# 1 Hayward Ave
# Mixed-Use Development
# Transportation Impact Analysis Report

**Prepared for:**

**City of San Mateo**

**Prepared by:**

AECOM

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# 1.0 EXECUTIVE SUMMARY

This report presents the results of a Transportation Impact Analysis (TIA) conducted for a proposed mixed-use complex located at 1 Hayward Avenue in the City of San Mateo, California.

The project involves the construction of a four-story building with 18 residential dwelling units (DU), a small office of 4,650 square feet and 22 parking spaces.

The impacts of the proposed project were evaluated following the City of San Mateo's adopted TIA guidelines. Roadway system operations were evaluated under the following study scenarios:

- Existing Conditions
- Existing plus Project Conditions
- Background Conditions
- Background plus Project Conditions
- Cumulative Conditions
- Cumulative plus Project Conditions

Pedestrian, bicycle, and transit facilities were also evaluated.

## 1.1 Project Trip Generation

Project generated trips were estimated using vehicle trip rates published by the Institute of Transportation Engineers (ITE, 10$^{th}$ Edition). The proposed project is estimated to generate a net of 12 AM peak hour vehicle trips (eight inbound trips and four outbound trips) and 15 PM peak hour vehicle trips (six inbound trips and nine outbound trips).

## 1.2 Project Impacts

This analysis identifies potentially significant adverse impacts of the proposed project, if any, on the surrounding transportation system and recommends measures to mitigate significant impacts. The VMT analysis determined that the project would have a significant impact.. However, the transportation demand management programs proposed are expected to mitigate the impacts to non-significant levels.

### 1.2.1 *Plus Project Conditions*

**Intersection Analysis**

Under all the 'Plus Project' conditions for all the three scenarios, both study intersections are expected to operate within acceptable levels of service in the AM peak hour. In the PM peak, Hayward Avenue, mid-block between El Camino Real and Palm Avenue (Intersection #2), is expected to operate at the same level of service (level A) as the 'without project' condition. As for the intersection of S El Camino Real and Hayward Avenue (Intersection #1), the level of service would improve from level F to level E with the project. This is because the Project would add more traffic to the westbound right-turn movement which currently has additional capacity and operate better than the westbound approach as a whole. In addition, the queuing analysis results show that the project would have a negligible effect on queues at Intersection #1, with no measurable change in queue length compared to the 'without project' conditions. As such, the project is not expected to impact both study intersections significantly for all three scenarios.

### 1.2.2 *Vehicle Miles Travelled*

Based on the City's Average VMT per Capita or per Employee by TAZ Maps, the expected VMT for the residential portion of this project is 14.8 VMT/capita and that for the office portion is 22.2 VMT/employee. Both portions exceed the City's respective threshold of 13.1 VMT/capita and 15.3/employee.

| | **City's VMT Threshold (0.85 of Regional Average)** | **Project VMT (TAZ #3035)** |
|---|---|---|
| **Residential** | 13.1 VMT/capita | 14.8 VMT/capita |
| **Commercial (Office)** | 15.3 VMT/employee. | 22.2 VMT/employee |

A separate report (attached to this report as Appendix F), *1 Hayward Avenue TDM Plan* by Steer Group, looked at transportation demand management programs for the project and indicated that the project VMT can be reduced to meet the City's threshold through implementation of a series of transportation demand management measures. As such, the project's VMT impacts are estimated to be mitigated to non-significant levels.

### 1.2.3 *Pedestrian, Bicycle and Transit Analysis*

The project proposes installation of new sidewalks on El Camino Real and Hayward Avenue abutting the project site, enhanced with new landscaping and building lightings. The vehicular access along El Camino Real will be closed, retaining only one vehicular access along Hayward Avenue. Visitors accessing the project by foot can enter via the main building entrance facing El Camino Real; residents have another private pedestrian access next to the vehicular driveway along Hayward Avenue. Apart from providing sufficient long-term secured bicycle parking for its residents and tenants, bike racks that can accommodate up to four bicycles will be provided along the El Camino Real sidewalk. The project is not expected to have significant impacts on the pedestrian, bicycle, and transit infrastructure in the vicinity. There are no design features that would interfere with these facilities. The planned improvements for these facilities in the project vicinity, like those outlined in the City's Citywide Pedestrian Master Plan and Bicycle Master Plan, are expected to accommodate the additional usage. There would also not be delay at any of the study intersections to transit services due to the project trips. Closure of the El Camino Real driveways would, in fact, improve the cycling and walking experience along El Camino Real as conflicts with turning vehicles would be removed. It is recommended that visual warning signs be installed at the driveway to alert drivers, pedestrians, and cyclists of potential conflicts due to the slight increase in vehicle movements as a result of the project.

### 1.2.4 *Site Access, On-site Circulation and Parking*

The project proposes to retain only the driveway along Hayward Avenue and close off the driveways along El Camino Real. The access has a right-in-right-out configuration as Hayward Avenue is divided and there is no median opening to allow direct eastbound access. As such, drivers approaching the project from eastbound Hayward Avenue will have to make a U-turn mid-block at the landscaped median opening. The 24-foot-wide driveway meets the City design standards and lead to the project's below-grade parking garage. The parking stalls and aisle width of the dead-end garage also satisfy the City's design requirements. The project plan indicated that a stopping sight-distance of 155 feet at the access can be provided.

The project proposes to include 22 vehicular parking spaces, of which two are ADA compliant and four are Electric Vehicle ready. The project also obtained a density bonus waiver to provide one parking space per 360 square feet instead of per 335 square feet of office space. The project meets the City's requirements by providing 13 parking spaces for the proposed office, including one ADA compliant space and two Electric Vehicle ready spaces. The remaining nine parking spaces, which consist of one ADA compliant space and two Electric Vehicle ready spaces, are allocated for the residential portion of the project. The residential parking also meets the revised parking ratio of 0.5 spaces per dwelling unit approved under the density bonus program. Correspondingly, the proposed number of EV ready spaces and ADA compliant spaces for residents also meets the stipulated requirements.

The project meets the bicycle parking requirements by providing the required 19 long-term secured parking spaces for its residents and tenants. Four short-term parking spaces for visitors would be provided, exceeding the required two short-term spaces.

# 2.0 INTRODUCTION

This report presents the results of a Transportation Impact Analysis (TIA) conducted for the proposed four-story mixed-use building consisting of 18 residential dwelling units (DU), a small office and 22 parking spaces located at 1 Hayward Avenue in the City of San Mateo, California.

The purpose of this TIA is to evaluate project-related transportation impacts and effects, including performing VMT analysis as required by CEQA, reviewing local transportation network changes, and reviewing the project's circulation plans. Where necessary, mitigation measures and proposed improvements will be included to address the CEQA impacts and network deficiencies. The scope of work was prepared in consultation with the City of San Mateo staff.

## 2.1 Project Description

Existing Site

The site is located at 1 Hayward Avenue. The existing parcel consists of five residential units with office space of approximately 1,115 square feet. These units have frontage along El Camino Real (ECR) where direct access is taken. The site was calculated to be generating a total of 54 daily trips between the office and residential units, with five and six trips in the AM and PM peak hour respectively.

Proposed Site

The project proposes to redevelop the parcel to a four-story mixed-use building with 18 residential dwelling units (DU) and a small office space of 4,650 square feet. **Figure 2-1** shows the Project site plan. The office will be located on the first floor while the residential units will be located on the second to fourth floor. In addition, the project will also provide improvements to the sidewalk curb and gutter abutting the site. New bicycle and electric vehicle ready parking spaces will also be provided. The project will have its driveway on Hayward Avenue instead of along ECR. The new proposal on its own, is expected a total 173 daily trips, with 17 trips in the AM peak hour and 21 trips in the PM peak hour.

## 2.2 Study Area

The study area is bounded by Hayward Avenue to the south and ECR to the west. The roadway impacts of the proposed Project were evaluated by measuring the effect project traffic would have on intersection operations. A total of two intersections, as shown in **Figure 2-2** and listed below, were selected as study locations following consultation with the City of San Mateo staff.

1. S ECR / Hayward Avenue – Aragon Boulevard
2. Hayward Avenue, mid-block between ECR and Palm Avenue

## 2.3 Study Scope and Approach

Several scenarios were evaluated to identify the potential impacts of the project based on the CEQA guidelines which included local circulation and transportation aspects like vehicle miles travelled and transportation facilities. In addition, this study also evaluated the project's effect on several nearby intersections (referred as 'study intersections' throughout the report) under six scenarios:

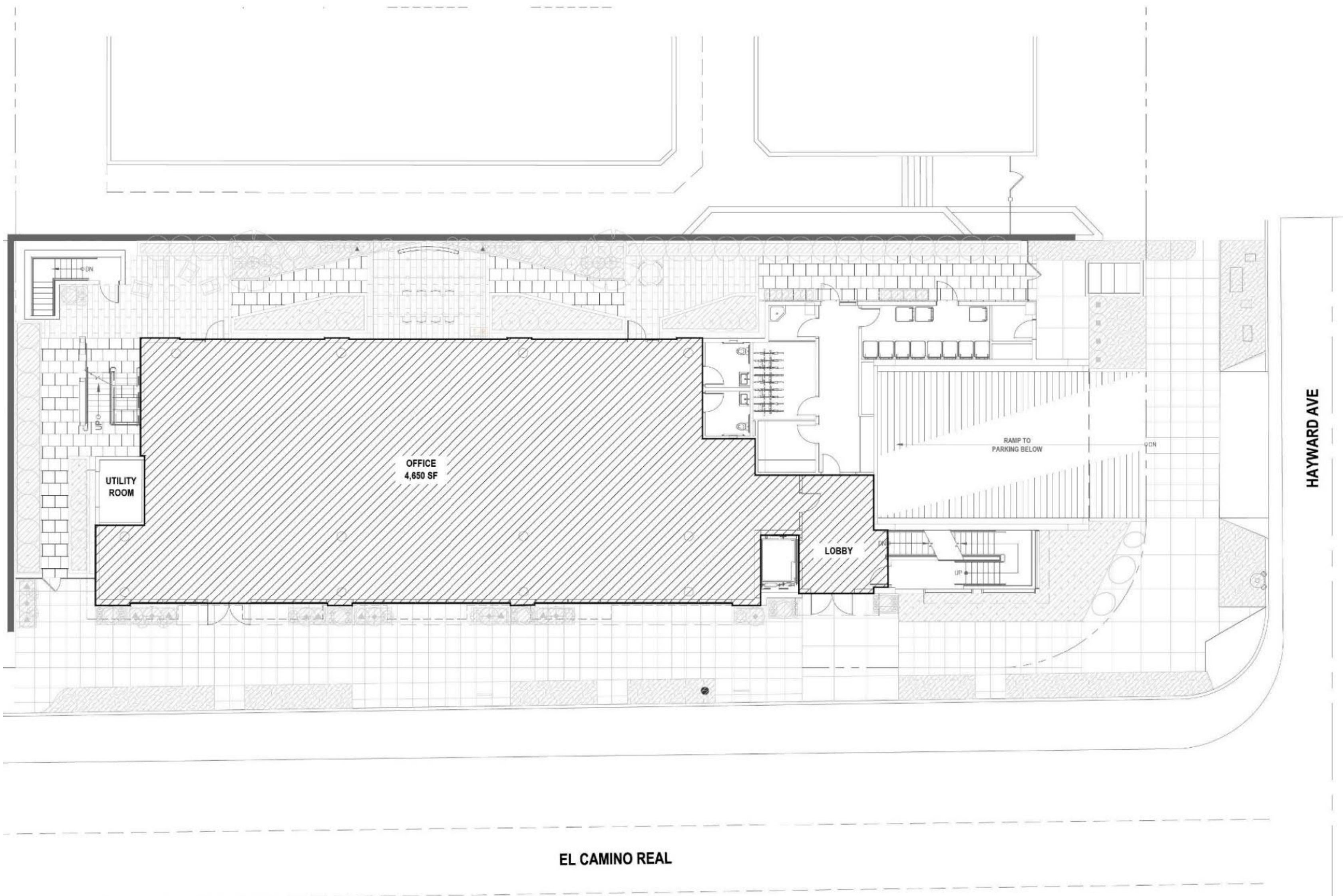
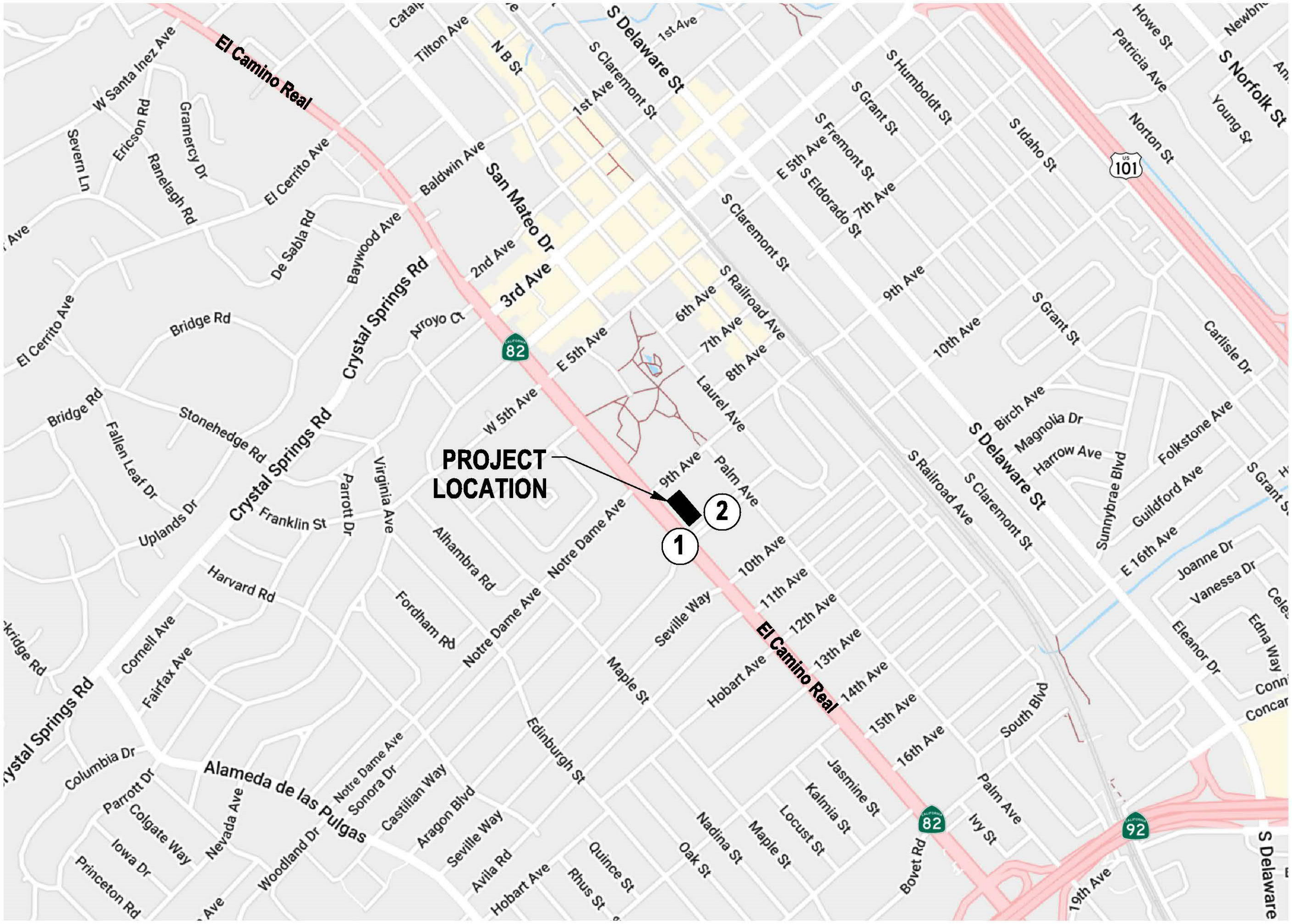



**Figure 2-1 Project Site Plan**
Source: One Hayward Avenue LLC.




(#) Un-Signalized Intersection

**Figure 2-2 Project Vicinity and Intersections**

1. Existing Conditions - Existing intersection volumes obtained from StreetLight traffic data extracted for weekdays between 04/01/2019-06/30/2019.
2. Existing plus Project Conditions – Existing volumes plus trips from this proposed project.
3. Background Conditions – Existing volumes plus trips from approved but not completed projects. This is defined as the Background without project conditions.
4. Background plus Project Conditions – Background volumes from *Scenario 3* plus trips from this proposed project.
5. Cumulative Conditions – Volumes for 2030 estimated from Existing volumes
6. Cumulative plus Project Conditions – Cumulative volumes from *Scenario 5* plus trips from this proposed project.

Intersection LOS was analyzed for the weekday AM peak hour and PM peak hour.

This analysis was conducted during the COVID-19 Pandemic when different degrees of stay-home orders were issued by the State and County of San Mateo. As a result, the amount of traffic on the roadways surrounding the project experienced significantly lower volumes than the pre-COVID conditions. No actual field data was collected. The existing volumes were therefore extracted from 'Streetlight (SL) Data'[1] and calibrated using the available field collected data for adjacent ECR/9th Avenue intersection. Calibration coded for data collection in SL allows for obtaining the adjusted volumes for study intersections based on the proportions and comparisons of field count data to SL data. The detail volume extraction sheets were included in Appendix A. In order to obtain the volumes for year 2030 (cumulative conditions), growth factors for the studied roadways were determined from the C/CAG model plots AECOM extract for 2020 and 2030. These factors were then applied to the existing volumes (determined above) to arrive at the 2030 intersection volumes. As this project is relatively small in size, it was more conservative to assume that it was not included in the model; project trips will be added to the estimated 2030 volumes to give the 'with project' conditions.

## 2.4 Analysis Methodology

In accordance with the City of San Mateo's *Transportation Impact Analysis Guidelines* (July 16, 2020), traffic operations are evaluated based on level of service (LOS), using the Highway Capacity Manual (HCM) methodology.[2] LOS is a qualitative description of traffic operations based on the amount of congestion or delay experienced by motorists, ranging from LOS A (free-flowing conditions) to LOS F (total breakdown with stop-and-go operations).

LOS ratings for unsignalized intersections are based on the weighted average control delay expressed in seconds per vehicle for all approaches. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For intersections under all-way stop control, the LOS is

[1] Streetlight Data – Big Data for Data Mobility, uses location data from smart phones and navigation devices to measure vehicle, transit, bike, and pedestrian traffic. Origin-Destination (OD), travel time, select link data etc. over different periods of time and day can be obtained from their web-based platform.

[2] Due to limitations in the most recent HCM editions (HCM 6th edition and HCM 2010) in reporting LOS and delay for unsignalized intersections, this analysis uses the HCM 2000 methodology.

reported as average for the intersection as a whole. For intersections under two-way stop control, the LOS is reported for the worst approach or lane group. For this report, LOS and delay have been calculated using Trafficware's Synchro 11 software package.

**Table 2-2** shows the thresholds for the different LOS conditions at unsignalized intersections. For unsignalized intersections operating at unacceptable LOS, the California Manual on Uniform Traffic Control Devices (CA MUTCD) peak-hour signal warrant is also evaluated.

**Table 2-1 Unsignalized Intersection Level of Service Definitions**

| Level of Service | Description | Average Control Delay (seconds/vehicle) |
|---|---|---|
| A | Little or no delay | delay ≤ 10.0 |
| B | Short traffic delays | 10.0 < delay ≤ 15.0 |
| C | Average traffic delays | 15.0 < delay ≤ 25.0 |
| D | Long traffic delays | 25.0 < delay ≤ 35.0 |
| E | Very long traffic delays | 35.0 < delay ≤ 50.0 |
| F | Extreme traffic delays with intersection capacity exceeded | delay > 50.0 |

Source: HCM 2000.

## 2.5 Significance Criteria

The City's *Transportation Impact Analysis Guidelines* prescribe a performance standard of LOS E for unsignalized intersections; under this standard, LOS E or better is considered acceptable, while LOS F or considered unacceptable. A deficiency is identified if a proposed project does either of the following:

- Triggers an intersection operating at acceptable LOS to operate at unacceptable LOS (from LOS E or better to LOS F); or
- Increases the average delay for an unsignalized study intersection that is already operating at unacceptable LOS by 4.0 seconds or more.

# 3.0 BASELINE CONDITIONS

This section describes baseline conditions against which "plus project" conditions are evaluated to determine potential project impacts. This section characterizes existing conditions in the vicinity of the project in terms of roadways, traffic operations, transit service, and pedestrian and bicycle facilities, and establishes future background and cumulative conditions without the project.

## 3.1 Existing Conditions

### 3.1.1 *Major Roadways in Study Area*

Local access to the Project site is provided by ECR, Hayward Avenue, and Palm Avenue. These roadways are described below.

*El Camino Real* (ECR) is a six-lane undivided north–south Arterial roadway with a posted speed of 35 mph in the project vicinity and is officially designated a State Route (SR) 82. Sidewalks and on-street parking are provided on both sides of the street.

*Hayward Avenue* is a two-lane east–west Local roadway that features a 40-foot-wide landscaped median. It is the southern border of the project site. Sidewalks and on-street parking are provided on both sides of Hayward Avenue. A median break is provided immediately east of the project site, approximately mid-block between ECR and Palm Avenue, to permit U-turn movements. West of ECR, Hayward Avenue connects directly to Aragon Boulevard which is a two-lane east–west Collector roadway. Sidewalks and on-street parking are provided on both sides of Aragon Boulevard.

*Palm Avenue* is a two-lane bidirectional north–south Collector / Local roadway. Palm Avenue accommodates Class II bikeways (bike lanes), and sidewalks and on-street parking are provided on both sides of the street.

### 3.1.2 *Intersection Operations*

Existing traffic counts for the two study intersections were obtained from Streetlight Data during the weekday morning (7:00-9:00 AM) and evening (4:00-6:00 PM) peak periods between April to June 2019. **Figure 3-1** and **Figure 3-2** show the intersection geometry and existing traffic volumes respectively. The performance of each intersection is presented in **Table 3-1**. The results of the LOS calculations indicate that both of the study intersections operate at acceptable levels of service except for Intersection #1 (South ECR / Hayward Avenue – Aragon Boulevard) during the weekday PM peak hour. The westbound approach at this intersection currently operates at LOS F during the weekday PM peak hour. However, the intersection does not satisfy the peak hour warrant during the weekday PM peak hour. Intersection LOS and signal warrant worksheets are presented in **Appendix B** and **Appendix D**, respectively.

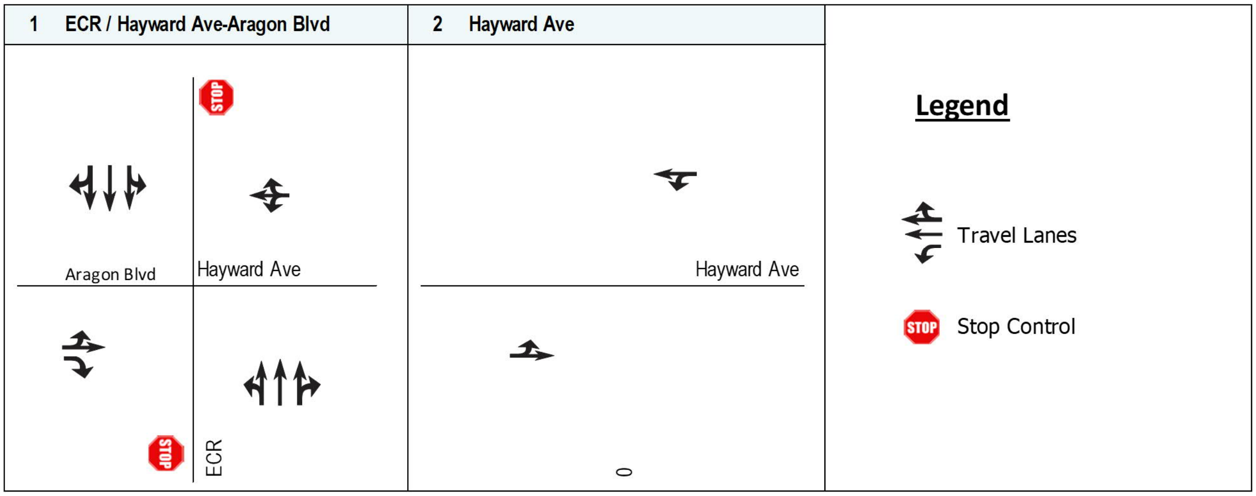



**Figure 3-1 Intersection Geometry**

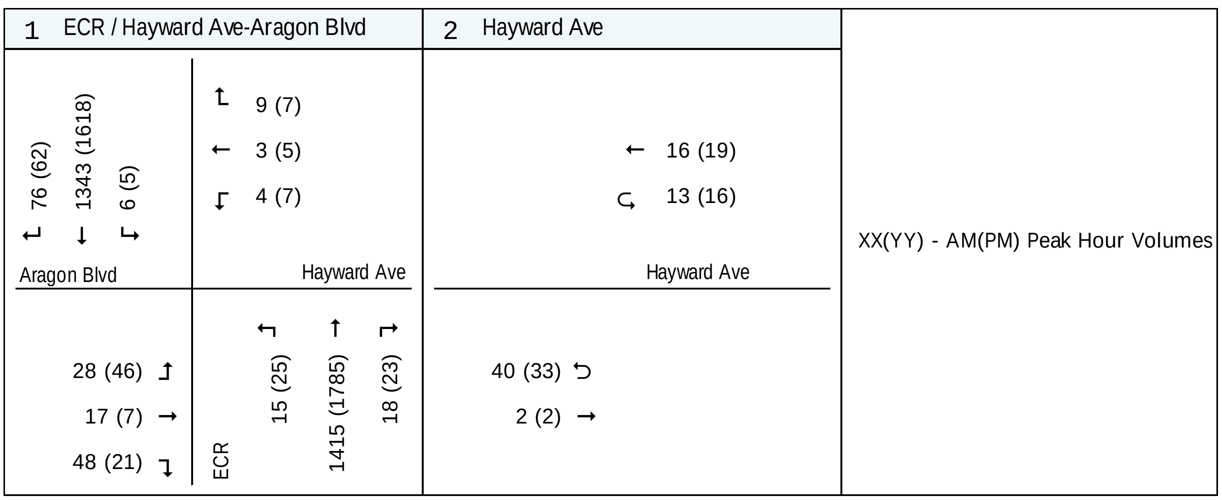



**Figure 3-2 Existing Traffic Volumes**

**Table 3-1 Intersection Performance – Existing Conditions**

| Intersection | | LOS Standard | Weekday AM Peak Hour | | Weekday PM Peak Hour | |
|---|---|---|---|---|---|---|
| | | | LOS | Average Delay (sec) | LOS | Average Delay (sec) |
| 1 | South ECR/ Hayward Avenue – Aragon Blvd | E | D | 28.1 | **F** | **50.1** |
| 2 | Hayward Ave. mid-block between S. ECR and Palm Ave. | E | A | 7.0 | A | 6.9 |

*LOS and delay reported for worst approach for 2-way stop controlled intersections
***Bold** indicates intersection operating at unacceptable conditions (LOS F).
Source: AECOM 2021

### 3.1.3 *Transit Facilities*

Existing transit service in the study area is illustrated in **Figure 3-3**.

Transit service is provided primarily by San Mateo County Transit District (SamTrans) buses, including routes ECR and 397 along ECR; routes 250 and 295 along 4th Avenue / 5th Avenue; and Route 292 along Delaware Street. Detailed information on these routes is provided in **Table 3-2**.

**Table 3-2 Existing Bus Service**

| Route | Description | Headways | | | Closest Bus Stop | Distance from Project Site |
|---|---|---|---|---|---|---|
| | | Weekdays | | Saturdays, Sundays, and Holidays | | |
| | | Peak and Midday | Off-Peak | | | |
| ECR | Daly City BART – Palo Alto Transit Center | 15 | 15–30 | 20–30 | ECR at 9th Ave. | 500 feet |
| 250 | 5th / ECR – College of San Mateo | 30 | 30 | 60 | West 5th Ave. at ECR | 2,000 feet |
| | | | | | | |
| 295 | San Mateo Caltrain – Redwood City Caltrain | 120 | — | — | ECR at 5th Ave. (southbound) West 4th Ave. at ECR (northbound) | 2,000 feet |
| 397 | San Francisco – San Francisco International Airport – Palo Alto Transit Center | Hourly owl service only | | | ECR at 9th Ave. | 500 feet |

Source: AECOM 2021

Within the study area, SamTrans also operates several school routes serving Borel Middle School, including Route 53 along South Delaware Street and Route 55 along ECR. These routes only operate weekdays, with only one roundtrip (one morning inbound trip to the school and one afternoon outbound trip from the school).

Supplementary transit service is provided by Caltrain commuter / regional rail service, which connects San Francisco, the Peninsula, and the South Bay. Two Caltrain stations are located slightly under one mile from the project site: San Mateo at 1st Avenue in Downtown San Mateo (north of the project site) and Hayward Park near 17th Avenue (south of the project site).

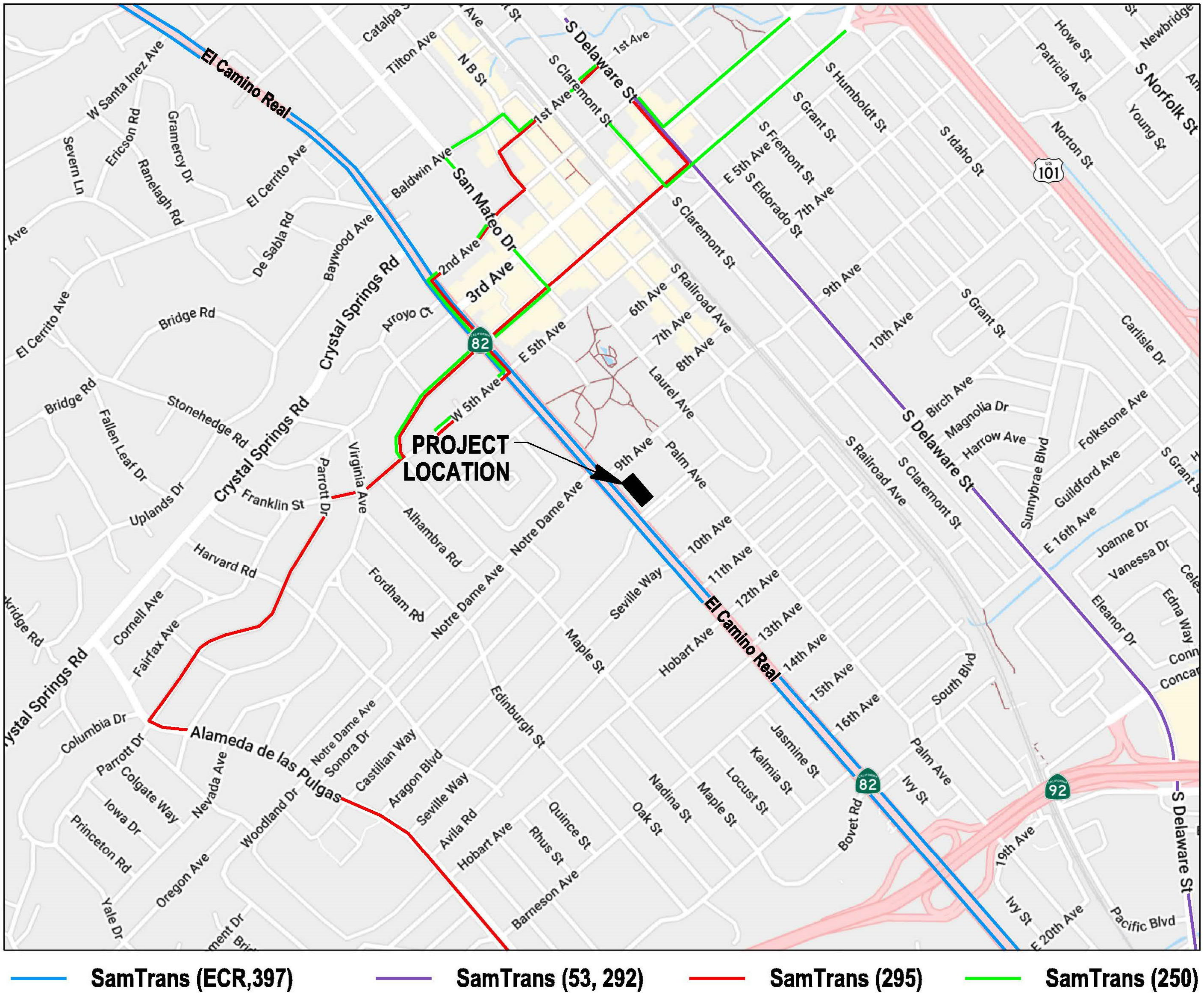



**Figure 3-3 Existing Transit Facilities**

### 3.1.4 *Pedestrian and Bicycle Facilities*

Sidewalks are generally provided along both sides of all streets in the vicinity of the project site, including streets abutting the project site (ECR and Hayward Avenue). Marked crosswalks are typically only provided at signalized intersections (e.g., ECR / 9th Avenue, ECR / 12th Avenue), but may also be provided at selected unsignalized intersections (e.g., Palm Avenue / 9th Avenue, Palm Avenue / 12th Avenue). In the case of unsignalized intersections, however, marked crosswalks are frequently only provided along selected approaches. Marked crosswalks are typically not provided at unsignalized intersections along ECR. Crosswalk markings vary and include both simple, low-visibility treatments (e.g., standard parallel lines) and high-visibility treatments (e.g., continental or ladder striping).

The existing bikeway network for the City of San Mateo consists of four basic types of facilities:

- Shared use paths, or Class I facilities as defined by Caltrans, provide an exclusive off-road right-of-way for bicyclists and pedestrians, with minimal interruption by motorized traffic.
- Bike lanes, or Class II facilities as defined by Caltrans, are on-road facilities that provide a designated lane for bicyclists, adjacent to motorized traffic. The bike lane may include a striped buffer zone that provides horizontal separation between bicyclists and adjacent motorized traffic.
- Bike routes, or Class III facilities as defined by Caltrans, are facilities where one or more travel lanes are shared by bicyclists and motorists. This is typically designated by signage and / or pavement markings indicating the roadway is shared by bicycles and automobiles.
- Bike Boulevards as defined by Caltrans, following the Federal Highway Administration (FHWA), are low-stress bikeways primarily located on low-volume, low-speed local roads.

Caltrans also defines Class IV facilities (separated bike lanes), which fall between Class I and Class II facilities in terms of bicyclists' level of safety and comfort. Separated bike lanes are on-road facilities, but are designated for the exclusive use of bicyclists, with physical separation from motorized traffic provided by grade separation, flexible posts, inflexible physical barriers, on-street parking, or other treatments. Class IV bike lanes have been proposed in the City's Bicycle Master Plan 2020 (near the project along B Street and 3rd Avenue) but have not been constructed.

Bicycles are allowed on all streets in the City of San Mateo except freeways. Existing bikeways in the vicinity of the project site are limited and consist of Class II facilities (un-buffered bike lanes) and Class III facilities (bike routes) along selected streets (e.g., Palm Avenue, Laurel Avenue, South B Street, 5th Avenue, 9th Avenue, Delaware Street).

Existing bicycle facilities in the vicinity of the project site are illustrated in **Figure 3-4.**

## 3.2 Background Conditions

The Background Conditions scenario includes the effects of approved but not yet completed projects. Based on input from City staff, there was one approved project in the vicinity of this development: a 225-unit residential development at 408 E 4th Avenue of City of San Mateo. It was determined that some of its project trips would affect intersection #1 of this project along ECR.

Background Conditions traffic volumes were developed by adding the trips generated by the above project to the existing traffic volumes. The total traffic of the existing and approved project trips is presented in

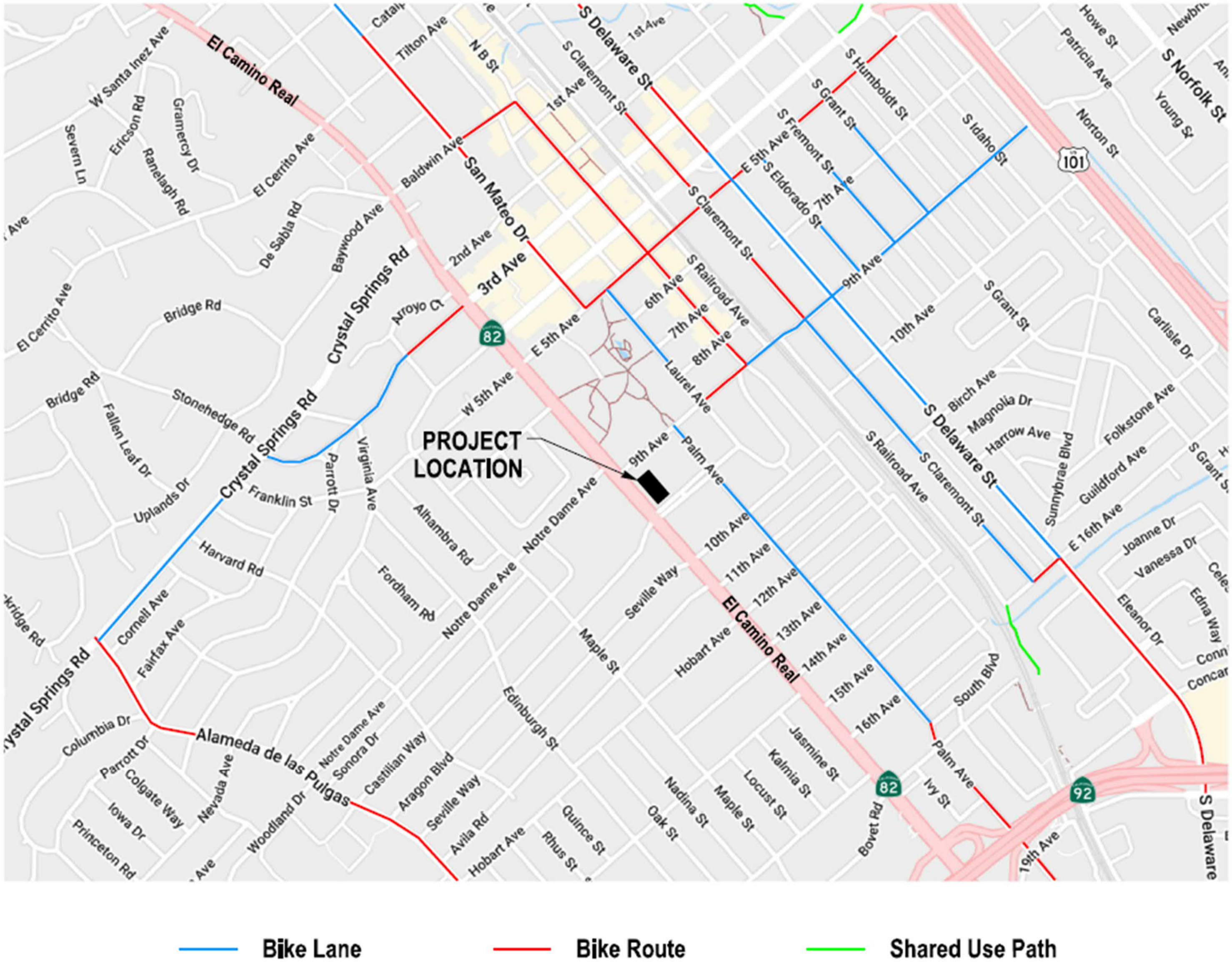



Figure 3-4 Existing Bicycle Facilities

**Figure 3-5**. Lane configurations for this scenario were assumed to remain unchanged from existing conditions. **Table 3-3** presents the analysis results and the analysis details are presented in **Appendix B**. The approved projects would add trips to ECR, resulting in a slight increase in average delays relative to Existing Conditions. However, these differences did not affect the overall LOS. Similar to Existing Conditions, Intersection #1 (South ECR / Hayward Avenue – Aragon Boulevard) would operate at LOS F during the weekday PM peak hour but would not satisfy the peak hour signal warrant.

**Table 3-3 Intersection Performance – Background Conditions**

| Intersection | | LOS Standard | Weekday AM Peak Hour | | Weekday PM Peak Hour | |
|---|---|---|---|---|---|---|
| | | | LOS | Average Delay (sec) | LOS | Average Delay (sec) |
| 1 | South ECR / Hayward Avenue – Aragon Blvd | E | D | 28.3 | **F** | **50.4** |
| 2 | Hayward Ave. mid-block between S. ECR and Palm Ave. | E | A | 7.0 | A | 6.9 |

*LOS and delay reported for worst approach for 2-way stop controlled intersections
*__Bold__ indicates intersection operating at unacceptable conditions (LOS F).
Source: AECOM 2021

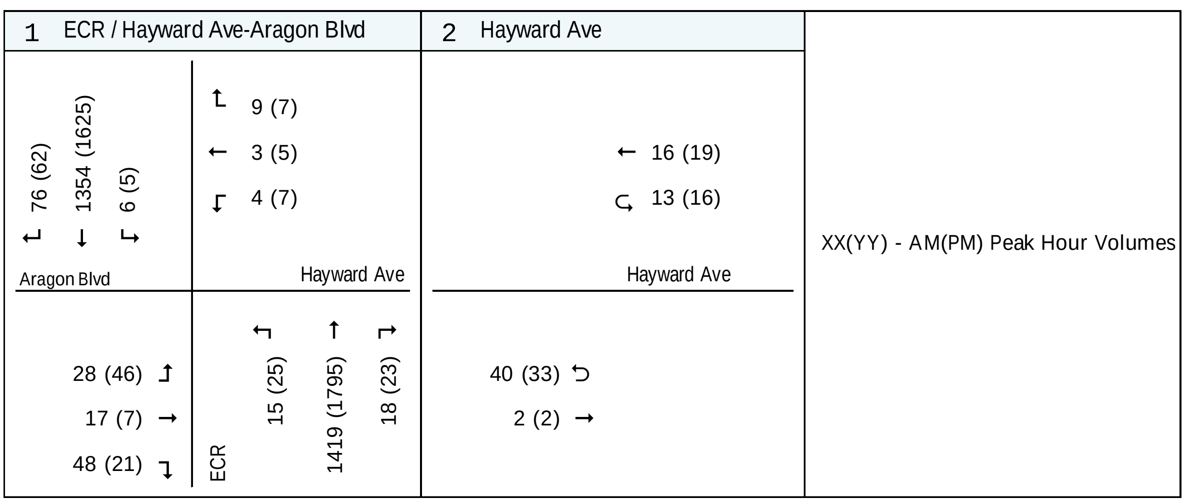



**Figure 3-5 Background Intersection Traffic Volumes**

## 3.3 Cumulative Conditions

The Cumulative Conditions scenario reflects expected conditions in 2030, coinciding with horizon year for the City's current General Plan, *Vision 2030*. Upon discussion with City staff, it was agreed that traffic volume projections would be developed using growth factors calculated from the City/County Association of Governments of San Mateo County (C/CAG) travel demand forecasting model.

Based on the C/CAG model, it was determined that the segment of ECR abutting the project site could see growth rates from 1.5% per year to 2.5% per year, depending on direction and time of the day. These rates appeared to be reasonable given the nature of the study area, consisting of established neighborhoods with few undeveloped parcels, with modest future growth attributable to redevelopment of existing lots and new development on selected lots.

For Hayward Avenue, the C/CAG model forecasts growth rates between 1.8% per year and 6.0% per year depending on direction and time of day. Given that the immediate vicinity of the project is considered relatively developed and that Hayward Avenue is not a major arterial roadway, a 6.0% annual growth rate for peak-hour traffic was considered relatively high but was conservatively retained for use in the analysis. **Figure 3-6** presents the intersection volumes under Cumulative Conditions.

The results of the intersection analysis under Cumulative Conditions are presented in **Table 3-4**. As shown in **Table 3-4**, increased traffic levels in the future would result in increased delays at Intersection #1, with LOS degrading to LOS E during the weekday AM peak hour. However, the performance of Intersection #2 would remain largely unchanged from Background Conditions, and both intersections are expected to operate at acceptable conditions (LOS E or better) with the exception of Intersection #1 during the weekday PM peak hour. This intersection would satisfy the peak hour signal warrant during the weekday PM peak hour.

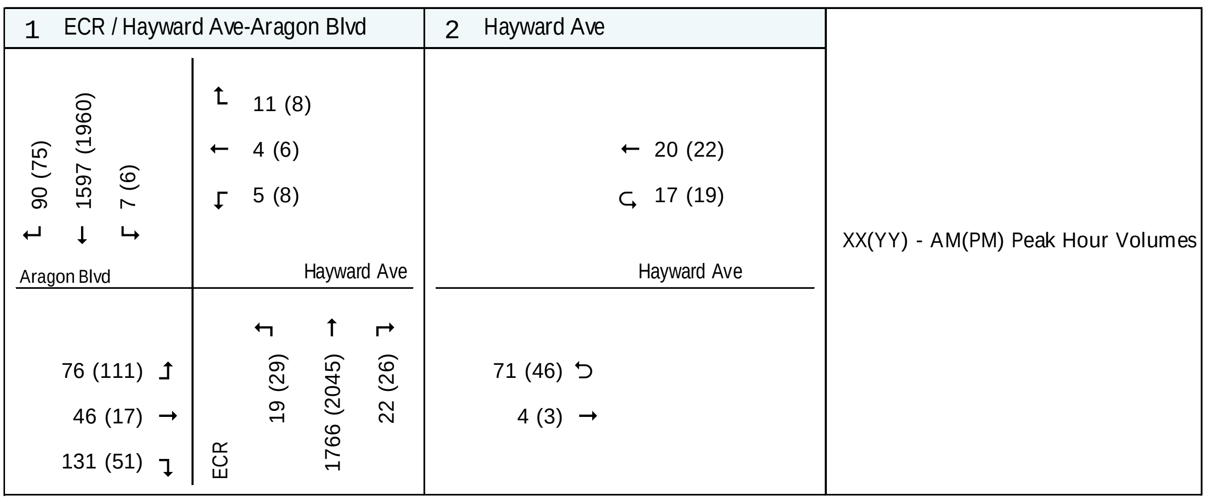



**Figure 3-6 Cumulative Intersection Traffic Volumes**

**Table 3-4 Intersection Performance – Cumulative Conditions**

| Intersection | | LOS Standard | Weekday AM Peak Hour | | Weekday PM Peak Hour | |
|---|---|---|---|---|---|---|
| | | | **LOS** | **Average Delay (sec)** | **LOS** | **Average Delay (sec)** |
| 1 | South ECR / Hayward Avenue – Aragon Blvd | E | E | 42.4 | **F** | **56.9** |
| 2 | Hayward Ave. mid-block between S. ECR and Palm Ave. | E | A | 7.0 | A | 6.9 |

*LOS and delay reported for worst approach for 2-way stop controlled intersections
***Bold** indicates intersection operating at unacceptable conditions (LOS F).
Source: AECOM 2021

# 4.0 PROJECT CONDITIONS

This chapter looks at the future transportation conditions in the study area as a result of the proposed project in terms of intersection operations. Trips generated by the proposed development are added to the 'no project' scenarios discussed in the earlier chapter to determine the effects of this project. Any mitigation measures necessary to alleviate potential impacts will also be discussed.

## 4.1 Project Travel Demand

This section presents travel demand estimates for the proposed project, including trip generation, trip distribution, and trip assignment.

Trip generation (specifically, vehicle-trips) for the proposed project were estimated using trip rates from the Institute of Transportation Engineers' (ITE) *Trip Generation Manual* (10th Edition, 2017) and are summarized in **Table 4-1**.

As there are existing active uses at the site that would be demolished and expanded as part of the proposed project, the trip generation calculation reflects net-new trips, with a trip credit (reduction) assumed for the existing uses. Based on input from City staff, existing land uses at the project site consist of a combination of commercial and residential uses. Given the size of the existing and proposed commercial (office) use, the associated trips were estimated using ITE's "Small Office" land use category. Trips for the residential use were estimated using the "Low-Rise Multifamily" and "Mid-Rise Multifamily" land use categories for the existing and proposed uses, respectively.

Overall, the proposed project is estimated to generate a net-new travel demand of 12 vehicle-trips (eight inbound trips and four outbound trips) during the weekday AM peak hour and 15 vehicle-trips (six inbound trips and nine outbound trips) during the weekday PM peak hour.

**Table 4-1 Trip Generation for Proposed Project**

| Land Use | Size | Unit | Daily Rate | Daily Trips | AM Peak Hour | | | | | | PM Peak Hour | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Rate | In% | In | Out % | Out | Total | Rate | In% | In | Out % | Out | Total |
| Existing Land Use | | | | | | | | | | | | | | | | |
| Residential (220) | 5 | DU | 7.32 | 36 | 0.46 | 23% | 0 | 77% | 2 | 2 | 0.56 | 63% | 2 | 37% | 1 | 3 |
| Small Office (712) | 1.115 | 1,000 SF | 16.19 | 18 | 1.92 | 83% | 2 | 17% | 1 | 3 | 2.45 | 32% | 1 | 68% | 2 | 3 |
| Total Existing Trips | | | | 54 | | | 2 | | 3 | 5 | | | 3 | | 3 | 6 |
| Proposed Land Use | | | | | | | | | | | | | | | | |
| Small Office (712) | 4.65 | 1,000 SF | 16.19 | 75 | 1.92 | 83% | 8 | 17% | 2 | 10 | 2.45 | 32% | 4 | 68% | 8 | 12 |
| Residential (221) | 18 | DU | 5.44 | 98 | 0.36 | 26% | 2 | 74% | 5 | 7 | 0.44 | 61% | 5 | 39% | 4 | 9 |
| Total New Trips | | | | 173 | | | 10 | | 7 | 17 | | | 9 | | 12 | 21 |
| Net New Trips | | | | 119 | | | 8 | | 4 | 12 | | | 6 | | 9 | 15 |

Notes: All rates are from Institute of Transportation Engineers, Trip Generation, 10th Edition
Residential Land Use 220 is Low Rise Multifamily and Residential Land Use 221 is Mid-Rise Multifamily
Source: *Trip Generation Manual, 10th Edition* (ITE, 2017)

Trip distribution is defined as the direction of approach and departure that vehicles would use to arrive at and depart from the site. The trip distribution pattern of the traffic generated by the project onto the roadway system was based on knowledge of the area, prevailing traffic patterns and the site access locations. The project trips were distributed and assigned to the study intersections for traffic impact determination based on the trip distribution percentages shown in **Figure 4-1.**

It is assumed that half of the inbound project trips arriving via ECR to the north would make a left-turn onto eastbound 9th Avenue and approach the project site via Palm Avenue. This route avoids the southbound left turn at the unsignalized intersection at ECR / Aragon Boulevard / Hayward Avenue and the subsequent U-turn along Hayward Avenue to access the project site. Similarly, it is also assumed that half of the outbound project trips going to areas south of the project site would make a right turn onto ECR follow by a U-turn at the signalized intersection at ECR / 9th Avenue to avoid the left turn onto ECR from Hayward Avenue during peak hours. The resulting project trip assignment at each of the study intersections is presented in **Figure 4-2.**

### 4.1.1 *Intersection Operations*

A Project impact is determined by comparing the operating conditions of the 'plus project' and the 'no project' scenarios. The comparison table is shown in **Table 4-2**. The total 'plus project' traffic volumes for all the study intersections under the Existing Conditions are presented in **Figure 4-3**.

The results show that both study intersections are expected to operate within acceptable LOS with the proposed project during both peak hours. In particular, Intersection #1 during the weekday PM peak hour would improve from LOS F to LOS E because the Project would add more traffic to the westbound right-turn movement, which currently has additional capacity and operates better than the westbound approach as a whole. As all intersections would operate at acceptable conditions, a signal warrant analysis was not conducted.

### 4.1.2 *Queuing Impacts*

A queuing analysis was also conducted for Intersection #1 (South ECR / Hayward Avenue – Aragon Boulevard) to determine if the Project would cause any queues that would spill back to upstream intersections or exceed the capacity of turn pockets.

**Table 4-3** summarizes 95th percentile queues for Existing Conditions and Existing and Plus Project Conditions. There are no designated turn pockets provided at the intersection, although the eastbound (Aragon Boulevard) approach operates with a *de facto* right-turn pocket due to a wide parking lane marked as a red "NO STOPPING" zone.

## 4.2 Existing plus Project Conditions

The results show that the Project would have a negligible effect on queues at this intersection, with no measurable change in queue length from Existing Conditions for either side-street approach (eastbound and westbound Hayward Avenue) or for either left-turn movement from the major street (ECR). None of the queues would extend into upstream intersections. Detailed information is included in the intersection LOS worksheets provided in **Appendix C**.

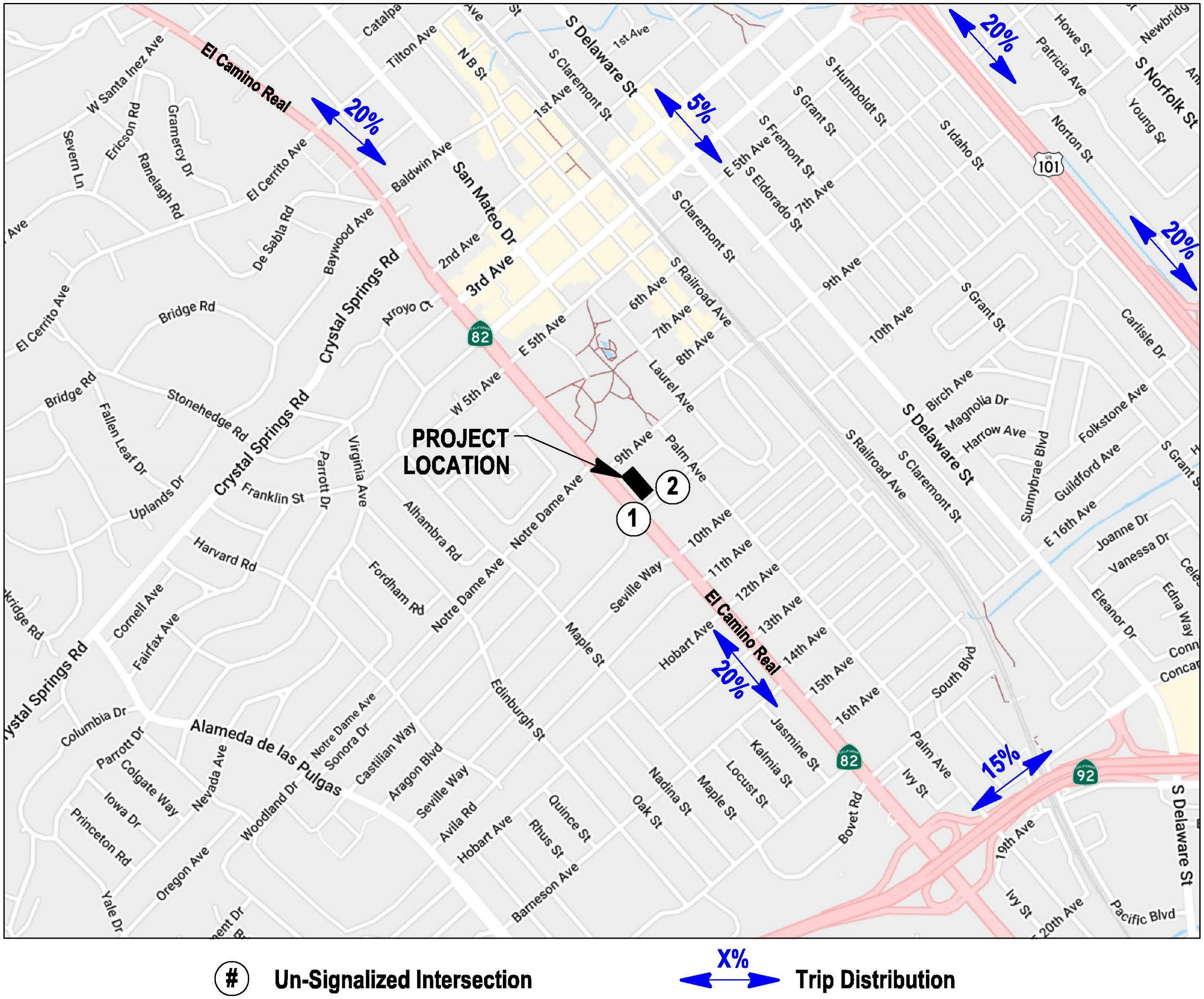



**Figure 4-1 Project Trip Distribution**

**Table 4-2 Intersection Performance – Existing plus Project Conditions**

| Intersection | | LOS Standard | Existing Conditions | | | | Existing plus Project Conditions | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Weekday AM Peak Hour | | Weekday PM Peak Hour | | Weekday AM Peak Hour | | Weekday PM Peak Hour | |
| | | | LOS | Avg. Del. (sec) | LOS | Avg. Del. (sec) | LOS | Avg. Del. (sec) | LOS | Avg. Del. (sec) |
| 1 | S. ECR / Hayward Ave. – Aragon Blvd. | E | D | 28.1 | **F** | **50.1** | D | 25.9 | E | 41.1 |
| 2 | Hayward Ave. mid-block between S. ECR and Palm Ave. | E | A | 7.0 | A | 6.9 | A | 7.1 | A | 7.0 |

*LOS and delay reported for worst approach for 2-way stop controlled intersections
***Bold** indicates intersection operating at unacceptable conditions (LOS F).
Source: AECOM 2021

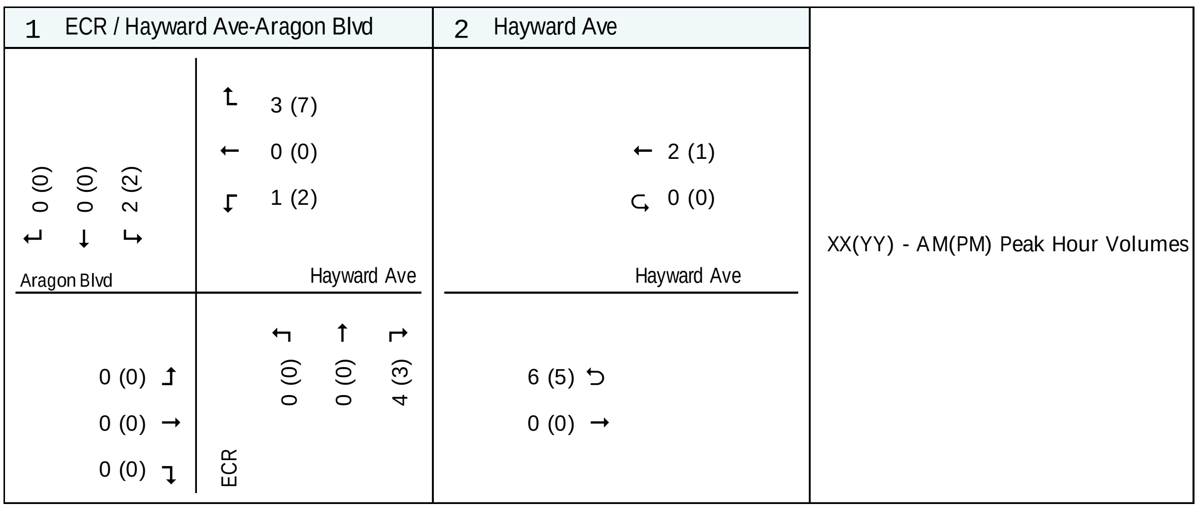



**Figure 4-2 Project Only Traffic Volumes**

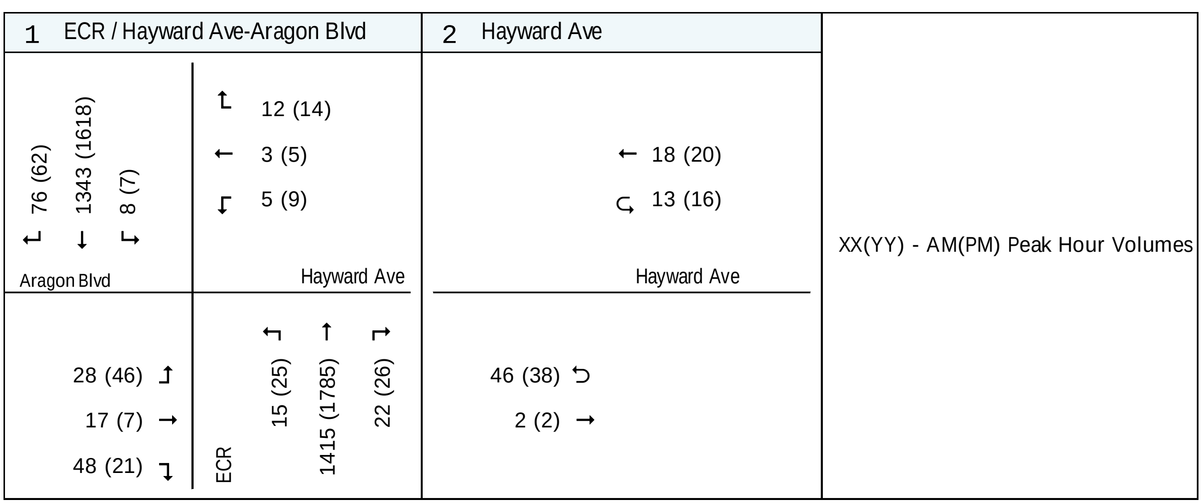



**Figure 4-3 Existing plus Project Traffic Volumes**

**Table 4-3 Queuing Analysis – Existing plus Project Conditions**

| Intersection | | Approach/ Movement | Existing Conditions | | Existing plus Project Conditions | |
|---|---|---|---|---|---|---|
| | | | Wkdy. AM Peak Hour | Wkdy. PM Peak Hour | Wkdy. AM Peak Hour | Wkdy. PM Peak Hour |
| 1 | S. ECR / Hayward Ave. – Aragon Blvd. | NBL | 0 | 5 | 0 | 5 |
| | | SBL | 0 | 0 | 0 | 0 |
| | | EB | 35 | 30 | 35 | 30 |
| | | WB | 10 | 20 | 10 | 20 |

*Queue length rounded up to nearest 5 feet
Source: AECOM, 2021

## 4.3 Background plus Project Conditions

### 4.3.1 *Intersection Operations*

The ‘with project volumes under the Background scenario are presented in **Figure 4-4,** while **Table 4-4** presents the comparison of intersection performance between the ‘with project’ and ‘without project’ conditions under this scenario. Both intersections are expected to operate within acceptable LOS with the proposed project during both peak hours. Similar to Existing plus Project Conditions, Intersection #1 would improve LOS F to LOS E during the weekday PM peak hour because the Project would add more traffic to the westbound right-turn movement, which would have additional capacity and would operate better than the westbound approach as a whole. As all intersections would operate at acceptable conditions, a signal warrant analysis was not conducted.

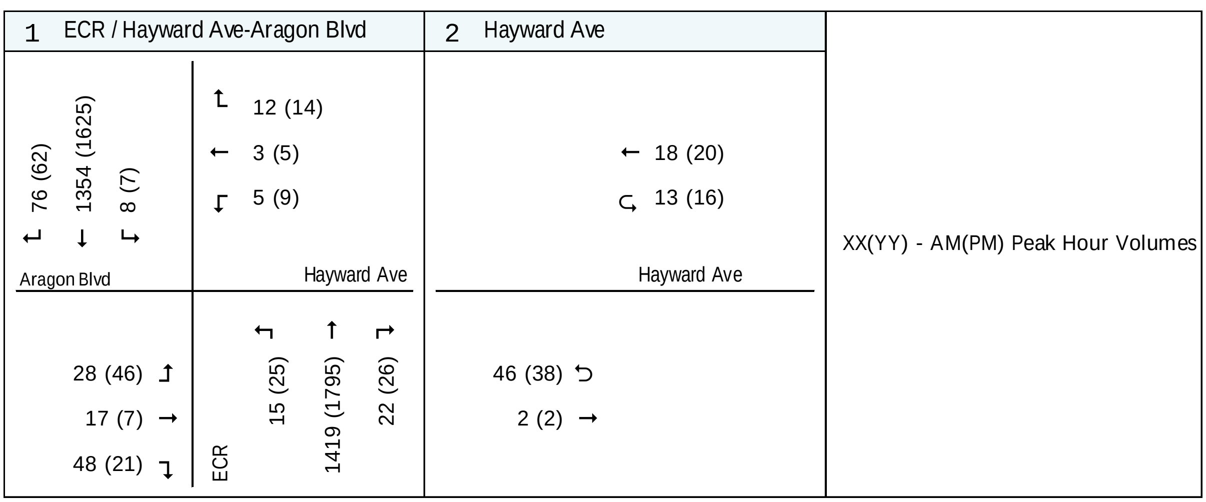



**Figure 4-4 Background plus Project Traffic Volumes**

**Table 4-4 Intersection Performance – Background plus Project Conditions**

| Intersection | | LOS Standard | Background Conditions | | | | Background plus Project Conditions | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Weekday AM Peak Hour | | Weekday PM Peak Hour | | Weekday AM Peak Hour | | Weekday PM Peak Hour | |
| | | | LOS | Avg. Del. (sec) | LOS | Avg. Del. (sec) | LOS | Avg. Del. (sec) | LOS | Avg. Del. (sec) |
| 1 | S. ECR / Hayward Ave. – Aragon Blvd. | E | D | 28.3 | **F** | **50.4** | D | 26.1 | E | 41.3 |
| 2 | Hayward Ave. mid-block between S. ECR and Palm Ave. | E | A | 7.0 | A | 6.9 | A | 7.1 | A | 7.0 |

*LOS and delay reported for worst approach for 2-way stop controlled intersections
***Bold** indicates intersection operating at unacceptable conditions (LOS F).
Source: AECOM 2021

### 4.3.2 *Queuing Analysis*

**Table 4-5** summarizes the 95th percentile queues for Background Conditions and Background plus Project Conditions. The results show that the Project would have a negligible effect on queues, and none of the queues would extend into upstream intersections.

**Table 4-5 Queuing Analysis – Background plus Project Conditions**

| Intersection | | Approach/ Movement | Background Conditions | | Background plus Project Conditions | |
|---|---|---|---|---|---|---|
| | | | Wkdy. AM Peak Hour | Wkdy. PM Peak Hour | Wkdy. AM Peak Hour | Wkdy. PM Peak Hour |
| 1 | S. ECR / Hayward Ave. – Aragon Blvd. | NBL | 0 | 5 | 0 | 5 |
| | | SBL | 0 | 0 | 0 | 0 |
| | | EB | 35 | 30 | 35 | 30 |
| | | WB | 10 | 20 | 10 | 20 |

*Queue length rounded up to nearest 5 feet
Source: AECOM, 2021

## 4.4 Cumulative plus Project Conditions

### 4.4.1 *Intersection Operations*

The ‘with project’ volumes under the Cumulative scenario are presented in **Figure 4-5** while **Table 4-6** presents the comparison of intersection performance between the ‘with project’ and ‘without project’ conditions under this scenario. Both intersections are expected to operate within acceptable LOS with the proposed project during both peak hours. Similar to Existing plus Project Conditions and Background plus Project Conditions, Intersection #1 would improve LOS F to LOS E during the weekday PM peak hour because the Project would add more traffic to the westbound right-turn movement, which would have additional capacity and would operate better than the westbound approach as a whole. As all intersections would operate at acceptable conditions, a signal warrant analysis was not conducted.

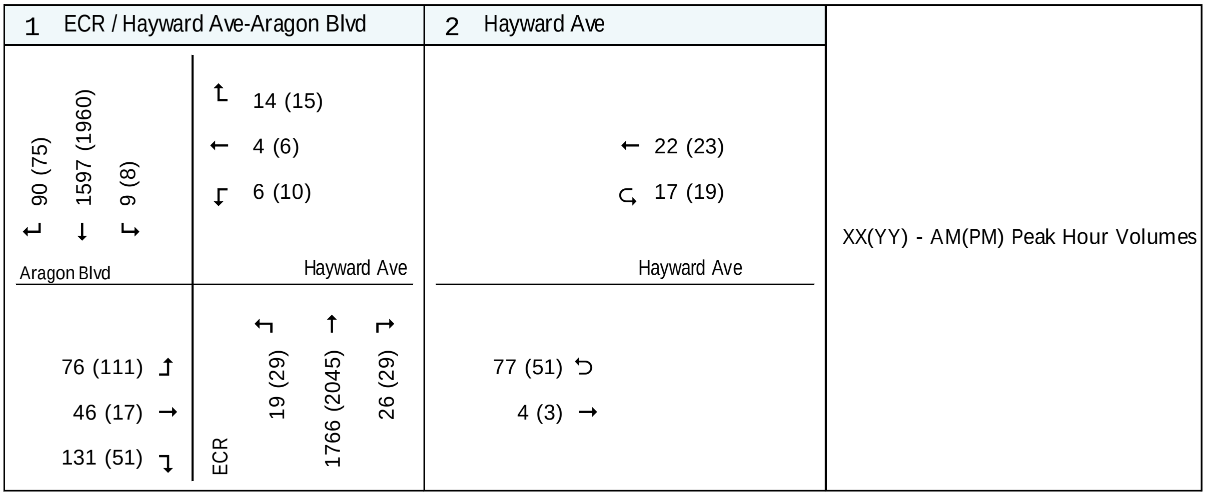



**Figure 4-5 Cumulative plus Project Traffic Volumes**

**Table 4-6 Intersection Performance – Cumulative plus Project Conditions**

| Intersection | | LOS Standard | Cumulative Conditions | | | | Cumulative plus Project Conditions | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Weekday AM Peak Hour | | Weekday PM Peak Hour | | Weekday AM Peak Hour | | Weekday PM Peak Hour | |
| | | | LOS | Avg. Del. (sec) | LOS | Avg. Del. (sec) | LOS | Avg. Del. (sec) | LOS | Avg. Del. (sec) |
| 1 | S. ECR / Hayward Ave. – Aragon Blvd. | E | E | 42.4 | **F** | **56.9** | E | 44.9 | E | 47.5 |
| 2 | Hayward Ave. mid-block between S. ECR and Palm Ave. | E | A | 7.0 | A | 6.9 | A | 7.1 | A | 7.0 |

*LOS and delay reported for worst approach for 2-way stop controlled intersections
*__Bold__ indicates intersection operating at unacceptable conditions (LOS F).
Source: AECOM 2021

### 4.4.2 *Queuing Analysis*

**Table 4-7** summarizes the 95th percentile queues for Cumulative Conditions and Cumulative plus Project Conditions. The results show that the Project would have a negligible effect on queues, and none of the queues would extend into upstream intersections.

**Table 4-7 Queuing Analysis – Cumulative plus Project Conditions**

| Intersection | | Approach/ Movement | Cumulative Conditions | | Cumulative plus Project Conditions | |
|---|---|---|---|---|---|---|
| | | | Wkdy. AM Peak Hour | Wkdy. PM Peak Hour | Wkdy. AM Peak Hour | Wkdy. PM Peak Hour |
| 1 | S. ECR / Hayward Ave. – Aragon Blvd. | NBL | 5 | 5 | 5 | 5 |
| | | SBL | 0 | 0 | 0 | 0 |
| | | EB | 80 | 70 | 80 | 75 |
| | | WB | 15 | 25 | 20 | 30 |

*Queue length rounded up to nearest 5 feet
Source: AECOM, 2021

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# 5.0 OTHER TRANSPORTATION IMPACTS

This section discusses the effects of the project on other aspects of transportation according to the CEQA requirements. The discussion will touch on the project's impact on vehicle miles traveled (VMT), facilities related to transit, pedestrian and bicycle. This section also evaluates if the proposed project access, circulation and parking meet the City's design standards and requirements or will the proposed features impede emergency access

## 5.1 Vehicle Miles Traveled Evaluation

In September 2013, California Governor Jerry Brown signed Senate Bill (SB) 743 into law, eliminating level of service (LOS) and other measures of automobile delay or congestion as metrics for determining the significance of transportation impacts under the California Environmental Quality Act (CEQA). The updated CEQA Guidelines now require the use of vehicle miles traveled (VMT) for evaluating transportation impacts.

Based on City *Transportation Impact Analysis Guidelines*, the City has adopted thresholds of significance to determine when a project will have a significant transportation impact based on VMT, consistent with CEQA Guidelines section 15064.3. A detailed VMT analysis is required for a land use development project unless it meets one of the City's five screening criteria for VMT analysis streamlining:

- Small projects
- Provision of affordable housing
- Local-serving retail
- Project located in a High-Quality Transit Area (HQTA)
- Project located in low VMT area

This project does not meet any of these screening criteria; the total daily trips is greater than the small project limit of 110 trips (daily project trips = 119 trips), it is not an affordable housing project nor a local serving retail project, it is also not located in a HQTA or in a low VMT area. As such, further VMT analysis needs to be performed to ascertain if the expected VMT of the project falls within the City's threshold. Otherwise, the project would be considered to have significant VMT impacts and mitigation measures will be needed.

### 5.1.1 *VMT Analysis*

The City's VMT analysis criteria for mixed-use developments such as this project ask for each component of the development to be assessed separately since none of the land use dominates 80% or more of the total daily trips. For residential projects, the regional average VMT is 15.5 VMT/capita which corresponds to a threshold VMT of 13.1 VMT/capita. For office project, the regional average is 18.0 VMT/employee and the corresponding threshold for office is 15.3 VMT/employee.

Based on the City's Average VMT per Capita or per Employee by TAZ Maps[3], the expected VMT for the residential portion of this project is 14.8 VMT/capita and that for the office portion is 22.2 VMT/employee.

[3] VMT Screening Maps, Attachment B *City of San Mateo Transportation Impact Analysis Guidelines*, July 16, 2020

Table 5-1 below presents the comparison of the project's VMT. As can be seen, both portions of the project are expected to have VMT higher than the City's threshold, with the office VMT expected to be even higher than the regional average. The project is therefore considered to have significant VMT impacts and mitigation measures are needed.

**Table 5-1 Summary of Project VMT**

| | Regional Average | City's VMT Threshold (0.85 of Regional Average) | Project VMT (TAZ #3035) |
|---|---|---|---|
| **Residential** | 15.5 VMT/capita | 13.1 VMT/capita | 14.8 VMT/capita |
| **Commercial (Office)** | 18.0 VMT/employee | 15.3 VMT/employee. | 22.2 VMT/employee |

### 5.1.2 *VMT Mitigation*

In order to mitigate the potential VMT impacts discussed above, the City engaged a VMT consultant, Steer Group, to examine what transportation demand management (TDM) measures could be implemented to alleviate these impacts.

The detail TDM study report prepared by Steer, *1 Hayward Avenue TDM Plan*, has been attached to this report as **Appendix F**. The study found that there are programs that can be implemented to reduce the expected VMT impacts to less than significant levels.

From Table A.4 of Steer's TDM Plan, it was determined that the project will generate 25 residential commuters and 45 employee commuters. Given the expected project VMT/capita and VMT/Employee is 14.8 and 22.2 respectively, a reduction of at least 1.7 VMT/capital and 6.9 VMT/employee would be needed in order to meet the City thresholds (13.1 VMT/capital and 15.3 VMT/employee). Table 17 of the TDM Plan shows that the total reduction needed is therefore:

> Total Daily Residential VMT reduction needed: (14.8 – 13.1) VMT/capita * 25 residential commuters = 42.5
>
> Total Daily Commercial VMT reduction needed: (22.2 – 15.3) VMT/employee * 45 employee commuters = 310.5
>
> Total Daily VMT reduction needed = 42.5 + 310.5 = 353

Table 18 of the TDM Plan indicated that the recommended measures could lead to a daily VMT reduction that ranges from 366 (low) to 712 (high). This is greater than the required reduction of 353. The VMT reduction would be higher if the proposed 'Optional TDM Program' is also implemented. As such, the proposed TDM programs would be able to mitigate the expected VMT impacts of the project to less than significant levels. Table 19 of the TDM Plan details the expected VMT reduction of each individual TDM measure recommended for this project.

## 5.2 Transit Facilities

The transit infrastructure in the project vicinity is expected to support the project usage under the 'plus project' conditions. The nearest bus stops to the project site are about 500 feet north, along ECR, near San Mateo Central Park. With the City's plan to increase bus ridership as outlined in its General Plan – Vision 2030, bus services would continue to serve the project vicinity and are therefore expected to accommodate the increased usage by the project. In addition, the transit stops would also have capacity to accommodate more waiting passengers from the project.

With respect to intersection delay experience by transit due to the added project trips, only study intersection #1 lies along the route for SamTrans Line ECR and Line 397. The project will not have significant impacts on these two transit services because the north and southbound through movements of ECR at intersection #1 are uninhibited. The expected project trips would not interfere with the services going through ECR. Intersection analysis described in Chapter indicated that there are no delays for the north and southbound through-movements under both the ‘with’ and ‘without’ project scenarios. As such, the project does not conflict with any program/plan/ordinance or policy addressing the transit facilities and is considered to be less than significant under CEQA.

### 5.3 Pedestrian and Bicycle Facilities

The project site currently has several driveways along ECR. With the new project, these driveways will be closed. As such, coupled with the enhanced landscaping proposed, the project will improve the pedestrian experience along ECR abutting the project. These modifications coincide with the City’s Goal 2 (Safety) “to improve pedestrian safety through design and maintenance of sidewalks, streets….” and Goal 3 (Infrastructure and Support Facilities) Objective 3B to “provide maintained walkways that are clean, safe and encourage use” as outlined in the City of San Mateo Citywide Pedestrian Master Plan (City of San Mateo, 2012).

The existing streetlight (currently only one along ECR) will be retained, but new lighting will be installed to illuminate the building facade and doorway providing additional lighting to the surrounding sidewalks. The curb-cut ramp leading to Hayward Avenue will be retained. Concrete pavers will be used to line the surrounding sidewalks, improving them aesthetically as well.

While the current access along Hayward Avenue will be retained under the proposed project, existing access along ECR will be removed. As a result, conflicts between pedestrians and motorized vehicles along ECR will be eliminated. However, the slight increase in the number of trips (up to 15 trips in the PM peak hour or one trip every four minutes) using the Hayward Avenue access increases the frequency of pedestrians encountering a turning motorized vehicle. It is therefore proposed, after consultation with the City, that visual warning signs to remind exiting drivers to look out for pedestrians and cyclists be installed near the egress. Visual warning devices are also recommended to warn pedestrians and cyclist of exiting vehicles. The design of such warning devices, for both vehicles and pedestrians/cyclists, should be approved by the City before installation if they deviate from the CA MUTCD provisions.

Overall, the project is not expected to result in adverse impacts on the surrounding pedestrian infrastructure; the infrastructure is expected to accommodate the increase usage by project residents, tenants and visitors. The City’s Pedestrian Master Plan identified several pedestrian oriented improvements in the immediate project vicinity; implementation of high visibility crosswalks at the intersections of Palm Avenue / Hayward Avenue and ECR / Aragon Boulevard as well as the installation of pedestrian scale lightings along ECR and Hayward Avenue (between Palm Avenue and ECR). The project has no design features that would interfere with the existing and planned infrastructure for the safe and secure movement of pedestrians.

Similarly, the project is not expected to cause adverse impacts on the surrounding bicycle infrastructure as it is expected to accommodate the usage by the proposed project. In the future, according to the City’s Bicycle Master Plan (City of San Mateo, April 2020), a new bike boulevard has been planned for Hobart

Avenue / 12th Avenue about three blocks south of the project site. There are also plans to provide 9th Avenue, east of ECR, with bike lanes and upgrade the western section to a bike boulevard.

The project will provide bike racks along the sidewalk abutting ECR that can accommodate up to 4 bicycles in addition to meeting the bike parking provision for its residents and tenants. There are no design features that will interfere with the movement, safety and security of cyclists in the project vicinity. Providing the required bike parking spaces supports the City's goal (Goal 5, San Mateo Bicycle Master Plan) to increase bike use while reducing the dependency of driving. The closure of existing driveways along ECR will reduce cyclists' exposure to conflict with other motorized vehicles. This is in line with the City's goal to improve and increase cyclists' safety, comfort and security as outlined in its Bicycle Master Plan (Goal 2). As discussed above, it is recommended, after consulting with the City, that visual warning signs be installed near the egress to remind exiting drivers to look out for crossing pedestrians and cyclists. Visual warning devices are also recommended to warn pedestrians and cyclists of exiting vehicles.

While the project would increase the amount of vehicle movement at the existing driveway location, additional features can be put in place to enhance the safe interaction between vehicles going in/out of the project and crossing pedestrians and cyclists. On the other hand, the elimination of accesses along ECR completely removes the current hazards caused by turning vehicles. Therefore, the project overall does not conflict with any program/plan/ordinance or policy addressing the pedestrian and bicycle facilities and is considered to be less than significant under CEQA.

## 5.4 Site Access, Circulation and Parking Analysis

This project proposes to provide one access along Hayward Avenue. This access will be right-in-right-out as Hayward Avenue is divided. Drivers can either use Palm Avenue follow by Hayward Avenue or use eastbound Hayward Avenue (from ECR) follow by a U-turn to the access on westbound Hayward Avenue. The provision of project driveway along Hayward Avenue, instead of along ECR, is in line with the City's General Plan Policy C1.2 to minimize curb cuts on arterial streets like ECR and the City's Zoning Code 27.64.025 that prohibits new access on arterial streets. The proposed access is not a new or additional access along Hayward Avenue as the existing use already has a driveway along Hayward Avenue at the project proposed driveway location as part of the existing development. But by removing the existing accesses along ECR, this project reduces conflicts along the arterial.

Drivers upon entering the project complex will head towards the parking below grade via a two-way ramp. The proposed curb-to-curb width of the ramp is 24 feet, meeting the City minimum design criterion of 24 feet. The driveway then leads to below-grade parking garage with 90-degree, mostly compact parking spaces. The width of the two-way parking aisle is proposed to be 24 feet which meets the minimum design requirement for a dead-end aisle. The driveway and aisle widths also meet the City's design requirements. The widths of the parking stalls range from eight feet to 10 feet, meeting the City's design requirements for the different regular parking stall types[4]. The ADA compliant stalls have a total proposed width of 17 feet, consisting of 12 feet of parking area and five feet of loading area. This satisfies the City's design requirement of five feet of loading area and at least nine feet of parking area. Since the signing and striping plan is not provided for evaluation at this point, it is recommended that the driveway be stop-controlled. In addition, after consultation with the City, it is agreed that visual warning signs to remind exiting drivers to look out for pedestrians and cyclists should be installed near the egress. Visual warning devices should

[4] City of San Mateo Parking Standard Drawings
https://www.cityofsanmateo.org/DocumentCenter/View/8009/PW_Parking_Standard-Specifications?bidId=

also be installed to warn pedestrians and cyclists of exiting vehicles. The designs of such warning devices, for both vehicles and pedestrians/cyclists, should comply with provisions of the CA MUTCD and should be approved by the City before installation.

The project proposes to provide a total of 22 parking spaces, which includes two stalls for electric vehicles (EV), one EV capable stall and two ADA compliant spaces of which one stall is for an EV.

According to the information provided by the City, the City has approved the project applicant's request for density bonus waiver under California Government Code section 65915, to allow an increase in the commercial parking ratio from one stall per 335 square feet to one stall per 360 square feet. The project meets the requirement stated in Zoning Code 27.16.060 Clause (b)(2) as 'at least five percent of the total units are designated for very low-income households'; the project proposes to devote two such units (11%). As such, the project needs to provide at least 13 spaces for the proposed 4,650 square feet of office use. The project satisfies this parking requirement by proposing 13 office parking spaces.

The submitted project plan indicated that the nine residential parking spaces proposed were determined based on City of San Mateo Zoning Code 27.64.100. This section of the code, however, dictates parking requirements for the Downtown Specific Planning Area, outside of where the project is located. The southern boundary of the Downtown Planning Area is 9th Avenue, one block north of the project site. Therefore, based on the general parking requirements stipulated by Zoning Code 27.64.160, the project instead needs to provide at least one space per dwelling unit (DU) for the 16 non-affordable housing units. For one-bedroom apartments, the required parking provision outside the downtown area is 1.8 spaces per DU which equates to 29 spaces. However, the project qualifies for density bonus waivers and incentives since more than five percent of the total units are set aside for very low-income housing as approved by the City. The revised parking ratio that the project needs to satisfy is 0.5 spaces per DU which equates to nine parking spaces. The proposed number of residential parking spaces therefore meets this requirement.

The ADA parking requirement is based on the California Building Code Title 24 Part 2 Chapter 11B. According to Table 11B-208.2, one ADA compliant space is needed for the proposed office (based on 13 number of total proposed office spaces) and one ADA compliant space is needed for the residential units, totaling to two ADA spaces. The project, providing two ADA compliant spaces, meets these requirements.

The City's code[5] requires that at least 15 percent of the parking spaces provided be ready for EVs. Therefore, based on the required number of spaces for the residential units (nine spaces), two spaces would need to be provided for EVs. The project is proposing two such spaces for the residential portion to satisfy the City's requirement. The City also requires 10 percent of the total number of parking spaces provided (if >10 spaces) for non-residential facilities to be EV capable[6]. Given the proposed 13 spaces for the office, at least two spaces would need to be EV capable and the project meets this requirement.

The project plans to provide 19 long-term and four short-term bicycle parking spaces to meet City's requirement. Long-term bicycle parking is defined as lockable facilities like individual lockers or enclosed, locked, limited access areas for parking of bicycles[7]. Short-term bicycle parking refers to bicycle racks accessible to visitors, customers and others expected to park less than two hours. Based on the City's requirements, 18 long-term and one short-term bicycle parking spaces should be provided for the residential units. For the proposed office use, one long term and one short-term bicycle parking are needed. The total

[5] City of San Mateo Municipal Code 23.70.040
[6] City of San Mateo Municipal Code 23.70.050
[7] City of San Mateo Municipal Code 27.64.262

number of long-term and short-term bicycle spaces needed are 19 and two respectively. The project therefore meets this requirement by proposing 19 long-term and four short-term bicycle parking spaces.

The project plan indicated that a stopping sight distance of 155 feet can be achieved for drivers exiting the project driveway to Hayward Avenue (posted speed limit of 25mph).

Based on the discussion above, the project would not cause an increase in hazards due to less-than desirable geometric design features nor result in inadequate emergency access to the site and its surrounding by meeting City's design requirements. The project is therefore considered to have less than significant impacts in these areas under CEQA.

## 6.0 CONCLUSIONS

This section summarizes the evaluation results for the TIA conducted for the proposed 18 DU, a small office of 4,650 square feet and 22 parking spaces development located at 1 Hayward Avenue in the City of San Mateo, California.

The evaluation concludes the following:

Under the three ‘with project’ scenarios, the Project is not expected to bring about any significant LOS impacts at the two study intersections in terms of delays as well as queue lengths. The intersections are expected to operate within acceptable levels with the Project and it is not expected to result in any measurable change in queue lengths at Intersection #1 (S. ECR / Hayward Ave–Aragon Boulevard).

The project will not have significant impacts on the surround transit facilities in terms of design, intersection delay and usage. The project does not have features that would hinder the operation, movement, and safety of transit services. The project trips would also not delay the transit services at any of the study intersections and the infrastructure is expected to accommodate the increase usage.

The project proposes to close off all the current accesses along ECR, retaining only the one access along Hayward Avenue that will lead to the project’s below grade parking garage. The closure of the accesses along ECR, coupled with the enhanced sidewalk abutting the project site, will improve the pedestrian and cycling experience by reducing exposure to motorized vehicles turning in/out of the project. Due to the slight increase of vehicular traffic at the Hayward Avenue access as a result of the project, installation of visual warning signs for drivers, pedestrians and cyclists is recommended. The project can achieve a driveway stopping sight-distance of 155 feet as indicated on the plans. The project is not expected to have adverse impacts to the surrounding pedestrian and bicycle facilities. The planned improvements to these facilities are expected to accommodate the usage by project residents, tenants and visitors. In addition, the project does not have design features that would conflict with the movement, safety and security of pedestrians and cyclists.

The residential and office VMT of the project is expected be 14.8 VMT/capita and 22.2 VMT/employee respectively. These exceed the City’s threshold for residential and office VMT of 13.1 VMT/Capita and 15.3 VMT/employee, respectively. A separate TDM plan, attached in Appendix F, details a comprehensive TDM program for the project. It indicated that by implementing a suite of recommended measures, the expected VMT impacts can be reduced to less than significant levels.

The proposed number of parking spaces for residents meets the required parking ratio approved under the density bonus program. The project is providing nine spaces for the residents, including two EV ready spaces and one ADA compliant space. The project also meets the parking requirements for the proposed office use by providing 13 spaces that include two EV ready spaces and one ADA compliant space.

The project meets the City’s bicycle parking requirements by providing required 19 long-term secured parking spaces and four short-term spaces (two required) for visitors.

# APPENDICES

# APPENDIX A

## Streetlight Data

# Int 1 - Hayward and ECR

| Mode of Travel | Origin Zone ID | Origin Zone Name | Origin Zone Is Pass-Through | Origin Zone Direction (degrees) | Origin Zone is Bi-Direction | Destination Zone ID | Destination Zone Name | Destination Zone Is Pass-Through | Destination Zone Direction (degrees) | Destination Zone is Bi-Direction | Day Type | Day Part | Average Daily O-D Traffic (StL Calibrated | Average Daily Origin Zone Traffic (StL Calibrated | Average Daily Destination Zone Traffic (StL Calibrated Index) | Avg Trip Duration (sec) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All Vehicles - StL Calibrated All Vehicles Index | | EB_IN | yes | 29 | no | | NB_OUT | yes | 132 | no | 1: Weekday (Tu-Th) | 08: 7am (7am-8am) | 70 | 114 | 1551 | 6 |
| All Vehicles - StL Calibrated All Vehicles Index | | EB_IN | yes | 29 | no | | NB_OUT | yes | 132 | no | 1: Weekday (Tu-Th) | 09: 8am (8am-9am) | 26 | 74 | 1422 | 21 |
| All Vehicles - StL Calibrated All Vehicles Index | | EB_IN | yes | 29 | no | | NB_OUT | yes | 132 | no | 1: Weekday (Tu-Th) | 17: 4pm (4pm-5pm) | 14 | 63 | 1729 | 4 |
| All Vehicles - StL Calibrated All Vehicles Index | | EB_IN | yes | 29 | no | | NB_OUT | yes | 132 | no | 1: Weekday (Tu-Th) | 18: 5pm (5pm-6pm) | 28 | 91 | 1883 | 6 |
| All Vehicles - StL Calibrated All Vehicles Index | | EB_IN | yes | 29 | no | | SB_OUT | yes | 318 | no | 1: Weekday (Tu-Th) | 08: 7am (7am-8am) | 26 | 114 | 1501 | 5 |
| All Vehicles - StL Calibrated All Vehicles Index | | EB_IN | yes | 29 | no | | SB_OUT | yes | 318 | no | 1: Weekday (Tu-Th) | 09: 8am (8am-9am) | 30 | 74 | 1625 | 15 |
| All Vehicles - StL Calibrated All Vehicles Index | | EB_IN | yes | 29 | no | | SB_OUT | yes | 318 | no | 1: Weekday (Tu-Th) | 17: 4pm (4pm-5pm) | 39 | 63 | 1812 | 9 |
| All Vehicles - StL Calibrated All Vehicles Index | | EB_IN | yes | 29 | no | | SB_OUT | yes | 318 | no | 1: Weekday (Tu-Th) | 18: 5pm (5pm-6pm) | 52 | 91 | 2197 | 9 |
| All Vehicles - StL Calibrated All Vehicles Index | | EB_IN | yes | 29 | no | | WB_OUT | yes | 48 | no | 1: Weekday (Tu-Th) | 08: 7am (7am-8am) | 15 | 114 | 30 | 9 |
| All Vehicles - StL Calibrated All Vehicles Index | | EB_IN | yes | 29 | no | | WB_OUT | yes | 48 | no | 1: Weekday (Tu-Th) | 09: 8am (8am-9am) | 18 | 74 | 61 | 75 |
| All Vehicles - StL Calibrated All Vehicles Index | | EB_IN | yes | 29 | no | | WB_OUT | yes | 48 | no | 1: Weekday (Tu-Th) | 17: 4pm (4pm-5pm) | 8 | 63 | 28 | 5 |
| All Vehicles - StL Calibrated All Vehicles Index | | EB_IN | yes | 29 | no | | WB_OUT | yes | 48 | no | 1: Weekday (Tu-Th) | 18: 5pm (5pm-6pm) | 6 | 91 | 54 | 8 |
| All Vehicles - StL Calibrated All Vehicles Index | | NB_IN | yes | 312 | no | | EB_OUT | yes | 209 | no | 1: Weekday (Tu-Th) | 08: 7am (7am-8am) | 20 | 1380 | 137 | 4 |
| All Vehicles - StL Calibrated All Vehicles Index | | NB_IN | yes | 312 | no | | EB_OUT | yes | 209 | no | 1: Weekday (Tu-Th) | 09: 8am (8am-9am) | 10 | 1524 | 74 | 3 |
| All Vehicles - StL Calibrated All Vehicles Index | | NB_IN | yes | 312 | no | | EB_OUT | yes | 209 | no | 1: Weekday (Tu-Th) | 17: 4pm (4pm-5pm) | 23 | 1651 | 80 | 10 |
| All Vehicles - StL Calibrated All Vehicles Index | | NB_IN | yes | 312 | no | | EB_OUT | yes | 209 | no | 1: Weekday (Tu-Th) | 18: 5pm (5pm-6pm) | 26 | 2026 | 119 | 4 |
| All Vehicles - StL Calibrated All Vehicles Index | | NB_IN | yes | 312 | no | | SB_OUT | yes | 318 | no | 1: Weekday (Tu-Th) | 08: 7am (7am-8am) | 1348 | 1380 | 1501 | 4 |
| All Vehicles - StL Calibrated All Vehicles Index | | NB_IN | yes | 312 | no | | SB_OUT | yes | 318 | no | 1: Weekday (Tu-Th) | 09: 8am (8am-9am) | 1481 | 1524 | 1625 | 5 |
| All Vehicles - StL Calibrated All Vehicles Index | | NB_IN | yes | 312 | no | | SB_OUT | yes | 318 | no | 1: Weekday (Tu-Th) | 17: 4pm (4pm-5pm) | 1611 | 1651 | 1812 | 5 |
| All Vehicles - StL Calibrated All Vehicles Index | | NB_IN | yes | 312 | no | | SB_OUT | yes | 318 | no | 1: Weekday (Tu-Th) | 18: 5pm (5pm-6pm) | 1958 | 2026 | 2197 | 5 |
| All Vehicles - StL Calibrated All Vehicles Index | | NB_IN | yes | 312 | no | | WB_OUT | yes | 48 | no | 1: Weekday (Tu-Th) | 08: 7am (7am-8am) | 7 | 1380 | 30 | 5 |
| All Vehicles - StL Calibrated All Vehicles Index | | NB_IN | yes | 312 | no | | WB_OUT | yes | 48 | no | 1: Weekday (Tu-Th) | 09: 8am (8am-9am) | 29 | 1524 | 61 | 2 |
| All Vehicles - StL Calibrated All Vehicles Index | | NB_IN | yes | 312 | no | | WB_OUT | yes | 48 | no | 1: Weekday (Tu-Th) | 17: 4pm (4pm-5pm) | 9 | 1651 | 28 | 3 |
| All Vehicles - StL Calibrated All Vehicles Index | | NB_IN | yes | 312 | no | | WB_OUT | yes | 48 | no | 1: Weekday (Tu-Th) | 18: 5pm (5pm-6pm) | 36 | 2026 | 54 | 5 |
| All Vehicles - StL Calibrated All Vehicles Index | | SB_IN | yes | 138 | no | | EB_OUT | yes | 209 | no | 1: Weekday (Tu-Th) | 08: 7am (7am-8am) | 96 | 1494 | 137 | 5 |
| All Vehicles - StL Calibrated All Vehicles Index | | SB_IN | yes | 138 | no | | EB_OUT | yes | 209 | no | 1: Weekday (Tu-Th) | 09: 8am (8am-9am) | 56 | 1368 | 74 | 4 |
| All Vehicles - StL Calibrated All Vehicles Index | | SB_IN | yes | 138 | no | | EB_OUT | yes | 209 | no | 1: Weekday (Tu-Th) | 17: 4pm (4pm-5pm) | 46 | 1618 | 80 | 5 |
| All Vehicles - StL Calibrated All Vehicles Index | | SB_IN | yes | 138 | no | | EB_OUT | yes | 209 | no | 1: Weekday (Tu-Th) | 18: 5pm (5pm-6pm) | 77 | 1764 | 119 | 4 |
| All Vehicles - StL Calibrated All Vehicles Index | | SB_IN | yes | 138 | no | | NB_OUT | yes | 132 | no | 1: Weekday (Tu-Th) | 08: 7am (7am-8am) | 1391 | 1494 | 1551 | 5 |
| All Vehicles - StL Calibrated All Vehicles Index | | SB_IN | yes | 138 | no | | NB_OUT | yes | 132 | no | 1: Weekday (Tu-Th) | 09: 8am (8am-9am) | 1294 | 1368 | 1422 | 4 |
| All Vehicles - StL Calibrated All Vehicles Index | | SB_IN | yes | 138 | no | | NB_OUT | yes | 132 | no | 1: Weekday (Tu-Th) | 17: 4pm (4pm-5pm) | 1558 | 1618 | 1729 | 5 |
| All Vehicles - StL Calibrated All Vehicles Index | | SB_IN | yes | 138 | no | | NB_OUT | yes | 132 | no | 1: Weekday (Tu-Th) | 18: 5pm (5pm-6pm) | 1678 | 1764 | 1883 | 5 |
| All Vehicles - StL Calibrated All Vehicles Index | | SB_IN | yes | 138 | no | | WB_OUT | yes | 48 | no | 1: Weekday (Tu-Th) | 08: 7am (7am-8am) | 4 | 1494 | 30 | 19 |
| All Vehicles - StL Calibrated All Vehicles Index | | SB_IN | yes | 138 | no | | WB_OUT | yes | 48 | no | 1: Weekday (Tu-Th) | 09: 8am (8am-9am) | 7 | 1368 | 61 | 7 |
| All Vehicles - StL Calibrated All Vehicles Index | | SB_IN | yes | 138 | no | | WB_OUT | yes | 48 | no | 1: Weekday (Tu-Th) | 17: 4pm (4pm-5pm) | 6 | 1618 | 28 | 9 |
| All Vehicles - StL Calibrated All Vehicles Index | | SB_IN | yes | 138 | no | | WB_OUT | yes | 48 | no | 1: Weekday (Tu-Th) | 18: 5pm (5pm-6pm) | 4 | 1764 | 54 | 7 |
| All Vehicles - StL Calibrated All Vehicles Index | | WB_IN | yes | 225 | no | | EB_OUT | yes | 209 | no | 1: Weekday (Tu-Th) | 08: 7am (7am-8am) | 3 | 23 | 137 | 12 |
| All Vehicles - StL Calibrated All Vehicles Index | | WB_IN | yes | 225 | no | | EB_OUT | yes | 209 | no | 1: Weekday (Tu-Th) | 09: 8am (8am-9am) | 2 | 12 | 74 | 9 |
| All Vehicles - StL Calibrated All Vehicles Index | | WB_IN | yes | 225 | no | | EB_OUT | yes | 209 | no | 1: Weekday (Tu-Th) | 17: 4pm (4pm-5pm) | 2 | 19 | 80 | 8 |
| All Vehicles - StL Calibrated All Vehicles Index | | WB_IN | yes | 225 | no | | EB_OUT | yes | 209 | no | 1: Weekday (Tu-Th) | 18: 5pm (5pm-6pm) | 7 | 20 | 119 | 11 |
| All Vehicles - StL Calibrated All Vehicles Index | | WB_IN | yes | 225 | no | | NB_OUT | yes | 132 | no | 1: Weekday (Tu-Th) | 08: 7am (7am-8am) | 5 | 23 | 1551 | 7 |
| All Vehicles - StL Calibrated All Vehicles Index | | WB_IN | yes | 225 | no | | NB_OUT | yes | 132 | no | 1: Weekday (Tu-Th) | 09: 8am (8am-9am) | 3 | 12 | 1422 | 3 |
| All Vehicles - StL Calibrated All Vehicles Index | | WB_IN | yes | 225 | no | | NB_OUT | yes | 132 | no | 1: Weekday (Tu-Th) | 17: 4pm (4pm-5pm) | 5 | 19 | 1729 | 13 |
| All Vehicles - StL Calibrated All Vehicles Index | | WB_IN | yes | 225 | no | | NB_OUT | yes | 132 | no | 1: Weekday (Tu-Th) | 18: 5pm (5pm-6pm) | 8 | 20 | 1883 | 28 |
| All Vehicles - StL Calibrated All Vehicles Index | | WB_IN | yes | 225 | no | | SB_OUT | yes | 318 | no | 1: Weekday (Tu-Th) | 08: 7am (7am-8am) | 14 | 23 | 1501 | 4 |
| All Vehicles - StL Calibrated All Vehicles Index | | WB_IN | yes | 225 | no | | SB_OUT | yes | 318 | no | 1: Weekday (Tu-Th) | 09: 8am (8am-9am) | 4 | 12 | 1625 | 5 |
| All Vehicles - StL Calibrated All Vehicles Index | | WB_IN | yes | 225 | no | | SB_OUT | yes | 318 | no | 1: Weekday (Tu-Th) | 17: 4pm (4pm-5pm) | 9 | 19 | 1812 | 7 |
| All Vehicles - StL Calibrated All Vehicles Index | | WB_IN | yes | 225 | no | | SB_OUT | yes | 318 | no | 1: Weekday (Tu-Th) | 18: 5pm (5pm-6pm) | 5 | 20 | 2197 | 8 |
| All Vehicles - StL Calibrated All Vehicles Index | | WB_IN | yes | 225 | no | | WB_OUT | yes | 48 | no | 1: Weekday (Tu-Th) | 09: 8am (8am-9am) | 2 | 12 | 61 | 57 |

Int 2 - Aragon_Hayward

| Mode of Travel | Origin Zone ID | Origin Zone Name | Origin Zone Is Pass-Through | Origin Zone Direction (degrees) | Origin Zone is Bi-Direction | Destination Zone ID | Destination Zone Name | Destination Zone Is Pass-Through | Destination Zone Direction (degrees) | Destination Zone is Bi-Direction | Day Type | Day Part | Average Daily O-D Traffic (StL Calibrated Index) | Average Daily Origin Zone Traffic (StL Calibrated Index) | Average Daily Destination Zone Traffic (StL Calibrated Index) | Avg Trip Duration (sec) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All Vehicles - StL Calibrated All Vehicles Index | | EB_IN | yes | 47 | no | | EB_OUT | yes | 47 | no | 1: Weekday (Tu-Th) | 08: 7am (7am-8am) | 26 | 29 | 25 | 5 |
| All Vehicles - StL Calibrated All Vehicles Index | | EB_IN | yes | 47 | no | | EB_OUT | yes | 47 | no | 1: Weekday (Tu-Th) | 09: 8am (8am-9am) | 54 | 62 | 61 | 4 |
| All Vehicles - StL Calibrated All Vehicles Index | | EB_IN | yes | 47 | no | | EB_OUT | yes | 47 | no | 1: Weekday (Tu-Th) | 17: 4pm (4pm-5pm) | 23 | 27 | 31 | 6 |
| All Vehicles - StL Calibrated All Vehicles Index | | EB_IN | yes | 47 | no | | EB_OUT | yes | 47 | no | 1: Weekday (Tu-Th) | 18: 5pm (5pm-6pm) | 43 | 55 | 63 | 7 |
| All Vehicles - StL Calibrated All Vehicles Index | | EB_IN | yes | 47 | no | | WB_OUT | yes | 231 | no | 1: Weekday (Tu-Th) | 08: 7am (7am-8am) | 1 | 29 | 21 | 42 |
| All Vehicles - StL Calibrated All Vehicles Index | | EB_IN | yes | 47 | no | | WB_OUT | yes | 231 | no | 1: Weekday (Tu-Th) | 09: 8am (8am-9am) | 2 | 62 | 13 | 15 |
| All Vehicles - StL Calibrated All Vehicles Index | | EB_IN | yes | 47 | no | | WB_OUT | yes | 231 | no | 1: Weekday (Tu-Th) | 17: 4pm (4pm-5pm) | 1 | 27 | 18 | 3 |
| All Vehicles - StL Calibrated All Vehicles Index | | EB_IN | yes | 47 | no | | WB_OUT | yes | 231 | no | 1: Weekday (Tu-Th) | 18: 5pm (5pm-6pm) | 2 | 55 | 21 | 4 |
| All Vehicles - StL Calibrated All Vehicles Index | | WB_IN | yes | 225 | no | | EB_OUT | yes | 47 | no | 1: Weekday (Tu-Th) | 09: 8am (8am-9am) | 0 | 10 | 61 | N/A |
| All Vehicles - StL Calibrated All Vehicles Index | | WB_IN | yes | 225 | no | | EB_OUT | yes | 47 | no | 1: Weekday (Tu-Th) | 17: 4pm (4pm-5pm) | 2 | 22 | 31 | 38 |
| All Vehicles - StL Calibrated All Vehicles Index | | WB_IN | yes | 225 | no | | EB_OUT | yes | 47 | no | 1: Weekday (Tu-Th) | 18: 5pm (5pm-6pm) | 9 | 32 | 63 | 13 |
| All Vehicles - StL Calibrated All Vehicles Index | | WB_IN | yes | 225 | no | | WB_OUT | yes | 231 | no | 1: Weekday (Tu-Th) | 08: 7am (7am-8am) | 20 | 20 | 21 | 6 |
| All Vehicles - StL Calibrated All Vehicles Index | | WB_IN | yes | 225 | no | | WB_OUT | yes | 231 | no | 1: Weekday (Tu-Th) | 09: 8am (8am-9am) | 6 | 10 | 13 | 50 |
| All Vehicles - StL Calibrated All Vehicles Index | | WB_IN | yes | 225 | no | | WB_OUT | yes | 231 | no | 1: Weekday (Tu-Th) | 17: 4pm (4pm-5pm) | 16 | 22 | 18 | 11 |
| All Vehicles - StL Calibrated All Vehicles Index | | WB_IN | yes | 225 | no | | WB_OUT | yes | 231 | no | 1: Weekday (Tu-Th) | 18: 5pm (5pm-6pm) | 15 | 32 | 21 | 12 |

# APPENDIX B

## ‘No Project’ Traffic Analysis Synchro Output

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 28 | 17 | 48 | 4 | 3 | 9 | 15 | 1415 | 18 | 6 | 1343 | 76 |
| Future Volume (Veh/h) | 28 | 17 | 48 | 4 | 3 | 9 | 15 | 1415 | 18 | 6 | 1343 | 76 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 30 | 18 | 52 | 4 | 3 | 10 | 16 | 1538 | 20 | 7 | 1460 | 83 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | 2 | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | 1055 | | | 464 | |
| pX, platoon unblocked | 0.92 | 0.92 | 0.85 | 0.92 | 0.92 | 0.87 | 0.85 | | | 0.87 | | |
| vC, conflicting volume | 2072 | 3106 | 528 | 2090 | 3137 | 523 | 1543 | | | 1558 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 870 | 1998 | 0 | 890 | 2032 | 0 | 1021 | | | 1106 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 85 | 66 | 94 | 97 | 94 | 99 | 97 | | | 99 | | |
| cM capacity (veh/h) | 206 | 52 | 922 | 146 | 50 | 940 | 574 | | | 543 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|---|
| Volume Total | 100 | 17 | 400 | 769 | 404 | 372 | 730 | 448 |
| Volume Left | 30 | 4 | 16 | 0 | 0 | 7 | 0 | 0 |
| Volume Right | 52 | 10 | 0 | 0 | 20 | 0 | 0 | 83 |
| cSH | 309 | 173 | 574 | 1700 | 1700 | 543 | 1700 | 1700 |
| Volume to Capacity | 0.32 | 0.10 | 0.03 | 0.45 | 0.24 | 0.01 | 0.43 | 0.26 |
| Queue Length 95th (ft) | 34 | 8 | 2 | 0 | 0 | 1 | 0 | 0 |
| Control Delay (s) | 24.2 | 28.1 | 0.9 | 0.0 | 0.0 | 0.4 | 0.0 | 0.0 |
| Lane LOS | C | D | A | | | A | | |
| Approach Delay (s) | 24.2 | 28.1 | 0.2 | | | 0.1 | | |
| Approach LOS | C | D | | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.0 | | |
| Intersection Capacity Utilization | 50.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 40 | 2 | 0 | 13 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Future Volume (Veh/h) | 40 | 2 | 0 | 13 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 43 | 2 | 0 | 14 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | Raised | | | Raised | | | | | | | |
| Median storage veh) | | 1 | | | 1 | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 17 | | | 2 | | | 133 | 133 | 2 | 133 | 133 | 17 |
| vC1, stage 1 conf vol | | | | | | | 88 | 88 | | 45 | 45 | |
| vC2, stage 2 conf vol | | | | | | | 45 | 45 | | 88 | 88 | |
| vCu, unblocked vol | 17 | | | 2 | | | 133 | 133 | 2 | 133 | 133 | 17 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | 6.1 | 5.5 | | 6.1 | 5.5 | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 97 | | | 99 | | | 100 | 100 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 1600 | | | 1620 | | | 785 | 700 | 1082 | 786 | 702 | 1062 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 45 | 31 | 0 | 0 |
| Volume Left | 43 | 14 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 |
| cSH | 1600 | 1620 | 1700 | 1700 |
| Volume to Capacity | 0.03 | 0.01 | 0.00 | 0.00 |
| Queue Length 95th (ft) | 2 | 1 | 0 | 0 |
| Control Delay (s) | 7.0 | 3.3 | 0.0 | 0.0 |
| Lane LOS | A | A | A | A |
| Approach Delay (s) | 7.0 | 3.3 | 0.0 | 0.0 |
| Approach LOS | | | A | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.5 | | |
| Intersection Capacity Utilization | 7.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 46 | 7 | 21 | 7 | 5 | 7 | 25 | 1785 | 23 | 5 | 1618 | 62 |
| Future Volume (Veh/h) | 46 | 7 | 21 | 7 | 5 | 7 | 25 | 1785 | 23 | 5 | 1618 | 62 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 50 | 8 | 23 | 8 | 5 | 8 | 27 | 1940 | 25 | 5 | 1759 | 67 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | 2 | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | 1055 | | | 464 | |
| pX, platoon unblocked | 0.87 | 0.87 | 0.81 | 0.87 | 0.87 | 0.77 | 0.81 | | | 0.77 | | |
| vC, conflicting volume | 2514 | 3822 | 620 | 2607 | 3842 | 659 | 1826 | | | 1965 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 729 | 2236 | 0 | 836 | 2260 | 0 | 1196 | | | 1219 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 78 | 76 | 97 | 95 | 85 | 99 | 94 | | | 99 | | |
| cM capacity (veh/h) | 224 | 34 | 878 | 171 | 33 | 838 | 469 | | | 439 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|---|
| Volume Total | 81 | 21 | 512 | 970 | 510 | 445 | 880 | 507 |
| Volume Left | 50 | 8 | 27 | 0 | 0 | 5 | 0 | 0 |
| Volume Right | 23 | 8 | 0 | 0 | 25 | 0 | 0 | 67 |
| cSH | 276 | 100 | 469 | 1700 | 1700 | 439 | 1700 | 1700 |
| Volume to Capacity | 0.29 | 0.21 | 0.06 | 0.57 | 0.30 | 0.01 | 0.52 | 0.30 |
| Queue Length 95th (ft) | 30 | 18 | 5 | 0 | 0 | 1 | 0 | 0 |
| Control Delay (s) | 24.5 | 50.1 | 1.7 | 0.0 | 0.0 | 0.4 | 0.0 | 0.0 |
| Lane LOS | C | F | A | | | A | | |
| Approach Delay (s) | 24.5 | 50.1 | 0.4 | | | 0.1 | | |
| Approach LOS | C | F | | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.0 | | |
| Intersection Capacity Utilization | 66.4% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ✣ | | | ✣ | | | ✣ | | | ✣ | |
| Traffic Volume (veh/h) | 33 | 2 | 0 | 16 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Future Volume (Veh/h) | 33 | 2 | 0 | 16 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 36 | 2 | 0 | 17 | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | Raised | | | Raised | | | | | | | |
| Median storage veh) | | 1 | | | 1 | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 21 | | | 2 | | | 129 | 129 | 2 | 129 | 129 | 21 |
| vC1, stage 1 conf vol | | | | | | | 74 | 74 | | 55 | 55 | |
| vC2, stage 2 conf vol | | | | | | | 55 | 55 | | 74 | 74 | |
| vCu, unblocked vol | 21 | | | 2 | | | 129 | 129 | 2 | 129 | 129 | 21 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | 6.1 | 5.5 | | 6.1 | 5.5 | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 98 | | | 99 | | | 100 | 100 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 1595 | | | 1620 | | | 792 | 705 | 1082 | 794 | 707 | 1056 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 38 | 38 | 0 | 0 |
| Volume Left | 36 | 17 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 |
| cSH | 1595 | 1620 | 1700 | 1700 |
| Volume to Capacity | 0.02 | 0.01 | 0.00 | 0.00 |
| Queue Length 95th (ft) | 2 | 1 | 0 | 0 |
| Control Delay (s) | 6.9 | 3.3 | 0.0 | 0.0 |
| Lane LOS | A | A | A | A |
| Approach Delay (s) | 6.9 | 3.3 | 0.0 | 0.0 |
| Approach LOS | | | A | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.1 | | |
| Intersection Capacity Utilization | 6.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 28 | 17 | 48 | 4 | 3 | 9 | 15 | 1419 | 18 | 6 | 1354 | 76 |
| Future Volume (Veh/h) | 28 | 17 | 48 | 4 | 3 | 9 | 15 | 1419 | 18 | 6 | 1354 | 76 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 30 | 18 | 52 | 4 | 3 | 10 | 16 | 1542 | 20 | 7 | 1472 | 83 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | 2 | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | 1055 | | | 464 | |
| pX, platoon unblocked | 0.92 | 0.92 | 0.85 | 0.92 | 0.92 | 0.87 | 0.85 | | | 0.87 | | |
| vC, conflicting volume | 2085 | 3122 | 532 | 2098 | 3153 | 524 | 1555 | | | 1562 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 871 | 2004 | 0 | 885 | 2039 | 0 | 1027 | | | 1107 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 85 | 65 | 94 | 97 | 94 | 99 | 97 | | | 99 | | |
| cM capacity (veh/h) | 205 | 52 | 919 | 146 | 49 | 939 | 570 | | | 542 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|---|
| Volume Total | 100 | 17 | 402 | 771 | 406 | 375 | 736 | 451 |
| Volume Left | 30 | 4 | 16 | 0 | 0 | 7 | 0 | 0 |
| Volume Right | 52 | 10 | 0 | 0 | 20 | 0 | 0 | 83 |
| cSH | 307 | 172 | 570 | 1700 | 1700 | 542 | 1700 | 1700 |
| Volume to Capacity | 0.33 | 0.10 | 0.03 | 0.45 | 0.24 | 0.01 | 0.43 | 0.27 |
| Queue Length 95th (ft) | 34 | 8 | 2 | 0 | 0 | 1 | 0 | 0 |
| Control Delay (s) | 24.3 | 28.3 | 0.9 | 0.0 | 0.0 | 0.4 | 0.0 | 0.0 |
| Lane LOS | C | D | A | | | A | | |
| Approach Delay (s) | 24.3 | 28.3 | 0.2 | | | 0.1 | | |
| Approach LOS | C | D | | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.0 | | |
| Intersection Capacity Utilization | 50.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 40 | 2 | 0 | 13 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Future Volume (Veh/h) | 40 | 2 | 0 | 13 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 43 | 2 | 0 | 14 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | Raised | | | Raised | | | | | | | |
| Median storage veh) | | 1 | | | 1 | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 17 | | | 2 | | | 133 | 133 | 2 | 133 | 133 | 17 |
| vC1, stage 1 conf vol | | | | | | | 88 | 88 | | 45 | 45 | |
| vC2, stage 2 conf vol | | | | | | | 45 | 45 | | 88 | 88 | |
| vCu, unblocked vol | 17 | | | 2 | | | 133 | 133 | 2 | 133 | 133 | 17 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | 6.1 | 5.5 | | 6.1 | 5.5 | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 97 | | | 99 | | | 100 | 100 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 1600 | | | 1620 | | | 785 | 700 | 1082 | 786 | 702 | 1062 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 45 | 31 | 0 | 0 |
| Volume Left | 43 | 14 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 |
| cSH | 1600 | 1620 | 1700 | 1700 |
| Volume to Capacity | 0.03 | 0.01 | 0.00 | 0.00 |
| Queue Length 95th (ft) | 2 | 1 | 0 | 0 |
| Control Delay (s) | 7.0 | 3.3 | 0.0 | 0.0 |
| Lane LOS | A | A | A | A |
| Approach Delay (s) | 7.0 | 3.3 | 0.0 | 0.0 |
| Approach LOS | | | A | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.5 | | |
| Intersection Capacity Utilization | 7.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 46 | 7 | 21 | 7 | 5 | 7 | 25 | 1795 | 23 | 5 | 1625 | 62 |
| Future Volume (Veh/h) | 46 | 7 | 21 | 7 | 5 | 7 | 25 | 1795 | 23 | 5 | 1625 | 62 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 50 | 8 | 23 | 8 | 5 | 8 | 27 | 1951 | 25 | 5 | 1766 | 67 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | 2 | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | 1055 | | | 464 | |
| pX, platoon unblocked | 0.87 | 0.87 | 0.81 | 0.87 | 0.87 | 0.77 | 0.81 | | | 0.77 | | |
| vC, conflicting volume | 2524 | 3840 | 622 | 2620 | 3860 | 663 | 1833 | | | 1976 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 720 | 2239 | 0 | 830 | 2264 | 0 | 1199 | | | 1220 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 78 | 76 | 97 | 95 | 85 | 99 | 94 | | | 99 | | |
| cM capacity (veh/h) | 226 | 34 | 876 | 171 | 32 | 834 | 467 | | | 437 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|---|
| Volume Total | 81 | 21 | 515 | 976 | 513 | 446 | 883 | 508 |
| Volume Left | 50 | 8 | 27 | 0 | 0 | 5 | 0 | 0 |
| Volume Right | 23 | 8 | 0 | 0 | 25 | 0 | 0 | 67 |
| cSH | 279 | 100 | 467 | 1700 | 1700 | 437 | 1700 | 1700 |
| Volume to Capacity | 0.29 | 0.21 | 0.06 | 0.57 | 0.30 | 0.01 | 0.52 | 0.30 |
| Queue Length 95th (ft) | 29 | 19 | 5 | 0 | 0 | 1 | 0 | 0 |
| Control Delay (s) | 24.3 | 50.4 | 1.7 | 0.0 | 0.0 | 0.4 | 0.0 | 0.0 |
| Lane LOS | C | F | A | | | A | | |
| Approach Delay (s) | 24.3 | 50.4 | 0.4 | | | 0.1 | | |
| Approach LOS | C | F | | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.0 | | |
| Intersection Capacity Utilization | 66.6% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ✣ | | | ✣ | | | ✣ | | | ✣ | |
| Traffic Volume (veh/h) | 33 | 2 | 0 | 16 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Future Volume (Veh/h) | 33 | 2 | 0 | 16 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 36 | 2 | 0 | 17 | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | Raised | | | Raised | | | | | | | |
| Median storage veh) | | 1 | | | 1 | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 21 | | | 2 | | | 129 | 129 | 2 | 129 | 129 | 21 |
| vC1, stage 1 conf vol | | | | | | | 74 | 74 | | 55 | 55 | |
| vC2, stage 2 conf vol | | | | | | | 55 | 55 | | 74 | 74 | |
| vCu, unblocked vol | 21 | | | 2 | | | 129 | 129 | 2 | 129 | 129 | 21 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | 6.1 | 5.5 | | 6.1 | 5.5 | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 98 | | | 99 | | | 100 | 100 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 1595 | | | 1620 | | | 792 | 705 | 1082 | 794 | 707 | 1056 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 38 | 38 | 0 | 0 |
| Volume Left | 36 | 17 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 |
| cSH | 1595 | 1620 | 1700 | 1700 |
| Volume to Capacity | 0.02 | 0.01 | 0.00 | 0.00 |
| Queue Length 95th (ft) | 2 | 1 | 0 | 0 |
| Control Delay (s) | 6.9 | 3.3 | 0.0 | 0.0 |
| Lane LOS | A | A | A | A |
| Approach Delay (s) | 6.9 | 3.3 | 0.0 | 0.0 |
| Approach LOS | | | A | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.1 | | |
| Intersection Capacity Utilization | 6.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 76 | 46 | 131 | 5 | 4 | 11 | 19 | 1766 | 22 | 7 | 1597 | 90 |
| Future Volume (Veh/h) | 76 | 46 | 131 | 5 | 4 | 11 | 19 | 1766 | 22 | 7 | 1597 | 90 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.92 | 0.92 | 0.92 | 0.92 | 0.95 | 0.92 | 0.92 | 0.95 | 0.92 |
| Hourly flow rate (vph) | 80 | 48 | 138 | 5 | 4 | 12 | 21 | 1859 | 24 | 8 | 1681 | 98 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | 2 | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | 1055 | | | 464 | |
| pX, platoon unblocked | 0.88 | 0.88 | 0.79 | 0.88 | 0.88 | 0.77 | 0.79 | | | 0.77 | | |
| vC, conflicting volume | 2422 | 3671 | 609 | 2513 | 3708 | 632 | 1779 | | | 1883 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 518 | 1942 | 0 | 622 | 1984 | 0 | 1057 | | | 1112 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 77 | 10 | 84 | 91 | 92 | 99 | 96 | | | 98 | | |
| cM capacity (veh/h) | 342 | 53 | 857 | 58 | 50 | 838 | 517 | | | 482 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|---|
| Volume Total | 266 | 21 | 486 | 930 | 489 | 428 | 840 | 518 |
| Volume Left | 80 | 5 | 21 | 0 | 0 | 8 | 0 | 0 |
| Volume Right | 138 | 12 | 0 | 0 | 24 | 0 | 0 | 98 |
| cSH | 486 | 117 | 517 | 1700 | 1700 | 482 | 1700 | 1700 |
| Volume to Capacity | 0.55 | 0.18 | 0.04 | 0.55 | 0.29 | 0.02 | 0.49 | 0.30 |
| Queue Length 95th (ft) | 81 | 16 | 3 | 0 | 0 | 1 | 0 | 0 |
| Control Delay (s) | 23.2 | 42.4 | 1.2 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 |
| Lane LOS | C | E | A | | | A | | |
| Approach Delay (s) | 23.2 | 42.4 | 0.3 | | | 0.1 | | |
| Approach LOS | C | E | | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 2.0 | | |
| Intersection Capacity Utilization | 67.8% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 71 | 4 | 0 | 17 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Future Volume (Veh/h) | 71 | 4 | 0 | 17 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 77 | 4 | 0 | 18 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | Raised | | | Raised | | | | | | | |
| Median storage veh) | | 1 | | | 1 | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 22 | | | 4 | | | 216 | 216 | 4 | 216 | 216 | 22 |
| vC1, stage 1 conf vol | | | | | | | 158 | 158 | | 58 | 58 | |
| vC2, stage 2 conf vol | | | | | | | 58 | 58 | | 158 | 158 | |
| vCu, unblocked vol | 22 | | | 4 | | | 216 | 216 | 4 | 216 | 216 | 22 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | 6.1 | 5.5 | | 6.1 | 5.5 | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 95 | | | 99 | | | 100 | 100 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 1593 | | | 1618 | | | 700 | 632 | 1080 | 699 | 633 | 1055 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 81 | 40 | 0 | 0 |
| Volume Left | 77 | 18 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 |
| cSH | 1593 | 1618 | 1700 | 1700 |
| Volume to Capacity | 0.05 | 0.01 | 0.00 | 0.00 |
| Queue Length 95th (ft) | 4 | 1 | 0 | 0 |
| Control Delay (s) | 7.0 | 3.3 | 0.0 | 0.0 |
| Lane LOS | A | A | A | A |
| Approach Delay (s) | 7.0 | 3.3 | 0.0 | 0.0 |
| Approach LOS | | | A | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.8 | | |
| Intersection Capacity Utilization | 10.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 111 | 17 | 51 | 8 | 6 | 8 | 29 | 2045 | 26 | 6 | 1960 | 75 |
| Future Volume (Veh/h) | 111 | 17 | 51 | 8 | 6 | 8 | 29 | 2045 | 26 | 6 | 1960 | 75 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.92 | 0.92 | 0.92 | 0.92 | 0.98 | 0.92 | 0.92 | 0.98 | 0.92 |
| Hourly flow rate (vph) | 117 | 18 | 54 | 9 | 7 | 9 | 32 | 2087 | 28 | 7 | 2000 | 82 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | 2 | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | 1055 | | | 464 | |
| pX, platoon unblocked | 0.84 | 0.84 | 0.75 | 0.84 | 0.84 | 0.71 | 0.75 | | | 0.71 | | |
| vC, conflicting volume | 2827 | 4234 | 708 | 2855 | 4261 | 710 | 2082 | | | 2115 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 495 | 2169 | 0 | 527 | 2201 | 0 | 1272 | | | 1164 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 61 | 49 | 93 | 95 | 79 | 99 | 92 | | | 98 | | |
| cM capacity (veh/h) | 297 | 35 | 812 | 190 | 34 | 775 | 406 | | | 426 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|---|
| Volume Total | 189 | 25 | 554 | 1044 | 550 | 507 | 1000 | 582 |
| Volume Left | 117 | 9 | 32 | 0 | 0 | 7 | 0 | 0 |
| Volume Right | 54 | 9 | 0 | 0 | 28 | 0 | 0 | 82 |
| cSH | 367 | 94 | 406 | 1700 | 1700 | 426 | 1700 | 1700 |
| Volume to Capacity | 0.51 | 0.27 | 0.08 | 0.61 | 0.32 | 0.02 | 0.59 | 0.34 |
| Queue Length 95th (ft) | 71 | 25 | 6 | 0 | 0 | 1 | 0 | 0 |
| Control Delay (s) | 26.0 | 56.9 | 2.4 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 |
| Lane LOS | D | F | A | | | A | | |
| Approach Delay (s) | 26.0 | 56.9 | 0.6 | | | 0.1 | | |
| Approach LOS | D | F | | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.8 | | |
| Intersection Capacity Utilization | 80.8% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 46 | 3 | 0 | 19 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Future Volume (Veh/h) | 46 | 3 | 0 | 19 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 50 | 3 | 0 | 21 | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | Raised | | | Raised | | | | | | | |
| Median storage veh) | | 1 | | | 1 | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 24 | | | 3 | | | 169 | 169 | 3 | 169 | 169 | 24 |
| vC1, stage 1 conf vol | | | | | | | 103 | 103 | | 66 | 66 | |
| vC2, stage 2 conf vol | | | | | | | 66 | 66 | | 103 | 103 | |
| vCu, unblocked vol | 24 | | | 3 | | | 169 | 169 | 3 | 169 | 169 | 24 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | 6.1 | 5.5 | | 6.1 | 5.5 | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 97 | | | 99 | | | 100 | 100 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 1591 | | | 1619 | | | 751 | 673 | 1081 | 752 | 675 | 1052 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 53 | 45 | 0 | 0 |
| Volume Left | 50 | 21 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 |
| cSH | 1591 | 1619 | 1700 | 1700 |
| Volume to Capacity | 0.03 | 0.01 | 0.00 | 0.00 |
| Queue Length 95th (ft) | 2 | 1 | 0 | 0 |
| Control Delay (s) | 6.9 | 3.4 | 0.0 | 0.0 |
| Lane LOS | A | A | A | A |
| Approach Delay (s) | 6.9 | 3.4 | 0.0 | 0.0 |
| Approach LOS | | | A | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.3 | | |
| Intersection Capacity Utilization | 8.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

# APPENDIX C

## ‘Plus Project’ Traffic Analysis Synchro Output

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 28 | 17 | 48 | 5 | 3 | 12 | 15 | 1415 | 22 | 8 | 1343 | 76 |
| Future Volume (Veh/h) | 28 | 17 | 48 | 5 | 3 | 12 | 15 | 1415 | 22 | 8 | 1343 | 76 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 30 | 18 | 52 | 5 | 3 | 13 | 16 | 1538 | 24 | 9 | 1460 | 83 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | 2 | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | 1055 | | | 464 | |
| pX, platoon unblocked | 0.92 | 0.92 | 0.85 | 0.92 | 0.92 | 0.87 | 0.85 | | | 0.87 | | |
| vC, conflicting volume | 2079 | 3114 | 528 | 2096 | 3143 | 525 | 1543 | | | 1562 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 871 | 2000 | 0 | 890 | 2032 | 0 | 1020 | | | 1107 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 85 | 65 | 94 | 97 | 94 | 99 | 97 | | | 98 | | |
| cM capacity (veh/h) | 204 | 52 | 921 | 145 | 50 | 939 | 575 | | | 542 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|---|
| Volume Total | 100 | 21 | 400 | 769 | 408 | 374 | 730 | 448 |
| Volume Left | 30 | 5 | 16 | 0 | 0 | 9 | 0 | 0 |
| Volume Right | 52 | 13 | 0 | 0 | 24 | 0 | 0 | 83 |
| cSH | 306 | 193 | 575 | 1700 | 1700 | 542 | 1700 | 1700 |
| Volume to Capacity | 0.33 | 0.11 | 0.03 | 0.45 | 0.24 | 0.02 | 0.43 | 0.26 |
| Queue Length 95th (ft) | 34 | 9 | 2 | 0 | 0 | 1 | 0 | 0 |
| Control Delay (s) | 24.4 | 25.9 | 0.9 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 |
| Lane LOS | C | D | A | | | A | | |
| Approach Delay (s) | 24.4 | 25.9 | 0.2 | | | 0.1 | | |
| Approach LOS | C | D | | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.1 | | |
| Intersection Capacity Utilization | 50.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 46 | 2 | 0 | 13 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Future Volume (Veh/h) | 46 | 2 | 0 | 13 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 50 | 2 | 0 | 14 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | Raised | | | Raised | | | | | | | |
| Median storage veh) | | 1 | | | 1 | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 20 | | | 2 | | | 150 | 150 | 2 | 150 | 150 | 20 |
| vC1, stage 1 conf vol | | | | | | | 102 | 102 | | 48 | 48 | |
| vC2, stage 2 conf vol | | | | | | | 48 | 48 | | 102 | 102 | |
| vCu, unblocked vol | 20 | | | 2 | | | 150 | 150 | 2 | 150 | 150 | 20 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | 6.1 | 5.5 | | 6.1 | 5.5 | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 97 | | | 99 | | | 100 | 100 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 1596 | | | 1620 | | | 768 | 686 | 1082 | 768 | 688 | 1058 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 52 | 34 | 0 | 0 |
| Volume Left | 50 | 14 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 |
| cSH | 1596 | 1620 | 1700 | 1700 |
| Volume to Capacity | 0.03 | 0.01 | 0.00 | 0.00 |
| Queue Length 95th (ft) | 2 | 1 | 0 | 0 |
| Control Delay (s) | 7.1 | 3.0 | 0.0 | 0.0 |
| Lane LOS | A | A | A | A |
| Approach Delay (s) | 7.1 | 3.0 | 0.0 | 0.0 |
| Approach LOS | | | A | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.5 | | |
| Intersection Capacity Utilization | 8.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 46 | 7 | 21 | 9 | 5 | 14 | 25 | 1785 | 26 | 7 | 1618 | 62 |
| Future Volume (Veh/h) | 46 | 7 | 21 | 9 | 5 | 14 | 25 | 1785 | 26 | 7 | 1618 | 62 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 50 | 8 | 23 | 10 | 5 | 15 | 27 | 1940 | 28 | 8 | 1759 | 67 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | 2 | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | 1055 | | | 464 | |
| pX, platoon unblocked | 0.87 | 0.87 | 0.81 | 0.87 | 0.87 | 0.77 | 0.81 | | | 0.77 | | |
| vC, conflicting volume | 2527 | 3830 | 620 | 2614 | 3850 | 661 | 1826 | | | 1968 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 738 | 2241 | 0 | 839 | 2264 | 0 | 1195 | | | 1219 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 77 | 76 | 97 | 94 | 85 | 98 | 94 | | | 98 | | |
| cM capacity (veh/h) | 217 | 33 | 877 | 168 | 32 | 837 | 469 | | | 438 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|---|
| Volume Total | 81 | 30 | 512 | 970 | 513 | 448 | 880 | 507 |
| Volume Left | 50 | 10 | 27 | 0 | 0 | 8 | 0 | 0 |
| Volume Right | 23 | 15 | 0 | 0 | 28 | 0 | 0 | 67 |
| cSH | 268 | 129 | 469 | 1700 | 1700 | 438 | 1700 | 1700 |
| Volume to Capacity | 0.30 | 0.23 | 0.06 | 0.57 | 0.30 | 0.02 | 0.52 | 0.30 |
| Queue Length 95th (ft) | 31 | 21 | 5 | 0 | 0 | 1 | 0 | 0 |
| Control Delay (s) | 25.3 | 41.1 | 1.7 | 0.0 | 0.0 | 0.6 | 0.0 | 0.0 |
| Lane LOS | D | E | A | | | A | | |
| Approach Delay (s) | 25.3 | 41.1 | 0.4 | | | 0.1 | | |
| Approach LOS | D | E | | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.1 | | |
| Intersection Capacity Utilization | 67.5% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 38 | 2 | 0 | 16 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Future Volume (Veh/h) | 38 | 2 | 0 | 16 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 41 | 2 | 0 | 17 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | Raised | | | Raised | | | | | | | |
| Median storage veh) | | 1 | | | 1 | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 22 | | | 2 | | | 140 | 140 | 2 | 140 | 140 | 22 |
| vC1, stage 1 conf vol | | | | | | | 84 | 84 | | 56 | 56 | |
| vC2, stage 2 conf vol | | | | | | | 56 | 56 | | 84 | 84 | |
| vCu, unblocked vol | 22 | | | 2 | | | 140 | 140 | 2 | 140 | 140 | 22 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | 6.1 | 5.5 | | 6.1 | 5.5 | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 97 | | | 99 | | | 100 | 100 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 1593 | | | 1620 | | | 780 | 696 | 1082 | 782 | 698 | 1055 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 43 | 39 | 0 | 0 |
| Volume Left | 41 | 17 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 |
| cSH | 1593 | 1620 | 1700 | 1700 |
| Volume to Capacity | 0.03 | 0.01 | 0.00 | 0.00 |
| Queue Length 95th (ft) | 2 | 1 | 0 | 0 |
| Control Delay (s) | 7.0 | 3.2 | 0.0 | 0.0 |
| Lane LOS | A | A | A | A |
| Approach Delay (s) | 7.0 | 3.2 | 0.0 | 0.0 |
| Approach LOS | | | A | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.2 | | |
| Intersection Capacity Utilization | 7.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 28 | 17 | 48 | 5 | 3 | 12 | 15 | 1419 | 22 | 8 | 1354 | 76 |
| Future Volume (Veh/h) | 28 | 17 | 48 | 5 | 3 | 12 | 15 | 1419 | 22 | 8 | 1354 | 76 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 30 | 18 | 52 | 5 | 3 | 13 | 16 | 1542 | 24 | 9 | 1472 | 83 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | 2 | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | 1055 | | | 464 | |
| pX, platoon unblocked | 0.92 | 0.92 | 0.85 | 0.92 | 0.92 | 0.86 | 0.85 | | | 0.86 | | |
| vC, conflicting volume | 2092 | 3130 | 532 | 2104 | 3159 | 526 | 1555 | | | 1566 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 873 | 2006 | 0 | 885 | 2038 | 0 | 1026 | | | 1108 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 85 | 65 | 94 | 97 | 94 | 99 | 97 | | | 98 | | |
| cM capacity (veh/h) | 203 | 51 | 919 | 146 | 49 | 938 | 570 | | | 541 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|---|
| Volume Total | 100 | 21 | 402 | 771 | 410 | 377 | 736 | 451 |
| Volume Left | 30 | 5 | 16 | 0 | 0 | 9 | 0 | 0 |
| Volume Right | 52 | 13 | 0 | 0 | 24 | 0 | 0 | 83 |
| cSH | 305 | 192 | 570 | 1700 | 1700 | 541 | 1700 | 1700 |
| Volume to Capacity | 0.33 | 0.11 | 0.03 | 0.45 | 0.24 | 0.02 | 0.43 | 0.27 |
| Queue Length 95th (ft) | 35 | 9 | 2 | 0 | 0 | 1 | 0 | 0 |
| Control Delay (s) | 24.5 | 26.1 | 0.9 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 |
| Lane LOS | C | D | A | | | A | | |
| Approach Delay (s) | 24.5 | 26.1 | 0.2 | | | 0.1 | | |
| Approach LOS | C | D | | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.1 | | |
| Intersection Capacity Utilization | 50.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 46 | 2 | 0 | 13 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Future Volume (Veh/h) | 46 | 2 | 0 | 13 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 50 | 2 | 0 | 14 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | Raised | | | Raised | | | | | | | |
| Median storage veh) | | 1 | | | 1 | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 20 | | | 2 | | | 150 | 150 | 2 | 150 | 150 | 20 |
| vC1, stage 1 conf vol | | | | | | | 102 | 102 | | 48 | 48 | |
| vC2, stage 2 conf vol | | | | | | | 48 | 48 | | 102 | 102 | |
| vCu, unblocked vol | 20 | | | 2 | | | 150 | 150 | 2 | 150 | 150 | 20 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | 6.1 | 5.5 | | 6.1 | 5.5 | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 97 | | | 99 | | | 100 | 100 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 1596 | | | 1620 | | | 768 | 686 | 1082 | 768 | 688 | 1058 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 52 | 34 | 0 | 0 |
| Volume Left | 50 | 14 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 |
| cSH | 1596 | 1620 | 1700 | 1700 |
| Volume to Capacity | 0.03 | 0.01 | 0.00 | 0.00 |
| Queue Length 95th (ft) | 2 | 1 | 0 | 0 |
| Control Delay (s) | 7.1 | 3.0 | 0.0 | 0.0 |
| Lane LOS | A | A | A | A |
| Approach Delay (s) | 7.1 | 3.0 | 0.0 | 0.0 |
| Approach LOS | | | A | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.5 | | |
| Intersection Capacity Utilization | 8.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 46 | 7 | 21 | 9 | 5 | 14 | 25 | 1795 | 26 | 7 | 1625 | 62 |
| Future Volume (Veh/h) | 46 | 7 | 21 | 9 | 5 | 14 | 25 | 1795 | 26 | 7 | 1625 | 62 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 50 | 8 | 23 | 10 | 5 | 15 | 27 | 1951 | 28 | 8 | 1766 | 67 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | 2 | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | 1055 | | | 464 | |
| pX, platoon unblocked | 0.86 | 0.86 | 0.81 | 0.86 | 0.86 | 0.77 | 0.81 | | | 0.77 | | |
| vC, conflicting volume | 2537 | 3848 | 622 | 2628 | 3868 | 664 | 1833 | | | 1979 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 729 | 2245 | 0 | 833 | 2267 | 0 | 1197 | | | 1220 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 77 | 76 | 97 | 94 | 84 | 98 | 94 | | | 98 | | |
| cM capacity (veh/h) | 219 | 33 | 876 | 169 | 32 | 833 | 467 | | | 436 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|---|
| Volume Total | 81 | 30 | 515 | 976 | 516 | 450 | 883 | 508 |
| Volume Left | 50 | 10 | 27 | 0 | 0 | 8 | 0 | 0 |
| Volume Right | 23 | 15 | 0 | 0 | 28 | 0 | 0 | 67 |
| cSH | 271 | 129 | 467 | 1700 | 1700 | 436 | 1700 | 1700 |
| Volume to Capacity | 0.30 | 0.23 | 0.06 | 0.57 | 0.30 | 0.02 | 0.52 | 0.30 |
| Queue Length 95th (ft) | 30 | 21 | 5 | 0 | 0 | 1 | 0 | 0 |
| Control Delay (s) | 25.1 | 41.3 | 1.7 | 0.0 | 0.0 | 0.6 | 0.0 | 0.0 |
| Lane LOS | D | E | A | | | A | | |
| Approach Delay (s) | 25.1 | 41.3 | 0.4 | | | 0.1 | | |
| Approach LOS | D | E | | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.1 | | |
| Intersection Capacity Utilization | 67.7% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 38 | 2 | 0 | 16 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Future Volume (Veh/h) | 38 | 2 | 0 | 16 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 41 | 2 | 0 | 17 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | Raised | | | Raised | | | | | | | |
| Median storage veh) | | 1 | | | 1 | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 22 | | | 2 | | | 140 | 140 | 2 | 140 | 140 | 22 |
| vC1, stage 1 conf vol | | | | | | | 84 | 84 | | 56 | 56 | |
| vC2, stage 2 conf vol | | | | | | | 56 | 56 | | 84 | 84 | |
| vCu, unblocked vol | 22 | | | 2 | | | 140 | 140 | 2 | 140 | 140 | 22 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | 6.1 | 5.5 | | 6.1 | 5.5 | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 97 | | | 99 | | | 100 | 100 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 1593 | | | 1620 | | | 780 | 696 | 1082 | 782 | 698 | 1055 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 43 | 39 | 0 | 0 |
| Volume Left | 41 | 17 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 |
| cSH | 1593 | 1620 | 1700 | 1700 |
| Volume to Capacity | 0.03 | 0.01 | 0.00 | 0.00 |
| Queue Length 95th (ft) | 2 | 1 | 0 | 0 |
| Control Delay (s) | 7.0 | 3.2 | 0.0 | 0.0 |
| Lane LOS | A | A | A | A |
| Approach Delay (s) | 7.0 | 3.2 | 0.0 | 0.0 |
| Approach LOS | | | A | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.2 | | |
| Intersection Capacity Utilization | 7.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 76 | 46 | 131 | 6 | 4 | 14 | 19 | 1766 | 26 | 9 | 1597 | 90 |
| Future Volume (Veh/h) | 76 | 46 | 131 | 6 | 4 | 14 | 19 | 1766 | 26 | 9 | 1597 | 90 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.92 | 0.92 | 0.92 | 0.92 | 0.95 | 0.92 | 0.92 | 0.95 | 0.92 |
| Hourly flow rate (vph) | 80 | 48 | 138 | 7 | 4 | 15 | 21 | 1859 | 28 | 10 | 1681 | 98 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | 2 | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | 1055 | | | 464 | |
| pX, platoon unblocked | 0.88 | 0.88 | 0.79 | 0.88 | 0.88 | 0.77 | 0.79 | | | 0.77 | | |
| vC, conflicting volume | 2429 | 3679 | 609 | 2519 | 3714 | 634 | 1779 | | | 1887 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 518 | 1945 | 0 | 621 | 1985 | 0 | 1055 | | | 1112 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 76 | 9 | 84 | 87 | 92 | 98 | 96 | | | 98 | | |
| cM capacity (veh/h) | 340 | 53 | 857 | 55 | 50 | 836 | 518 | | | 481 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|---|
| Volume Total | 266 | 26 | 486 | 930 | 493 | 430 | 840 | 518 |
| Volume Left | 80 | 7 | 21 | 0 | 0 | 10 | 0 | 0 |
| Volume Right | 138 | 15 | 0 | 0 | 28 | 0 | 0 | 98 |
| cSH | 482 | 116 | 518 | 1700 | 1700 | 481 | 1700 | 1700 |
| Volume to Capacity | 0.55 | 0.22 | 0.04 | 0.55 | 0.29 | 0.02 | 0.49 | 0.30 |
| Queue Length 95th (ft) | 82 | 20 | 3 | 0 | 0 | 2 | 0 | 0 |
| Control Delay (s) | 23.5 | 44.9 | 1.2 | 0.0 | 0.0 | 0.6 | 0.0 | 0.0 |
| Lane LOS | C | E | A | | | A | | |
| Approach Delay (s) | 23.5 | 44.9 | 0.3 | | | 0.2 | | |
| Approach LOS | C | E | | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 2.1 | | |
| Intersection Capacity Utilization | 67.9% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ✣ | | | ✣ | | | ✣ | | | ✣ | |
| Traffic Volume (veh/h) | 77 | 4 | 0 | 17 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Future Volume (Veh/h) | 77 | 4 | 0 | 17 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 84 | 4 | 0 | 18 | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | Raised | | | Raised | | | | | | | |
| Median storage veh) | | 1 | | | 1 | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 24 | | | 4 | | | 232 | 232 | 4 | 232 | 232 | 24 |
| vC1, stage 1 conf vol | | | | | | | 172 | 172 | | 60 | 60 | |
| vC2, stage 2 conf vol | | | | | | | 60 | 60 | | 172 | 172 | |
| vCu, unblocked vol | 24 | | | 4 | | | 232 | 232 | 4 | 232 | 232 | 24 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | 6.1 | 5.5 | | 6.1 | 5.5 | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 95 | | | 99 | | | 100 | 100 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 1591 | | | 1618 | | | 685 | 619 | 1080 | 683 | 620 | 1052 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 88 | 42 | 0 | 0 |
| Volume Left | 84 | 18 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 |
| cSH | 1591 | 1618 | 1700 | 1700 |
| Volume to Capacity | 0.05 | 0.01 | 0.00 | 0.00 |
| Queue Length 95th (ft) | 4 | 1 | 0 | 0 |
| Control Delay (s) | 7.1 | 3.2 | 0.0 | 0.0 |
| Lane LOS | A | A | A | A |
| Approach Delay (s) | 7.1 | 3.2 | 0.0 | 0.0 |
| Approach LOS | | | A | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.8 | | |
| Intersection Capacity Utilization | 12.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 111 | 17 | 51 | 10 | 6 | 15 | 29 | 2045 | 29 | 8 | 1960 | 75 |
| Future Volume (Veh/h) | 111 | 17 | 51 | 10 | 6 | 15 | 29 | 2045 | 29 | 8 | 1960 | 75 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.92 | 0.92 | 0.92 | 0.92 | 0.98 | 0.92 | 0.92 | 0.98 | 0.92 |
| Hourly flow rate (vph) | 117 | 18 | 54 | 11 | 7 | 16 | 32 | 2087 | 32 | 9 | 2000 | 82 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | 2 | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | 1055 | | | 464 | |
| pX, platoon unblocked | 0.84 | 0.84 | 0.75 | 0.84 | 0.84 | 0.71 | 0.75 | | | 0.71 | | |
| vC, conflicting volume | 2838 | 4242 | 708 | 2861 | 4267 | 712 | 2082 | | | 2119 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 499 | 2172 | 0 | 526 | 2201 | 0 | 1270 | | | 1164 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 60 | 48 | 93 | 94 | 79 | 98 | 92 | | | 98 | | |
| cM capacity (veh/h) | 291 | 35 | 812 | 188 | 33 | 774 | 406 | | | 425 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|---|
| Volume Total | 189 | 34 | 554 | 1044 | 554 | 509 | 1000 | 582 |
| Volume Left | 117 | 11 | 32 | 0 | 0 | 9 | 0 | 0 |
| Volume Right | 54 | 16 | 0 | 0 | 32 | 0 | 0 | 82 |
| cSH | 359 | 118 | 406 | 1700 | 1700 | 425 | 1700 | 1700 |
| Volume to Capacity | 0.53 | 0.29 | 0.08 | 0.61 | 0.33 | 0.02 | 0.59 | 0.34 |
| Queue Length 95th (ft) | 73 | 28 | 6 | 0 | 0 | 2 | 0 | 0 |
| Control Delay (s) | 26.8 | 47.5 | 2.4 | 0.0 | 0.0 | 0.6 | 0.0 | 0.0 |
| Lane LOS | D | E | A | | | A | | |
| Approach Delay (s) | 26.8 | 47.5 | 0.6 | | | 0.2 | | |
| Approach LOS | D | E | | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.9 | | |
| Intersection Capacity Utilization | 80.9% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 51 | 3 | 0 | 19 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Future Volume (Veh/h) | 51 | 3 | 0 | 19 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 55 | 3 | 0 | 21 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | Raised | | | Raised | | | | | | | |
| Median storage veh) | | 1 | | | 1 | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 25 | | | 3 | | | 180 | 180 | 3 | 180 | 180 | 25 |
| vC1, stage 1 conf vol | | | | | | | 113 | 113 | | 67 | 67 | |
| vC2, stage 2 conf vol | | | | | | | 67 | 67 | | 113 | 113 | |
| vCu, unblocked vol | 25 | | | 3 | | | 180 | 180 | 3 | 180 | 180 | 25 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | 6.1 | 5.5 | | 6.1 | 5.5 | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 97 | | | 99 | | | 100 | 100 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 1589 | | | 1619 | | | 740 | 664 | 1081 | 741 | 666 | 1051 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 58 | 46 | 0 | 0 |
| Volume Left | 55 | 21 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 |
| cSH | 1589 | 1619 | 1700 | 1700 |
| Volume to Capacity | 0.03 | 0.01 | 0.00 | 0.00 |
| Queue Length 95th (ft) | 3 | 1 | 0 | 0 |
| Control Delay (s) | 7.0 | 3.4 | 0.0 | 0.0 |
| Lane LOS | A | A | A | A |
| Approach Delay (s) | 7.0 | 3.4 | 0.0 | 0.0 |
| Approach LOS | | | A | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.4 | | |
| Intersection Capacity Utilization | 8.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

# APPENDIX D

## Signal Warrant Analysis

# Traffic Signal Warrants Worksheet

Warrant 3: Peak Hour (*from the California MUTCD 2014 Edition*)

Scenario: Existing Conditions, weekday PM peak hour
Intersection: South El Camino Real / Hayward Avenue – Aragon Boulevard

**PART A or PART B SATISFIED** **YES** ☐ **NO** ☒

---

**PART A** **SATISFIED** **YES** ☐ **NO** ☒
**(All parts 1, 2, and 3 below must be satisfied)**

1. The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach. Yes ☐ No ☒
   EB (Aragon Blvd. // 2 lanes): (46 + 7 + 21) veh × 24.5 sec/veh ÷ 3600 sec/h = 0.50 veh·h
   WB (Hayward Ave. // 1 lane): (7 + 5 + 7) veh × 50.1 sec/veh ÷ 3600 sec/h = 0.26 veh·h

2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes. Yes ☐ No ☒
   EB (Aragon Blvd. // 2 lanes): (46 + 7 + 21) veh = 74 veh
   WB (Hayward Ave. // 1 lane): (7 + 5 + 7) veh = 19 veh

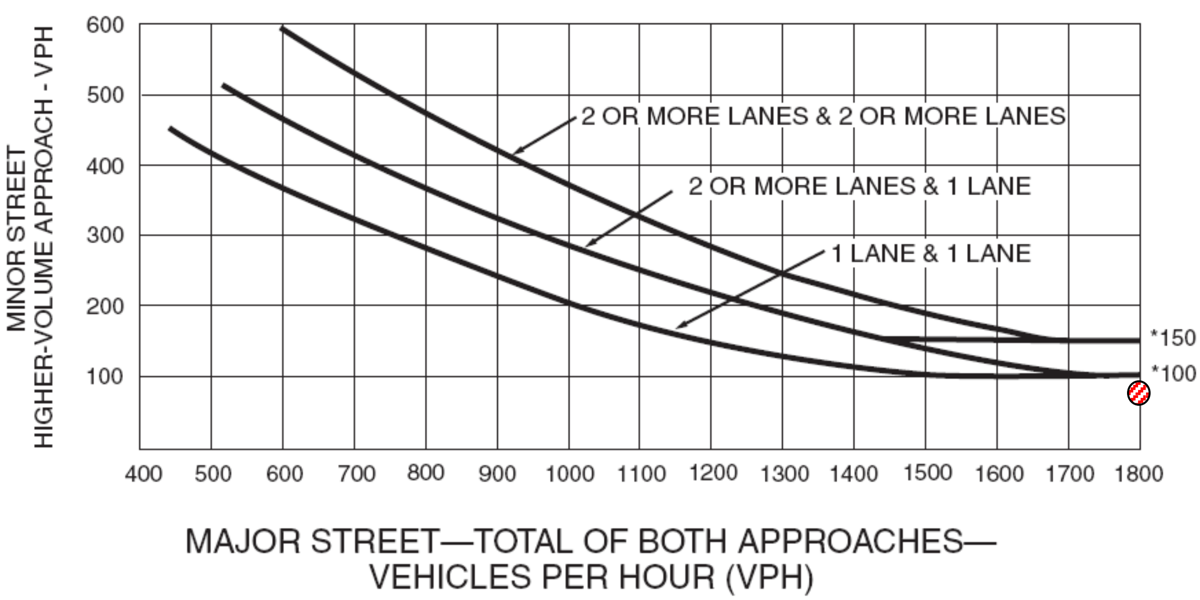
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. Yes ☒ No ☐
   Four approaches: 3,611 veh

---

**PART B** **SATISFIED** **YES** ☐ **NO** ☒

| | Approach Lanes: One | Approach Lanes: 2 or More | Vehicles per hour |
|---|---|---|---|
| Both Approaches – Major Street | | ✓ | 3,518 |
| Higher Approach – Minor Street | ✓ | | 74 |

**Figure 4C-3.Warrant 3, Peak Hour**




*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

# Traffic Signal Warrants Worksheet

Warrant 3: Peak Hour (*from the California MUTCD 2014 Edition*)

Scenario: Background Conditions, weekday PM peak hour
Intersection: South El Camino Real / Hayward Avenue – Aragon Boulevard

**PART A or PART B SATISFIED** **YES** ☐ **NO** ☒

---

**PART A** **SATISFIED** **YES** ☐ **NO** ☒
**(All parts 1, 2, and 3 below must be satisfied)**

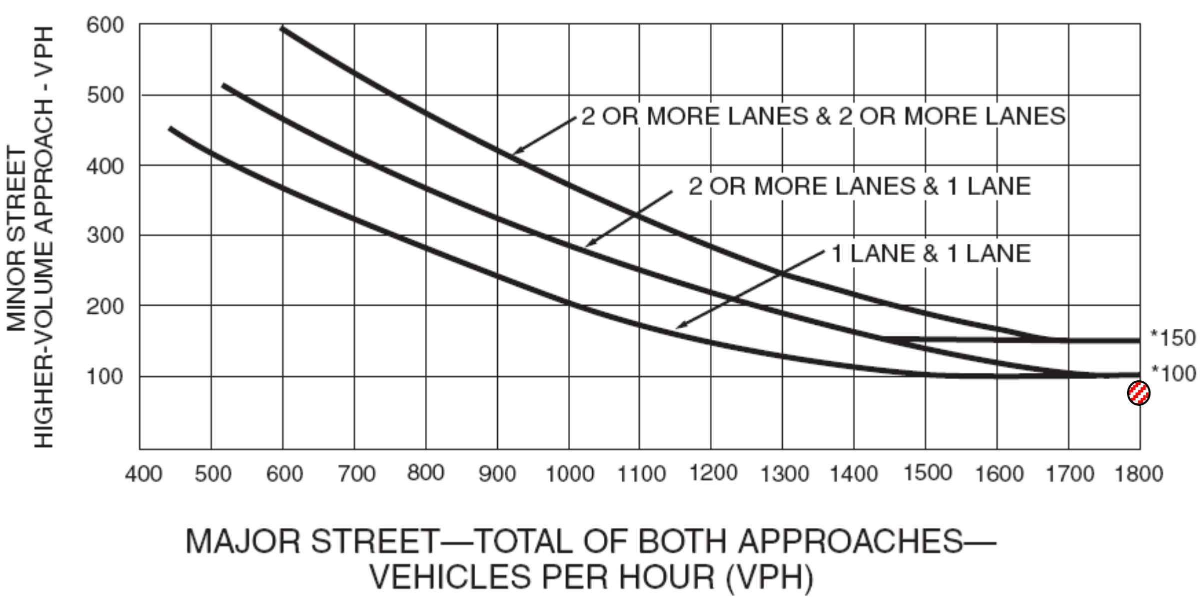
1. The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach. Yes ☐ No ☒
   EB (Aragon Blvd. // 2 lanes): (46 + 7 + 21) veh × 24.3 sec/veh ÷ 3600 sec/h = 0.50 veh·h
   WB (Hayward Ave. // 1 lane): (7 + 5 + 7) veh × 50.1 sec/veh ÷ 3600 sec/h = 0.27 veh·h
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes. Yes ☐ No ☒
   EB (Aragon Blvd. // 2 lanes): (46 + 7 + 21) veh = 74 veh
   WB (Hayward Ave. // 1 lane): (7 + 5 + 7) veh = 19 veh
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. Yes ☒ No ☐
   Four approaches: 3,628 veh

---

**PART B** **SATISFIED** **YES** ☐ **NO** ☒

| | Approach Lanes | | Vehicles per hour |
|---|---|---|---|
| | One | 2 or More | |
| Both Approaches – Major Street | | ✓ | 3,535 |
| Higher Approach – Minor Street | ✓ | | 74 |

**Figure 4C-3.Warrant 3, Peak Hour**




*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

# Traffic Signal Warrants Worksheet

Warrant 3: Peak Hour (*from the California MUTCD 2014 Edition*)

Scenario: Cumulative Conditions, weekday PM peak hour
Intersection: South El Camino Real / Hayward Avenue – Aragon Boulevard

**PART A or PART B SATISFIED** **YES** ☒ **NO** ☐

---

**PART A** **SATISFIED** **YES** ☐ **NO** ☒
**(All parts 1, 2, and 3 below must be satisfied)**

1. The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach. Yes ☐ No ☒
   EB (Aragon Blvd. // 2 lanes): (111 + 17 + 51) veh × 26.0 sec/veh ÷ 3600 sec/h = 1.29 veh·h
   WB (Hayward Ave. // 1 lane): (8 + 6 + 8) veh × 56.9 sec/veh ÷ 3600 sec/h = 0.35 veh·h

2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes. Yes ☐ No ☒
   EB (Aragon Blvd. // 2 lanes): (111 + 17 + 51) veh = 179 veh
   WB (Hayward Ave. // 1 lane): (8 + 6 + 8) veh = 22 veh

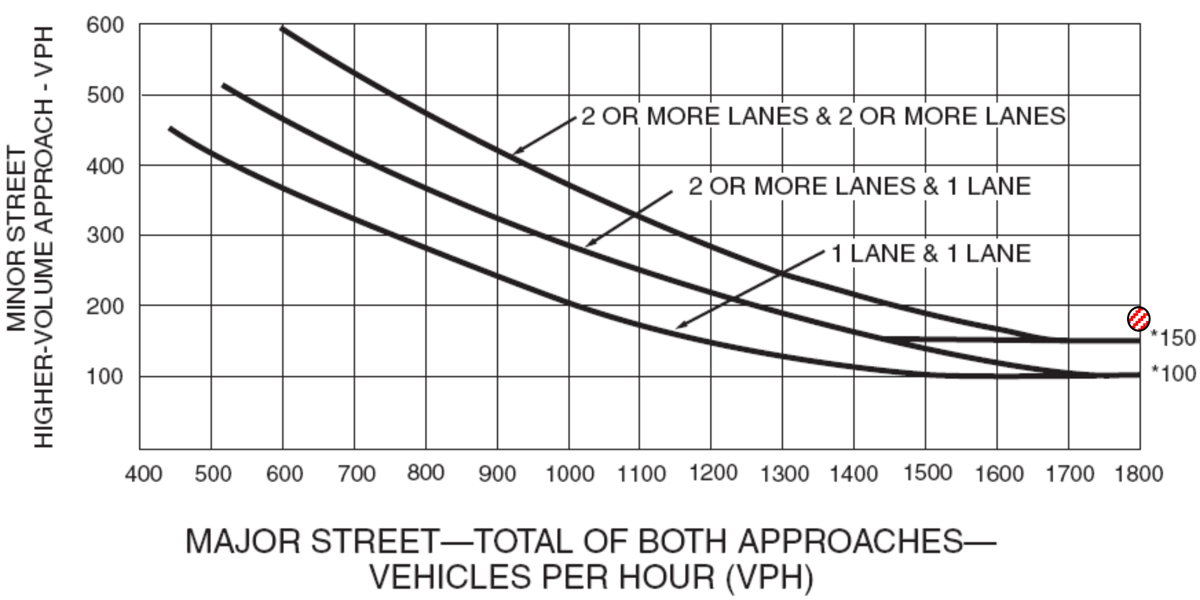
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. Yes ☒ No ☐
   Four approaches: 4,342 veh

---

**PART B** **SATISFIED** **YES** ☒ **NO** ☐

| | Approach Lanes: One | Approach Lanes: 2 or More | Vehicles per hour |
|---|---|---|---|
| Both Approaches – Major Street | | ✓ | 4,141 |
| Higher Approach – Minor Street | ✓ | | 179 |

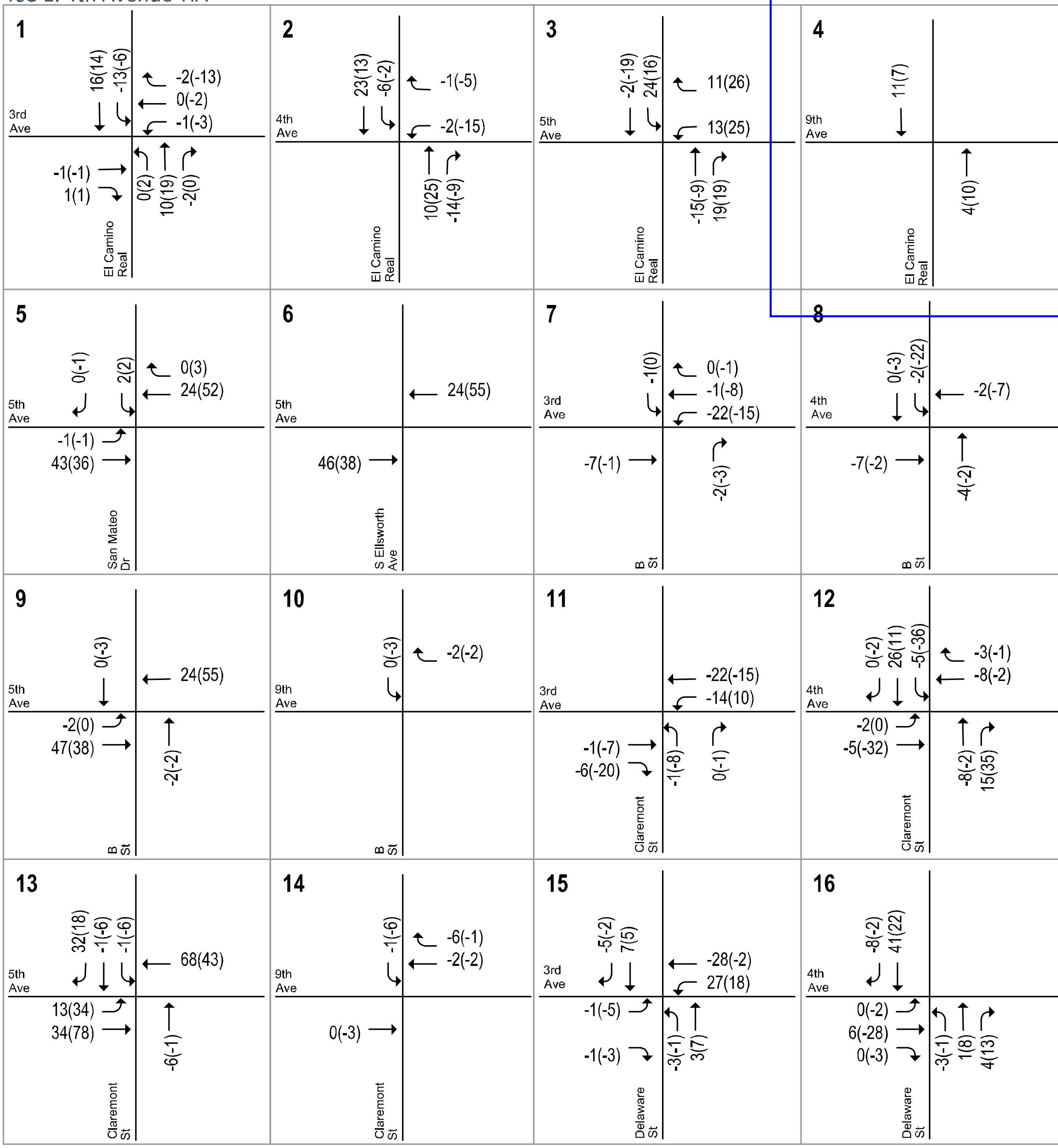
**Figure 4C-3.Warrant 3, Peak Hour**




*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

# APPENDIX E

## Approved Project Trips




LEGEND

XX(XX) = AM(PM) Peak-Hour Trips

**Figure 11**
**Net Project Trip Assignment**

HEXAGON

NORTH
Not to Scale

# APPENDIX F

## 1 Hayward Avenue TDM Plan

## by Steer Group

TDM Plan
March 2022

# 1 Hayward Avenue TDM Plan

**Image source: ARC TEC Inc.**

The City of San Mateo
23911801

steer

TDM Plan
March 2022

# 1 Hayward Avenue TDM Plan

Prepared by:

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# Introduction

A Transportation Demand Management (TDM) Plan is a long-term management strategy for an organization or site that seeks to deliver sustainable transportation objectives. It is articulated in a document that is regularly reviewed by the implementing organization. It involves identifying an appropriate package of measures aimed at promoting sustainable travel, with an emphasis on reducing reliance on single occupancy car journeys and vehicle miles traveled (VMT). It can also assist in meeting other objectives such as increasing accessibility as well as reducing congestion, greenhouse gas and noise pollution.

**This TDM Plan was produced on behalf of the City of San Mateo for the 1 Hayward Ave. project site, which is a planned mixed-used property owned by One Hayward Avenue LLC. and developed by ARC TEC Inc.**

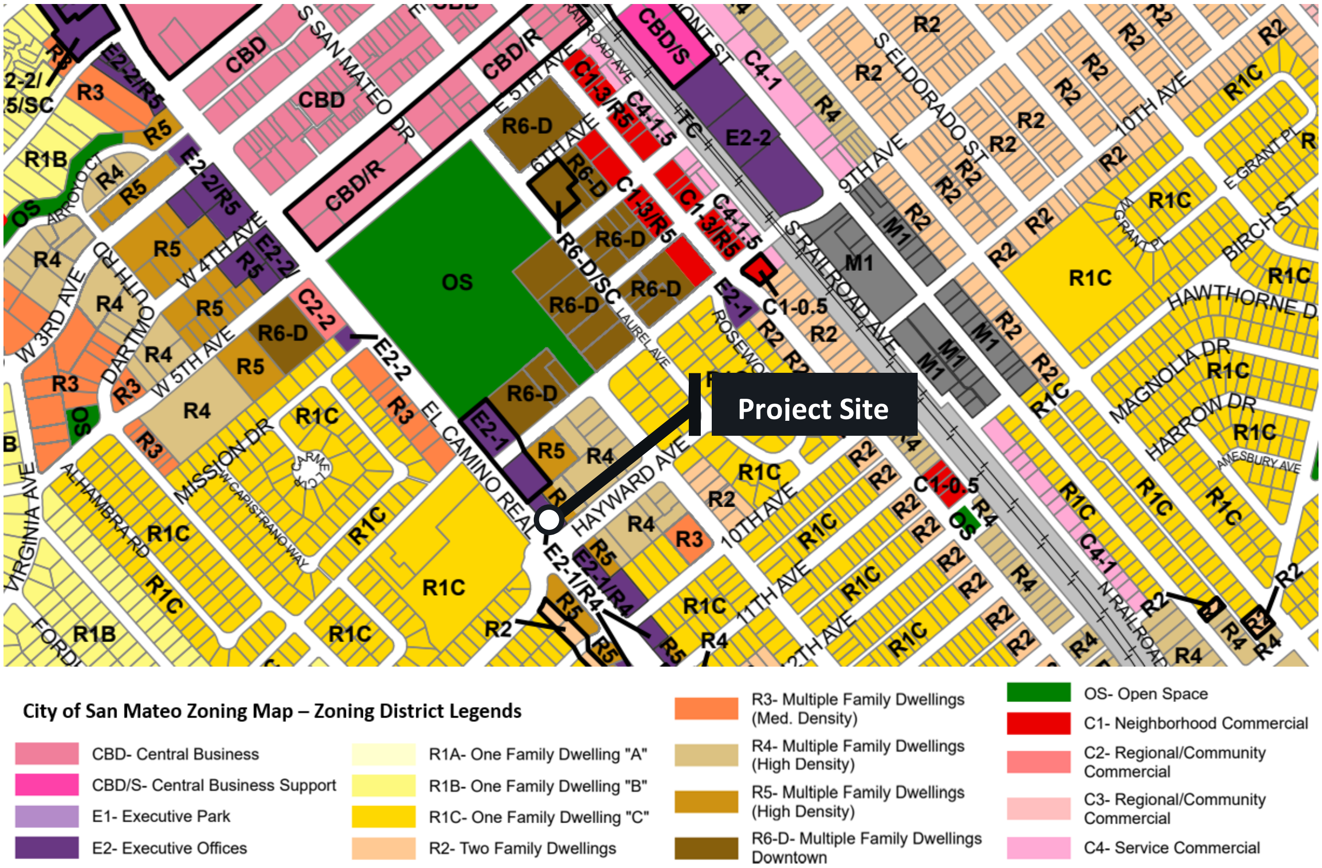
## Project Description

The project site is located at 1 Hayward Avenue in Central San Mateo within the 94401 ZIP code. This project involves the demolition of the existing structures and the development of a four-story mixed-use building with 18 residential units. The project includes:

- 4,495 sq. ft. of office space on the ground floor
- 15,315 sq. ft. of residential area (3 junior one-bedrooms and 15 one-bedrooms) on levels 2 through 4
- Subterranean parking garage with 22 parking spaces

The site is a 12,820 sq. ft./0.29-acre corner-plot located at the intersection of N. El Camino Real and Hayward Avenue. The site is zoned *Executive Offices* with Residential Overlay (E2-1/R-4). As shown in Figure 1, the area immediately surrounding the project site is primarily zoned *One Family Dwelling "C"* (R1C), with other corner plots designated as *Executive Offices* (E2-1) or *High-Density Multiple Family Dwellings* (R5). The parcels north of the site, within the Downtown San Mateo area, are zoned R5, R6-D, and *Central Business District* (CBD), allowing for high-density residential, retail, cultural, entertainment, and community service uses which have the potential to generate traffic and congestion around the project site. The area to the south, east, and west generally accommodates low traffic-generating uses such as single-family residential and incidental commercial uses.

**Figure 1. Zoning Map**




Source: City of San Mateo Zoning Map

The project site allows for a maximum FAR of 2 and an allowable height of 40 feet. The developer used the state density bonus provisions to increase the number of buildable units from 12 to 18, by proposing to devote two units (16%) to the very low-income category. Similarly, using the General Plan provisions, a request was also filed for increasing the maximum building height limit from 40 feet up to 55 feet by meeting certain General Plan findings and providing public benefits. There is an economic study underway to determine the appropriate amount of financial contribution from the developer. The financial contribution may target improvements in the area nearby the project site. Table 1. Proposed Project Attributes provides additional details regarding the proposed project compared to the parcel's current use.

**Table 1. Proposed Project Attributes**

| | Current | Proposed |
|---|---|---|
| **Description** | 5 dwelling units and 1 commercial unit | 4-story mixed-use building |
| **Square Footage** | 6,754 sq. ft. (5,639 sq. ft. residential area and 1,115 sq. ft. commercial area) | 23,275 sq. ft. total floor area, including office and residential area |
| **Zoning Designation** | Executive Offices with Residential Overlay (E2-1/R-4) | Executive Offices with Residential Overlay (E2-1/R-4) |

As per the San Mateo Municipal Code (SMMC), the project typically requires a total of 23 parking spaces: 14 parking stalls for commercial office use and 9 stalls for residential use. However, the project proposes only 22 subterranean vehicle parking spaces on-site. To reduce the required commercial use parking by 1 unit, the developer has requested a state density bonus waiver to modify the commercial parking ratio from 1 stall per 335 sq. ft. to 1 stall per 360 sq. ft. Additionally, a density bonus waiver has also been requested to allow 13 various sized "compact" spaces, exceeding the allowable 30% (SMMC 27.64). The project has provided more than the required infrastructure for short-term bicycle parking for residents and guests. In addition to the required 1 short-term space and 18 long-term spaces, the project has provided an additional 3 short-term and 1 long-term spaces to provide a total of 4 short-term and 19 long-term bicycle parking spaces. The project site is located almost equidistant and within 0.8 miles of both Hayward Park and Downtown San Mateo Caltrain Stations.

**Table 2. Required vs. Provided Bicycle Parking**

| | Required Bicycle Parking | Provided Bicycle Parking |
|---|---|---|
| Multi-family dwelling | 1 Short-term, 18 Long-term | 2 Short-term, 18 Long-term |
| Office | 0 Short-term, 0 Long-term | 2 Short-term, 1 Long-term |

The office and residential community will be managed by a property manager once units are available.

## Demographic and Travel Trends

The travel trends and insights detailed in this section are based on data associated with the project's census tract (6064). Census tracts are established by the Census Bureau for the purpose of analyzing populations.

### Demographic Insights

Census tract 6064 has a population of 5,134 people. The demographic information in Table 3 and Figure 2 is collected from Census and 2019 American Communities Survey (ACS) data and can provide insight into residents' needs and behaviors.

**Table 3. Demographic data for census tract 6064**

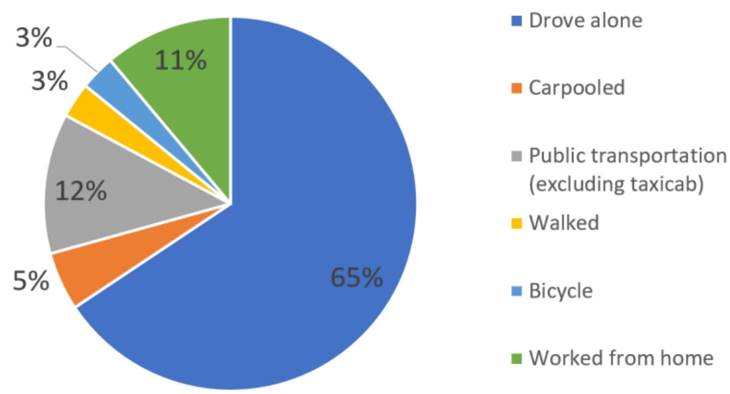
| Category | Characteristics | Amount |
|---|---|---|
| **Age** | Under 18 | 14% |
| | 18 to 64 | 62% |
| | Over 65 | 23% |
| **Education** | Bachelor's degree or higher | 73.1% |
| **Households** | Number of households | 2,413 |
| | Renter-Occupied Housing Units | 59% |
| | Persons per household | 2.1 |
| | Median household income | $167,165 |
| **Race** | White alone | 56% |
| | Asian alone | 25% |
| | Hispanic or Latino (of any race) | 12% |
| | Black or African American alone | 0.3% |
| **Languages spoken** | Speaks only English | 65% |
| | Speaks a language other than English: Spanish | 10% |
| | Speaks a language other than English: Indo-European Languages | 6% |
| | Speaks a language other than English: Asian and Pacific Island languages | 18% |

Source: 2019 ACS 5-Year Data Estimates

### Commute Insights

American Communities Survey data from 2019 indicates that a majority (65%) of those who live within the census tract commute to work by driving alone. The data in Figure 2 shows that 23% of the population uses sustainable alternatives to driving-alone such as transit, carpool, walk and bike. The mean commute time across all travel modes is 30.6 minutes. About 11% of the population indicated that they regularly "worked from home", however the share of teleworkers may be in flux at this time and in the future, due to the Covid 19Pandemic.

**Figure 2. Commute mode split for residents living in census tract 6064**




Source: 2019 ACS 5-Year Data Estimates, Census.gov (Universe: workers aged 16 and up)

As shown in Table 4, residents of the census tract commute to a wide variety of locations, with 11.8% commuting within the City of San Mateo, and 11.2% commuting to San Francisco.

**Table 4. Where people living in census tract 6064 worked in 2018**

| Job Locations | Count | Share |
|---|---|---|
| San Mateo, CA | 211 | 11.8% |
| San Francisco, CA | 201 | 11.2% |
| San Jose, CA | 76 | 4.2% |
| Foster City, CA | 74 | 4.1% |
| South San Francisco, CA | 52 | 2.9% |
| Other Locations | 1,176 | 64.1% |
| **All Places (Cities, CDPs, etc.)** | **1,790** | **100%** |

Source: U.S. Census Bureau, Center for Economic Studies

Inflow/Outflow analysis of the census tract, as shown in Figure 3, depicts that 2,422 individuals commute out of the area and 1,745 people commute into the area for work on a daily basis. A total of forty-five individuals both live and work inside the census tract.

**Figure 3. Inflow/Outflow of Commuters for census tract 6064**


Source: U.S. Census Bureau, Center for Economic Studies

# Site Assessment

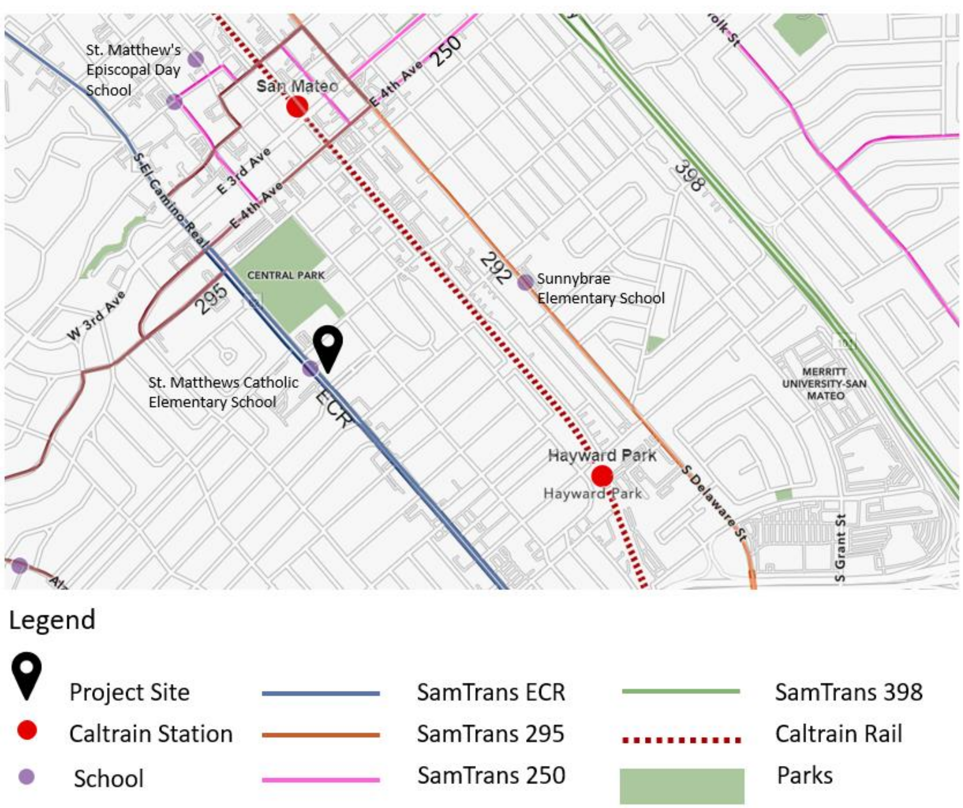
A site assessment was conducted as part of the TDM Plan development process. The site assessment included a description of the site's geography and road network, pedestrian and bicycle infrastructure, transit services, nearby attractions, and existing TDM services. For the complete assessment, please refer to the 1 Hayward Avenue Background Assessment memo in Exhibit B. Key findings from the site assessment are as follows:

## Geography and Road Network

The project site is located at the intersection of the six-lane arterial El Camino Real (Highway 82) and local street Hayward Ave. The site is surrounded by:

- Arterial N. El Camino Real (Highway 82) to the west
- Local street Hayward Avenue to the south
- A 3 story multi-family building to the east
- A dentist office and 4 story multi-family building to the north

**Figure 4. A view of the project site**



In terms of highway access, the project site is located adjacent to N. El Camino Real (Highway 82). The closest highway on-ramps for US-101 and SR-92 are situated 1.2 miles east and 0.8 miles south of the project site respectively.

The intersection of El Camino Real and 4th Avenue, the first major intersection when exiting from the 1 Hayward Avenue development, sees reasonably free flow in the AM with a ‘B’ Level of Service (LOS), but during PM hours, vehicular traffic at the intersection gets close to capacity and therefore has a “C” LOS.

**Table 5. Levels of service for the El Camino Real and 4th Avenue**

| | Signalized Intersection Peak-Hour Levels of Service | | | |
|---|---|---|---|---|
| | Year 2018 Conditions | | | |
| | AM Peak Hour | | PM Peak Hour | |
| | Delay | LOS | Delay | LOS |
| El Camino Real and 4th Avenue | 19.3 | B | 22.3 | C |

Source: San Mateo Existing Conditions Circulation Report (October 2018)

The site is within walkable distance from Downtown San Mateo, which is less than 0.5 miles away:

- 4 mins by car
- 3 mins by bike
- 8 mins by SamTrans ECR Bus
- 10 mins by walking

## Pedestrian and Bicycle Infrastructure

The site’s topography, street network, and proximity to Downtown San Mateo are conducive to pedestrian and bicycle access. The walkability website Walkscore.com gives the site an 84/100 for walking, which they classify as “*very walkable – most errands can be accomplished on foot*”.

Located 400 ft. away, the closest existing bike lane to the project site is the Class II bike lane on Palm Avenue that connects Hayward Park Caltrain station to San Mateo Central Park. The Palm Avenue bike lane extends beyond South Boulevard as a Class III bike route that connects the Hayward Park Caltrain Station to 25$^{th}$ Avenue. To the north, the Palm Avenue bike lane connects the site to the southern border of Downtown San Mateo on 9$^{th}$ Avenue. However, there is a network gap between 9$^{th}$ Ave./Palm Ave. and 9$^{th}$ Ave./Laurel Ave. which creates an unsafe intersection for bikers. Delaware Street, which can be accessed from the project site via the bike lane on Palm Avenue (located 0.5 miles away from the site), is a combination of Class II bike lane and Class III bike route and traverses across the City, connecting the northernmost Peninsula Avenue to Franklin Parkway in the south, which is 0.2 miles north of Hillsdale Boulevard.

The Delaware Street bike facility extends beyond Hillsdale Boulevard, renamed as ‘Pacific Boulevard’ which has segments of both Class II bike lanes and Class III bike routes and provides connectivity to the southerly border of the City. Delaware Street/Pacific Boulevard runs parallel to the Caltrain tracks and connects residential and commercial areas to the three Caltrain stations within San Mateo.

Due to minimal traffic and the presence of on-street vehicular parking and a bike facility, Palm Avenue has been designated as a “Low-stress” street by the April 2020 San Mateo Bicycle Master Plan and is considered suitable for most adults and families traveling by bike. Overall, the Hayward Park neighborhood is considered to have low-stress bikeways with very few high-stress barriers. However, due to higher traffic stress and inadequate separation from vehicular traffic, Delaware Street has been classified as a 'High-stress' street, which is defined as being uncomfortable or unappealing to all cyclists other than those with high levels of experience and risk tolerance or those traveling by electric bikes. As part of the Bicycle Master Plan, the existing bike lanes on Delaware Street are recommended to be upgraded to buffered bike lanes to improve safety and comfort and provide a continuous north-south connection into and out of Downtown San Mateo.

In terms of nearby bicycle amenities, BikeLink operates multiple on-demand bike lockers located at nearby Caltrain Stations as well as the Hillsdale Shopping Center and its surrounding area. BikeLink allows bicyclists to securely store their bikes in lockers using a stored-value card that can be purchased online or at nearby vendors. There are four lockers at the nearest Caltrain Station (Hayward Park) and 24 at the Downtown station. Additionally, four free-to-use public bike repair stations are located within two miles of the project site. These stations are located at San Mateo City Hall, the San Mateo Main Library, Ryder Court Park, and the Downtown San Mateo Caltrain station.

**City of San Mateo Bicycle Master Plan**

The 2020 Bicycle Master Plan was adopted by the City Council on April 6, 2020, and serves as a blueprint for expanding and improving the San Mateo bicycle and mobility network in the coming years. The Plan includes four recommendations relevant to the 1 Hayward Avenue project site:

- Notre Dame Avenue and 9th Avenue are offset from one another at El Camino Real
- Bike lane on 9th Avenue, connecting El Camino Real to S. B Street
- Bike boulevard along Hobart Avenue/12th Avenue connecting Edinburgh Street to S. B Street
- Buffered bike lane along Delaware Street, connecting 5th Avenue to Concar Drive

## Transit Services

The project site is located within a 0.8-mile walk from both the San Mateo and Hayward Park Caltrain Stations. The project site is also served by two San Mateo County Transit District (SamTrans) routes as shown in Table 6.

**Table 6. Summary of Transit Services**

| Transit Service | Hours of Operation | Frequency | Closest Stop | Distance to Closest Stop | Cost |
|---|---|---|---|---|---|
| BART | Monday – Friday: 5 AM – Midnight; Saturday: 6 AM - Midnight; Sunday: 8 AM – 9 PM | 15 minutes | Millbrae station | 4.8 miles | $4.25+** |
| Caltrain | Daily – 5:30 AM to 12:15 PM | 30 minutes | Downtown San Mateo station | 0.8 miles | $3.20-$14+** |
| Caltrain | Daily – 5:30 AM to 12:15 PM | Hourly | Hayward Park station | 0.8 miles | $3.20-$14+** |
| SamTrans ECR | Daily – 4 AM to midnight | 15 minutes | El Camino Real & 9th Ave | 0.1 miles/ 2-minute walk | $2.25 Local Fare |
| SamTrans 55 | School Day Service Schedule | 1 morning bus, 2 afternoon busses | El Camino Real & 9th Ave | 0.1 miles/ 2-minute walk | $2.25 Local Fare |
| ***price subject to change due to distance traveled* | | | | | |

## Nearby Destinations

Key destinations in close proximity to the project site include:

- **Four shopping centers** within one-and-half mile walk that provide access to a multitude of retail outlets, eateries, grocery stores, pharmacy, gym, banks, etc.
- **Four childcare centers** within a mile walking distance.
- **Three parks** within one-mile radius.
- **Two universities** within a two-mile radius.
- **Over one dozen schools** within a two-miles radius.

**Table 7. Public Schools for 1 Hayward Avenue**

| Nearby Schools | Travel distance in miles |
|---|---|
| Sunnybrae Elementary School | 0.7 |
| Borel Middle School | 0.8 |
| Aragon High School | 0.8 |

## Available TDM Services

**Commute.org Incentives**

Commute.org is San Mateo County's Transportation Demand Management Agency. Their resources are available to all residents and employees in the County. As such, the residents and employees of the project site will be able to take advantage of TDM resources curated for those commuting within the County and in the surrounding areas. The Commute.org website serves as a regional clearinghouse for all transportation and commuting-related information. They also provide the following services:

- **Try Transit Incentives:** Commute.org provides a free 'try transit' program that allows individuals to request free tickets for the transit option that works best for them.
- **Carpool Incentives:** Commuters who use Waze Carpool or Scoop are eligible to earn gift cards worth up to $100.
- **Vanpool Incentives:** Drivers of a new vanpool can earn a $500 reward, and vanpool riders can be reimbursed $100/month of their costs for up to three months.
- **Bike Education:** Free bike safety workshops and bike marketing materials are available to residents and commuters. These are scheduled upon request and are available to employers and other sites, including residential properties, within San Mateo County. They can be 60, 75, or 90 minutes in length depending on what is ideal for the requesting party and include time for Q&A.
- **Bike Incentives:** Commute.org currently provides commuters who live or work in San Mateo County with incentives worth between $25 to $100 for biking to work. To participate in the program, bike commuters must track their work commutes using the Strava app. The rides are then recorded in the STAR platform, iCommute.org's incentive delivery platform, where commuters can access their incentives.

# Project TDM Measures

This chapter outlines the TDM strategies identified for the 1 Hayward Avenue site. The strategies in this section are effective and appropriate based on the project's size, location, and land use. The narrative below provides guidelines for implementation, cost estimates, expected timelines, and indicates the anticipated responsible party for each recommended measure. It is understood that the property management team will be the 'responsible party' for most TDM measures outlined below.

Each strategy's description also estimates the number of vehicle miles traveled and percentage of trips expected to be reduced through its implementation. It is important to note that many of the TDM strategies in this section are scalable and can easily be expanded by increasing the number of resources allocated.

## TDM Coordinator

An on-site TDM coordinator would act as a liaison between the developer, City, employees, and the residents. The TDM coordinator would help develop, implement, and report on the various TDM strategies. This person would be responsible for coordinating and marketing the selected TDM strategies as well as maintaining working relationships with the City and nearby developments.

**Implementation Guidelines:**

Assign the role of TDM Coordinator to an individual on the apartment management team to plan and implement the TDM program. Allocate approximately 5 hours per month for the TDM Coordinator to spend on the following activities:

- **Annual Monitoring:** Survey the residents and employees and compile a monitoring report for submission to the City of San Mateo annually.
- **TDM Program Coordination and Outreach:** Organize and promote sustainable travel options through building communications such as emails, bulletin boards, and social media. Specific tasks include:
  - Organize and promote the trip reduction and air quality strategies detailed in the following sections.
  - Promote the sustainable transportation options available to the residents and employees.

**Table 8. TDM Coordinator**

| | |
|---|---|
| **Estimated timeframe** | Ongoing |
| **Estimated cost** | $2,000 per year (or equivalent staff time) |
| **Responsible party** | Apartment management team |
| **Estimated daily VMT reduced** | 19 to 37 |
| **Percent of daily vehicle trips reduced** | Spending 5 hours per month organizing TDM programs will lead to a 0.58% to 1.16% decrease in vehicle trips (can be reduced further with an increased commitment in time and TDM strategies). |

## Institutionalizing TDM

It is important that the TDM program be implemented as the site becomes occupied and when units eventually begin to turn over. It must also be updated as needs change and transportation options and technology evolve. Therefore, the TDM Plan should become 'institutionalized' as part of the property's leasing process to ensure the program remains in place and new residents and employees are aware of its existence.

**Implementation Guidelines:**

Describe the TDM infrastructure, amenities, and programs available to employers and residents and how they will be made available to the tenants in the lease documents.

**Table 9. Institutionalizing TDM**

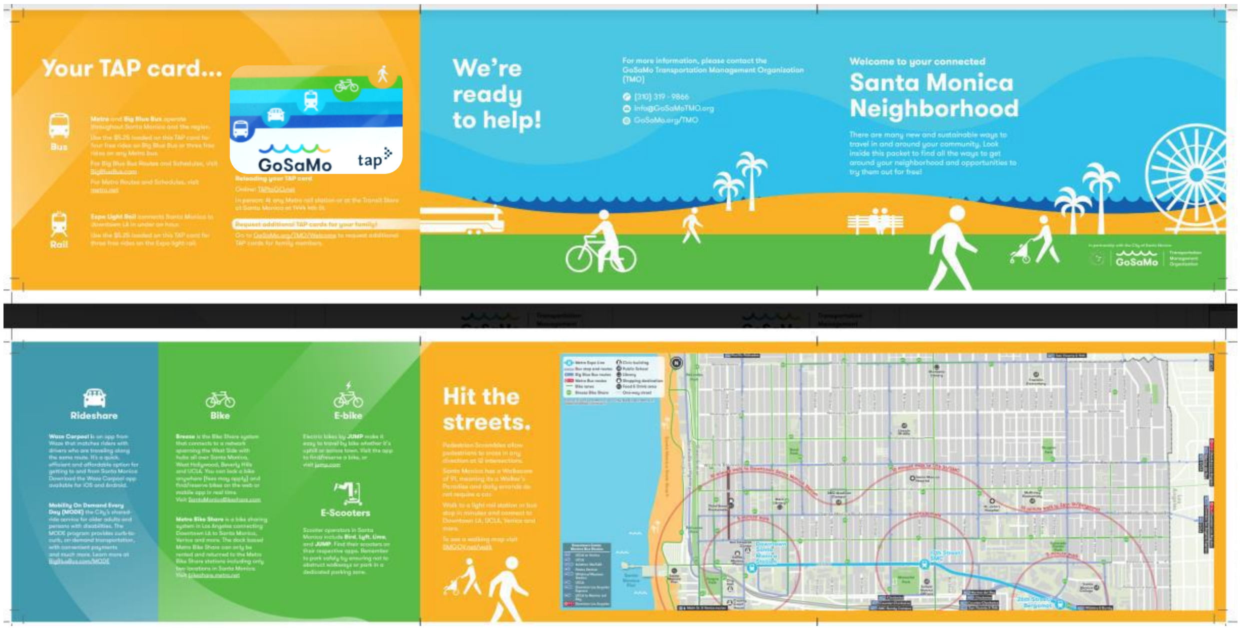
| | |
|---|---|
| **Estimated timeframe** | During the drafting of lease language and ongoing |
| **Estimated cost** | $0 – it is likely that this cost will already be undertaken by the property management in order to establish the details of the lease agreement, so including TDM information in this effort will likely come at little or no additional cost. |
| **Responsible party** | Property Management |
| **Estimated daily VMT reduced** | 0 to 1 |
| **Percent of daily vehicle trips reduced** | 0% |

## New Resident and Employee Packets

Individuals are most likely to make a change in their transportation behavior alongside other life changes. This means that providing new residents with a packet that offers them information about all their transportation options can increase the likelihood for them to choose options other than driving alone.

New residents end employees would be provided with welcome packets that include a Clipper Card with stored value, customized transportation information about nearby transit routes, bus stops, bike maps, amenities, and routes, and other TDM initiatives undertaken by the property. The welcome packets should also include the contact information of the property's TDM Coordinator. Figure 5 offers an example of a welcome packet distributed to new residents in Santa Monica, CA.

**Figure 5. A New Resident Packet distributed in Santa Monica**




## Implementation Guidelines:

Design a New Resident and Employee Packet for the property that provides information on all transportation modes available as well as services that may make choosing sustainable travel easier. The TDM Coordinator can work directly with Commute.org, who can assist the property in purchasing Clipper Cards and provide supportive materials, commuter incentives and advice. The packet should include:

- A Clipper Card with stored value ($10 to $20 would be ideal)
- A map depicting a 10- and 20-minute walk and bicycle radius
- Information about the transit options available (SamTrans, Caltrain, and BART) and how to connect to them, including Park and Ride options
- Information about all the transportation related amenities offered by the property
- Information about Commute.org services and resources
- Information about Guaranteed Ride Home and how to register
- Information about bike routes and amenities in the City of San Mateo Parking and Transportation Planning webpage (https://www.cityofsanmateo.org/2125/Parking-Transportation)

**Table 10. New Resident and Employee Packets**

| | |
|---|---|
| **Estimated timeframe** | Pre-occupancy, ongoing |
| **Estimated cost** | Approximately $3,000 total:<br>$2,000 to develop packet, $10 to $20 in Clipper Card stored value per unit, then up to $4 per packet to print and distribute |
| **Responsible party** | Owner or consultant to develop; Property Management team to maintain and distribute long term |
| **Estimated daily VMT reduced** | 87 to 97 |
| **Percent of daily vehicle trips reduced** | 2.89% |

## Multimodal Wayfinding Signage

The developer would provide multimodal wayfinding signage at entry and exit points of the property. Wayfinding can help people visualize how close sustainable travel options are and in which direction, as well as familiarize them with nearby modes. Examples of wayfinding window decals used in the City of Santa Monica are shown in Figure 6.

**Figure 6. Multimodal wayfinding window decals used in Santa Monica**


**Implementation Guidelines:**

Using consistent and legible design guidelines, create and post a network of pedestrian-scale signage at key entry and exit points of the property. The signs should point users to key destinations and give them estimates for how far away they are by walking and/or biking. For example -

- 16 min walk to Downtown San Mateo Caltrain Station
- 3 min walk to El Camino Real & 9th Ave. Bus Stop
- 3 min walk to 9th Ave. entrance to San Mateo Central Park

Be sure to evaluate the signage regularly to take into consideration any infrastructural or service changes that may impact options.

**Table 11. Multimodal Wayfinding Signage**

| | |
|---|---|
| **Estimated timeframe** | Pre-occupancy |
| **Estimated cost** | Under $500 |
| **Responsible party** | Property Management |
| **Estimated daily VMT reduced** | 0 to 1 |
| **Percent of daily vehicle trips reduced** | 0% |

## TDM Communications

In order to encourage individuals to choose sustainable travel options, it is critical to provide them with the information needed to do so. Having a Communications Plan that outlines which information to share and how will set clear expectations for the TDM Coordinator.

The Communications Plan would likely include:

- **Website -** Having all transportation-related information and resources available in one virtual location makes it easy and convenient for residents to learn about their travel options. The webpage could be integrated as part of the apartment portal and should provide information about nearby transit routes and schedules, bike and pedestrian paths, services offered by Commute.org and other amenities. This is especially helpful for residents new to the neighborhood who are unaware of the transportation options available to them.

- **Resident and Employee Bulletin Boards** – Include TDM messaging in resident and employee bulletin boards on a regular basis to inform and update residents and employees of sustainable travel options, upcoming events, and activities. Commute.org sends out regularly scheduled newsletters that are a good reference for up-to-date transportation information.
- **Apartment Social Media Channels (Facebook, Instagram, etc**.) – Promote transportation options and updates via the property management social media channels such as Facebook, Instagram and Nextdoor. Each social media post could advertise different TDM measures and events such as commuter promotions and incentives, and highlight resources such as 511 and Commute.org.

**Implementation Guidelines:**

Create a webpage that lives on or is linked from the property's resident-facing website and includes all the above listed information, at a minimum. Commute.org's website can be a resource for up to date transportation information.

Develop a regular schedule for updating the resident and employee bulletin boards and social media posts and promote relevant transportation information regularly.

**Table 12: TDM Communications**

| | |
|---|---|
| **Estimated timeframe** | Pre-occupancy, property management (TDM Coordinator) to maintain webpage and newsletter/social media calendar as well as managing all transportation-related information to residents. |
| **Estimated cost** | $0 |
| **Responsible party** | Property Management |
| **Estimated daily VMT reduced** | 7 to 15 |
| **Percent of daily vehicle trips reduced** | 0% to 0.58% |

## Bike Share

Providing shared bikes to tenants is an excellent way to encourage bike ridership. Biking could easily replace driving for short trips and local errands under three miles. Use of electric bikes can increase the average commuting distance even further, to around seven miles.

**Implementation Guidelines:**

Purchase two or more bicycles to create a property bike share. The following factors should be considered at the outset to ensure the program meets resident and employee needs and is widely used.

- Choose at least one electric bike as part of the fleet
- Choose at least one cargo or cargo electric bike for the fleet, or purchase a bike trailer, so that residents can transport children or make grocery store trips
- Choose bikes with easily adjustable seat height and wide seat height range to allow use by riders of different sizes
- Keep the bikes well maintained and clean. The property could partner with local bike shops to do on-site maintenance or tune-ups twice a year.

- Place the bikes in a visible, easy to access location so that using the bikes is convenient for residents and employees.
- A simple check out system will make using the bikes more convenient. The bikes can be offered on a first come, first served basis where the residents and employees are required to check out a key to the bike lock from the front desk. The TDM Coordinator can choose to create a more complex bike checkout and/or reservation system if that makes more sense for the property, or they may want to invest in technology-based smart locks that only open for specific people or those who have access to a frequently updated code.

**Table 13. Bike Share**

| | |
|---|---|
| **Estimated timeframe** | Ongoing |
| **Estimated cost** | $5,000 depending on cost and number of bikes.<br>Upfront costs/bike purchases: $200-500 per bike, $1,800-3,000 per electric bike<br>Ongoing Maintenance: $100/year/bike for tune-ups<br>Administrative costs will vary based on program structure |
| **Responsible party** | Property management to coordinate |
| **Estimated daily VMT reduced** | 8 to 16 |
| **Percent of daily vehicle trips reduced** | 1.16% to 2.31% for every six people who use the shared bikes for short trips |

## Unbundled Parking

Access to free parking often dramatically reduces the cost of car ownership. Providing unbundled parking means charges for using on-site parking spaces are separate from the unit price or monthly rent. By unbundling the cost of renting an apartment from the cost of the parking spot, the property will encourage and reward sustainable travel.

### Implementation guidelines:

Provide on-site parking spaces at a cost (market rate) and included as a separate line item from the unit price or monthly rent.

**Table 14. Unbundled Parking**

| | |
|---|---|
| **Estimated timeframe** | Pre-occupancy (during the drafting of lease agreements), and ongoing |
| **Estimated cost** | $0 |
| **Responsible party** | Property Management |
| **Estimated daily VMT reduced** | 240 to 534 |
| **Percent of daily vehicle trips reduced** | 9.83% to 21.97% |

# Optional TDM Strategies

In addition to the TDM measures identified in the previous Chapter, the following strategies would help to support further vehicle trip and VMT reduction for travel to and from the project site. They are offered as optional recommendations as they are measures that will require additional financial investment and are not required to meet the TIA VMT reduction requirement.

## Dynamic Carpooling Subsidy

Dynamic carpooling platforms connect commuters going the same way through an app-based model. The property can partner with pre-established platforms to offer subsidies to residents and employees who choose to carpool. Waze Carpool and Scoop are the two official carpooling services that Commute.org partners with for San Mateo County and as such have a large pool of potential carpool partners. Working with these existing services will save the TDM Coordinator from creating a new rideshare database for the property which could become limited considering the small number of residents and limited employees.

**Implementation Guidelines:**

Offer and promote a daily or monthly subsidy to those who choose to utilize carpooling for their work commute. This can be done as a reimbursement or, if partnering with pre-established platforms, can be applied directly at the time of booking. For example, those who carpool to work can receive a $2 subsidy toward the cost of their ride per day for carpooling a minimum of 15 days in a month.

**Table 15. Dynamic Carpooling Subsidy**

| | |
|---|---|
| **Estimated timeframe** | Ongoing |
| **Estimated cost** | $1,000 to $5,000 per year depending on policy set and number of participants |
| **Responsible party** | Property Management |
| **Estimated daily VMT reduced** | 62 to 87 |
| **Percent of daily vehicle trips reduced** | 1.73% to 2.89% with every five participants in the carpool program and will increase with each additional carpooler |

## Bike Education / Workshops

Encouraging bike ridership is one of the most effective ways of reducing short range trips by car. About 59.4% of vehicle trips in the United States were less than six miles in 2017.[1] The property could partner

[1] As per data collected from Office of Energy Efficiency and renewable Energy 2017. https://www.energy.gov/eere/vehicles/articles/fotw-1042-august-13-2018-2017-nearly-60-all-vehicle-trips-were-less-six miles#:~:text=Data%20collected%20on%20one%2Dway,distance%20categories%20about%205%25%20each.

with local bike advocacy groups, bike shops or Commute.org to host bike safety workshops to educate residents and employees on the basics of biking and share educational resources such as maps of nearby bike amenities (such as BikeLink lockers at Caltrain stations). Given the size of the project site, if demand for full workshops doesn't exist, it may be more appropriate to support residents and employees in one-on-one support from bike shops.

**Implementation Guidelines:**

Partner with Commute.org or a local bike advocacy organization to organize a bicycle safety training webinar or workshop annually. Commute.org offers free bike training workshops to employers and residential properties within San Mateo County.

- Promote the workshop or webinar along with additional resources on the property's dedicated website, resident and employee bulletin board, and social media. Some additional resources to share with residents and employees include:
  - Bike Safety and Rules of the Road
  - Family Biking - How to Bike Safely with Adults and Kids of Any Age
  - Biking Maps and Trails

**Table 16. Bike Education/Workshops**

| | |
|---|---|
| **Estimated timeframe** | 75% occupancy, annually |
| **Estimated cost** | $0 |
| **Responsible party** | Property management to coordinate |
| **Estimated daily VMT reduced** | 4 to 9 |
| **Percent of daily vehicle trips reduced** | 0 to 0.58% for every five individuals who participate in a workshop and will increase further with additional participants |

# Impacts of Project TDM Measures

If implemented correctly and consistently, the TDM program outlined is forecasted to result in a daily reduction of over 366 to 432 vehicle miles traveled (VMT) on a low estimate, which would lead to a reduction in over 125 to 148 kilograms of carbon dioxide every day.

## VMT Reduction Calculations

Estimated VMT reduction calculations were made using the TDM Return on Investment (ROI) Calculator, a tool owned by Mobility Lab and developed by university and governmental partners. The TDM ROI Calculator helps practitioners and policy makers understand the benefits of their investment in TDM strategies and programs by calculating estimated vehicle trips, VMT, hours of congestion delay, and emissions reduced. More information about the TDM ROI Calculator and assumptions made to calculate estimated impacts are included in Exhibit A.

It was determined that the project will result in 25 residential commuters and 45 employee commuters (as shown in Table A.4 of Exhibit A) to the site area. The expected project VMT/capita and VMT/Employee are 14.8 and 22.2 respectively, and, as per the Traffic Impact Assessment done by AECOM, a reduction of at least 1.7 VMT/capital and 6.9 VMT/employee would be needed in order to meet the City thresholds (13.1 VMT/capita and 15.3 VMT/employee). The total required reduction is therefore 353, as demonstrated in Table 17 below.

**Table 17: VMT Reduction Calculations**

| Category | Expected project generated VMT | City VMT threshold | Difference between expected project generated VMT and City threshold | No. of commuters | Required VMT Reduction |
|---|---|---|---|---|---|
| Total Daily Residential VMT reduction needed | 14.8 | 13.1 | 1.7 VMT/capita | 25 residential commuters | **1.7 * 25 = 42.5** |
| Total Daily Commercial VMT reduction needed | 22.2 | 15.3 | 6.9 VMT/employee | 45 employee commuters | **6.9 * 45 = 310.5** |
| **Total Daily VMT reduction required** | | | | | **353** |

## Program Impacts

### TDM Program for 1 Hayward Ave

Table 18 outlines the total estimated VMT and congestion hours reduced with the recommended TDM program for the project site.

**Table 18. Project TDM Measures Impact Overview**

| 1 Hayward Ave | Daily VMT Reduced | | Daily Vehicle Trips Reduced | | Daily Congestion Reduced (hours of delay) | | Daily Carbon Dioxide Reduced (kg) | |
|---|---|---|---|---|---|---|---|---|
| | Low Est. | High Est. | Low Est. | High Est. | Low Est. | High Est. | Low Est. | High Est. |
| Recommended TDM Program | 366 | 712 | 26 | 51 | 16 | 22 | 125 | 243 |
| Recommended and Optional TDM Program | 432 | 808 | 29 | 57 | 25 | 35 | 148 | 276 |

## Individual Strategies

Table 19 outlines the individual program components and estimated daily VMT reduction ranges for each TDM strategy. This is presented in order to provide an understanding of which strategies are the most impactful. However, whenever possible, program impacts should be measured and estimated holistically as TDM services often are designed to work together, with one service reinforcing another and there can be substantial overlap among the services. Given that Table 18 demonstrates a comprehensive calculation of the impacts from all services together, they may not match the totals of the impacts from each strategy individually, as depicted in Table 19.

**Table 19. Individual Impacts of Project TDM Measures**

| Strategy | Daily VMT Reduced | | Daily Vehicle Trips Reduced | | Daily Congestion Reduced (hours of delay) | | Daily Carbon Dioxide Reduced (kg) | |
|---|---|---|---|---|---|---|---|---|
| | Low Est. | High Est. | Low Est. | High Est. | Low Est. | High Est. | Low Est. | High Est. |
| TDM Coordinator | 19 | 37 | 1 | 2 | 3 | 6 | 6 | 13 |
| Institutionalizing TDM at the Property | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| New Resident + New Employee Packet | 87 | 97 | 5 | 5 | 11 | 13 | 30 | 33 |
| Wayfinding to outside building (signs/stickers) | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| TDM Communications | 7 | 15 | 0 | 1 | 1 | 2 | 2 | 5 |
| Bike share | 8 | 16 | 2 | 4 | 0 | 0 | 3 | 6 |
| Unbundled Parking | 240 | 534 | 17 | 38 | 0 | 0 | 82 | 183 |
| (Optional) Dynamic carpooling subsidy | 62 | 87 | 3 | 5 | 8 | 12 | 21 | 30 |
| (Optional) Bike Education and Promotion | 4 | 9 | 0 | 1 | 0 | 0 | 1 | 3 |

# Monitoring

Annual monitoring and reporting are required from the site by the City of San Mateo. Ongoing monitoring will help the project site track the impact of their TDM programs as well as provide a regular schedule for evaluating programming and identifying gaps and opportunities. The results will help the building adjust programs to better meet the needs of their residents and employees.

## Annual Survey

The City of San Mateo requires an annual letter to the Public Works Director or designee that outlines the TDM measures implemented and information from a mode split survey.

To comply with City requirements, the TDM Coordinator will conduct an annual resident and employee survey to understand commute patterns and the modes by which they commute. During the first year of occupancy, an initial survey should be conducted to establish a baseline to which future surveys will be compared.

The baseline survey and the subsequent annual surveys should ask questions to understand how residents and employees travel for different types of trips and understand barriers to sustainable travel. To gain insight into the resident's and employee's travel characteristics and attitudes, the survey should identify the following key topics:

- Mode of travel by trip purpose (work, school, leisure, etc.)
- Work location
- Business travel requirements, if applicable
- Daycare or school pick-up/drop-off location, if applicable
- Flexible working arrangements, if applicable
- Improvements to the main mode of travel
- Current barriers to walking/biking
- Ideas for how the property could encourage walking, biking, carpooling and transit
- Car ownership
- Level of awareness of the property's TDM amenities
- Feedback on amenities and services currently available to the residents and employees
- Other services or amenities that are not currently offered that would encourage residents and employees to try a different mode of travel

The survey results allow the property to not only track program progress but also identify ways to adjust the program and further shift travel behavior towards more sustainable modes (transit, bike, walk and carpool) over time. The TDM Coordinator could use the data to understand which amenities are popular and should remain, which are not effective and should be adjusted, and identify additional measures to implement at their site.

# Exhibits

# A TDM ROI Calculator

The Transportation Demand Management (TDM) Return on Investment-(ROI) Calculator is a tool owned by Mobility Lab, an Arlington County, Virginia funded transportation behavior and policy research center. It was developed in partnership with university and governmental partners, with funding from the Federal Highway Administration, to provide TDM program staff, transportation planners, and others involved in implementing TDM services a quantifiable way to estimate the ROI for TDM services.

According to the TDM ROI Calculator User Manual, the model calculates impacts for individual TDM services then combines the individual impacts, with discounts to account for overlap between services, to determine the cumulative impact of all services.[2]

The calculator performs the following functions:

- Estimates TDM travel impacts, defined as reductions in commute vehicle trips and vehicle miles travelled (VMT), from a user-defined package of TDM services
- Converts vehicle trip and VMT reductions into societal benefits, such as reduction in hours of travel time delay and gallons of gasoline saved
- Calculates the societal cost savings from each benefit and the overall cost saving from all benefits combined
- Compares the societal cost saving to the TDM program "investment" cost to estimate ROI

As most TDM programs do not have detailed VMT and trip reduction data, the ROI Calculator instead asks for user participation numbers and program costs as the inputs for its calculations. The model then uses four calculation factors derived from TDM service user surveys along with pre-set regional inputs and national environmental data to estimate the number of participants who will shift behavior and the number of daily vehicle trips, VMT and hours of congestion that their behavior shift will reduce. If more detailed regional and national data are known, they can be input to override the preset data used for calculation.

The inputs used for calculating the VMT and vehicle trip reductions for the 1 Hayward Avenue TDM Plan are outlined below so that the results can be duplicated with ease.

[2] Mobility Lab.(2019).TDM ROI Calculator User Manual Retrieved from https://mobilitylab.org/calculators/

## A1 Regional Inputs

At the outset in Section A (Your Region, Service Area Type and Transit Availability), the TDM ROI Calculator asks users to make a series of selections to determine geographic and transit characteristics of the area being examined. The options selected for the 1 Hayward Avenue TDM Plan are displayed in Table A.1 as follows:

**Table A.1: Selections made for region, service area type and transit availability**

| Questions in the ROI Calculator | Option Selected for the TDM Plan |
|---|---|
| Metropolitan Region | San Francisco-Oakland-Hayward, CA |
| Primary land use density and development pattern | Moderate density, urban or small city/town |
| Primary focus of TDM program outreach | Primarily to commuters at residential areas |
| Percentage of commuters within ½ mile of bus/train stop in the service area | 76% to 100% of commuters are within ½ mile of a bus or train stop |
| Average public transit frequency in the service area in the morning peak period (Select ONLY ONE option) | Low- Average rush hour frequency for most routes is 31 minutes or more OR there is no transit service |

With the above inputs selected, the model determines the classifications for the project site as follows in Table A.2:

**Table A.2: Project site TDM service area and transit availability classifications**

| | |
|---|---|
| Your TDM Service Area classification is: | Suburban/Small city |
| Your Transit Availability classification is: | Moderate Transit |

## A2 Regional Travel, Environmental and Cost Benefit Factors

The final section of the ROI Calculator (Section F - Additional Regional/Service Area Data Environmental Inputs) shows the default numbers used for regional travel, environmental and cost benefit factors. Users have the option to override these defaults by inputting values into the "User Defined" cells if specific local factors are known. Table A.3 shows the defaults assumed by the model and indicates if the defaults were overridden, and which values were used. The inputs defined in Table A.3 remained the same for all calculations for the 1 Hayward Ave TDM Plan.

**Table A.3: Travel, vehicle pollutant emission, and benefit cost factor default and user defined values**

| Regional Travel Factors | Regional Default | User Defined |
|---|---|---|
| Average home-to-work commute miles for the region (one-way distance) | 9.6 | 13.9[1] |
| Percentage of regional commuters who drive alone to work OR percentage of weekly commute trips made by driving alone | 63.2% | 62%[2] |
| Percentage of regional commuters who ride public transit to work OR percentage of weekly commute trips made by transit | 17.6% | 17%[2] |
| **Regional Vehicle Pollutant Emission Factors** | **National Default** | **User Defined** |
| Oxides of Nitrogen (NOx) emission rate in grams per mile of travel | 0.445 | 0.171[3] |
| Volatile Organic Compounds (VOC) emission rate in grams per mile of travel | 0.075 | 0.035[4] |
| Greenhouse gas (Carbon Dioxide Equivalent) emission rate in grams per mile of travel | 387.460 | 342.000[4] |
| **Regional Benefit Cost Factors** | **Regional Default** | **User Defined** |
| Median average wage rate for commuters in the service area or metropolitan region | $24.90 | $49.71[1] |
| Estimated average annualized cost to build/maintain one lane-mile of major roadway (combination of Interstate and limited access roadway) | $165,000 | N/A |
| Average pump price per gallon for regular unleaded gasoline | $3.36 | $3.97[3] |

[1] Source: San Mateo Economic Development Association's Labor Supply and Commute Patterns in San Mateo County Report, 2012.

[2] Source: ACS 2018 5-year for the Census Tract 6075, Census.gov

[3] Source: Gas Price Watch

[4] Source: California Air Resources Board Emissions Factors (EMFAC) database

## Assumptions

### Resident Characteristics Assumptions

To estimate potential participation numbers, some assumptions about the number of individuals living at the property at 100% occupancy were made. These assumptions begin with the knowledge that there will be 18 units for rent. The assumptions and the basis for each are outlined in Table A.4.

**Table A.4: 1 Hayward Avenue resident and employee characteristics assumptions**

| Category | Assumption and Basis | Number |
|---|---|---|
| Total number of people residing at the property at full occupancy | ACS data indicates that there are 2.1 persons per household in the census tract 6064 and there will be 18 one-bedrooms on site. | 38 |
| Children under 18 | ACS data shows that 14% of the census tract's population is children | 5 |
| Adults | Subtracting children from the total population | 33 |
| Number of residential commuters | ACS data shows that 30.3% of people residing in the census tract are not in the labor force | 25 |
| Number of employee commuters | California building code prescribes a minimum 100 sq. ft. per occupant for office space and there will be 4,495 sq. ft. of office space on the ground floor. | 45 |

### ROI Calculator Participation and Calculation Factors Assumptions

In order to use the ROI calculator to calculate estimated impacts for the 1 Hayward Avenue project, assumptions were made to estimate participation rate for each strategy. Additionally, if a strategy was not outlined as a direct input in the model, assumptions were made to estimate the calculation factors associated with it. Table A.5 outlines those assumptions.

Table A.5: Participation and calculation factor assumptions used for TDM measures

| Strategy | ROI Calc Input | Participation Assumption (per year) | Basis for Participation Assumption | Placement Rate (%) Assumption | Vehicle Trip Reduction Factor Assumption | One-Way Commute Distance Assumption | Drive-Alone Access % Assumption |
|---|---|---|---|---|---|---|---|
| TDM Coordinator | Comprehensive commute assistance | 7 | Organize all TDM activities on the property and assist 5% of residents with questions about transportation including one-on-one assistance when asked and promoting sustainable transportation options | 40% Pre-set in mode | 0.8 Pre-set in model | 19.8 miles Pre-set in model | 40% Pre-set in model |
| Institutionalizing TDM at the Property | General marketing | 70 | All adults residing at the property would see and sign the lease. All employees will also benefit from the lease agreement between the employer and property management. | 0% Pre-set in model | 0.5 Pre-set in model | 19.8 miles Pre-set in model | 40% Pre-set in model |
| New Resident + New Employee Packet | Alternative mode "try it" incentive | 13 | Each household on the property would receive a packet. At a minimum, the transit users (9, 12%) would take advantage of the cards and an additional 5% (4) will "try it" based on the transit mode split and ease of accessing the incentive | 50% Pre-set in model | 1 Pre-set in model | 19.8 miles Pre-set in model | 40% Pre-set in model |
| Wayfinding to outside building (signs/stickers) | Targeted residential marketing | 83 | The decals would be visible to all residents | 1% Pre-set in model | 0.5 Pre-set in model | 19.8 miles Pre-set in model | 40% Pre-set in model |
| TDM Communications | Commute program website | 25 | 10% of adults would access webpage for transportation info and incentives and approximately 25% would see the newsletter and social media communications, especially if they are included with communications regarding other property updates. | 35% Pre-set in model | 0.3 Pre-set in model | 19.8 miles Pre-set in model | 40% Pre-set in model |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bike Share | Bike Share | 6 | 3% of commuters will use it and an additional 3 users will try it based on updated placement rate to 50% and increased trips replated to 1.4. (Jump from 30 participants to over 100 - https://sanfrancisco.cbslocal.com/2020/05/24/bay-area-residents-rediscover-the-joys-of-cycling-during-pandemic/) | 50% custom model | 1.4 custom model | 4.5 miles Pre-set in model | 0% Pre-set in model |
| Unbundled Parking | Custom | 24 | All residents (33) of the 18 apartments, apart from the residents renting the available 9 parking spaces, will be able to exclude the cost of parking from their lease agreement. | 100% custom model | 2.0 custom model | 13.9 miles custom model | 0% Pre-set in model |
| Dynamic carpooling subsidy | Ongoing multi-modal incentive | 5 | 5% of the population carpools and with an additional incentive more people could be motivated to carpool | 50% Pre-set in model | 1.0 Pre-set in model | 19.8 miles Pre-set in model | 40% Pre-set in model |
| Bike Education and Promotion | Custom | 5 | Approximately 5 individuals will attend the workshop. Two are already bikers and the general increased interest in biking coupled with the lack of parking may motivated additional individuals to consider biking. That number is likely to increase over time as bike infrastructure improves. According to NACTO, approximately 30 of the 71 adults at the property would be willing to ride a bike on streets with a protected bike lane. | 20% Pre-set in model (for commute challenges/ events) | 1.2 Used the same pre-set for a bike commute program | 10 miles Average doable biking distance according to Mobility Lab [A1] | 40% Pre-set in model |

[A1] McLeish, Mike. (February 27,2017). How far is too far to bike to work? Retrieved from **https://mobilitylab.org/2017/02/27/how-far-bike-work/**
[A2] National Association of City Transportation Organizers. (July 20, 2016). High-Quality Bike Facilities Increase Ridership and Make Biking Safer. Retrieved from https://nacto.org/2016/07/20/high-quality-bike-facilities-increase-ridership-make-biking-safer/
**[A3]** Eco-Counter. (January 2021). Bike count trends by North American region for December 2020 (compared to Dec 2019). Retrieved from **https://www.eco-compteur.com/en/cycling-data-tracker/**

# B Background Assessment Memo

## Introduction

The City of San Mateo has commissioned Steer to develop a Transportation Demand Management (TDM) Plan for the 1 Hayward Ave. project site to reduce the ceiling of potential congestion and trips generated by the project. The project is a planned mixed-used property owned by One Hayward Avenue LLC. and being developed by ARC TEC Inc. (referred to as “the developer” or as “ATI” throughout this document).

The TDM Plan development process begins with a thorough assessment of the site, including existing and planned conditions. A combination of desktop-based research and analyses, review of available site plans and renderings, and study of planned developments was utilized in our understanding of the site conditions. Insight from the City and developer team has also been incorporated into this document.

This document details the following aspects of the site and project:

- Project Description
- Physical Attributes
  - Site Geography and Road Network
  - Pedestrian and Bicycle Infrastructure
  - Transit Services
- Nearby Attractions
- Available TDM Services
- Travel Trends

- Next Steps

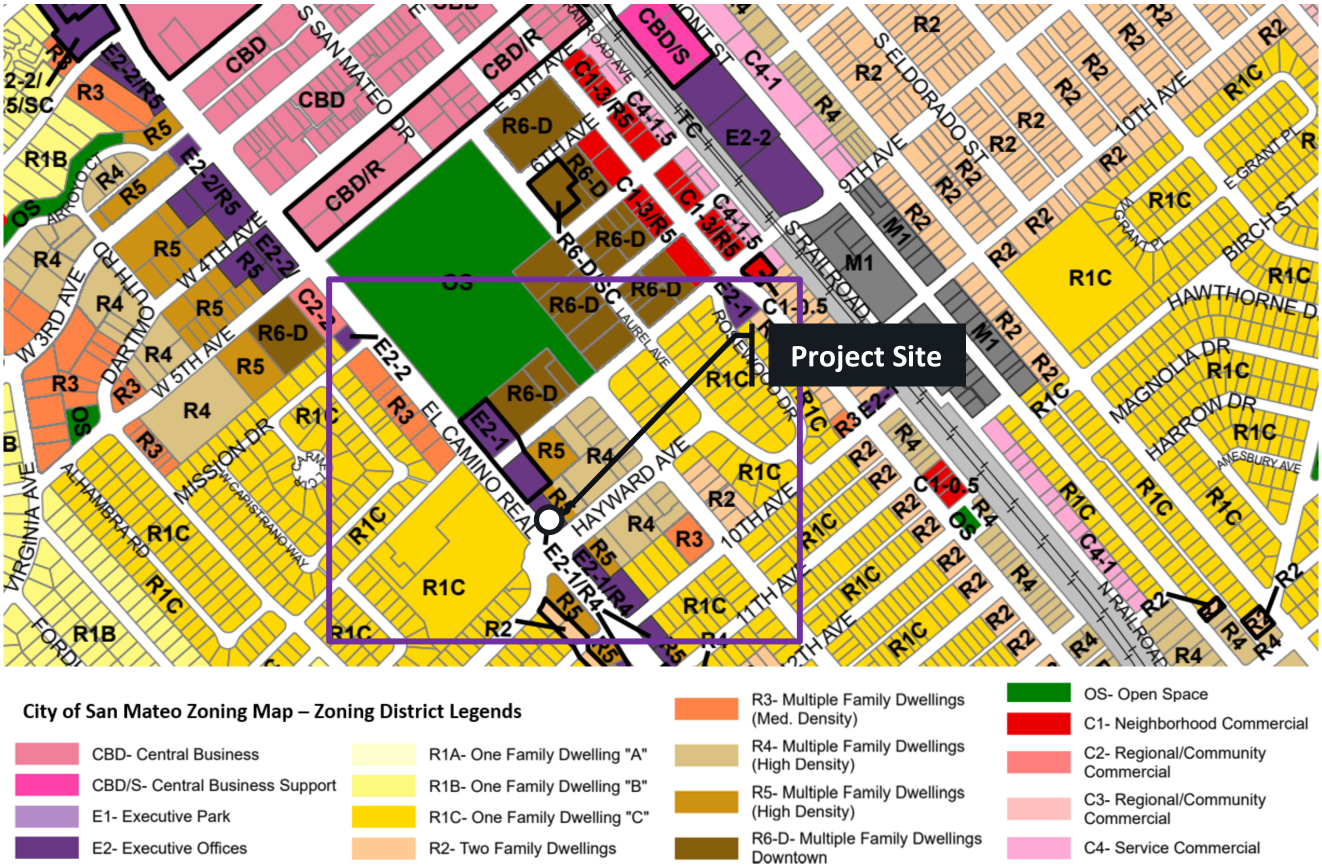
## Project Description

The project site is located at 1 Hayward Ave. in Central San Mateo within the 94401 ZIP code. This project involves the demolition of the existing structures and the development of a four-story mixed-use building with 18 residential units. The project includes:

1. 4,495 sq.ft. of office space on the ground floor
2. 15,315 sq.ft. of residential area (3 junior one-bedrooms and 15 one-bedrooms) on levels 2 through 4
3. Subterranean parking garage with 22 parking spaces

The site is a 12,820 sq.ft./.29 acre corner-plot located at the intersection of N El Camino Real and Hayward Ave. The site is zoned Executive Offices with Residential Overlay (E2-1/R-4). As shown in Figure 1, the area immediately surrounding the project site is primarily zoned One Family Dwelling "C" (R1C), with other corner plots designated as Executive Offices (E2-1) or High-Density Multiple Family Dwellings (R5). The parcels north of the site, within the Downtown San Mateo area, are zoned R5, R6-D, and Central Business District (CBD) that allows for high-density residential, retail, cultural, entertainment, and community service uses which have the potential to generate traffic and congestion around the project site. The area to the south, east, and west generally accommodates low traffic generating uses such as single-family residential and incidental commercial uses.

**Figure 7: Zoning Map**




Source: City of San Mateo Zoning Map

The project site allows for a maximum FAR of 2 and an allowable height of 40 feet. The developer used the state density bonus provisions to increase the number of buildable units from 12 to 18, by proposing to devote two units (16%) to the very low-income category. Similarly, using the General Plan provisions, a request was also filed for increasing the maximum building height from 40ft to 55ft in lieu of providing certain public benefits. There is an economic study underway to determine the appropriate amount of financial contribution from the developer. The financial contribution may target improvements in the area nearby the project site. **Table 20** provides additional details regarding the proposed project compared to the parcel's current use.

**Table 20: Proposed Project Attributes**

| | Current | Proposed |
|---|---|---|
| **Description** | 5 dwelling units and 1 commercial unit | 4-story mixed-use building |
| **Square Footage** | 6,754 sq.ft. (5,639 sq.ft. residential area and 1,115 sq.ft. commercial area) | 23,275 sq.ft. total floor area, including office and residential area |
| **Zoning Designation** | Executive Offices with Residential Overlay (E2-1/R-4) | Executive Offices with Residential Overlay (E2-1/R-4) |

As per the San Mateo Municipal Code (SMMC), the project requires a total of 23 parking spaces - 14 parking stalls for commercial office use and 9 stalls for residential use. However, the project proposes only 22 subterranean vehicle parking spaces on-site. To reduce the required commercial use parking by 1 unit, the developer has requested a state density bonus waiver to modify the commercial parking ratio from 1 stall per 335 sq.ft. to 1 stall per 360 sq.ft. Additionally, a density bonus waiver has also been requested to allow 66% various sized “compact” spaces, exceeding the allowable 30% (SMMC 27.64). The project has provided more than the required infrastructure for short-term bicycle parking for residents and guests. In addition to the required 2 short-term space and 19 long-term spaces, the project has provided an additional 2 short-term spaces to provide a total of 4 short-term and 19 long-term bicycle parking spaces. The project site is located almost equidistant and within 0.8 miles of both Hayward Park and Downtown San Mateo Caltrain Stations.

**Table 21. Required vs. Provided Bicycle Parking**

| | Required Bicycle Parking | Provided Bicycle Parking |
|---|---|---|
| Multi-family dwelling | 1 Short-term, 18 Long-term | 2 Short-term, 18 Long-term |
| Office | 1 Short-term, 1 Long-term | 2 Short-term, 1 Long-term |

The office and residential community will be managed by a property manager once units are available for rent.

## Physical Attributes

### Site Geography and Road Network

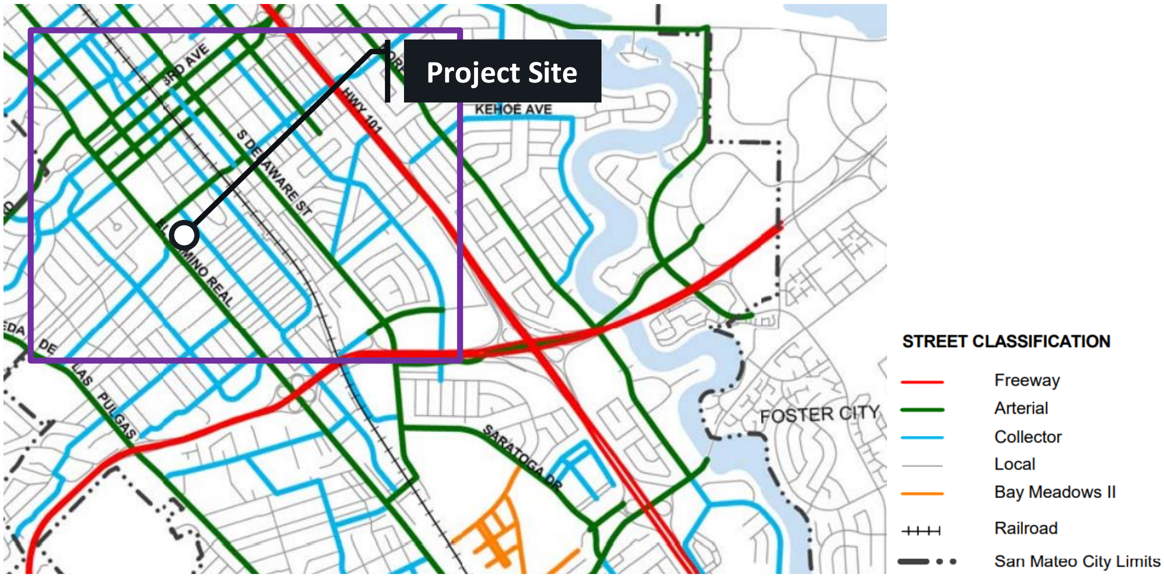
As shown in Figure 8, the project site is located at the intersection of the six-lane arterial El Camino Real (Highway 82) and local street Hayward Ave. The site is surrounded by:

- Arterial N El Camino Real (Highway 82) to the west
- Local street Hayward Ave. to the south
- 3 story multi-family building to the east
- Dentist office and 4 story multi-family building to the north

The site is within walkable distance from Downtown San Mateo, which is less than 0.5 miles away:

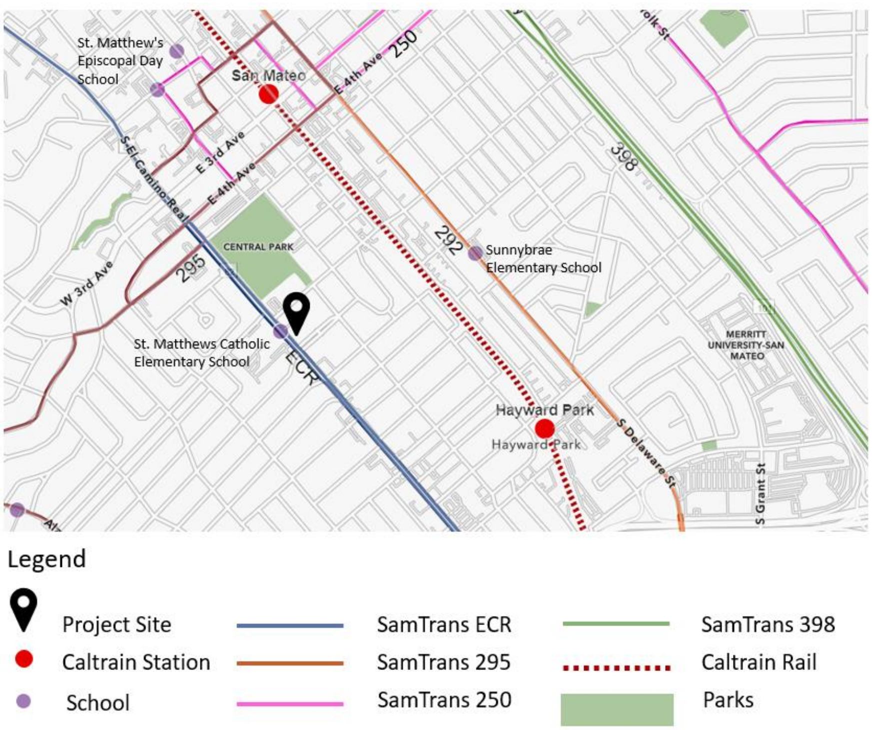
- 4 mins by car
- 3 mins by bike
- 8 mins by SamTrans ECR Bus
- 10 mins by walking

**Figure 8: Street Network**




Source: City of San Mateo General Plan

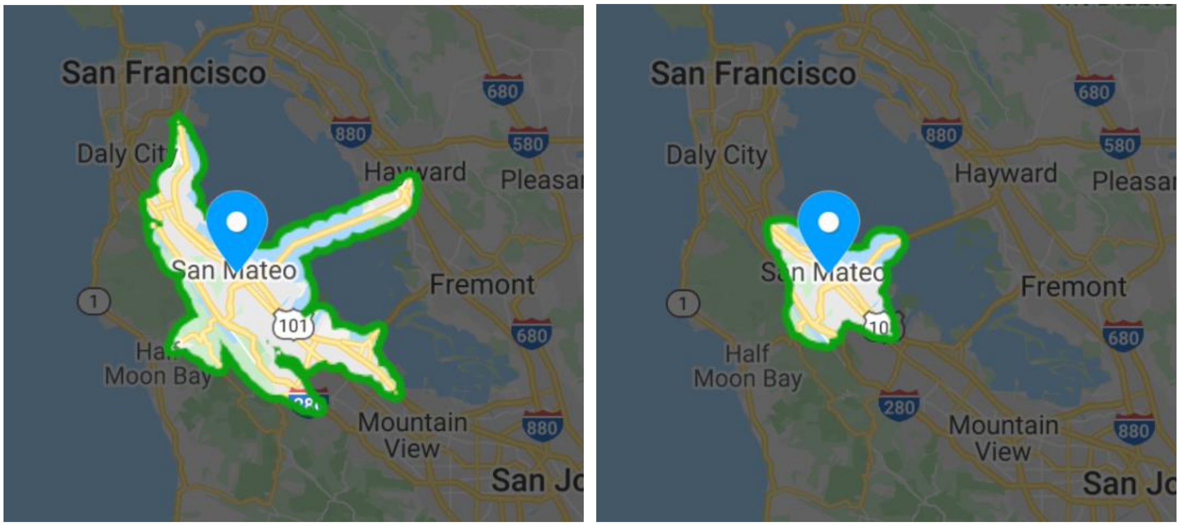
**Figure 9. A view of the project site**




Source: San Mateo County GIS

In terms of highway access, the project site is located adjacent to the N El Camino Real (Highway 82).The closest US-101 and SR-92 highway on-ramps are situated 1.2 miles east and 0.8 miles south of the project site respectively. By traveling on El Camino Real, US-101, and SR-92, drivers can reach as far as San Francisco, Hayward, Palo Alto, and Mountain View within 20 minutes. However, during the peak hours of 4 to 6 PM, driver access is limited significantly, as shown in Figure 10.

**Figure 10. 20 Minute Car Shed for 1 Hayward Ave.**




**Free Flow: 20-minute driving shed from 1 Hayward Ave.** | **Rush Hour: 20-minute driving shed from 1 Hayward Ave.**

Source: WalkScore.com

The intersection of El Camino Real and 4th Ave., the first major intersection coming out of the 1 Hayward Ave. development that has been assessed as part of the 2018 City of San Mateo Existing Conditions Report - Circulation, sees reasonably free flow in the AM with a 'B' Level of Service (LOS) but during PM hours, vehicular traffic at the intersection gets close to capacity and therefore has a "C" LOS.

**Table 22. Levels of service for the El Camino Real and 4th Ave**

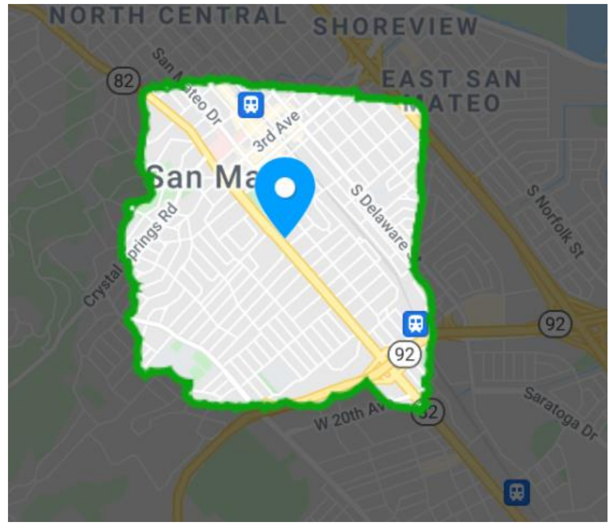
| | Signalized Intersection Peak-Hour Levels of Service | | | |
|---|---|---|---|---|
| | Year 2018 Conditions | | | |
| | AM Peak Hour | | PM Peak Hour | |
| | Delay | LOS | Delay | LOS |
| El Camino Real and 4th Ave | 19.3 | B | 22.3 | C |

Source: San Mateo Existing Conditions Circulation Report (October 2018)

### Pedestrian and Bicycle Infrastructure

The site's topography, street network, and proximity to Downtown San Mateo are conducive to pedestrian and bicycle access. The walkability website Walkscore.com gives the site an 84/100 for walking, which they classify as "*very walkable – most errands can be accomplished on foot*". The walkshed for the project site is seen in Figure 11.

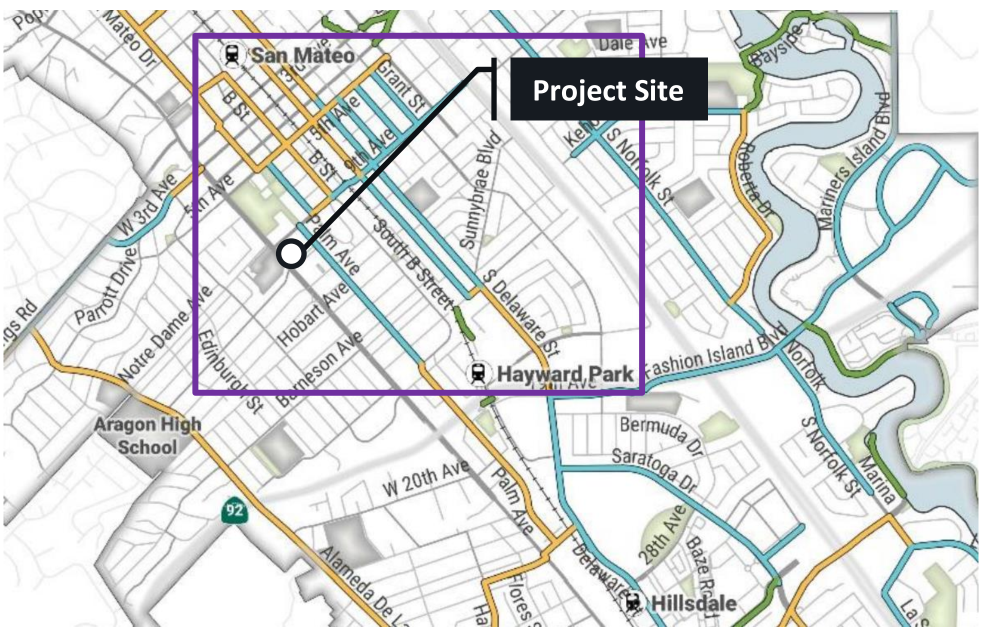
**Figure 11. 20-minute pedestrian shed for 1 Hayward Ave.**

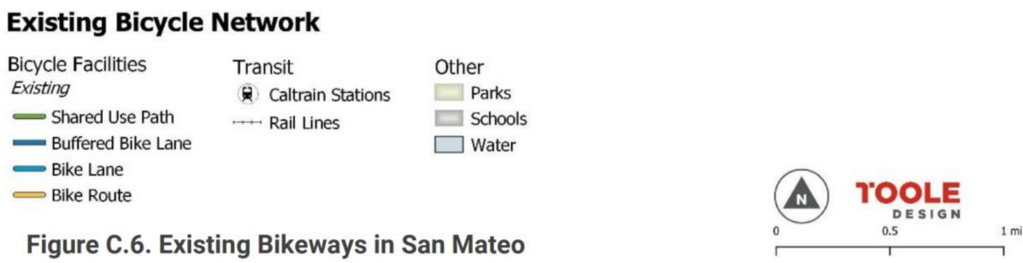



Source: WalkScore.com

Located 400 ft away, the closest existing bike lane to the project site is the Class II bike lane on Palm Ave. that connects Hayward Park Caltrain station to San Mateo Central Park. The Palm Ave. bike lane extends beyond South Blvd. as a Class III bike route that connects the Hayward Park Caltrain Station to 25th Ave. In the north, the Palm Ave. bike lane connects the site to 9th Ave. which extends to Downtown San Mateo. However, there is a network gap between 9th Ave./Palm Ave. and 9th Ave./Laurel Ave. which creates an unsafe intersection for bikers. Delaware St., which can be accessed via the bike lane on Palm Ave. (located 0.5 miles away from the site), is a combination of Class II bike lane and Class III bike route and traverses across the City of San Mateo, connecting the northernmost Peninsula Ave. to Franklin Pkwy in the south which is 0.2 miles north of Hillsdale Blvd. The Delaware St. extends beyond Hillsdale Blvd. as Pacific Blvd. which has segments of both Class II bike lanes and Class III bike routes and provides connectivity to the southerly border of the City. It runs parallel to Caltrain tracks and connects residential and commercial areas to all the three Caltrain stations within San Mateo.

**Figure 12: Existing Bicycle Network**






Source: Toole Design Group (on behalf of City of San Mateo, Bicycle Master Plan 2020)

Due to minimal traffic, presence of on-street vehicular parking, and presence of a bike facility, Palm Ave. has been designated as a “Low-stress” street by the April 2020 San Mateo Bicycle Master Plan and is considered suitable for most adults and families. Overall, the Hayward Park neighborhood is considered to have low-stress bikeways with very few high-stress barriers. However, due to higher traffic stress, and inadequate separation from vehicular traffic, Delaware St. has been classified as a ‘High-stress’ street, which is defined as being uncomfortable or unappealing to all cyclists other than those with high levels of experience and risk tolerance or those traveling by e-bike. As part of the Bicycle Master Plan, the existing bike lanes on Delaware St. are recommended for upgradation to buffered bike lanes to improve north-south connections into and out of Downtown San Mateo. Figure 13 shows the stress level of the surrounding area, with the immediate project area denoted by a purple box.

**Figure 13: Level of Stress**

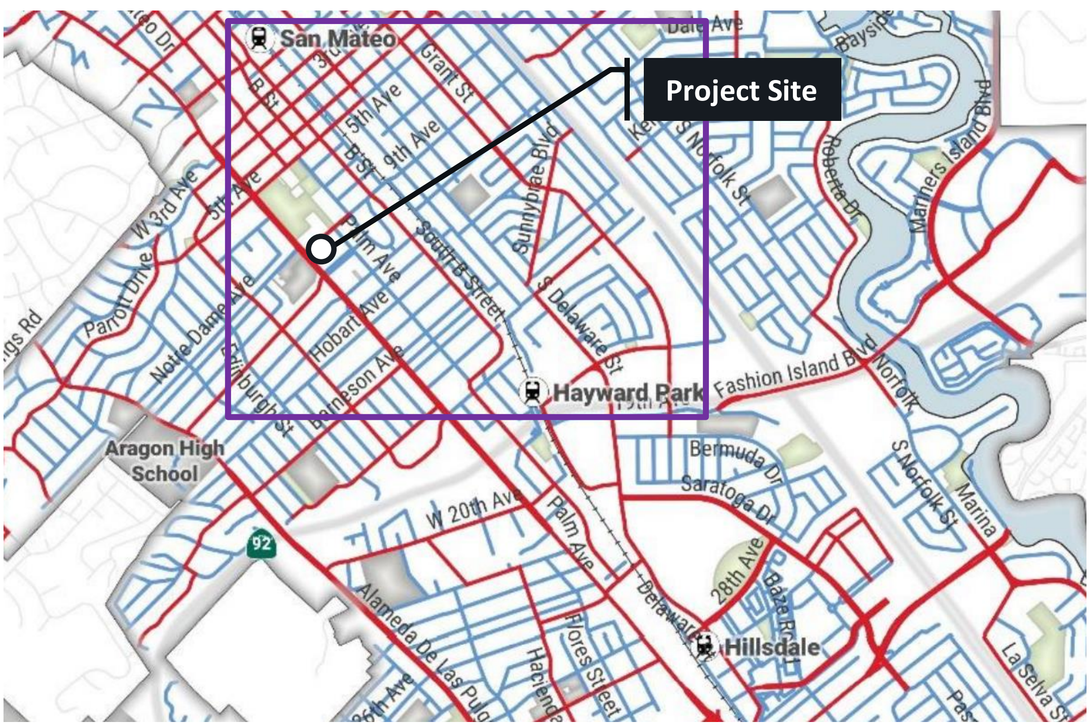



**Figure D.2. Level of Bicycle Traffic Stress – Street Network**

Source: Toole Design Group (on behalf of City of San Mateo, Bicycle Master Plan 2020)

In terms of nearby bicycle amenities, BikeLink operates multiple on-demand bike lockers located at nearby Caltrain Stations as well as the Hillsdale Shopping Center and its surrounding area. BikeLink allows bicyclists to securely store their bikes in lockers using a stored-value card that can be purchased online or at nearby vendors. There are four lockers at the nearest Caltrain Station (Hayward Park) and 24 at the Downtown station. Additionally, four free-to-use public bike repair stations are located within two miles of the project site. These stations are located at San Mateo City Hall, the San Mateo Main Library, Ryder Court Park, and the downtown San Mateo Caltrain station.

**City of San Mateo Bicycle Master Plan**

The **2020 Bicycle Master Plan** was adopted by the City Council on April 6, 2020, and serves as a blueprint for expanding and improving the San Mateo bicycle and mobility network in the coming years. The Plan includes four recommendations relevant to 1 Hayward Ave. project site:

- Notre Dame Ave. and 9th Ave. are offset from one another at El Camino Real, creating a dogleg intersection that will require bicycle infrastructure treatments along the short segment to connect the existing bike facilities.
- Bike lane on 9th Ave., connecting El Camino Real to S B Street
- Bike boulevard along Hobart Ave./12th Ave. connecting Edinburgh St. to S B St.
- Buffered bike lane along Delaware St, connecting 5th Ave. to Concar St.

**Transit Services**

The project site is located within a 0.8-mile walk from both the San Mateo and Hayward Park Caltrain Stations. The project site is also served by two San Mateo County Transit District (SamTrans) routes.

*Caltrain*

Caltrain connects the project site to San Francisco to the north as well as San Jose and Gilroy to the south. The project site is near both the San Mateo and Hayward Park stations, which can be accessed via bike, walk, transit, and car.

| Category | San Mateo Station | Hayward Park Station |
|---|---|---|
| Frequency | 30-minute service during peak | Hourly service during peak |
| Walking Distance to Station | 0.8 miles | 0.8 miles |

| | | |
|---|---|---|
| | | |
| Access | Park and ride lot, bike racks, and BikeLink lockers | Park and ride lot, bike racks, and BikeLink lockers |
| Cost | $3.20 - $10+ depending on distance | $3.20 - $10+ depending on distance |

*SamTrans*

There are two SamTrans bus routes accessible to the project site within a 5-minute walk, which are described in the table below. SamTrans route ECR currently connects the project site to Daly City to the north and Palo Alto to the south. Route 55 offers connections to a middle school with a school-day only service schedule. The bus stop closest to the project site can be accessed via bike, walk, and car. Each SamTrans bus is equipped with bus bike racks that hold up to three bikes and trips cost $2.25 in cash or via mobile app or $2.05 if a Clipper card is being used.

| SamTrans Route # | Hours of Operation | Frequency | Closest Stop | Distance to Closest Stop | Route Details |
|---|---|---|---|---|---|
| ECR | Daily – 4 AM to midnight | 15 minutes | El Camino Real & 9th Ave | 0.1 miles/ 2-minute walk | Connecting Daly City BART Station to Palo Alto Transit Center |
| 55 | School Day Service Schedule | 1 morning bus, 2 afternoon busses | El Camino Real & 9th Ave | 0.1 miles/ 2-minute walk | Connection to a middle school |

## Nearby Attractions

There are several attractions in the project vicinity that residents may visit regularly. Some of these attractions are detailed below and will likely be considered in the development of the final TDM plan.

**Shopping**

There are four shopping destinations within one-and-half mile walking distance of the project site that offer a large variety of retail and dining options.

- Downtown San Mateo shopping area (0.5 miles), located primarily along E. 4$^{th}$ Ave. and 3$^{rd}$ Ave. and between N. El Camino Real and S. Eldorado St., provides access to a multitude of retail outlets, eateries, and grocery stores such as Draeger's market, Suruki supermarket, etc.
- Borel Square Shopping Centre (0.8 miles) has a pharmacy, gym, and additional fast-casual food options. There are also several fast-casual dining and stand-alone shopping options along El Camino Real and 20$^{th}$ Ave.
- Shopping area along 17$^{th}$ St. and between N El Camino Real and Palm Ave. (0.8 miles) has a major grocery store, banks, and restaurants.

- A shopping center (1.2 miles) is located at the intersection of Concar Drive and S. Delaware St. and includes major outlets such as T J Maxx, Rite Aid, Shane Co., Ross Dress for Less, Trader Joes, etc.

**Schools and Child Care**

About 18.5 percent of the population[4] in the residential area (census tract) surrounding the project site have children under 18 years of age, suggesting that future tenants may need to add school or childcare trips into their schedule. Since school drop-offs and pickups can lead to significant traffic and congestion twice daily, the TDM Plan will explore synergies with existing Safe Routes to School (SRTS) programs and related trip reduction strategies.

*Childcare Centers*

There are five childcare centers located within a mile walking distance of the project site.

- Papillon Preschool managed by Bright Horizons (0.3 miles) on N. El Camino Real
- Lucy's Learn and Plan Daycare (1 mile) at the corner of Folkstone Ave. and Sunnybrae Blvd.
- Cheryl's Daycare (1.1 miles at the intersection of S. Delaware St. and Cypress Ave.
- Playful Learning Preschool/Childcare (0.9 miles) on Harrow Ave.
- Bright Beginnings Montessori Preschool (0.3 miles) on Hobart Ave.

*Nearby Schools*

There are over a dozen schools within two miles' travel of the project site. A comprehensive list of schools located within 2 miles of the project site is listed in Table 23.

**Table 23. Proximate School Distances**

| Nearby Schools | Travel distance in miles |
|---|---|
| St. Matthew Catholic Elementary School | 0.2 |
| **Sunnybrae Elementary School*** | 0.7 |
| St Matthew's Episcopal Day School | 0.7 |
| **Borel Middle School*** | 0.8 |
| **Aragon High School*** | 0.8 |
| Baywood Elementary School | 0.9 |
| South Hillsborough Elementary | 1.3 |
| Crystal Springs Uplands School | 1.4 |
| St. Timothy School | 1.5 |
| Stanbridge Academy | 1.5 |
| San Mateo High School | 1.6 |
| College Park Elementary School | 1.6 |
| San Mateo Adult School | 1.7 |

[4] *2019 American Community Survey (ACS) 5-Year Estimates*

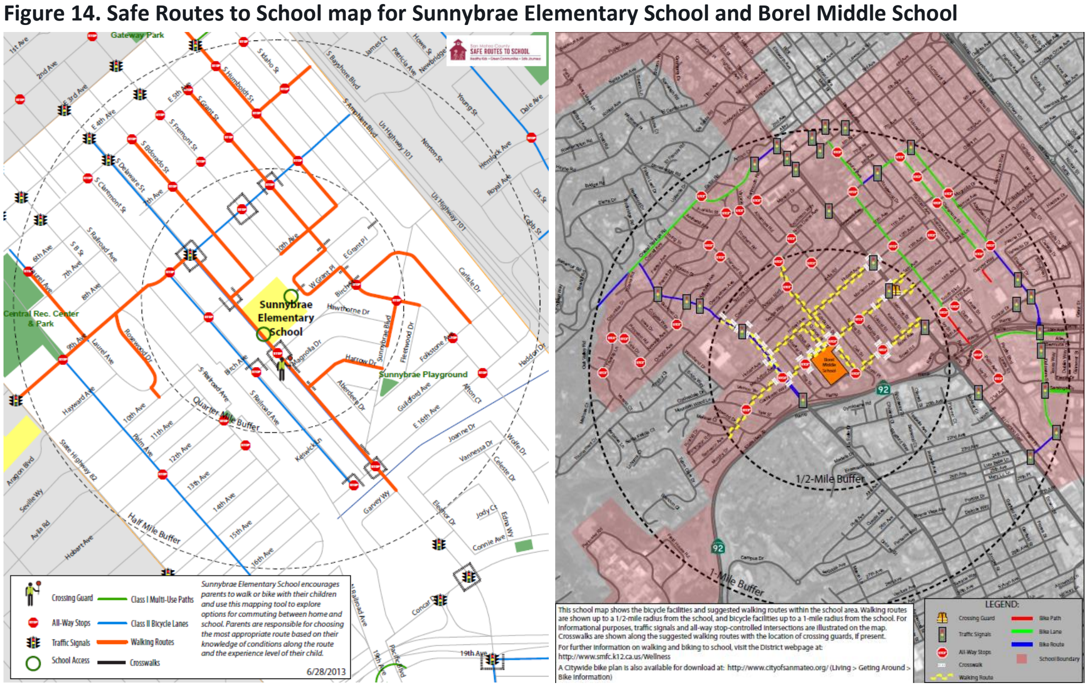
| | |
|---|---|
| San Mateo Park School | 1.7 |
| North Shoreview Montessori | 1.8 |
| Pacific Rim International School | 1.9 |
| St. Catherine of Siena School | 1.9 |

*Assigned public schools for 1 Hayward Ave.

The 1 Hayward Ave. project site is zoned for, and is within walking and biking distance from, Sunnybrae Elementary School and Borel Middle School, which is included in the County's Safe Routes to School program. **Safe Routes to School San Mateo County** promotes biking and walking to school for children countywide. The program focuses on improving the health, well-being, and safety of children as well as reducing traffic congestion and emissions caused by school-related travel. The program is led by a network of implementors and volunteers, often parents and PTA members.

Figure 14 shows the scope of this Safe Routes to School program within a half-mile radius, including suggested walking and biking routes to Sunnybrae Elementary School and Borel Middle School.

**Figure 14. Safe Routes to School map for Sunnybrae Elementary School and Borel Middle School**




Source: San Mateo County Safe Routes to School Program

### *Other Educational Institutions*

There are two universities within a 2-mile radius from the site.

- Draper University (0.5 miles by foot ) on 3rd Ave. is a private, for-profit school that offers boot camp-style educational programming in collaboration with Arizona State University.
- Samuel Merritt University on S. Amphlett Blvd. (2 miles by car) is the San Francisco Peninsula campus of the Oakland-based Samuel Merritt private university, focused on health sciences.

**Parks**

There are three parks located within one mile of the project site.

- San Mateo Central Park is a 16.5-acre park, bounded by 9th Ave. on the south, E 5th Ave. on the north, N El Camino Real on the west, and Laurel Ave. on the east. The southern entrance to the site is only a 3 minutes' walk and 1 minute bike ride (0.2 miles) from the project site. The park is the first public park in San Mateo and hosts a baseball field, tennis courts, sculptures, playground, Japanese tea garden, recreation center, miniature train, rose garden and the San Mateo Arboretum. Central Park is one of the most popular parks in San Mateo and thereby brings in both visitor and residential footfall, which will need to be considered when determining the TDM strategies.
- De Anza Historical Park is a relatively smaller park, located along Arroyo Ct. It is one of the historical parks along the 1,200-mile Juan Buatista de Anza National Historic Trail that commemorates the route traveled by Anza and the colonists from Nogales, Arizona, to San Francisco. The park has a historic camp-site marker from 1775. The park is located only 0.7 miles away from the project site can be easily accessed by walk (14 mins) or by bike (4 mins).
- Hayward Square Park is a 0.25-acre community park, located at the intersection of S B St. and 12$^{th}$ Ave. The park includes a garden, benches and chess playing areas.

## Available TDM Services:

**Commute.org Incentives**

Commute.org is San Mateo County's Transportation Demand Management Agency. Their resources are available to all residents and employees in the County. As such, the residents and employees of the project site will be able to take advantage of TDM resources curated for those commuting within the County and in the surrounding areas. The Commute.org website serves as a regional clearinghouse for all transportation and commuting-related information. They also provide the following services:

- **Try Transit Incentives:** Commute.org provides a free 'try transit' program that allows individuals to request free tickets for the transit option that works best for them.
- **Carpool Incentives:** Commuters who use Waze Carpool or Scoop are eligible to earn gift cards worth up to $100.
- **Vanpool Incentives:** Drivers of a new vanpool can earn a $500 reward, and vanpool riders can be reimbursed $100/month of their costs for up to three months.
- **Bike Education:** Free bike safety workshops and bike marketing materials are available to residents and commuters. These are scheduled upon request and are available to employers and other sites, including residential properties, within San Mateo County. They can be 60, 75, or 90 minutes in length depending on what is ideal for the requesting party and include time for Q&A.
- **Bike Incentives:** Commute.org currently provides commuters who live or work in San Mateo County with incentives worth between $25 to $100 for biking to work. To participate in the program, bike commuters must track their work commutes using the Strava app. The rides

are then recorded in the STAR platform, iCommute.org's incentive delivery platform, where commuters can access their incentives.

## Travel Trends:

The travel trends and insights detailed in this section are based on data associated with the project's census tract (6064.00). Census tracts are similar to neighborhoods and established by the Census Bureau for the purpose of analyzing populations.

### Demographic Insights

The project site is located within **census tract 6064**, which has a population of 5,134 people. The demographic information in Table 24 and Figure 15 is collected from Census and 2019 **American Communities Survey (ACS)** data and will provide insight into the residents' needs and behaviors.

**Table 24. Demographic data for census tract 6064**

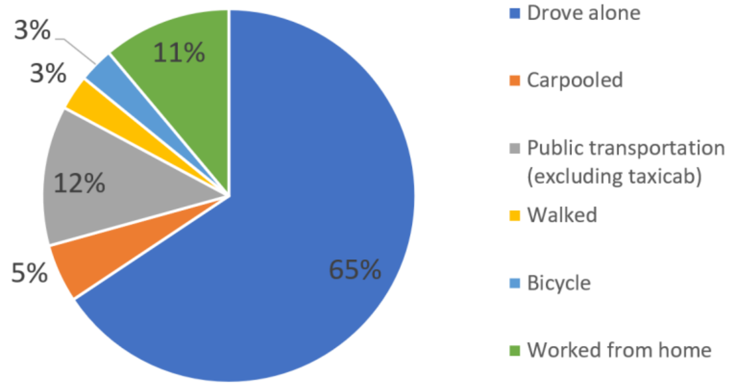
| Category | Characteristics | Amount |
|---|---|---|
| **Age** | Under 18 | 14% |
| | 18 to 64 | 62% |
| | Over 65 | 23% |
| **Education** | Bachelor's degree or higher | 73.1% |
| **Households** | Number of households | 2,413 |
| | Renter-Occupied Housing Units | 59% |
| | Persons per household | 2.1 |
| | Median household income | $167,165 |
| **Race** | White alone | 56% |
| | Asian alone | 25% |
| | Hispanic or Latino (of any race) | 12% |
| | Black or African American alone | 0.3% |
| **Languages spoken** | Speak only English | 65% |
| | Speak a language other than English: Spanish | 10% |
| | Speak a language other than English: Indo-European Languages | 6% |
| | Speak a language other than English: Asian and Pacific Island languages | 18% |

Source: 2019 ACS 5-Year Data Esitmates

### Commute Insights

American Communities Survey data from 2018 indicates that a majority (65%) of those who live within the census tract commute to work by driving alone (Figure 15). The data also shows that 23% of the population uses sustainable alternatives to drive-alone such as transit, carpool, walk and bike. The mean commute time across all travel modes is 30.6 minutes. About 11% of the population indicated that they regularly "worked from home", however the share of teleworkers may be in flux at this time and in the future, due to the pandemic.

**Figure 15. Commute mode split for residents living in census tract 6064**




Source: 2019 ACS 5-Year Data Estimates, Census.gov (Universe: workers aged 16 and up)

As shown in Table 25, residents of the area commute to a wide variety of locations, with 11.8% commuting within the City of San Mateo, and 11.2% commuting to San Francisco

**Table 25. Where people living in census tract 6064 worked in 2018**

| Job Locations | Count | Share |
|---|---:|---:|
| San Mateo, CA | 211 | 11.8% |
| San Francisco, CA | 201 | 11.2% |
| San Jose, CA | 76 | 4.2% |
| Foster City | 74 | 4.1% |
| South San Francisco | 52 | 2.9% |
| Other Locations | 1,176 | 64.1% |
| **All Places (Cities, CDPs, etc.)** | **1,790** | **100%** |

Source: U.S. Census Bureau, Center for Economic Studies

Inflow/Outflow analysis of the census tract, as shown in Figure 16, depicts that 2,422 individuals commute out of the area and 1,745 people commute into the area for work on a daily basis. A total of forty-five individuals both live and work inside the census tract.

**Figure 16. Inflow/Outflow of Commuters for census tract 6064**


Source: U.S. Census Bureau, Center for Economic Studies

## Next Steps

Based on the information gleaned from the Background Assessment, our team will develop a Draft TDM Plan. The TDM Plan will include a list of recommended and optional TDM Strategies for the project site, and will touch on the following types of strategies:

- Site elements
- Education and incentives
- Service provision
- Monitoring and reporting

Based on comments from the City of San Mateo we will edit and submit a finalized TDM Plan and will work with the City to ensure it is approved.

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|---|---|
| | 03.02.2022 |