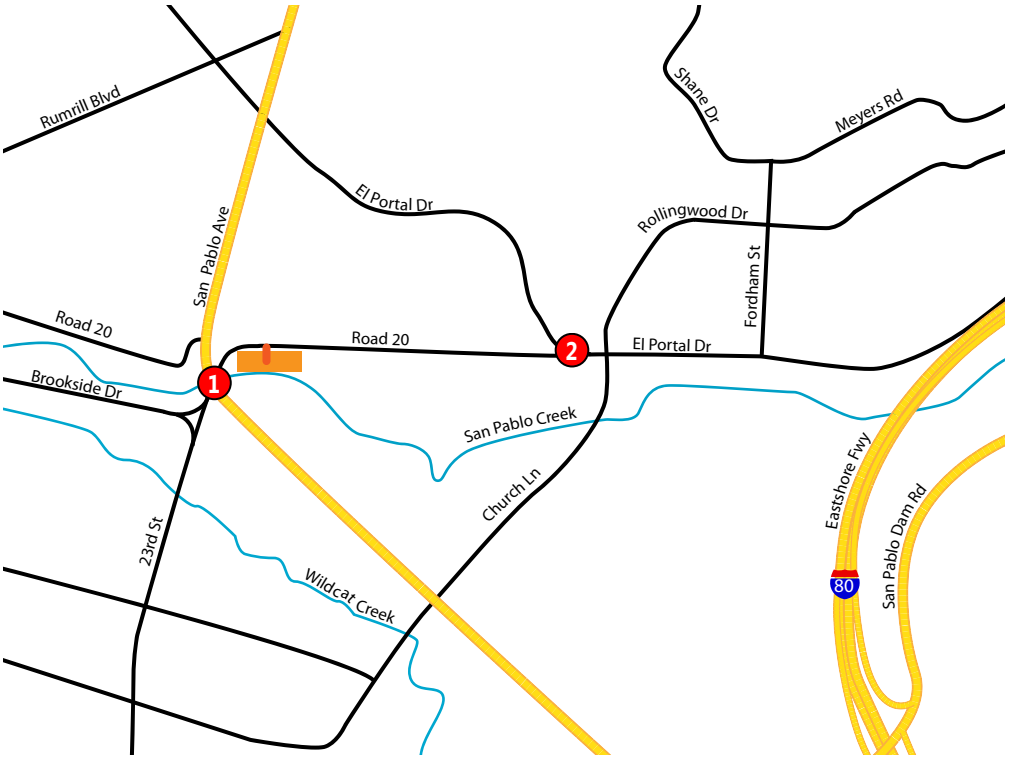
Table 4: Intersection Level of Service Analysis – Existing Conditions

#	Intersection	Control	Peak Hour[1]	Existing Conditions	
				Delay[2]	LOS[3]
1	San Pablo Avenue/Road 20-23rd Street	Signal	A.M.	53.2	D
			P.M.	47.1	D
2	El Portal Drive/Road 20	Signal	A.M.	11.9	B
			P.M.	8.2	A

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.
3. LOS – Level of Service. **Bold** indicates unacceptable LOS and Delay.

Figure 4: Existing Lane Geometry and Traffic Control

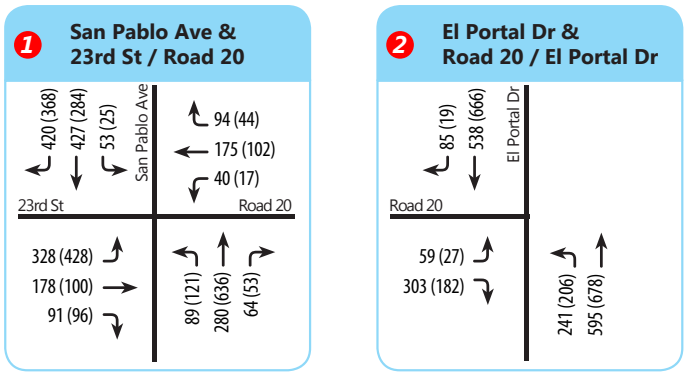


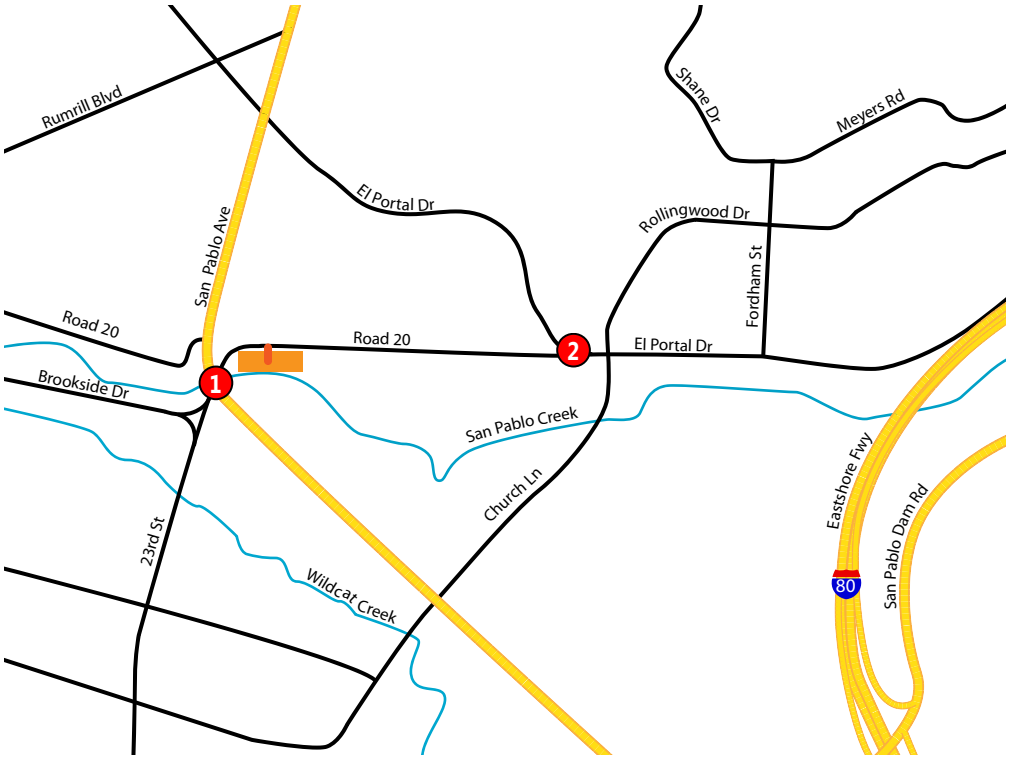


LEGEND

- Project Site
- Study Intersection
- Project Access
- Stop Sign
- Traffic Signal

Figure 5: Existing Peak Hour Traffic Volumes





LEGEND

- Project Site
- Study Intersection
- Project Access

XX AM Peak Hour Traffic Volumes
(XX) PM Peak Hour Traffic 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.

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 (10th Edition)*. TJKM used published trip rates for the ITE land use Multifamily Housing (Mid-Rise) (ITE Code 221) for the proposed residential development.

Table 5 shows the trip generation expected to be generated by the proposed project. The proposed project is expected to generate approximately 348 net new daily trips, including 23 weekday a.m. peak hour trips (6 inbound trips, 17 outbound trips), and 29 weekday p.m. peak hour trips (18 inbound trips, 11 outbound trips).

Table 5: Project Trip Generation

Proposed Land Uses (ITE Code)	Size	Daily		AM Peak				PM Peak			
		Rate	*Trips*	Rate	In/out %	In/out	Total	Rate	In/out %	In/out	Total
Multifamily Housing (Mid-Rise) (221)[1]	64 DU	5.44	348	0.36	26/74	6/17	23	0.44	61/39	18/11	29
Total Net Trips			**348**			**6/17**	**23**			**18/11**	**29**

Source - ITE Trip Generation Manual, 10th Edition (2019).
[1]Multifamily Housing (Mid-Rise), General Urban/Suburban (ITE Land Use Code 221) vehicle trip rates are based upon number of dwelling units.

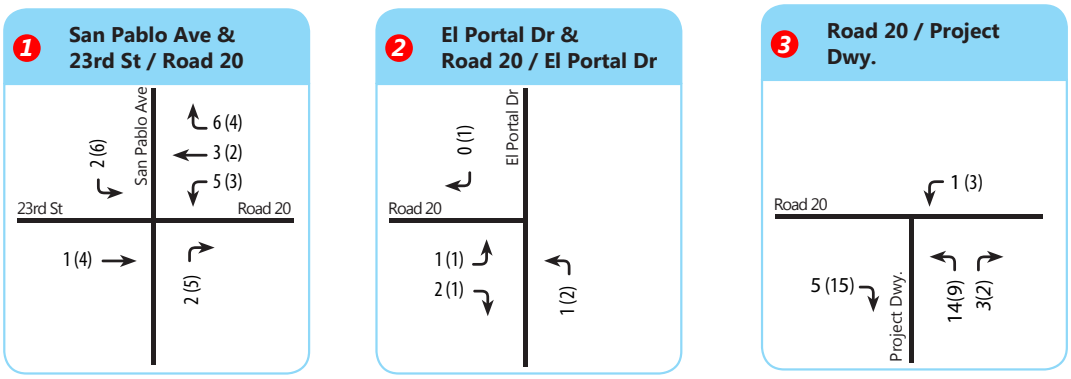
4.2 Project Trip Distribution and Assignment

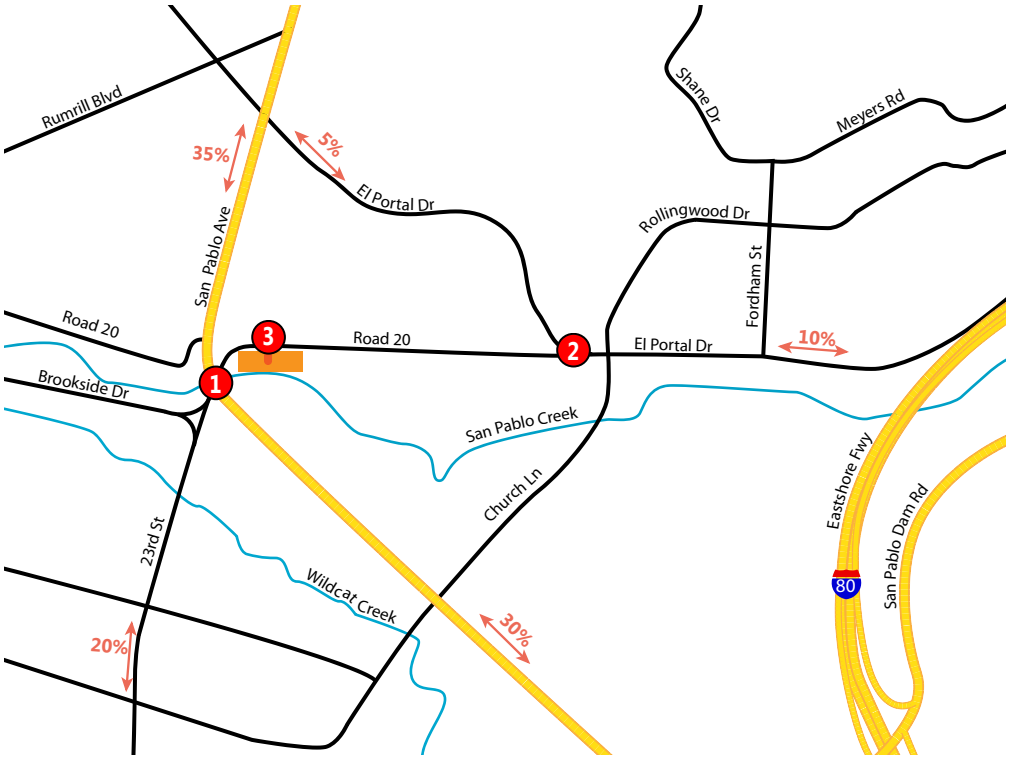
Trip distribution is a process that determines in what proportion vehicles would be expected to travel between the project site and various destinations outside the project study area and also determines the various routes that vehicles would take from the project site to each destination using the calculated trip

distribution. Trip distribution assumptions for the proposed project were developed based on existing travel patterns, and knowledge of the study area.

Figure 6 illustrates the trip distribution percentages and 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 6: Project Trip Distribution and Assignment





LEGEND

- Project Site
- Study Intersection
- Project Access

XX AM Peak Hour Project Trips

(XX) PM Peak Hour Project Trips

XX% Trip Distribution

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 6**. The results for Existing Conditions are included for comparison purposes. **Figure 7** displays projected peak hour turning movement volumes at all of the study intersections for Existing plus Project Conditions.

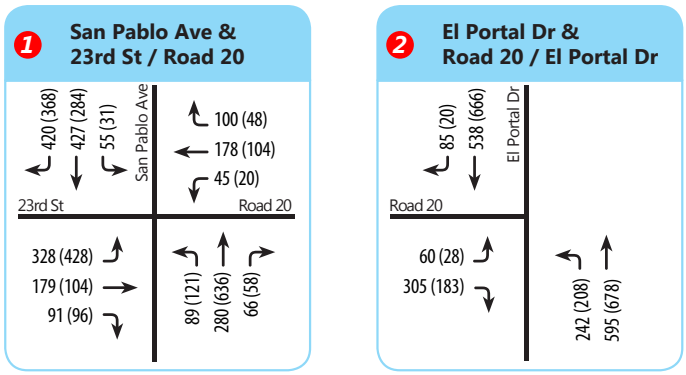
All study intersections are expected to continue operating within applicable jurisdictional standards of LOS D or better under Existing plus Project Conditions. **Appendix C** contains the detailed LOS calculation sheets for Existing plus Project Conditions.

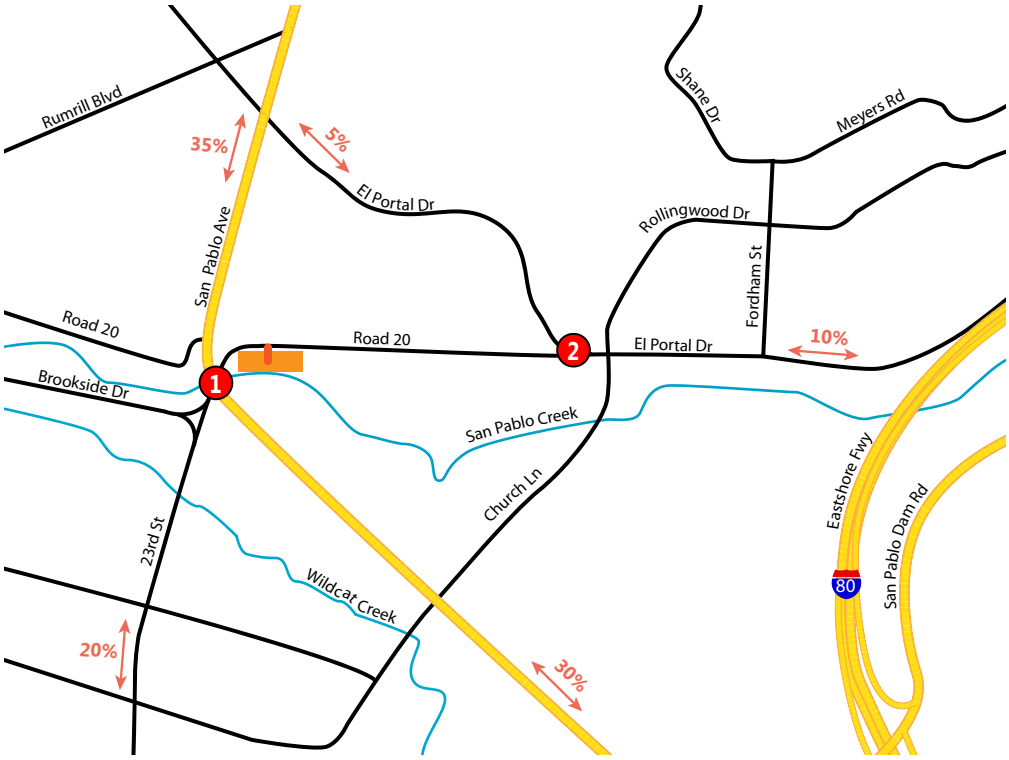
Table 6: Intersection Level of Service Analysis – Existing plus Project Conditions

#	Study Intersections	Control	Peak Hour[1]	Existing Conditions		Existing Plus Project Conditions		Change in Delay	Significant?
				Delay[2]	LOS[3]	Delay[2]	LOS[3]		
1	San Pablo Avenue/Road 20-23rd Street	Signal	A.M.	53.2	D	53.9	D	0.7	N
			P.M.	47.1	D	48.2	D	1.1	N
2	El Portal Drive/Road 20	Signal	A.M.	11.9	B	11.9	B	0.0	N
			P.M.	8.2	A	8.3	A	0.1	N

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.
3. LOS – Level of Service.

Figure 7: Existing plus Project Peak Hour Traffic Volumes





LEGEND

- Project Site
- Study Intersection
- Project Access
- XX AM Peak Hour Traffic Volumes
- (XX) PM Peak Hour Traffic Volumes
- XX% Trip Distribution

4.4 Queuing Analysis – Existing Plus Project Conditions

TJKM conducted a vehicle queueing and storage analysis for exclusive left and right turn pockets at the study intersections where project traffic is added under Existing plus Project Conditions. The 95th percentile queues were analyzed using Synchro 10.0 software. Detailed calculations are included in the LOS appendices corresponding to each analysis scenario. **Table 7** summarizes the 95th percentile queue lengths at selected study intersections under Existing and Existing plus Project scenarios. It should be noted that queue lengths at some locations already exceed capacity, creating deficient conditions.

Table 7: 95th Percentile Queues at Study Intersections

#	Study Intersections	Lane Group	Storage Length	Existing		Existing Plus Project Conditions		Change	
				AM	PM	AM	PM	AM	PM
1	San Pablo Avenue/Road 20-23rd Street	EBL	325	**525**	**490**	**525**	**505**	0	15
		EBTL	325	**535**	**500**	**540**	**505**	5	5
		EBR	135	20	25	20	25	0	0
		WBTL	70	**440**	**245**	**460**	**255**	20	10
		WBR	70	20	0	35	0	15	0
		NBL	155	**220**	**285**	**220**	**290**	0	5
		NBTR	1,025	280	540	280	550	0	10
		SBL	90	**175**	75	**185**	90	10	15
		SBT	90	**370**	**225**	**370**	**230**	0	5
		SBR	90	**405**	**280**	**405**	**285**	0	5
2	El Portal Drive/Road 20	EBL	170	40	30	45	30	5	0
		EBR	300	0	0	0	0	0	0
		NBL	155	**235**	**190**	**235**	**190**	0	0
		NBT	350	115	135	115	135	0	0
		SBT	445	160	240	160	240	0	0
		SBR	45	40	20	40	20	0	0

Notes: Storage length and 95th percentile queue is expressed in feet per lane
AM – morning peak hour, PM – evening peak hour
1 vehicle = 25 feet
Bold indicates queue lengths exceeding capacity

The following are movements where the addition of project trips would exceed existing storage or further increase the queue lengths that already exceed existing storage lengths:

- Eastbound left-turn lane at San Pablo Avenue/Road 20-23rd Street: the proposed project would further increase the already exceeding exiting queue length by less than one vehicle (1 vehicle = 25 ft.) during the p.m. peak only. Improvements to this intersection have been identified in the *Update of the Contra Costa Congestion Management Program* (CCTA, 2019) that include widening the intersection to accommodate additional eastbound left-turn lanes. However, specific improvements to this approach have not been identified yet.

- Eastbound through-left lane at San Pablo Avenue/Road 20-23rd Street: the proposed project would further increase the already exceeding existing queue length by less than one (1 vehicle = 25 feet) during both peak periods.
- Westbound through-left lane at San Pablo Avenue/Road 20-23rd Street: the proposed project would further increase the already exceeding existing queue length by less than one vehicle (1 vehicle = 25 feet) during both peak periods.
- Northbound left-turn lane at San Pablo Avenue/Road 20-23rd Street: the proposed project would further increase the already exceeding existing queue length by less than one vehicle (1 vehicle = 25 feet) during the p.m. peak period only.
- Southbound left-turn lane at San Pablo Avenue/Road 20-23rd Street: the proposed project would further increase the already exceeding existing queue length by less than one vehicle (1 vehicle = 25 feet) during the a.m. peak period only.
- Southbound through lane at San Pablo Avenue/Road 20-23rd Street: the proposed project would further increase the already exceeding existing queue length by less than one vehicle (1 vehicle = 25 ft.) during the p.m. peak only.
- Southbound right-turn lane at San Pablo Avenue/Road 20-23rd Street: the proposed project would further increase the already exceeding existing queue length by less than one vehicle (1 vehicle = 25 ft.) during the p.m. peak only.

4.5 Queuing Analysis at Project Driveway

TJKM conducted a vehicle queuing analysis at the project driveway along Road 20. The 95th percentile (maximum) queues were analyzed using the HCM 2000 Queue methodology contained in Synchro 10 software for the project driveways**. Table 8** summarizes the 95th percentile queue lengths at the project driveway under Existing plus Project scenario. As shown in **Table 8**, under Existing plus Project Conditions the 95th percentile queues at the outbound approach of project driveway are expected to be minimal.

Table 8: 95th Percentile Queues at Project Driveways

Intersection	Control	Existing plus Project Conditions			
		AM		PM	
		LOS	95th Percentile Queue (ft)[1]	LOS	95th Percentile Queue (ft)[1]
Road 20/ Project Driveway	One-Way Stop	B	25	B	25

Notes:

1 vehicle=25 feet

[1]Reported values of 95th percentile queues are for the outbound movements at the project driveways

5.0 ADDITIONAL ANALYSES

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

- Site Access and Onsite Circulation;
- Pedestrian, Bicycle, and Transit Impacts
- Vehicle Miles Traveled (VMT) Analysis

Unlike the LOS impact methodology, 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 the project environment.

5.1 Site Access and On-Site Circulation

Site Access

The proposed vehicular access to the project site is via one project entrance on Road 20. Main driveway access is to the proposed parking garage. From the site plan, it appears that existing sidewalks and on-street parking along the project frontage will be maintained. The posted speed limit along the project frontage is 30 mph, requiring a stopping sight distance of 200 feet. Sight distance between vehicles travelling westbound on Road 20 and vehicles exiting the project site is clear and visible for at least 200 feet; however, sight distance between vehicles travelling eastbound on Road 20 and vehicles exiting the project site is slightly obstructed by the horizontal curvature of Road 20, west of the project site. TJKM recommends the project use landscaping below eye level to avoid further obstructing sight distance west of the project site.

On-Site Circulation

In terms of external access, the project site plan (**Figure 2**) shows that the proposed project would provide access via one bidirectional driveway. The driveway does not have any turning restrictions and appears to accommodate two-way travel. Based on the current site plan, circulation aisles seem to satisfy the minimum 22 feet requirement from the City of San Pablo Municipal Code.

The proposed project proposes to provide a single level of parking garage space with one two-way circulation aisle. The southern side of the parking garage features surface level parking and the northern side of the garage features three-level parking lifts. The proposed project should perform a truck turning analysis to confirm a variety of trucks, including garbage trucks and emergency vehicles, can circulate on-site. Based on a preliminary review of the project site plan, the site access and on-site circulation is considered adequate. Garbage trucks can access the project site via the parking access driveway between the garage and accessible parking lot. Emergency vehicles may access the project site via the parking access driveway between the garage and accessible parking lot or the on-street parking along the project frontage.

5.2 Pedestrian, Bicycle, and Transit Impacts

Pedestrian Access

Pedestrian access to the project site will be facilitated by existing sidewalks along Road 20, San Pablo Avenue, 23rd Street and El Portal Drive. Additionally, a Class I shared use path called the Wildcat Creek Trail can be accessed via 23rd Street, located 0.2 miles southwest of the project site. Based on the project site plan, the project proposes to maintain the existing sidewalk adjacent to the project site. There is existing street lighting that is adequate along Road 20. However, the project should provide street lighting at the project driveway to increase pedestrian visibility. 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 are currently Class II bicycle facilities along 23rd Street, and El Portal Drive. Additionally, the Wildcat Creek Trail, a Class I shared use path, is accessible on 23rd Street, located 0.2 miles southwest of the project site. There are no bicycle facilities that provide direct access to the project site. The project does not conflict with existing and planned bicycle facilities; therefore, the impact to bicycle facilities is ***less than significant***.

Transit Access

AC Transit bus stops exist on Road 20, San Pablo Avenue, El Portal Drive and 23rd Street within the project vicinity. The project site is within a quarter mile of the San Pablo Avenue and Purisima Street, and Road 20 at Abella Circle AC Transit bus stops. AC Transit can connect riders locally to Richmond and Hilltop Mall. 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.***

5.4 Vehicles Miles Traveled (VMT)

The Governor's Office of Planning and Research (OPR) *Technical Advisory* (December 2018) provides guidance to analysts and local jurisdictions for implementing VMT as a metric for determining the transportation impact for land use projects. The OPR guidelines state that for analysis purposes, "VMT" refers to automobile VMT, specifically passenger vehicles and light trucks. Heavy truck traffic is typically excluded. The Contra Costa County *Transportation Analysis Guidelines* (June 2020) provide additional guidance on evaluating VMT impacts from projects within the County.

Both the OPR and County guidelines provide standards for identifying which projects should be exempt from further VMT analysis, based on characteristics such as their size, proximity to transit, or expected number of total daily trips. **Table 9** summarizes the VMT screening criteria as outlined in the Transportation analysis Guidelines.

Table 9: Contra Costa County VMT Screening Criteria

Type of Project	Screening Criteria
General	Generate or attract fewer than 110 daily vehicle trips; or Projects of 10,000 square feet or less of non-residential space or 20 residential units or less, or otherwise generating less than 836 VMT per day.
Residential, retail, office, or mixed-use projects	Projects within ½ mile of an existing major transit stop or an existing stop along a high quality transit corridor.
Residential, employment	Residential projects (home-based) at 15% or below the baseline County-wide home-based average VMT per capita; or Employment projects (employee VMT) at 15% or below the baseline Bay Area average commute VMT per employee in areas with low VMT that incorporate similar VMT reducing features (i.e. density, mix of uses, transit accessibility).
Public facilities and government buildings	Public facilities (e.g. emergency services, passive parks (low-intensity recreation, open space), libraries, community centers, public utilities) are exempt.

Source: Contra Costa County Transportation Analysis Guidelines

The project is located in the city of San Pablo consists of 64 multi-family housing units on a site east of San Pablo near the downtown area Currently, there is a small single family house on the site of the Project.

This project is exempt from VMT requirements per Contra Costa County Transportation Analysis Guidelines (6/23/2020, page 7) which states:

There are five screening criteria that lead agencies can apply to screen projects out of conducting project-level VMT analysis. Even if a project satisfies one or more of the screening criteria, lead agencies may still require a VMT analysis if there is evidence that the project has characteristics that might lead to a significant amount of VMT.

2.1: CEQA Exemption. Any project that is exempt from CEQA is not required to conduct a VMT analysis.

This project can claim CEQA exemption #15332, as stated below:

15332. IN-FILL DEVELOPMENT PROJECTS

Class 32 consists of projects characterized as in-fill development meeting the conditions described in this section:

A. The project is consistent with the applicable general plan designation and all applicable general plan policies as well as with applicable zoning designation and regulations.
B. The proposed development occurs within city limits on a project site of no more than five acres substantially surrounded by urban uses.
C. The project site has no value as habitat for endangered, rare or threatened species.

D. Approval of the project would not result in any significant effects relating to traffic, noise, air quality, or water quality.

E. The site can be adequately served by all required utilities and public services.

Note: Authority cited: Section 21083, Public Resources Code. Reference: Section 21084, Public Resources Code.

Since this project is exempt from CEQA, in accordance to CCTA VMT requirements, it is also not required to conduct a VMT analysis.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Project Trip Generation

The proposed project is expected to generate approximately 23 weekday a.m. peak hour trips (6 inbound trips, 17 outbound trips), and 29 weekday p.m. peak hour trips (18 inbound trips, 11 outbound trips).

Existing Conditions

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

Existing plus Project Conditions

Under this scenario, all of the study intersections continue to operate within applicable jurisdictional LOS standards of LOS D or better during both peak hours.

Queueing Analysis

The following are movements where the addition of project trips would further increase the queue lengths that already exceed existing storage lengths:

- San Pablo Avenue/Road 20-23rd Street
  - ✓ Eastbound left-turn lane during the p.m. peak hour only. Eastbound through-left lane during both peak hours.
  - ✓ Westbound through-left lane during both peak hours.
  - ✓ Northbound left-turn lane during the p.m. peak hour only.
  - ✓ Southbound left-turn lane during the a.m. peak hour only. Southbound through lane during the p.m. peak hour only. Southbound right-turn lane during the p.m. peak hour only.

Site Access and On-Site Circulation

The proposed vehicular access to the project site is via one project entrance on Road 20. Main driveway access is to the proposed parking garage. From the site plan, it appears that existing sidewalks and on-street parking along the project frontage will be maintained. Sight distance between vehicles travelling westbound on Road 20 and vehicles exiting the project site is clear and visible for at least 200 feet; however, sight distance between vehicles travelling eastbound on Road 20 and vehicles exiting the project site is slightly obstructed by the horizontal curvature of Road 20, west of the project site. TJKM recommends the project use landscaping below eye level to avoid further obstructing sight distance west of the project site.

Based on the current site plan, circulation aisles seem to satisfy the minimum 22 feet requirement from the City of San Pablo Municipal Code. The proposed project should perform a truck turning analysis to confirm a variety of trucks, including garbage trucks and emergency vehicles, can circulate on-site. Based on a preliminary review of the project site plan, the site access and on-site circulation is considered adequate.

Pedestrian Impacts

The proposed project should provide adequate street lighting at the project driveway. The proposed project does not conflict with existing and planned pedestrian facilities; therefore, the impact to pedestrian facilities is ***less than significant***.

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

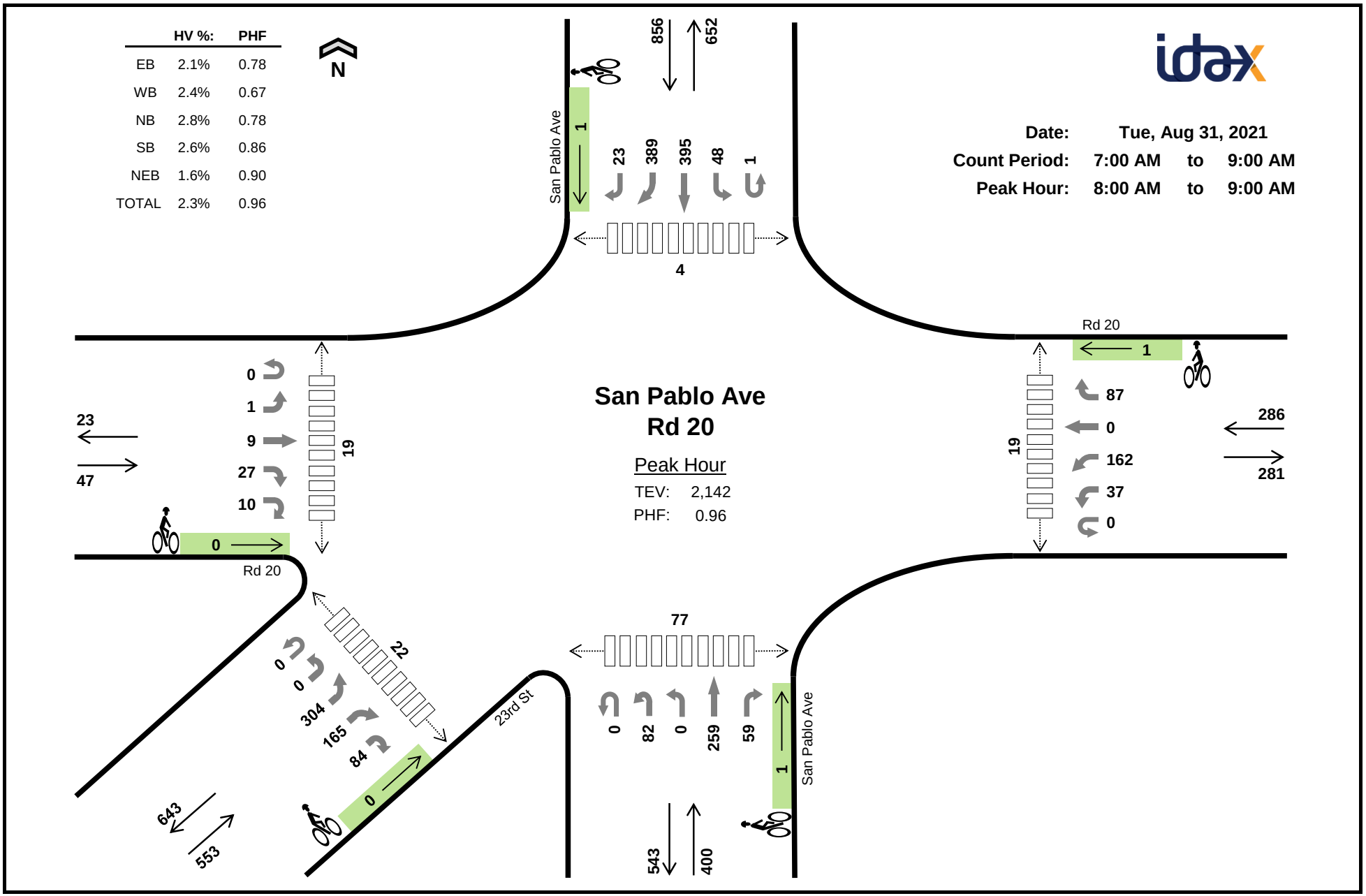
The project site is within walking distance to various AC Transit bus stops on Road 20 and San Pablo Avenue. Impacts to transit service are expected to be ***less than significant.***

Vehicle Miles Traveled

Since the proposed project is exempt from CEQA (CEQA exemption #15332), in accordance to CCTA VMT requirements, it is also not required to conduct a VMT analysis.

Appendix A – Existing Traffic Counts

AM PEAK HOUR TRAFFIC VOLUMES												
#	**Intersection**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**
1	San Pablo Avenue/Road 20-23rd Street	89	280	64	53	427	420	328	178	91	40	175	94
2	El Portal Drive/Road 20	241	595	0	0	538	85	59	0	303	1	0	2
PM PEAK HOUR TRAFFIC VOLUMES													
#	**Intersection**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**
1	San Pablo Avenue/Road 20-23rd Street	121	636	53	25	284	368	428	100	96	17	102	44
2	El Portal Drive/Road 20	206	678	0	0	666	19	27	0	182	0	0	1


HV %: PHF
EB 2.1% 0.78
WB 2.4% 0.67
NB 2.8% 0.78
SB 2.6% 0.86
NEB 1.6% 0.90
TOTAL 2.3% 0.96
N
Date: Tue, Aug 31, 2021
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM
San Pablo Ave
Rd 20
Peak Hour
TEV: 2,142
PHF: 0.96
San Pablo Ave
856
652
1
23
389
395
48
1
4
Rd 20
1
87
0
162
37
0
286
281
19
0
1
9
27
10
23
47
0
Rd 20
22
0
0
304
165
84
0
643
553
23rd St
77
0
82
0
259
59
1
San Pablo Ave
543
400

Two-Hour Count Summaries

Interval Start		Rd 20 Eastbound					Rd 20 Westbound					San Pablo Ave Northbound					San Pablo Ave Southbound					23rd St Northeastbound					15-min Total	Rolling One Hour
		UT	LT	TH	RT	HR	UT	LT	BL	TH	RT	UT	HL	LT	TH	RT	UT	LT	TH	BR	RT	UT	HL	BL	BR	HR		
7:00 AM		0	1	1	5	5	0	1	9	0	7	0	13	0	28	2	0	2	53	36	1	0	0	36	13	14	227	0
7:15 AM		0	0	3	8	8	0	6	24	0	5	0	7	0	32	5	0	3	76	57	0	0	0	42	12	14	302	0
7:30 AM		0	0	1	9	5	0	6	16	0	10	0	12	0	40	6	0	6	109	65	5	0	0	64	13	15	382	0
7:45 AM		0	1	2	11	7	0	3	20	0	11	0	20	0	71	8	0	4	131	83	2	0	0	111	21	14	520	1,431
8:00 AM		**0**	**0**	**3**	**7**	**5**	**0**	**8**	**27**	**0**	**21**	**0**	**20**	**0**	**68**	**6**	**0**	**3**	**104**	**100**	**4**	**0**	**0**	**105**	**28**	**21**	**530**	1,734
8:15 AM		**0**	**1**	**3**	**4**	**4**	**0**	**10**	**23**	**0**	**18**	**0**	**16**	**0**	**44**	**9**	**1**	**11**	**112**	**120**	**5**	**0**	**0**	**72**	**35**	**28**	**516**	1,948
8:30 AM		**0**	**0**	**1**	**7**	**0**	**0**	**5**	**51**	**0**	**17**	**0**	**19**	**0**	**79**	**30**	**0**	**11**	**84**	**104**	**6**	**0**	**0**	**56**	**67**	**18**	**555**	2,121
8:45 AM		**0**	**0**	**2**	**9**	**1**	**0**	**14**	**61**	**0**	**31**	**0**	**27**	**0**	**68**	**14**	**0**	**23**	**95**	**65**	**8**	**0**	**0**	**71**	**35**	**17**	**541**	**2,142**
Count Total		0	3	16	60	35	0	53	231	0	120	0	134	0	430	80	1	63	764	630	31	0	0	557	224	141	3,573	0
Peak Hour	**All**	**0**	**1**	**9**	**27**	**10**	**0**	**37**	**162**	**0**	**87**	**0**	**82**	**0**	**259**	**59**	**1**	**48**	**395**	**389**	**23**	**0**	**0**	**304**	**165**	**84**	**2,142**	**0**
	HV	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**4**	**0**	**3**	**0**	**3**	**0**	**8**	**0**	**0**	**2**	**15**	**5**	**0**	**0**	**0**	**6**	**0**	**3**	**50**	**0**
	HV%	**-**	**0%**	**0%**	**0%**	**10%**	**-**	**0%**	**2%**	**-**	**3%**	**-**	**4%**	**-**	**3%**	**0%**	**0%**	**4%**	**4%**	**1%**	**0%**	**-**	**-**	**2%**	**0%**	**4%**	**2%**	**0**

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

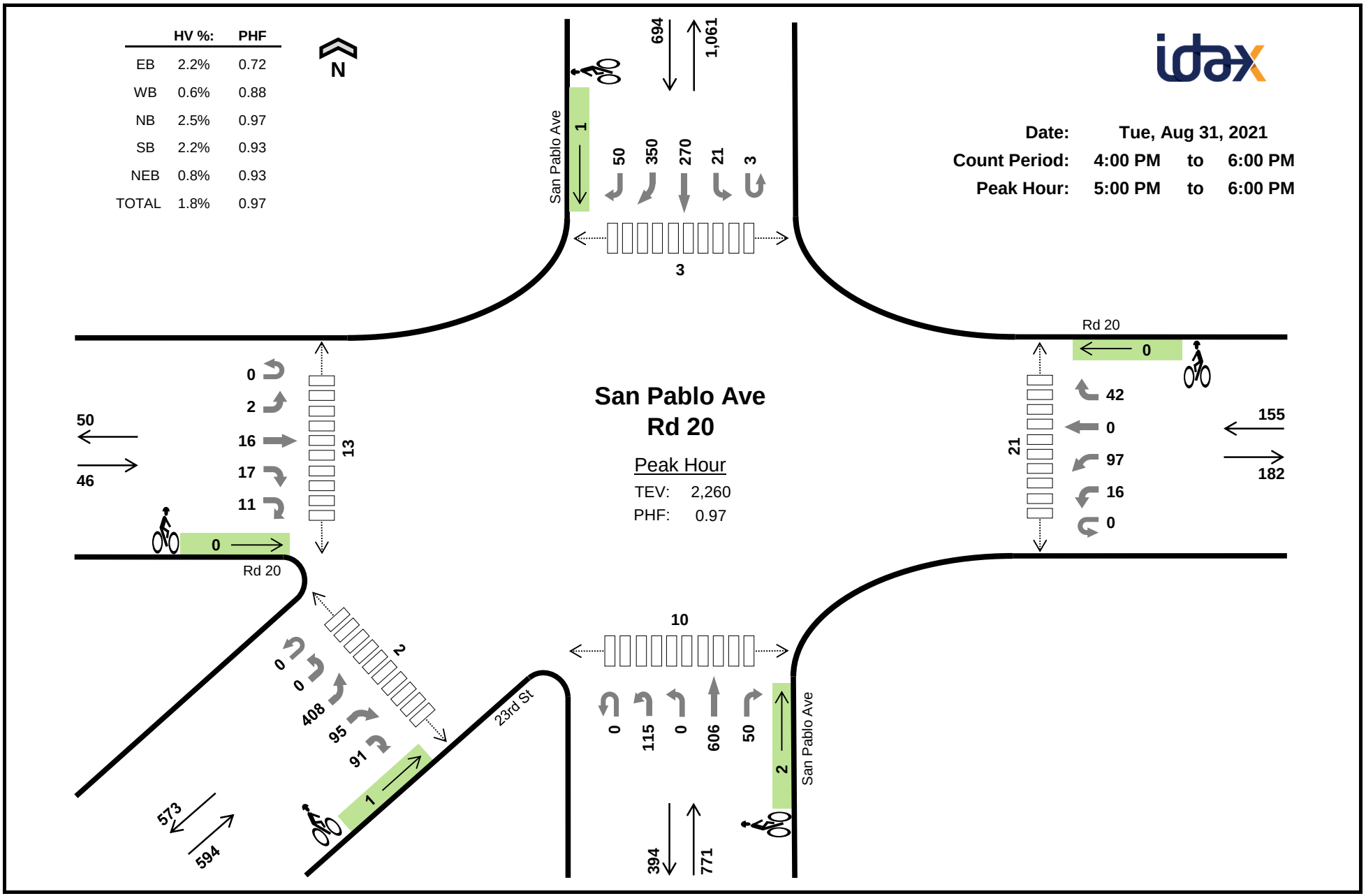
Interval Start	Heavy Vehicle Totals						Bicycles						Pedestrians (Crossing Leg)					
	EB	WB	NB	SB	NEB	Total	EB	WB	NB	SB	NEB	Total	East	West	North	South	Southwest	Total
7:00 AM	0	2	3	0	3	*8*	0	1	0	0	0	*1*	0	1	0	1	0	*2*
7:15 AM	0	2	3	10	3	*18*	0	0	1	0	0	*1*	2	5	0	0	1	*8*
7:30 AM	0	1	3	9	6	*19*	0	0	0	0	1	*1*	1	3	1	0	1	*6*
7:45 AM	2	1	4	9	3	*19*	0	0	0	0	0	*0*	5	6	0	6	5	*22*
8:00 AM	**0**	**1**	**2**	**4**	**3**	***10***	**0**	**1**	**1**	**1**	**0**	***3***	**6**	**9**	**0**	**11**	**3**	***29***
8:15 AM	**1**	**3**	**2**	**5**	**1**	***12***	**0**	**0**	**0**	**0**	**0**	***0***	**3**	**5**	**0**	**26**	**4**	***38***
8:30 AM	**0**	**2**	**1**	**2**	**2**	***7***	**0**	**0**	**0**	**0**	**0**	***0***	**4**	**2**	**4**	**25**	**12**	***47***
8:45 AM	**0**	**1**	**6**	**11**	**3**	***21***	**0**	**0**	**0**	**0**	**0**	***0***	**6**	**3**	**0**	**15**	**3**	***27***
Count Total	3	13	24	50	24	*114*	0	2	2	1	1	*6*	27	34	5	84	29	*179*
Peak Hr	**1**	**7**	**11**	**22**	**9**	***50***	**0**	**1**	**1**	**1**	**0**	***3***	**19**	**19**	**4**	**77**	**22**	*141*

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Rd 20 Eastbound					Rd 20 Westbound					San Pablo Ave Northbound					San Pablo Ave Southbound					23rd St Northeastbound					15-min Total	Rolling One Hour
	UT	LT	TH	RT	HR	UT	LT	BL	TH	RT	UT	HL	LT	TH	RT	UT	LT	TH	BR	RT	UT	HL	BL	BR	HR		
7:00 AM	0	0	0	0	0	0	0	1	0	1	0	2	0	1	0	0	0	0	0	0	0	0	1	1	1	8	0
7:15 AM	0	0	0	0	0	0	0	1	0	1	0	0	0	3	0	0	2	4	4	0	0	0	2	1	0	18	0
7:30 AM	0	0	0	0	0	0	0	1	0	0	0	2	0	1	0	0	1	4	4	0	0	0	4	1	1	19	0
7:45 AM	0	0	0	2	0	0	0	0	0	1	0	0	0	4	0	0	1	5	3	0	0	0	3	0	0	19	64
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**3**	**1**	**0**	**0**	**0**	**2**	**0**	**1**	**10**	66
8:15 AM	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**2**	**0**	**1**	**0**	**1**	**0**	**0**	**1**	**3**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**12**	60
8:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**2**	**0**	**0**	**7**	48
8:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**2**	**0**	**4**	**0**	**0**	**1**	**8**	**2**	**0**	**0**	**0**	**2**	**0**	**1**	**21**	**50**
Count Total	0	0	0	2	1	0	0	7	0	6	0	7	0	17	0	0	6	28	16	0	0	0	16	3	5	114	0
Peak Hour	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**4**	**0**	**3**	**0**	**3**	**0**	**8**	**0**	**0**	**2**	**15**	**5**	**0**	**0**	**0**	**6**	**0**	**3**	50	**0**

Two-Hour Count Summaries - Bikes

Interval Start	Rd 20 Eastbound					Rd 20 Westbound					San Pablo Ave Northbound					San Pablo Ave Southbound					23rd St Northeastbound					15-min Total	Rolling One Hour
	UT	LT	TH	RT	HR	UT	LT	BL	TH	RT	UT	HL	LT	TH	RT	UT	LT	TH	BR	RT	UT	HL	BL	BR	HR		
7:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	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	0	0	0	0	0	0	0	0	1	0	0	1	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**3**	5
8:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	4
8:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	3
8:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
Count Total	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	0	0	1	0	0	1	0	0	6	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	3	**0**



Project Manager: (415) 310-6469

project.manager.ca@idaxdata.com

Two-Hour Count Summaries

Interval Start		Rd 20 Eastbound					Rd 20 Westbound					San Pablo Ave Northbound					San Pablo Ave Southbound					23rd St Northeastbound					15-min Total	Rolling One Hour
		UT	LT	TH	RT	HR	UT	LT	BL	TH	RT	UT	HL	LT	TH	RT	UT	LT	TH	BR	RT	UT	HL	BL	BR	HR		
4:00 PM		0	0	3	6	0	0	6	31	0	13	0	34	0	125	6	0	10	73	114	18	0	0	107	22	18	586	0
4:15 PM		0	1	1	9	0	0	4	20	0	16	0	38	0	140	4	1	7	78	97	8	0	0	78	13	16	531	0
4:30 PM		0	0	2	4	1	0	2	18	0	12	0	28	0	159	7	0	5	63	78	14	0	0	122	13	25	553	0
4:45 PM		0	0	0	4	0	0	9	23	0	14	0	19	0	159	14	2	8	67	82	11	0	0	91	17	22	542	2,212
5:00 PM		**0**	**1**	**3**	**6**	**1**	**0**	**4**	**28**	**0**	**12**	**0**	**28**	**0**	**140**	**12**	**1**	**5**	**68**	**79**	**13**	**0**	**0**	**107**	**22**	**30**	**560**	2,186
5:15 PM		**0**	**0**	**6**	**4**	**6**	**0**	**1**	**21**	**0**	**12**	**0**	**38**	**0**	**139**	**17**	**0**	**4**	**66**	**92**	**5**	**0**	**0**	**97**	**21**	**25**	**554**	2,209
5:30 PM		**0**	**1**	**2**	**5**	**2**	**0**	**7**	**19**	**0**	**10**	**0**	**25**	**0**	**166**	**7**	**0**	**7**	**64**	**88**	**15**	**0**	**0**	**99**	**29**	**17**	**563**	2,219
5:45 PM		**0**	**0**	**5**	**2**	**2**	**0**	**4**	**29**	**0**	**8**	**0**	**24**	**0**	**161**	**14**	**2**	**5**	**72**	**91**	**17**	**0**	**0**	**105**	**23**	**19**	**583**	**2,260**
Count Total		0	3	22	40	12	0	37	189	0	97	0	234	0	1,189	81	6	51	551	721	101	0	0	806	160	172	4,472	0
Peak Hour	**All**	**0**	**2**	**16**	**17**	**11**	**0**	**16**	**97**	**0**	**42**	**0**	**115**	**0**	**606**	**50**	**3**	**21**	**270**	**350**	**50**	**0**	**0**	**408**	**95**	**91**	**2,260**	**0**
	HV	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**3**	**0**	**14**	**2**	**0**	**1**	**7**	**5**	**2**	**0**	**0**	**5**	**0**	**0**	**41**	**0**
	HV%	**-**	**0%**	**0%**	**6%**	**0%**	**-**	**0%**	**1%**	**-**	**0%**	**-**	**3%**	**-**	**2%**	**4%**	**0%**	**5%**	**3%**	**1%**	**4%**	**-**	**-**	**1%**	**0%**	**0%**	**2%**	**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	NEB	Total	EB	WB	NB	SB	NEB	Total	East	West	North	South	Southwest	Total
4:00 PM	0	1	9	7	2	*19*	0	0	0	2	0	*2*	1	8	0	5	2	*16*
4:15 PM	0	0	2	8	1	*11*	0	0	0	0	0	*0*	4	7	0	6	3	*20*
4:30 PM	0	2	5	4	3	*14*	1	1	0	0	0	*2*	2	4	0	4	5	*15*
4:45 PM	0	0	3	4	0	*7*	0	0	1	0	0	*1*	3	7	0	2	2	*14*
5:00 PM	**0**	**0**	**7**	**4**	**2**	***13***	**0**	**0**	**1**	**1**	**0**	***2***	**5**	**5**	**0**	**1**	**1**	***12***
5:15 PM	**0**	**0**	**4**	**4**	**0**	***8***	**0**	**0**	**0**	**0**	**0**	***0***	**4**	**3**	**2**	**0**	**0**	***9***
5:30 PM	**1**	**0**	**4**	**4**	**0**	***9***	**0**	**0**	**0**	**0**	**1**	***1***	**2**	**3**	**1**	**3**	**1**	***10***
5:45 PM	**0**	**1**	**4**	**3**	**3**	***11***	**0**	**0**	**1**	**0**	**0**	***1***	**10**	**2**	**0**	**6**	**0**	***18***
Count Total	1	4	38	38	11	*92*	1	1	3	3	1	*9*	31	39	3	27	14	*114*
Peak Hr	**1**	**1**	**19**	**15**	**5**	***41***	**0**	**0**	**2**	**1**	**1**	***4***	**21**	**13**	**3**	**10**	**2**	*49*

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Rd 20 Eastbound					Rd 20 Westbound					San Pablo Ave Northbound					San Pablo Ave Southbound					23rd St Northeastbound					15-min Total	Rolling One Hour
	UT	LT	TH	RT	HR	UT	LT	BL	TH	RT	UT	HL	LT	TH	RT	UT	LT	TH	BR	RT	UT	HL	BL	BR	HR		
4:00 PM	0	0	0	0	0	0	0	1	0	0	0	3	0	6	0	0	1	2	4	0	0	0	2	0	0	19	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	4	3	0	0	0	1	0	0	11	0
4:30 PM	0	0	0	0	0	0	0	0	0	2	0	1	0	4	0	0	0	3	1	0	0	0	3	0	0	14	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	1	2	1	0	0	0	0	0	0	7	51
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**6**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**2**	**0**	**0**	**13**	45
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**1**	**0**	**1**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8**	42
5:30 PM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**1**	**0**	**0**	**2**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**9**	37
5:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**0**	**2**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**3**	**0**	**0**	**11**	**41**
Count Total	0	0	0	1	0	0	0	2	0	2	0	9	0	26	3	0	4	18	14	2	0	0	11	0	0	92	0
Peak Hour	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**3**	**0**	**14**	**2**	**0**	**1**	**7**	**5**	**2**	**0**	**0**	**5**	**0**	**0**	41	**0**

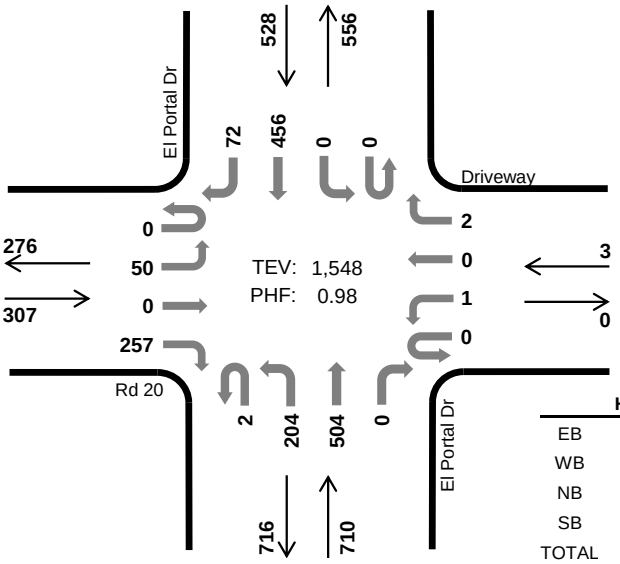
Two-Hour Count Summaries - Bikes

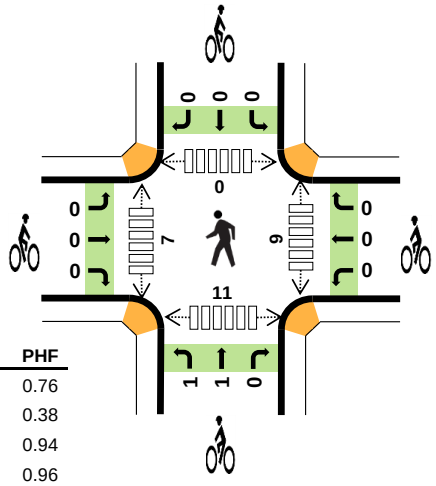
Interval Start	Rd 20 Eastbound					Rd 20 Westbound					San Pablo Ave Northbound					San Pablo Ave Southbound					23rd St Northeastbound					15-min Total	Rolling One Hour
	UT	LT	TH	RT	HR	UT	LT	BL	TH	RT	UT	HL	LT	TH	RT	UT	LT	TH	BR	RT	UT	HL	BL	BR	HR		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	5
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	5
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	5
5:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	4
5:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**4**
Count Total	0	0	1	0	0	0	0	0	0	1	0	0	0	3	0	0	0	1	1	1	0	0	0	1	0	9	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	4	**0**

El Portal Dr
Rd 20

Peak Hour

Date: 08-31-2021
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM





	HV %:	PHF
EB	1.0%	0.76
WB	0.0%	0.38
NB	3.5%	0.94
SB	2.7%	0.96
TOTAL	2.7%	0.98

Two-Hour Count Summaries

Interval Start	Rd 20 Eastbound				Driveway Westbound				El Portal Dr Northbound				El Portal Dr 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	3	0	33	0	0	0	1	1	15	62	0	0	0	117	4	236	0
7:15 AM	0	2	0	41	0	0	0	1	0	23	58	0	0	0	105	1	231	0
7:30 AM	0	4	0	40	0	0	0	1	0	21	84	0	0	0	105	5	260	0
7:45 AM	0	6	0	60	0	0	0	1	0	22	84	0	0	0	115	11	299	1,026
8:00 AM	**0**	**9**	**0**	**53**	**0**	**1**	**0**	**1**	**1**	**55**	**132**	**0**	**0**	**0**	**118**	**8**	**378**	1,168
8:15 AM	**0**	**15**	**0**	**58**	**0**	**0**	**0**	**0**	**0**	**49**	**124**	**0**	**0**	**0**	**121**	**17**	**384**	1,321
8:30 AM	**0**	**10**	**0**	**61**	**0**	**0**	**0**	**0**	**0**	**54**	**131**	**0**	**0**	**0**	**113**	**23**	**392**	1,453
8:45 AM	**0**	**16**	**0**	**85**	**0**	**0**	**0**	**1**	**1**	**46**	**117**	**0**	**0**	**0**	**104**	**24**	**394**	**1,548**
Count Total	0	65	0	431	0	1	0	6	3	285	792	0	0	0	898	93	2,574	0
Peak Hour All	**0**	**50**	**0**	**257**	**0**	**1**	**0**	**2**	**2**	**204**	**504**	**0**	**0**	**0**	**456**	**72**	**1,548**	**0**
Peak Hour HV	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**6**	**19**	**0**	**0**	**0**	**13**	**1**	**42**	**0**
Peak Hour HV%	**-**	**0%**	**-**	**1%**	**-**	**0%**	**-**	**0%**	**0%**	**3%**	**4%**	**-**	**-**	**-**	**3%**	**1%**	**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	4	0	6	3	*13*	0	0	0	0	*0*	1	0	0	1	*2*
7:15 AM	3	0	5	6	*14*	0	0	1	0	*1*	0	0	0	0	*0*
7:30 AM	1	0	7	3	*11*	0	0	1	0	*1*	0	1	0	0	*1*
7:45 AM	1	0	5	9	*15*	0	0	1	0	*1*	0	1	0	0	*1*
8:00 AM	**0**	**0**	**6**	**4**	***10***	**0**	**0**	**2**	**0**	***2***	**2**	**0**	**0**	**2**	*4*
8:15 AM	**1**	**0**	**5**	**3**	***9***	**0**	**0**	**0**	**0**	***0***	**1**	**1**	**0**	**0**	*2*
8:30 AM	**0**	**0**	**7**	**4**	***11***	**0**	**0**	**0**	**0**	***0***	**3**	**5**	**0**	**4**	*12*
8:45 AM	**2**	**0**	**7**	**3**	***12***	**0**	**0**	**0**	**0**	***0***	**3**	**1**	**0**	**5**	***9***
Count Total	12	0	48	35	*95*	0	0	5	0	*5*	10	9	0	12	*31*
Peak Hour	**3**	**0**	**25**	**14**	***42***	**0**	**0**	**2**	**0**	***2***	**9**	**7**	**0**	**11**	***27***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Rd 20				Driveway				El Portal Dr				El Portal Dr				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	2	0	2	0	0	0	0	0	1	5	0	0	0	2	1	13	0
7:15 AM	0	0	0	3	0	0	0	0	0	1	4	0	0	0	6	0	14	0
7:30 AM	0	0	0	1	0	0	0	0	0	1	6	0	0	0	3	0	11	0
7:45 AM	0	0	0	1	0	0	0	0	0	1	4	0	0	0	8	1	15	53
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**4**	**0**	**0**	**0**	**3**	**1**	**10**	50
8:15 AM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**2**	**3**	**0**	**0**	**0**	**3**	**0**	**9**	45
8:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**0**	**0**	**0**	**4**	**0**	**11**	45
8:45 AM	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**2**	**5**	**0**	**0**	**0**	**3**	**0**	**12**	**42**
Count Total	0	2	0	10	0	0	0	0	0	10	38	0	0	0	32	3	95	0
Peak Hour	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**6**	**19**	**0**	**0**	**0**	**13**	**1**	**42**	**0**

Two-Hour Count Summaries - Bikes

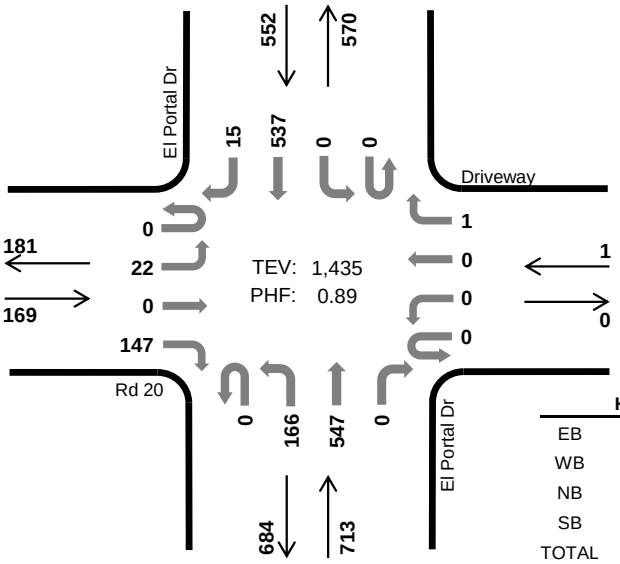
Interval Start	Rd 20			Driveway			El Portal Dr			El Portal Dr			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	1	0	0	0	0	1	0
7:30 AM	0	0	0	0	0	0	0	1	0	0	0	0	1	0
7:45 AM	0	0	0	0	0	0	1	0	0	0	0	0	1	3
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**2**	5
8:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	4
8:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	3
8:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**
Count Total	0	0	0	0	0	0	2	3	0	0	0	0	5	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**2**	**0**

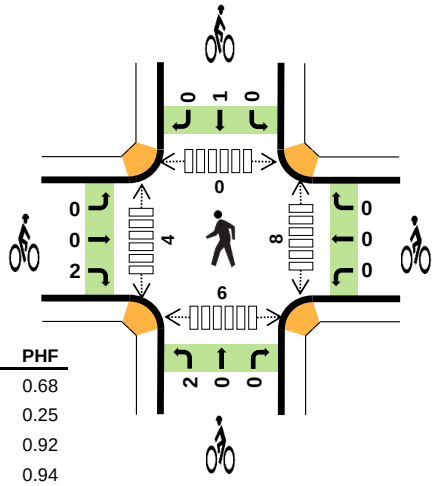
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

El Portal Dr
Rd 20

Date: 08-31-2021
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM

Peak Hour





	HV %:	PHF
EB	1.8%	0.68
WB	0.0%	0.25
NB	1.5%	0.92
SB	0.5%	0.94
TOTAL	1.2%	0.89

Two-Hour Count Summaries

Interval Start	Rd 20 Eastbound				Driveway Westbound				El Portal Dr Northbound				El Portal Dr Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	2	0	29	0	0	0	1	0	50	128	0	0	0	140	7	357	0
4:15 PM	0	5	0	28	0	0	0	0	0	50	131	0	0	0	122	7	343	0
4:30 PM	0	2	0	31	0	0	0	2	0	39	116	1	0	0	139	10	340	0
4:45 PM	0	5	0	43	0	0	0	1	0	48	135	0	0	0	111	6	349	1,389
5:00 PM	**0**	**7**	**0**	**30**	**0**	**0**	**0**	**1**	**0**	**40**	**136**	**0**	**0**	**0**	**128**	**3**	**345**	1,377
5:15 PM	**0**	**3**	**0**	**34**	**0**	**0**	**0**	**0**	**0**	**41**	**139**	**0**	**0**	**0**	**131**	**4**	**352**	1,386
5:30 PM	**0**	**1**	**0**	**32**	**0**	**0**	**0**	**0**	**0**	**37**	**126**	**0**	**0**	**0**	**136**	**3**	**335**	1,381
5:45 PM	**0**	**11**	**0**	**51**	**0**	**0**	**0**	**0**	**0**	**48**	**146**	**0**	**0**	**0**	**142**	**5**	**403**	**1,435**
Count Total	0	36	0	278	0	0	0	5	0	353	1,057	1	0	0	1,049	45	2,824	0
Peak Hour All	**0**	**22**	**0**	**147**	**0**	**0**	**0**	**1**	**0**	**166**	**547**	**0**	**0**	**0**	**537**	**15**	**1,435**	**0**
Peak Hour HV	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**2**	**9**	**0**	**0**	**0**	**3**	**0**	**17**	**0**
Peak Hour HV%	**-**	**0%**	**-**	**2%**	**-**	**-**	**-**	**0%**	**-**	**1%**	**2%**	**-**	**-**	**-**	**1%**	**0%**	**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	1	0	5	2	*8*	0	0	0	0	*0*	2	1	0	2	*5*
4:15 PM	2	0	3	4	*9*	0	0	1	1	*2*	1	3	1	2	*7*
4:30 PM	0	0	14	2	*16*	0	0	1	0	*1*	2	1	0	1	*4*
4:45 PM	1	0	4	4	*9*	0	0	0	1	*1*	0	2	0	0	*2*
5:00 PM	**1**	**0**	**2**	**0**	***3***	**0**	**0**	**2**	**1**	***3***	**0**	**1**	**0**	**2**	*3*
5:15 PM	**1**	**0**	**1**	**1**	***3***	**2**	**0**	**0**	**0**	***2***	**6**	**1**	**0**	**2**	*9*
5:30 PM	**1**	**0**	**4**	**2**	***7***	**0**	**0**	**0**	**0**	***0***	**1**	**1**	**0**	**1**	*3*
5:45 PM	**0**	**0**	**4**	**0**	***4***	**0**	**0**	**0**	**0**	***0***	**1**	**1**	**0**	**1**	***3***
Count Total	7	0	37	15	*59*	2	0	4	3	*9*	13	11	1	11	*36*
Peak Hour	**3**	**0**	**11**	**3**	***17***	**2**	**0**	**2**	**1**	***5***	**8**	**4**	**0**	**6**	***18***

Two-Hour Count Summaries - Heavy Vehicles

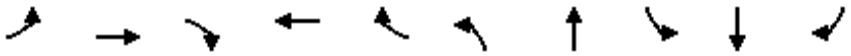
Interval Start	Rd 20				Driveway				El Portal Dr				El Portal Dr				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	1	0	0	0	0	0	0	5	0	0	0	2	0	8	0
4:15 PM	0	0	0	2	0	0	0	0	0	1	2	0	0	0	4	0	9	0
4:30 PM	0	0	0	0	0	0	0	0	0	3	10	1	0	0	2	0	16	0
4:45 PM	0	0	0	1	0	0	0	0	0	0	4	0	0	0	4	0	9	42
5:00 PM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**3**	37
5:15 PM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**3**	31
5:30 PM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	**0**	**0**	**0**	**2**	**0**	**7**	22
5:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	**0**	**0**	**0**	**0**	**0**	**4**	**17**
Count Total	0	0	0	7	0	0	0	0	0	6	30	1	0	0	15	0	59	0
Peak Hour	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**2**	**9**	**0**	**0**	**0**	**3**	**0**	**17**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	Rd 20			Driveway			El Portal Dr			El Portal Dr			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	0	0	0	1	0	0	1	0	2	0
4:30 PM	0	0	0	0	0	0	0	1	0	0	0	0	1	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	4
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**3**	7
5:15 PM	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	7
5:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	6
5:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**
Count Total	0	0	2	0	0	0	2	2	0	0	3	0	9	0
Peak Hour	**0**	**0**	**2**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**5**	**0**

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

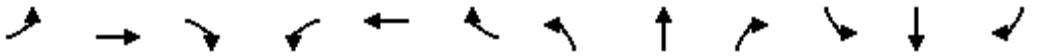
Appendix B – Existing Conditions Intersection Level of Service and Queuing Analysis Work Sheets



Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	271	279	99	233	102	97	374	58	464	457
v/c Ratio	0.74	0.74	0.27	0.74	0.27	0.63	0.37	0.55	0.49	0.57
Control Delay	76.9	76.0	4.2	84.7	5.0	100.2	49.7	106.2	56.3	22.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.9	76.0	4.2	84.7	5.0	100.2	49.7	106.2	56.3	22.6
Queue Length 50th (ft)	307	316	0	257	0	109	187	66	247	245
Queue Length 95th (ft)	524	534	18	442	22	218	280	#174	369	407
Internal Link Dist (ft)		368		769			1025		421	
Turn Bay Length (ft)			135			155		90		90
Base Capacity (vph)	597	620	520	525	537	251	1697	126	1510	1073
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.45	0.19	0.44	0.19	0.39	0.22	0.46	0.31	0.43

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	328	178	91	40	175	94	89	280	64	53	427	420
Future Volume (vph)	328	178	91	40	175	94	89	280	64	53	427	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.83		1.00	0.98	1.00	0.99		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	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1743	1316		1846	1551	1770	3406		1770	3539	1583
Flt Permitted	0.95	0.98	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1743	1316		1846	1551	1770	3406		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	357	193	99	43	190	102	97	304	70	58	464	457
RTOR Reduction (vph)	0	0	77	0	0	85	0	0	0	0	0	0
Lane Group Flow (vph)	271	279	22	0	233	17	97	374	0	58	464	457
Confl. Peds. (#/hr)			77			4			19			22
Confl. Bikes (#/hr)						1			1			1
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	pt+ov
Protected Phases	4	4		8	8		5	2		1	6	6 4
Permitted Phases			4			8						
Actuated Green, G (s)	34.8	34.8	34.8		27.1	27.1	14.0	46.9		9.5	42.4	77.2
Effective Green, g (s)	34.8	34.8	34.8		27.1	27.1	14.0	46.9		9.5	42.4	77.2
Actuated g/C Ratio	0.22	0.22	0.22		0.17	0.17	0.09	0.29		0.06	0.27	0.48
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0	2.0		3.0	3.0	2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	366	380	287		313	263	155	1001		105	940	766
v/s Ratio Prot	c0.16	0.16			c0.13		c0.05	c0.11		0.03	0.13	c0.29
v/s Ratio Perm			0.02			0.01						
v/c Ratio	0.74	0.73	0.08		0.74	0.07	0.63	0.37		0.55	0.49	0.60
Uniform Delay, d1	58.1	58.0	49.6		62.9	55.6	70.2	44.7		72.9	49.5	29.9
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.9	6.2	0.0		9.2	0.1	5.6	0.5		3.5	0.9	1.9
Delay (s)	65.0	64.3	49.6		72.1	55.7	75.8	45.1		76.5	50.3	31.7
Level of Service	E	E	D		E	E	E	D		E	D	C
Approach Delay (s)		62.3			67.1			51.5			43.2	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	53.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	159.5	Sum of lost time (s)	30.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

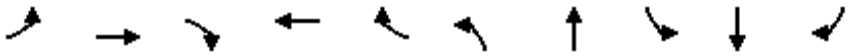
Lane Group	EBL	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	64	262	647	585	92
v/c Ratio	0.25	0.74	0.23	0.32	0.11
Control Delay	26.0	41.6	4.2	13.2	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	41.6	4.2	13.2	7.6
Queue Length 50th (ft)	26	102	28	76	7
Queue Length 95th (ft)	42	#235	114	162	42
Internal Link Dist (ft)	292		120	382	
Turn Bay Length (ft)		155			45
Base Capacity (vph)	632	362	2861	1849	830
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.10	0.72	0.23	0.32	0.11

Intersection Summary

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	59	0	241	595	538	85
Future Volume (vph)	59	0	241	595	538	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	5.0	5.0	5.0
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.97
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		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770		1770	3539	3539	1534
Flt Permitted	0.95		0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770		1770	3539	3539	1534
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	0	262	647	585	92
RTOR Reduction (vph)	0	0	0	0	0	30
Lane Group Flow (vph)	64	0	262	647	585	62
Confl. Peds. (#/hr)		11				7
Turn Type	Perm		Prot	NA	NA	Perm
Protected Phases			1	6	2	
Permitted Phases	8					2
Actuated Green, G (s)	8.0		14.0	53.0	35.0	35.0
Effective Green, g (s)	8.0		14.0	53.0	35.0	35.0
Actuated g/C Ratio	0.11		0.20	0.76	0.50	0.50
Clearance Time (s)	4.0		4.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0		2.0	4.0	4.0	4.0
Lane Grp Cap (vph)	202		354	2679	1769	767
v/s Ratio Prot			c0.15	0.18	c0.17	
v/s Ratio Perm	c0.04					0.04
v/c Ratio	0.32		0.74	0.24	0.33	0.08
Uniform Delay, d1	28.5		26.3	2.5	10.5	9.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		7.1	0.2	0.5	0.2
Delay (s)	28.8		33.4	2.7	11.0	9.3
Level of Service	C		C	A	B	A
Approach Delay (s)	28.8			11.6	10.8	
Approach LOS	C			B	B	

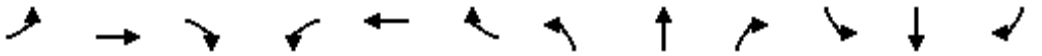
Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	284	290	104	129	48	132	749	27	309	400
v/c Ratio	0.72	0.72	0.23	0.58	0.16	0.64	0.61	0.30	0.36	0.50
Control Delay	66.7	66.4	4.2	80.2	1.1	84.5	47.2	91.1	51.1	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.7	66.4	4.2	80.2	1.1	84.5	47.2	91.1	51.1	18.6
Queue Length 50th (ft)	293	298	0	131	0	134	375	28	147	178
Queue Length 95th (ft)	491	498	25	246	0	#285	542	76	227	282
Internal Link Dist (ft)		368		769			1025		421	
Turn Bay Length (ft)			135			155		90		90
Base Capacity (vph)	665	680	682	586	585	280	1931	140	1682	1142
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.43	0.15	0.22	0.08	0.47	0.39	0.19	0.18	0.35

Intersection Summary

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



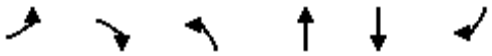
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	428	100	96	17	102	44	121	636	53	25	284	368
Future Volume (vph)	428	100	96	17	102	44	121	636	53	25	284	368
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97		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	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1716	1533		1850	1552	1770	3484		1770	3539	1583
Flt Permitted	0.95	0.97	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1716	1533		1850	1552	1770	3484		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	465	109	104	18	111	48	132	691	58	27	309	400
RTOR Reduction (vph)	0	0	80	0	0	42	0	0	0	0	0	0
Lane Group Flow (vph)	284	290	24	0	129	6	132	749	0	27	309	400
Confl. Peds. (#/hr)			10			3			21			2
Confl. Bikes (#/hr)			1						2			1
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	pt+ov
Protected Phases	4	4		8	8		5	2		1	6	6 4
Permitted Phases			4			8						
Actuated Green, G (s)	33.9	33.9	33.9		17.3	17.3	16.8	51.1		4.1	38.4	72.3
Effective Green, g (s)	33.9	33.9	33.9		17.3	17.3	16.8	51.1		4.1	38.4	72.3
Actuated g/C Ratio	0.23	0.23	0.23		0.12	0.12	0.11	0.35		0.03	0.26	0.49
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0	2.0		3.0	3.0	2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	386	394	352		216	182	201	1206		49	921	775
v/s Ratio Prot	0.17	c0.17			c0.07		c0.07	c0.21		0.02	0.09	0.25
v/s Ratio Perm			0.02			0.00						
v/c Ratio	0.74	0.74	0.07		0.60	0.03	0.66	0.62		0.55	0.34	0.52
Uniform Delay, d1	52.6	52.7	44.4		61.8	57.7	62.6	40.1		70.8	44.2	25.7
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.2	6.1	0.0		4.4	0.1	5.8	1.4		7.4	0.5	1.2
Delay (s)	58.8	58.7	44.5		66.2	57.7	68.4	41.6		78.2	44.7	26.8
Level of Service	E	E	D		E	E	E	D		E	D	C
Approach Delay (s)		56.6			63.9			45.6			36.2	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	47.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	147.5	Sum of lost time (s)	30.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	29	224	737	724	21
v/c Ratio	0.10	0.54	0.24	0.45	0.03
Control Delay	21.7	25.6	3.5	13.9	11.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	25.6	3.5	13.9	11.4
Queue Length 50th (ft)	5	36	0	43	1
Queue Length 95th (ft)	32	188	135	239	20
Internal Link Dist (ft)	292		120	382	
Turn Bay Length (ft)		155			45
Base Capacity (vph)	1006	798	3229	2395	1043
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.03	0.28	0.23	0.30	0.02

Intersection Summary

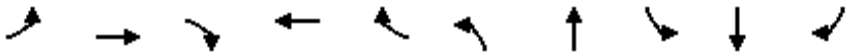


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	27	0	206	678	666	19
Future Volume (vph)	27	0	206	678	666	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	5.0	5.0	5.0
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.97
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		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770		1770	3539	3539	1543
Flt Permitted	0.95		0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770		1770	3539	3539	1543
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	0	224	737	724	21
RTOR Reduction (vph)	0	0	0	0	0	5
Lane Group Flow (vph)	29	0	224	737	724	16
Confl. Peds. (#/hr)		6				4
Confl. Bikes (#/hr)						1
Turn Type	Perm		Prot	NA	NA	Perm
Protected Phases			1	6	2	
Permitted Phases	8					2
Actuated Green, G (s)	4.2		11.9	39.8	23.9	23.9
Effective Green, g (s)	4.2		11.9	39.8	23.9	23.9
Actuated g/C Ratio	0.08		0.22	0.75	0.45	0.45
Clearance Time (s)	4.0		4.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0		2.0	4.0	4.0	4.0
Lane Grp Cap (vph)	140		397	2657	1595	695
v/s Ratio Prot			c0.13	0.21	c0.20	
v/s Ratio Perm	c0.02					0.01
v/c Ratio	0.21		0.56	0.28	0.45	0.02
Uniform Delay, d1	22.8		18.2	2.1	10.0	8.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		1.1	0.1	0.3	0.0
Delay (s)	23.1		19.3	2.2	10.3	8.1
Level of Service	C		B	A	B	A
Approach Delay (s)	23.1			6.2	10.3	
Approach LOS	C			A	B	

Intersection Summary			
HCM 2000 Control Delay	8.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	53.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

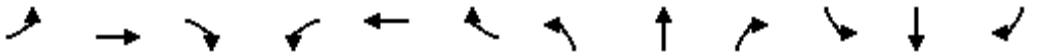
Appendix C – Existing plus Project Conditions Intersections Level of Service and Queuing Work Sheets



Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	271	281	99	242	109	97	376	60	464	457
v/c Ratio	0.74	0.74	0.27	0.76	0.29	0.63	0.38	0.57	0.49	0.57
Control Delay	77.6	77.1	4.2	85.9	6.3	101.1	50.1	107.3	56.7	22.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.6	77.1	4.2	85.9	6.3	101.1	50.1	107.3	56.7	22.9
Queue Length 50th (ft)	311	323	0	271	0	110	190	69	250	250
Queue Length 95th (ft)	524	541	18	460	33	218	281	#184	369	407
Internal Link Dist (ft)		368		402			1025		421	
Turn Bay Length (ft)			135			155		90		90
Base Capacity (vph)	592	613	516	519	533	249	1678	124	1496	1065
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.46	0.19	0.47	0.20	0.39	0.22	0.48	0.31	0.43

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	328	179	91	45	178	100	89	280	66	55	427	420
Future Volume (vph)	328	179	91	45	178	100	89	280	66	55	427	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.83		1.00	0.98	1.00	0.99		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	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1743	1314		1844	1552	1770	3403		1770	3539	1583
Flt Permitted	0.95	0.98	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1743	1314		1844	1552	1770	3403		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	357	195	99	49	193	109	97	304	72	60	464	457
RTOR Reduction (vph)	0	0	77	0	0	90	0	0	0	0	0	0
Lane Group Flow (vph)	271	281	22	0	242	19	97	376	0	60	464	457
Confl. Peds. (#/hr)			77			4			19			22
Confl. Bikes (#/hr)						1			1			1
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	pt+ov
Protected Phases	4	4		8	8		5	2		1	6	6 4
Permitted Phases			4			8						
Actuated Green, G (s)	35.0	35.0	35.0		27.8	27.8	14.0	47.2		9.6	42.8	77.8
Effective Green, g (s)	35.0	35.0	35.0		27.8	27.8	14.0	47.2		9.6	42.8	77.8
Actuated g/C Ratio	0.22	0.22	0.22		0.17	0.17	0.09	0.29		0.06	0.27	0.48
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0	2.0		3.0	3.0	2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	365	379	286		318	268	154	998		105	941	765
v/s Ratio Prot	0.16	c0.16			c0.13		c0.05	c0.11		0.03	0.13	c0.29
v/s Ratio Perm			0.02			0.01						
v/c Ratio	0.74	0.74	0.08		0.76	0.07	0.63	0.38		0.57	0.49	0.60
Uniform Delay, d1	58.7	58.7	50.0		63.3	55.7	70.9	45.1		73.6	49.8	30.1
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	7.0	6.7	0.0		10.3	0.1	5.7	0.5		4.6	0.9	1.9
Delay (s)	65.7	65.4	50.1		73.6	55.8	76.6	45.6		78.2	50.7	32.0
Level of Service	E	E	D		E	E	E	D		E	D	C
Approach Delay (s)		63.2			68.1			52.0			43.7	
Approach LOS		E			E			D			D	

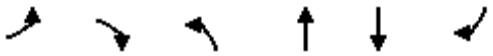
Intersection Summary			
HCM 2000 Control Delay	53.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	160.8	Sum of lost time (s)	30.0
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	65	263	647	585	92
v/c Ratio	0.25	0.74	0.23	0.32	0.11
Control Delay	26.0	41.5	4.2	13.3	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	41.5	4.2	13.3	7.7
Queue Length 50th (ft)	27	103	28	76	7
Queue Length 95th (ft)	43	#236	114	162	42
Internal Link Dist (ft)	292		120	382	
Turn Bay Length (ft)		155			45
Base Capacity (vph)	632	363	2859	1844	828
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.10	0.72	0.23	0.32	0.11

Intersection Summary

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



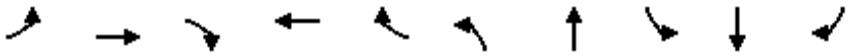
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	60	0	242	595	538	85
Future Volume (vph)	60	0	242	595	538	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	5.0	5.0	5.0
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.97
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		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770		1770	3539	3539	1534
Flt Permitted	0.95		0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770		1770	3539	3539	1534
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	0	263	647	585	92
RTOR Reduction (vph)	0	0	0	0	0	30
Lane Group Flow (vph)	65	0	263	647	585	62
Confl. Peds. (#/hr)		11				7
Turn Type	Perm		Prot	NA	NA	Perm
Protected Phases			1	6	2	
Permitted Phases	8					2
Actuated Green, G (s)	8.0		14.1	53.0	34.9	34.9
Effective Green, g (s)	8.0		14.1	53.0	34.9	34.9
Actuated g/C Ratio	0.11		0.20	0.76	0.50	0.50
Clearance Time (s)	4.0		4.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0		2.0	4.0	4.0	4.0
Lane Grp Cap (vph)	202		356	2679	1764	764
v/s Ratio Prot			c0.15	0.18	c0.17	
v/s Ratio Perm	c0.04					0.04
v/c Ratio	0.32		0.74	0.24	0.33	0.08
Uniform Delay, d1	28.5		26.2	2.5	10.5	9.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		6.8	0.2	0.5	0.2
Delay (s)	28.8		33.0	2.7	11.0	9.4
Level of Service	C		C	A	B	A
Approach Delay (s)	28.8			11.5	10.8	
Approach LOS	C			B	B	

Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	295	5	1	309	14	3
Future Volume (Veh/h)	295	5	1	309	14	3
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	321	5	1	336	15	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	482					
pX, platoon unblocked			0.88		0.88	0.88
vC, conflicting volume			326		662	324
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			172		552	170
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	100
cM capacity (veh/h)			1242		437	773

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	326	337	18
Volume Left	0	1	15
Volume Right	5	0	3
cSH	1700	1242	471
Volume to Capacity	0.19	0.00	0.04
Queue Length 95th (ft)	0	0	3
Control Delay (s)	0.0	0.0	12.9
Lane LOS		A	B
Approach Delay (s)	0.0	0.0	12.9
Approach LOS			B

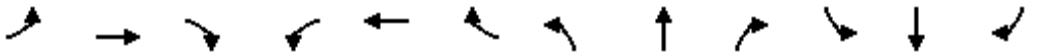
Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	27.1%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	288	290	104	135	52	132	754	34	309	400
v/c Ratio	0.73	0.72	0.23	0.60	0.17	0.65	0.65	0.36	0.36	0.50
Control Delay	68.4	67.6	4.2	81.5	1.2	86.7	50.2	93.9	51.3	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.4	67.6	4.2	81.5	1.2	86.7	50.2	93.9	51.3	18.7
Queue Length 50th (ft)	307	309	0	141	0	138	388	36	150	183
Queue Length 95th (ft)	504	505	24	257	0	#287	551	91	229	286
Internal Link Dist (ft)		368		330			1025		421	
Turn Bay Length (ft)			135			155		90		90
Base Capacity (vph)	652	667	671	574	576	274	1891	137	1649	1126
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.43	0.15	0.24	0.09	0.48	0.40	0.25	0.19	0.36

Intersection Summary

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



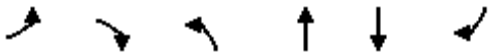
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	428	104	96	20	104	48	121	636	58	31	284	368
Future Volume (vph)	428	104	96	20	104	48	121	636	58	31	284	368
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97		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	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1717	1533		1848	1553	1770	3479		1770	3539	1583
Flt Permitted	0.95	0.97	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1717	1533		1848	1553	1770	3479		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	465	113	104	22	113	52	132	691	63	34	309	400
RTOR Reduction (vph)	0	0	80	0	0	46	0	0	0	0	0	0
Lane Group Flow (vph)	288	290	24	0	135	6	132	754	0	34	309	400
Confl. Peds. (#/hr)			10			3			21			2
Confl. Bikes (#/hr)			1						2			1
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	pt+ov
Protected Phases	4	4		8	8		5	2		1	6	6 4
Permitted Phases			4			8						
Actuated Green, G (s)	34.5	34.5	34.5		17.9	17.9	16.9	48.9		6.1	38.1	72.6
Effective Green, g (s)	34.5	34.5	34.5		17.9	17.9	16.9	48.9		6.1	38.1	72.6
Actuated g/C Ratio	0.23	0.23	0.23		0.12	0.12	0.11	0.33		0.04	0.26	0.49
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0	2.0		3.0	3.0	2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	390	398	356		222	187	201	1145		72	907	773
v/s Ratio Prot	c0.17	0.17			c0.07		c0.07	c0.22		0.02	0.09	0.25
v/s Ratio Perm			0.02			0.00						
v/c Ratio	0.74	0.73	0.07		0.61	0.03	0.66	0.66		0.47	0.34	0.52
Uniform Delay, d1	52.8	52.7	44.5		62.0	57.7	63.0	42.6		69.6	45.0	26.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.2	5.6	0.0		4.7	0.1	5.8	1.9		1.8	0.5	1.2
Delay (s)	59.0	58.2	44.5		66.6	57.7	68.8	44.5		71.4	45.4	27.1
Level of Service	E	E	D		E	E	E	D		E	D	C
Approach Delay (s)		56.5			64.2			48.1			36.8	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	48.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	148.5	Sum of lost time (s)	30.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	30	226	737	724	22
v/c Ratio	0.10	0.54	0.24	0.45	0.03
Control Delay	21.7	25.6	3.5	14.0	11.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	25.6	3.5	14.0	11.4
Queue Length 50th (ft)	5	36	0	43	1
Queue Length 95th (ft)	32	190	135	239	21
Internal Link Dist (ft)	292		120	382	
Turn Bay Length (ft)		155			45
Base Capacity (vph)	1010	802	3227	2405	1048
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.03	0.28	0.23	0.30	0.02

Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	28	0	208	678	666	20
Future Volume (vph)	28	0	208	678	666	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	5.0	5.0	5.0
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.97
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		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770		1770	3539	3539	1543
Flt Permitted	0.95		0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770		1770	3539	3539	1543
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	0	226	737	724	22
RTOR Reduction (vph)	0	0	0	0	0	6
Lane Group Flow (vph)	30	0	226	737	724	16
Confl. Peds. (#/hr)		6				4
Confl. Bikes (#/hr)						1
Turn Type	Perm		Prot	NA	NA	Perm
Protected Phases			1	6	2	
Permitted Phases	8					2
Actuated Green, G (s)	4.2		12.0	39.7	23.7	23.7
Effective Green, g (s)	4.2		12.0	39.7	23.7	23.7
Actuated g/C Ratio	0.08		0.23	0.75	0.45	0.45
Clearance Time (s)	4.0		4.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0		2.0	4.0	4.0	4.0
Lane Grp Cap (vph)	140		401	2655	1585	691
v/s Ratio Prot			c0.13	0.21	c0.20	
v/s Ratio Perm	c0.02					0.01
v/c Ratio	0.21		0.56	0.28	0.46	0.02
Uniform Delay, d1	22.8		18.1	2.1	10.1	8.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		1.1	0.1	0.3	0.0
Delay (s)	23.1		19.2	2.2	10.4	8.2
Level of Service	C		B	A	B	A
Approach Delay (s)	23.1			6.2	10.4	
Approach LOS	C			A	B	

Intersection Summary			
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	52.9	Sum of lost time (s)	13.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	209	15	3	225	9	2
Future Volume (Veh/h)	209	15	3	225	9	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	227	16	3	245	10	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	410					
pX, platoon unblocked						
vC, conflicting volume			243		486	235
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			243		486	235
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1323		539	804

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	243	248	12
Volume Left	0	3	10
Volume Right	16	0	2
cSH	1700	1323	570
Volume to Capacity	0.14	0.00	0.02
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.1	11.4
Lane LOS		A	B
Approach Delay (s)	0.0	0.1	11.4
Approach LOS			B

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	24.2%	ICU Level of Service	A
Analysis Period (min)	15		