Attachment XI

KITTELSON & ASSOCIATES

PARCEL GROUP 3 ENTITLEMENTS
LOCAL TRANSPORTATION ANALYSIS

HAYWARD, CA

June 1, 2021

Inside front cover

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Parcel Group 3 Entitlements Local Transportation Analysis (Draft Report)

Hayward, CA

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Project Number 24641
City of Hayward Planning Application #202001594

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Section 1 — Executive Summary

EXECUTIVE SUMMARY

This report presents the findings and conclusions of the local transportation analysis conducted by Kittelson & Associates for the proposed Parcel Group 3 (PG 3) project (the Project) located in Hayward, California. This report documents the non-California Environmental Quality Act (CEQA) local transportation analysis conducted for this project and complements the CEQA transportation impact analysis documented in the *VMT Impact Assessment Memorandum*.

PG 3 is located at the northeastern corner of Mission Boulevard and Tennyson Road in Hayward. The proposed project consists of 176 affordable rental apartments (38 studios, 47 one-bedroom, 44 two-bedroom, 47 three-bedroom) and a charter school serving 384 elementary students. Primary access to the project site for the school portion will be provided via Tennyson Road, with secondary access for the residential portion via two driveways on 16th Street.

Summary of Findings and Recommendations

The *VMT Impact Assessment Memorandum* previously determined that the project can be screened out of a detailed vehicle miles traveled (VMT) analysis under the City's Senate Bill 743-consistent VMT criteria. Therefore, it was determined that the project would have a **less-than-significant** VMT impact under CEQA. No mitigation measures were identified.

Non-CEQA recommendations have been made in this report to address multimodal transportation conditions and to be incorporated as part of this project.

To address local bus transit accessibility, the property owner should:

- Coordinate with AC Transit to improve user amenities at the two AC Transit bus stops at the intersection of Mission Boulevard and Hancock Street.

To address pedestrian conditions and accessibility, potential pedestrian-oriented treatments that could be considered as part of design review and conditions of approval include:

- Ensure that the project driveways are designed for pedestrian visibility safety (sidewalks clearly delineated, improved visibility by minimizing bushes and large signs).
- Coordinate with the City of Hayward to install warning signage (such as caution signage for exiting vehicles) and continental crosswalks at Site Access/Tennyson Road intersection.
- Explore options to improve pedestrian accessibility west of the project site, including along 16th Street and Hancock Street. Improvements can include marked crosswalks and bulbouts at the East 16th Street/Hancock Street intersection.
- There is the opportunity to add yellow continental school crosswalks at the Tennyson Road/Mission Boulevard intersection.

To address bicycling conditions and accessibility, potential bicycle-oriented treatments that could be considered as part of design review and conditions of approval include:

- Coordinate with the City of Hayward to install signage (such as bikeway signage and caution signage) and green conflict zone markings through the Site Access Road/Tennyson Road intersection.
- Consider implementing facilities to accommodate bicyclists (and pedestrians) crossing Tennyson Road to access the project site (e.g., marked north/south crosswalk at the Site Access Road/Tennyson Road intersection or a midblock location).
- Consider a treatment to improve downhill westbound bicycling conditions approaching the Mission Boulevard/Tennyson Road intersection. Note, Solutions for this location are limited by multiple constraints:

  - A pocket bike lane between the through and right turn lanes may not be feasible due to the curb-to-curb right-of-way or to avoid offsetting the westbound through lane. The length of the pocket bike lane (more than 300 feet) could result in a high-stress situation with vehicles traveling on both sides of bicyclists for an extended period of time.
  - A shared bike/right turn lane may be high-stress for children and other users due to the length of the right-turn lane and downhill vehicle speeds.
  - Solutions may require shortening the westbound right-turn lane at the Mission Boulevard & Tennyson Road intersection to reduce bicyclist stress.
- Consider installing bike routes with sharrows along residential roads such as Hancock Street and 16th Street to facilitate bike access to and from the project. This could be combined with traffic calming strategies due to increased vehicle volumes.

Recommendations to improve student pick-up/drop-off circulation consist of the following:

- Install school area signage and pavement markings according to MUTCD standards.
- Relocate the northern drop-off area away from the traffic circle.
- Short-term parking spaces should be identified past the student loading area and near the building entrance.
- Block access to the residential area of the parking lot during student drop-off/pick-up
- Assign staff parking to the areas west of the traffic circle, leaving the parking spaces within the loop drive open for parents during the drop-off and pick-up times.
- At the designated drop-off areas north and west of the elementary school building, paint the curb white and mark it as "passenger loading during student drop-off and pick-up times." "No Parking" signs should be installed indicating the times of the day when parking is not allowed.
- Traffic cones and other channelizing devices can be used to minimize pedestrian/vehicles conflicts.
- Student safety patrols and loading supervisors should be well trained and wear reflective safety vests.
- Install signage to indicate that parking is not allowed during drop-off/pick-up times and drivers must remain in the vehicles. Signage should also direct kindergarten/early childhood and lower grade drop-off/pick-up to the southern drop-off/pick-up zones, and upper grade drop-off/pick-up to the northern drop-off/pickup zone. Kindergarten/early childhood students should be walked to the school buildings by staff during drop-off times, as opposed to parents parking and walking their students.
- The applicant for the school should prepare a traffic and parking management plan. The plan would identify the parking areas for staff, visitors, parking restrictions, management of the student drop-off/pick-up, locations of crossing guards, staff and monitors assisting with student drop-off/pick-up, and an advanced student identification system so students can be matched to their parents. The plan should be prepared for the satisfaction of City of Hayward Public Works staff and submitted prior to building occupancy permits. The plan should include a process to reduce or eliminate the need for the parents to get out of the vehicle at drop-off locations to provide an efficient and safe drop-off and pick-up procedure. The plan should also include staggered drop-off schedules.
- The applicant should prepare a transportation demand management (TDM) plan to encourage carpooling, rideshare, and other modes and facilitate carpool matching for staff and students.

Given the anticipated increase in traffic volumes on local residential streets such as 16th Street and Hancock Street, project applicant should work with the City of Hayward to explore options for implementing traffic calming techniques along those streets. These measures can also support improved bicycle and pedestrian conditions in the neighborhood and access to the project site. Potential traffic calming techniques that could be applied to these streets include:

- Narrowing lanes
- Adding curb extensions and bulbouts
- Horizontal deflection

- On-site restrictions should be put in place to prohibit access to/from the project's charter school component from the East 16th Street driveways during peak periods of school pick-up and drop-off.

Recommendations to improve circulation and access are as follows:

- Along 16th Street, ample trees and on-street parking could potentially obstruct driveway sight distance. Parking should be prohibited within close proximity of the driveways to improve visibility and sight distance.
- In order to improve visibility and safety at the school access point on Tennyson Road for eastbound and westbound vehicles, it is recommended that an inbound left turn lane be added along Tennyson Road at the Site Access Road. Tennyson Road is currently approximately 35 feet wide (with two vehicle lanes and two bike lanes) adjacent to the project. Adding an inbound turn lane and its taper would require widening Tennyson Road by approximately 11 feet.

Section 2 — Methodologies and Existing Conditions

METHODOLOGIES AND EXISTING CONDITIONS

PG 3 is located at the northeastern corner of Mission Boulevard and Tennyson Road in Hayward. The proposed project consists of 176 affordable rental apartments (38 studios, 47 one-bedroom, 44 two-bedroom, 47 three-bedroom) and a charter school serving 384 elementary students. Primary access to the project site for the school portion will be provided via Tennyson Road, with secondary access for the residential portion via two driveways on 16th Street. The study area and project site are shown in Figure 1.

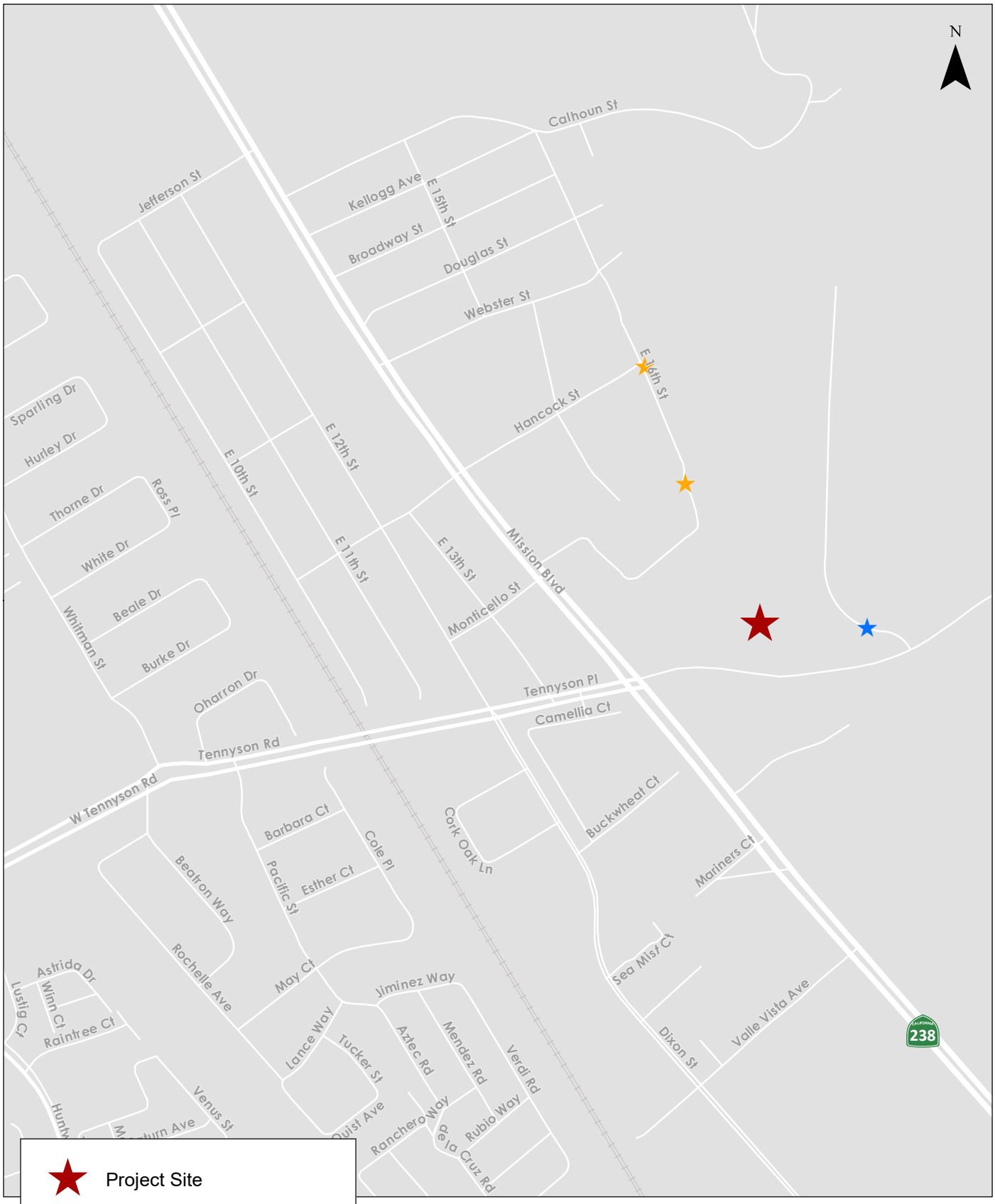
This local transportation analysis is therefore subject to the regulations and standards in place in the City of Hayward. These standards are outlined in the Hayward 2040 General Plan – Mobility Element (2014) and the City of Hayward Interim Traffic Study Guidelines (March 2017). Note, the City of Hayward published its updated Transportation Impact Analysis Guidelines in December 2020; however, this report refers to standards and methodologies that were in place at the time of scoping.

The analysis methodology used in this report was approved by City Transportation Staff prior to commencement of the study.

Intersection Level of Service Standards

Under Senate Bill (SB) 743, a project's effect on automobile delay shall not constitute a significant environmental impact. Therefore, level of service (LOS) and other similar vehicle delay or capacity metrics may no longer serve as transportation impact metrics for California Environmental Quality Act (CEQA) impact analyses. The Governor's Office of Planning and Research (OPR) has updated the CEQA Guidelines and provided a final technical advisory in December 2018 which recommends vehicle miles traveled (VMT) as the most appropriate measure of transportation impacts under CEQA. For land use and transportation projects, SB 743-compliant CEQA analysis became mandatory on July 1, 2020.

The City of Hayward has adopted VMT thresholds of significance and screening criteria, which were used in the *VMT Impact Assessment Memorandum* for impact analysis purposes. This report documents LOS analysis (consistent with the City's 2017 interim guidelines and the City's 2040 General Plan polices) which was considered part of the non-CEQA analysis conducted to determine any negative project effects on local roadway operations.



Study Area and Project Site
Hayward, California

Figure
1

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Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

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Goal 4 Local Circulation-M-4.3 of the City of Hayward's 2040 General Plan requires intersections to maintain a peak-hour level of service (LOS) of E or better for signalized intersections. M-4.3 describes this as follows: The City shall maintain a minimum Level of Service E at signalized intersections during the peak commute periods except when a LOS F may be acceptable due to costs of mitigation or when there would be other unacceptable impacts, such as right-of-way acquisition or degradation of the pedestrian environment due to increased crossing distances or unacceptable crossing delays.

Under SB 743, a project's effect on automobile delay shall not constitute a significant environmental impact. Therefore, LOS is included for non-CEQA purposes to determine if local intersections operate acceptably and if the project would result in any operational deficiencies on the local roadway network. This approach is consistent with the City's adopted thresholds of significance and screening criteria.

Signalized Intersections

Signalized intersection improvements should be identified if the project would degrade the AM or PM peak hour conditions from an acceptable LOS E or better under the No Project scenario to an unacceptable LOS F under the Plus Project scenario. The exception to this criterion is when LOS F is determined by the City of Hayward as acceptable due to right-of-way constraints or when there would be unacceptable impacts to other modes of travel, such as bicycle, pedestrian, or transit.

In addition, improvements should be identified at an intersection already operating at LOS F under an Existing or No Project scenario if the addition of project traffic results in an increase of 5.0 seconds or more to the intersection's average control delay.

Unsignalized Intersections

At unsignalized intersections, the need for improvements is based on LOS and delay, and whether any of the following are met:

- Traffic signal warrant,
- Pedestrian signal warrant, or
- All-way stop warrant

Note that solely triggering a warrant does not trigger the need for an intersection improvement, but the City will at its discretion require or not require a signal be installed, where warranted.

Level of Service Definitions

In this report, LOS is based on the Highway Capacity Manual (HCM) 6th edition definitions, included as Table 1 for ease of reference. The HCM methodology assigns a level of service (LOS) grade to an intersection based on the delay for vehicles at the intersection, ranging from LOS A to LOS F; LOS A signifies very slight delay with no approach phase fully utilized, while LOS F signifies very high delays and congestion, frequent cycle failures, and long queues. For signalized and all-way stop-controlled intersections, the average control delay for all vehicles is assessed; for two-way stop-controlled intersections, the intersection approach with the highest delay is utilized.

Table 1: Level of Service Standards

Level of Service	Delay Per Vehicle (Seconds)	
	Signalized Intersection	Unsignalized Intersection
A	< 10.0	< 10.0
B	> 10.0 to 20.0	> 10.0 to 15.0
C	> 20.0 to 35.0	> 15.0 to 25.0
D	> 35.0 to 55.0	> 25.0 to 35.0
E	> 55.0 to 80.0	> 35.0 to 50.0
F	> 80.0	> 50.0

SOURCE: HIGHWAY CAPACITY MANUAL

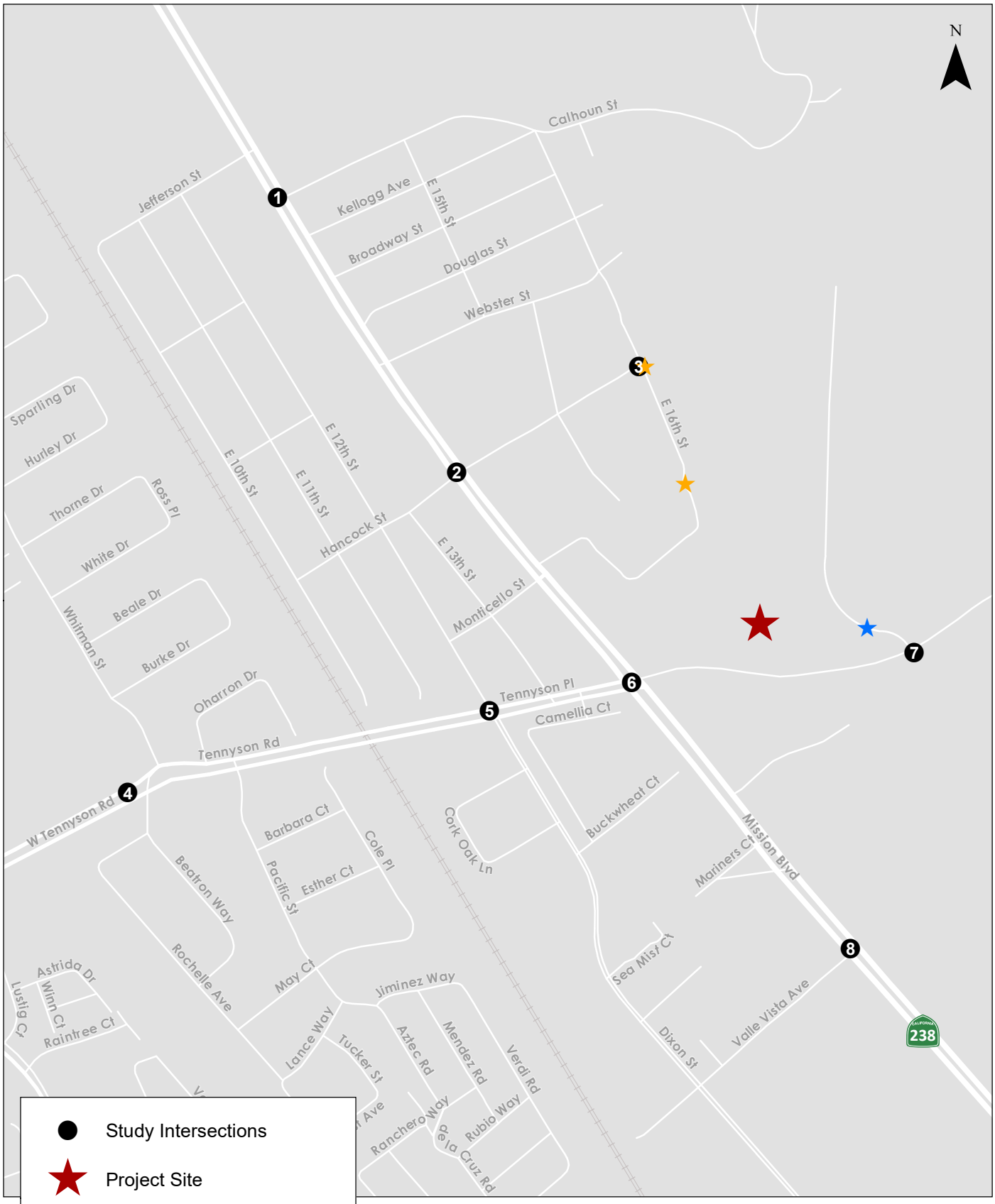
Study Intersections

A total of eight study intersections (listed in Table 2 and shown in Figure 2) were selected for the purposes of this analysis. All study intersections are under the City of Hayward's jurisdiction. These study intersections were selected based on discussions with City staff and the project's anticipated trip distribution patterns.

Table 2: Study Intersections

	Intersection	Traffic Control
1	Mission Boulevard & Calhoun Street	Signal
2	Mission Boulevard & Hancock Street	Signal
3	East 16th Street & Hancock Street	TWSC
4	Whitman Street/Beatron Way & Tennyson Road	Signal
5	East 12th Street/Dixon Street & Tennyson Road	Signal
6	Mission Boulevard & Tennyson Road	Signal
7	Site Access Road & Tennyson Road	TWSC
8	Mission Boulevard & Valle Vista Avenue	Signal

NOTE: TWSC SIGNIFIES A TWO-WAY STOP-CONTROLLED INTERSECTION. AWSC SIGNIFIES AN ALL-WAY STOP-CONTROLLED INTERSECTION.



Intersection Study Locations
Hayward, California

Figure
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Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

EXISTING NETWORK

Existing multimodal transportation facilities are discussed in this section.

ROADWAY NETWORK

The roadway system in the study area consists of arterial, collector, and local roadways that serve local and regional traffic demand. The vehicular facilities in the study area are discussed below. Signalized intersections in the study area are shown in Figure 3.

Arterials Roadways

Mission Boulevard is a north-south facility that is classified as a Principal Arterial and designated as a truck route by the City of Hayward. Mission boulevard runs from Interstate 680 in Fremont to the Interstate 580/Interstate 238 interchange in Castro Valley. Also known as State Route 238 (SR 238), the road splits into two one-way roads north through downtown Hayward: Foothill Boulevard heading northbound and Mission Boulevard heading southbound. Within the study area, Mission Boulevard is a six-lane facility with a center median south of Industrial Parkway. North of Industrial Parkway, Mission Boulevard is primarily a four-lane facility with a center median, but widens to a six-lane facility at the intersection approaches and departures at Harder Road, Tennyson Road, and Industrial Parkway. Travel lanes are typically 11 feet wide, and on-street parking is available when the facility is four lanes wide. The curb-to-curb right-of-way is approximately 80 feet and widens up to 106 feet at its widest around intersections. The posted speed limit is 35 miles per hour (mph) north of Tennyson Road and 40 mph south of Tennyson Road.

Tennyson Road is an east-west Principal Arterial and truck route (west of Mission Boulevard) that runs from Mission Boulevard west to the South Hayward Bay Area Rapid Transit (BART) station, Interstate 880, and Industrial Boulevard. East of Mission Boulevard, Tennyson Road is classified as a local road and connects to one of the proposed project access points. The road is a four-lane facility with a center median within the study area. Travel lanes are typically 12 feet wide, and there is on-street parking available on both sides of the roadway. The curb-to-curb right-of-way is approximately 90 feet wide. The posted speed limit varies between 25 and 35 mph.

Industrial Parkway is an east-west Minor Arterial and truck route (west of Mission Boulevard) that runs from Mission Boulevard west to Interstate I-880 (I-880) and Hesperian Boulevard before turning northward as Industrial Boulevard and connecting to State Route (SR) 92. At the Ruus Road intersection, Industrial Parkway becomes two separate roads: Industrial Parkway SW and Industrial Parkway W. Industrial Parkway SW allows northbound traffic from I-880 to exit at Whipple Road to access Industrial Parkway SW; there is no such northbound exit when I-880 and Industrial Parkway W intersect. The road is a four-lane facility with a center median within the study area. Travel lanes are typically 11 feet wide, and there is on-street parking available on both sides of the roadway. The curb-to-curb right-of-way is approximately 90 feet wide, widening to 102 feet wide on the eastbound approach with the Mission Boulevard intersection. The posted speed limit is 45 mph. East of Mission boulevard, this facility is Alquire Parkway.

Harder Road is an east-west Minor Arterial and truck route from Mission Boulevard west that connects with SR 92 and Jackson Road. Harder Road to the east of Mission Boulevard is a Collector Road that provides access to California State University, East Bay. The road is a four-lane facility with a center median within the study area. The inner travel lanes on Harder Road are 12 feet wide, and the outer travel lanes are 15 feet wide. The curb-to-curb right-of-way is approximately 88 feet wide. The posted speed limit is 35 mph.

Huntwood Avenue is a north-south Minor Arterial that connects to Industrial Parkway W and the city's industrial area to the south, as well as toward Harder Road heading north. The road is a truck route north of Tennyson Road. The road is a four-lane undivided roadway south of Tennyson Road and a two-lane road north of Tennyson Road. Along the four-lane portion, lanes are 11 feet wide, and there is on-street parking on both sides of the street where there is no center left-turn lane. The curb-to-curb right-of-way on the four-lane section of the road is approximately 72 feet. Along the two-lane portion, lanes are 11 feet wide, and

there is on-street parking on both sides of the street. The curb-to-curb right-of-way is approximately 48 feet. The posted speed limit is 30 mph.

Collector Roadways

Dixon Street is a north-south Collector that runs from Industrial Parkway and the Mission Hills of Hayward Golf Course to the South Hayward BART station at Tennyson Road. North of Tennyson Road, the road becomes East 12th Street and continues to head north. The road is a two-lane undivided facility with 12-foot travel lanes and on-street parking on both sides of the road. There is no on-street parking when a left-turn lane is present. The curb-to-curb right-of-way is approximately 48 feet. The posted speed limit is 25 mph.

Valle Vista Avenue is an east-west Collector that runs from Mission Boulevard to the BART railroad tracks, where it ends in a cul-de-sac. The road is a two-lane undivided facility and with a double yellow centerline at intersection approaches. Travel lanes are approximately 13 to 14 feet wide, and there is on-street parking along the road. The curb-to-curb right-of-way varies between 30 feet near Mission Boulevard to 40 feet at the western end of the road. Valle Vista Avenue does not have a posted speed limit.

Alquire Parkway is an east-west Collector that connects the Mission Boulevard/Industrial Parkway intersection with neighborhoods to the east. The road is classified as a Collector between Mission Boulevard and Vanderbilt Street; heading east, the road becomes a Local roadway. The road is a divided facility on the approach to Mission Boulevard; otherwise, it is a two-lane undivided roadway with on-street parking east of Vanderbilt Street. Travel lanes vary between 10 and 14 feet depending on the section of roadway. The curb-to-curb right-of-way varies between 42 feet on the two-lane section and 80 feet on the approach to Mission Boulevard. The posted speed limit is 25 mph. West of Mission boulevard, this facility is Industrial Parkway.

Whitman Street is a north-south Collector that runs from Tennyson Road north toward Jackson Street, running parallel to the BART railroad tracks. The road connects to several schools, including Cesar Chavez Middle School, Tennyson High School, and Harder Elementary School. The road is a two-lane undivided facility with 11-foot travel lanes and on-street parking on both sides of the road. The curb-to-curb right-of-way is approximately 44 feet. The posted speed limit is 25 mph.

Local Roadways

Hancock Street is an east-west Local roadway that runs from the general site area in the east to the BART railroad tracks. The road is a two-lane undivided facility and with a double yellow centerline at the approaches to Mission Boulevard. The curb-to-curb right-of-way varies between 30 feet west of Mission Boulevard and 48 feet east of Mission Boulevard. There is on-street parking on both sides of the road along its entire length. The posted speed limit is 25 mph.

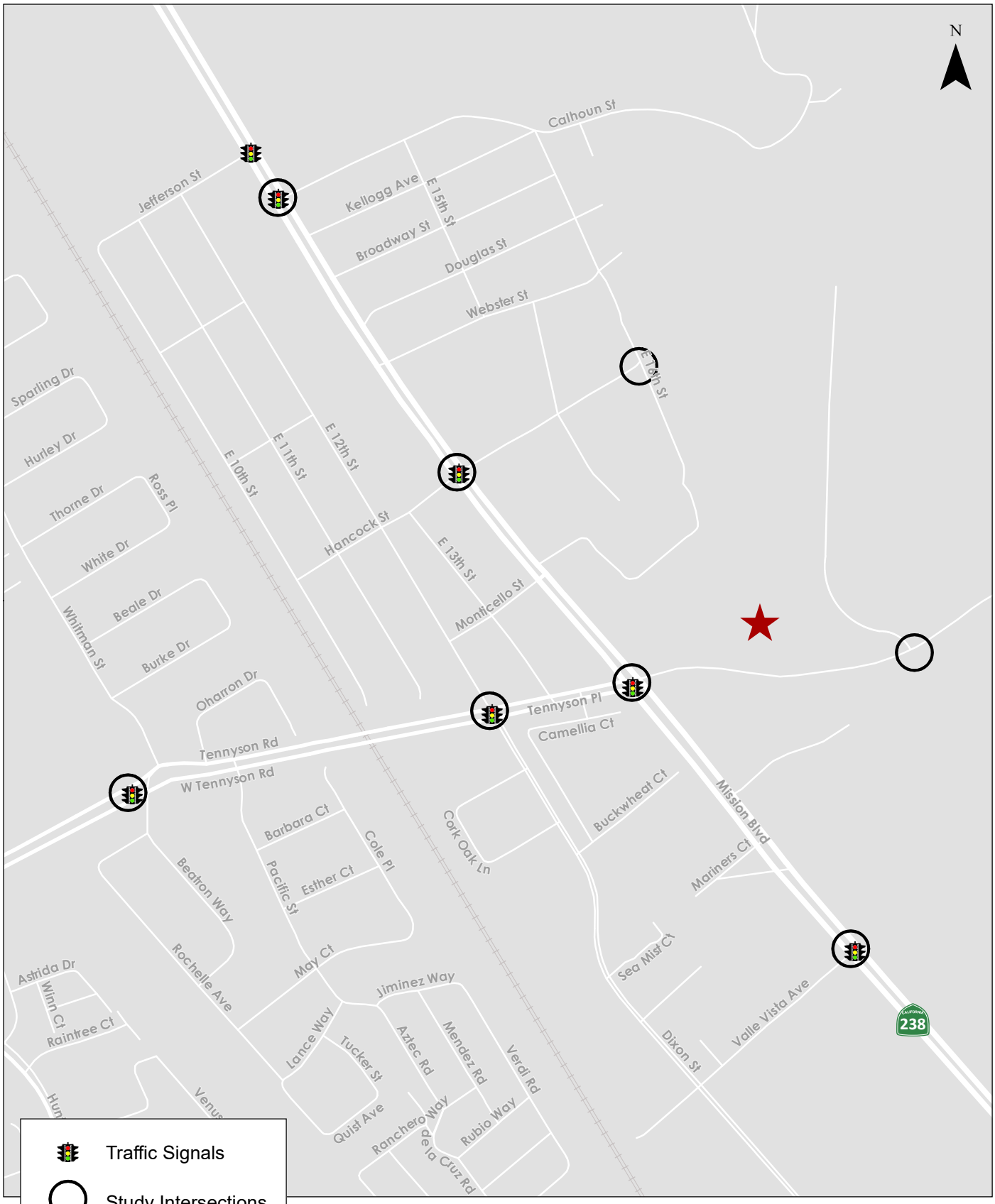
East 16th Street is a north-south Local roadway that runs from a cul-de-sac near the proposed project site to Calhoun Street and Moreau Catholic High School. The road is a two-lane undivided facility with no centerline. The curb-to-curb right-of-way is approximately 36 feet within the study area with on-street parking on both sides of the road. This road does not have a posted speed limit.

Calhoun Street is an east-west Local roadway that runs from Mission Boulevard and Moreau Catholic High School east into residential areas. The road is a winding two-lane undivided facility and with a double yellow centerline when approaching Mission Boulevard. The curb-to-curb right-of-way is approximately 30 feet, with a narrowing and varying right-of-way as the roadways ascends heading east. The posted speed limit is 25 mph.

East 12th Street is a north-south Local roadway that connects to Dixon Street, Tennyson Road, and the South Hayward BART station to the south and Jefferson Street to the north. The road is a two-lane undivided facility and with a double yellow centerline when approaching the Tennyson Road intersection. The curb-to-curb right-of-way is approximately 32 feet, and there is on-street parking on both sides of the roadway.

The only signage with speed information is the "Speed Humps Ahead – 15 MPH" accompanying speed humps.

Beatron Way is a north-south Local roadway that connects to Whitman Street, Tennyson Road, and Cesar Chavez Middle School to the north into the neighborhood immediately to the south. The road is a two-lane undivided facility with a double yellow centerline at intersections and around curves. The curb-to-curb right-of-way is approximately 34 feet, and there is on-street parking on both sides of the roadway. The posted speed limit is 25 mph.



Existing Traffic Signals
Hayward, California

Figure
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Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

TRANSIT SERVICE

The transit system in the study area consists of local bus and regional rail service. The transit facilities in the study area are discussed below and shown in Figure 4.

Alameda-Contra Costa Transit District

Alameda-Contra Costa Transit District (AC Transit) provides bus service in the study area. AC Transit bus routes and local bus stops are shown in Figure 4. In addition, weekday bus service in the study area is documented in Table 3.

Table 3: Existing AC Transit Weekday Service

Route	Beginning and End Points		Peak / Off-Peak Frequency (in Minutes)
	North/West	South/East	
41	Hayward BART	Union Landing Transit Center	60 / 60
86	Hayward BART	South Hayward BART	35 / 35
99	Hayward BART	Fremont BART	25 / 25
801	San Leandro BART	Fremont BART	N/A / 60

SOURCE: AC TRANSIT SERVICE CHANGES EFFECTIVE SUNDAY, MARCH 29, 2020.

Two of the four bus lines run along Mission Boulevard, and all four routes make stops at the South Hayward BART station. Line 801 is an overnight bus that complements Line 99 to provide 24-hour service on Mission Boulevard. Line 41 runs north-south with service along Huntwood Avenue near the site, and Line 86 is a local route in Hayward that connects downtown Hayward, Winton Avenue, Cabot Boulevard, Industrial Boulevard, and Tennyson Road to the South Hayward BART.

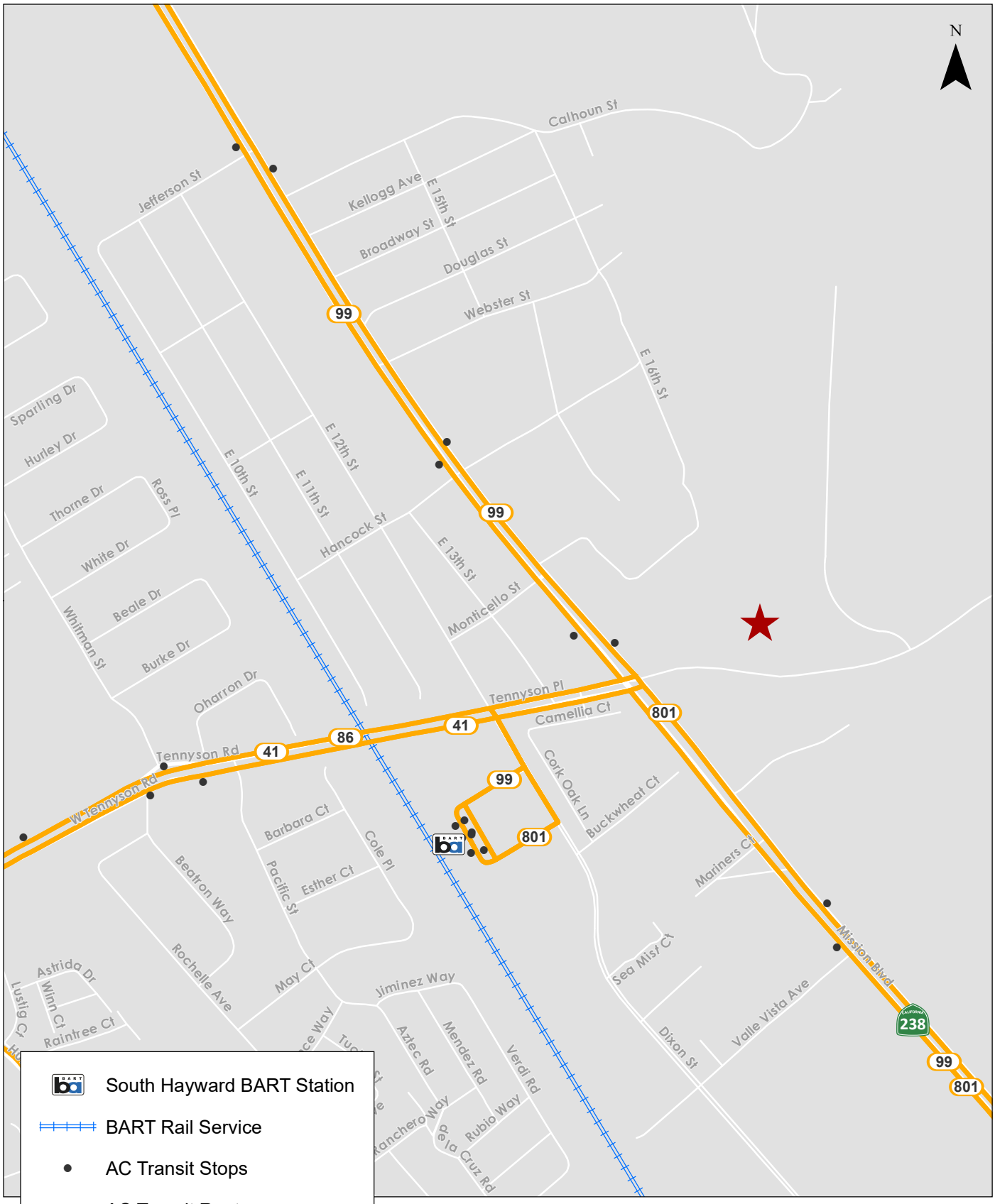
Generally, curbside transit stops along Mission Boulevard and Tennyson Road in the study area are identified with posted signs and lighting and do not include passenger amenities such as a shelter, seating, landscaping, or bicycle parking. The northbound and southbound bus stops at Mission Boulevard and Tennyson Road each provide a shelter, bench, and trash can. The South Hayward BART station has bus boarding islands, bike lockers, shelters, benches, trash cans, signage, and lighting.

Bay Area Rapid Transit

The South Hayward Bay Area Rapid Transit (BART) station is a major transit hub and a key transfer point for BART-to-bus and bus-to-bus connections. There are nine bus bays serving four AC Transit routes at the South Hayward BART station. BART operates regional heavy rail service connecting San Francisco, San Mateo, Alameda and Contra Costa Counties. The South Hayward BART station is located to the west of the study area and is part of the Berryessa/North San Jose-Richmond and Berryessa/North San Jose-Daly City lines. Each line currently operates at 15-minute headways during peak periods, resulting in an average peak period frequency of 7.5 minutes at the station.

Other Transit Services

The Hayward Greyhound bus station is located north of the study area at the Hayward BART station. In addition, the Hayward Amtrak Station is located approximately three miles northwest of the South Hayward BART station; the Hayward Amtrak station is part of the Capitol Corridor operating between San Jose and Sacramento.



Existing Transit Network
Hayward, California

Figure
4

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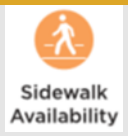
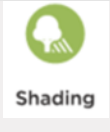
KITTELSON & ASSOCIATES

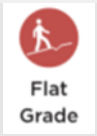
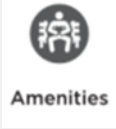
Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

PEDESTRIAN FACILITIES

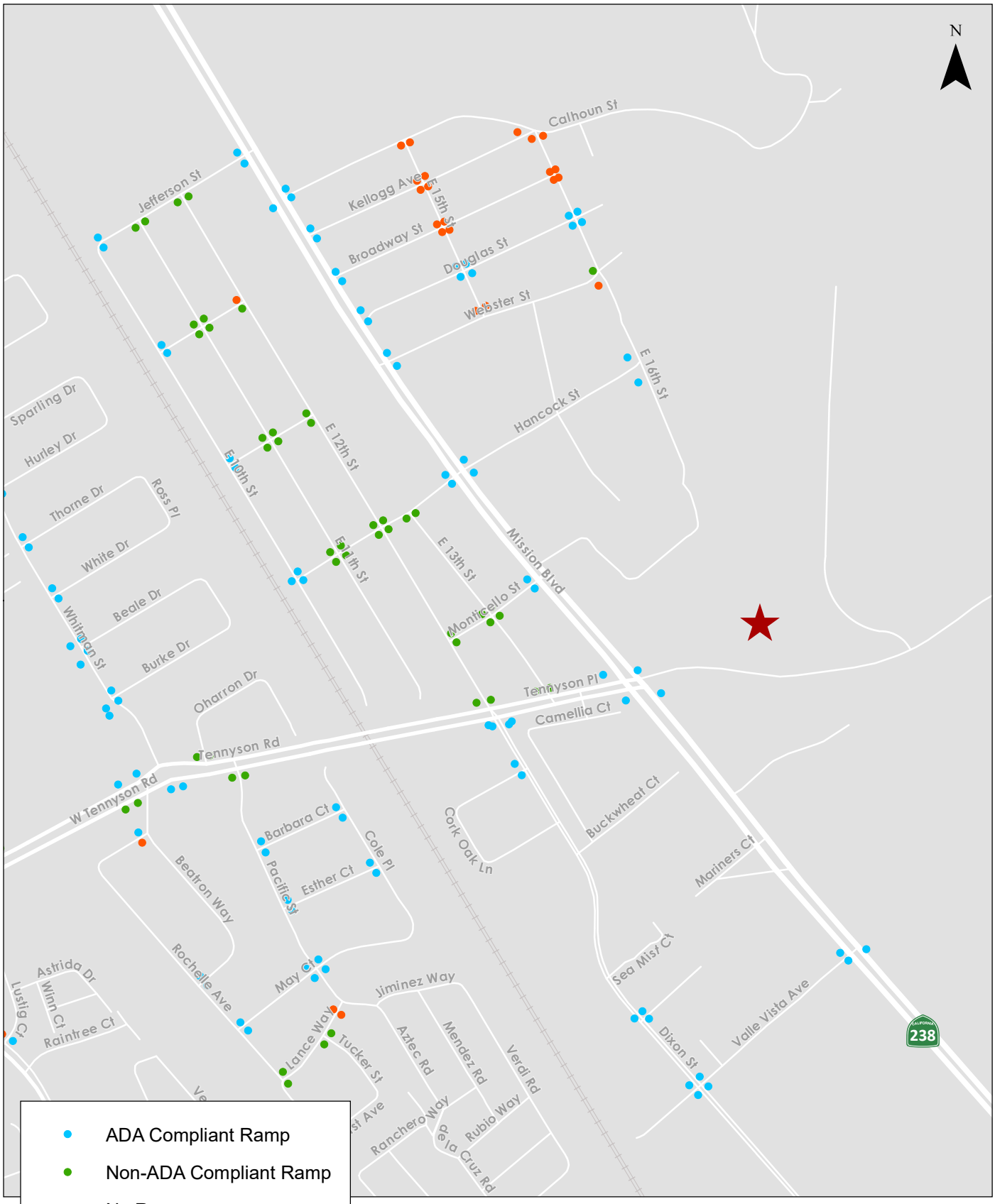
The study area offers several types of facilities and amenities that support walking. The availability and quality of pedestrian facilities can be analyzed using seven key factors as shown in Table 4.

Table 4: Pedestrian Facility Conditions

Factor	Description	Assessment
	Sidewalk availability is core to supporting walkability and safety separating pedestrians from vehicles and other modes. In addition, it is important that sidewalks are present on both sides of the roadway and are available along the entire segment rather than end midblock.	All of the Arterial roadways within the study area have sidewalks on both sides of the roadway with no gaps. Most Collector roadways have complete sidewalk coverage, as well. The exceptions are Valle Vista Avenue (which has sidewalk gaps west of Mission Boulevard), Harder Road (where the sidewalks on both sides of the road drop east of Bryn Mawr Avenue), and Tennyson Road (on the south side east of Mission Boulevard). There are significant sidewalks gaps along Local roads in the study area, especially east of Mission Boulevard. While there are sidewalks along Hancock Street, East 12th Street, and Beatron Way, East 16th Street has sidewalks on the west side of the street only (which contains gaps), and Calhoun Street generally does not provide sidewalks.
	Cracked, broken, or otherwise damaged sidewalks can pose a safety hazard and discourage walking.	Where sidewalks exist, they are generally in good condition free of cracks, breaks, or visible damage. At a few locations along Hancock Street and Beatron Way, grass and other plants have overtaken parts of the sidewalk, but the sidewalk is continuous through all of these areas.
	Marked crosswalks can safely accommodate pedestrians that need to cross streets. A lack of marked crosswalks could hinder walkability since pedestrians need to travel greater distances to reach a safe marked crossing point. Drivers may also be less likely to yield to intersections at unmarked crossings.	All signalized intersections on Mission Boulevard within the study area have marked crosswalks, and all of these crosswalks have continental striping, except for the east and west crosswalks at Mission Boulevard/Industrial Parkway. Intersections on Tennyson Road have a mixture of continental and standard striping. These crosswalks are in good condition. There are no marked crosswalks at the East 16th Street/Hancock Street and Site Access/Tennyson Road intersections. As shown in Figure 5, arterial intersections in the study area tend to provide Americans with Disabilities Act (ADA) compliant curb ramps. Local streets to the west of Mission Boulevard tend to provide standard curb ramps, while Local streets to the east of Mission Boulevard (near the project site) generally lack curb ramps.
	Shading, whether natural or artificial, can encourage walking in areas such as Southern California which are relatively warm with limited rainfall, especially in the summer.	Mission Boulevard, with its wide right-of-way, generally lacks shade for pedestrians, especially on the east side of the road. Other arterials, such as Tennyson Road and Industrial Parkway, have more intermittent shade from street trees. Several Collector and Local roadways have ample shade for pedestrians from street trees or buildings. These

Factor	Description	Assessment
		include Dixon Street, Hancock Street, Beatron Way, Huntwood Avenue, and East 16th Street. A couple of streets do not, including East 12th Street and Whitman Street.
	Steep hills and ravines can discourage walking, especially for pedestrians with limited mobility.	The land to the east of Mission Boulevard slopes upward at a fairly steep angle for pedestrians, which affects pedestrian accessibility from Mission Boulevard. The remaining study area is generally flat with mild inclines or declines for short stretches.
	Buffers which provide separation between pedestrians and moving vehicles can help improve the walking experience, and can include landscaping, parked vehicles, and bulbouts, which serve to both reduce pedestrian crossing distances at intersections and as a traffic calming measure.	There are several roadway sections that have a landscaped or planted buffer between the sidewalk and the road. These include Tennyson Road east of Mission Boulevard, Hancock Street, Huntwood Avenue south of Tennyson Road, and Industrial Parkway (the south side of the road is a multi-use path). There are also several roadway sections that have an intermittent buffer, such as street trees or planters. These include Mission Boulevard, Tennyson Road west of Mission Boulevard, and Huntwood Avenue north of Tennyson Road. All of these roads also have parked cars between the sidewalk and the motor vehicle lanes. All other low-volume roads have intermittent buffers or no buffer space at all.
	In addition to physical facilities that accommodate walking, useful or interesting amenities along sidewalks create a more interesting walking environment and increase pedestrian comfort. Amenities can include sidewalk-adjacent retail and restaurants, landscaping, and street furniture.	Street furniture is generally lacking along the roadways in the study area, except at bus stops with benches and shelters. The arterial roadways in the study area generally have either landscaping features or sidewalk-adjacent businesses. Tennyson Road, Industrial Parkway, and Huntwood Avenue have landscaping present. Mission Boulevard has several street-facing businesses along the corridor, although these are often spaced long distances apart. Lower classification roads generally have some landscaping or no other pedestrian amenities.

SOURCE: KITTELSON AND ASSOCIATES, INC., 2021.



Existing Crosswalk Ramps
Hayward, California

Figure
5

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KITTELSON & ASSOCIATES

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

BICYCLE FACILITIES

The study area contains a bicycle facilities network that consists primarily of dedicated street space for bicyclists. Figure 6 displays the existing designated bicycle facilities in the study area.

Bicycle facilities are categorized into four types, as described below:

- **Class I Bikeway (Bike Path).** Also known as a shared path or multi-use path, a bike path is a paved right-of-way for bicycle travel that is completely separate from any street or highway.
- **Class II Bikeway (Bike Lane).** A striped and stenciled lane for one-way bicycle travel on a street or highway. This facility could include a buffered space between the bike lane and vehicle lane and the bike lane could be adjacent to on-street parking.
- **Class III Bikeway (Bike Route).** A signed route along a street where the bicyclist shares the right-of-way with motor vehicles. This facility can also be designated using a shared-lane marking (sharrow).
- **Class IV Bikeway (Separated Bike Lane).** A bikeway for the exclusive use of bicycles including a separation required between the separated bikeway and the through vehicular traffic. The separation may include, but is not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking.

As shown in Figure 6, the existing bicycle facilities near the project site include:

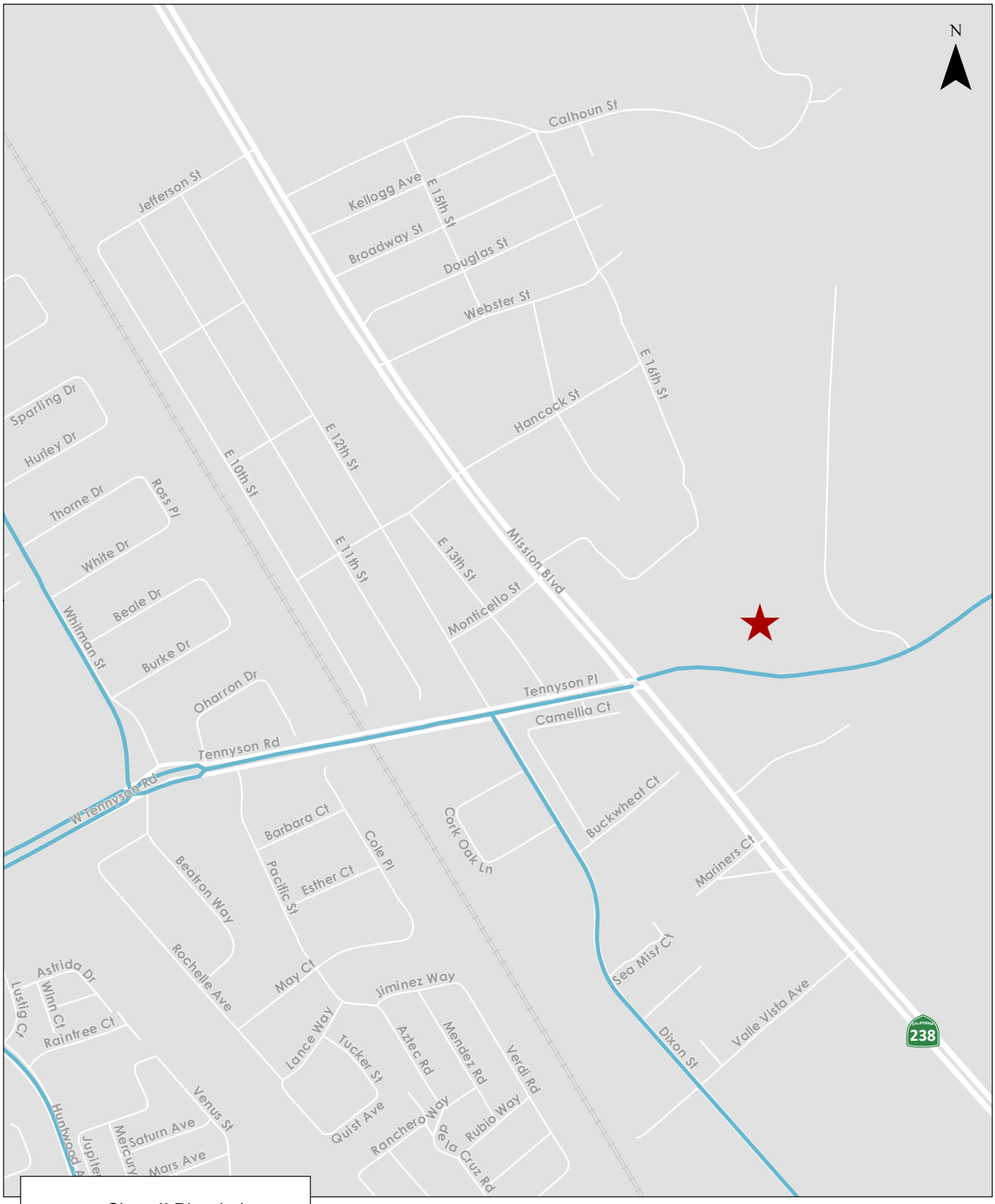
- Class II bike lanes on Tennyson Road
- Class II bike lanes on Dixon Street
- Class II bike lanes on Whitman Street

Other on-street bicycle facilities in the study area include the following:

- Green conflict zone markings and pocket bike lanes along Tennyson Road west of Mission Boulevard

The City of Hayward Bicycle & Pedestrian Master Plan (BPMP), includes the following bicycle improvements in the study area:

- Class IV separated bikeway on Mission Boulevard
- Class IV separated bikeway on Tennyson Road west of Mission Boulevard
- Class IV separated bikeway on Huntwood Avenue south of Tennyson Road
- Two Class I paths (parallel to Mission Boulevard and to the railroad tracks)
- Class II buffered bicycles lane on Dixon Street
- Class III bicycle boulevard on East 12th Street



Class II Bicycle Lanes

Project Site

Existing Bikeway Network
Hayward, California

Figure
6

KITTELSON & ASSOCIATES

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

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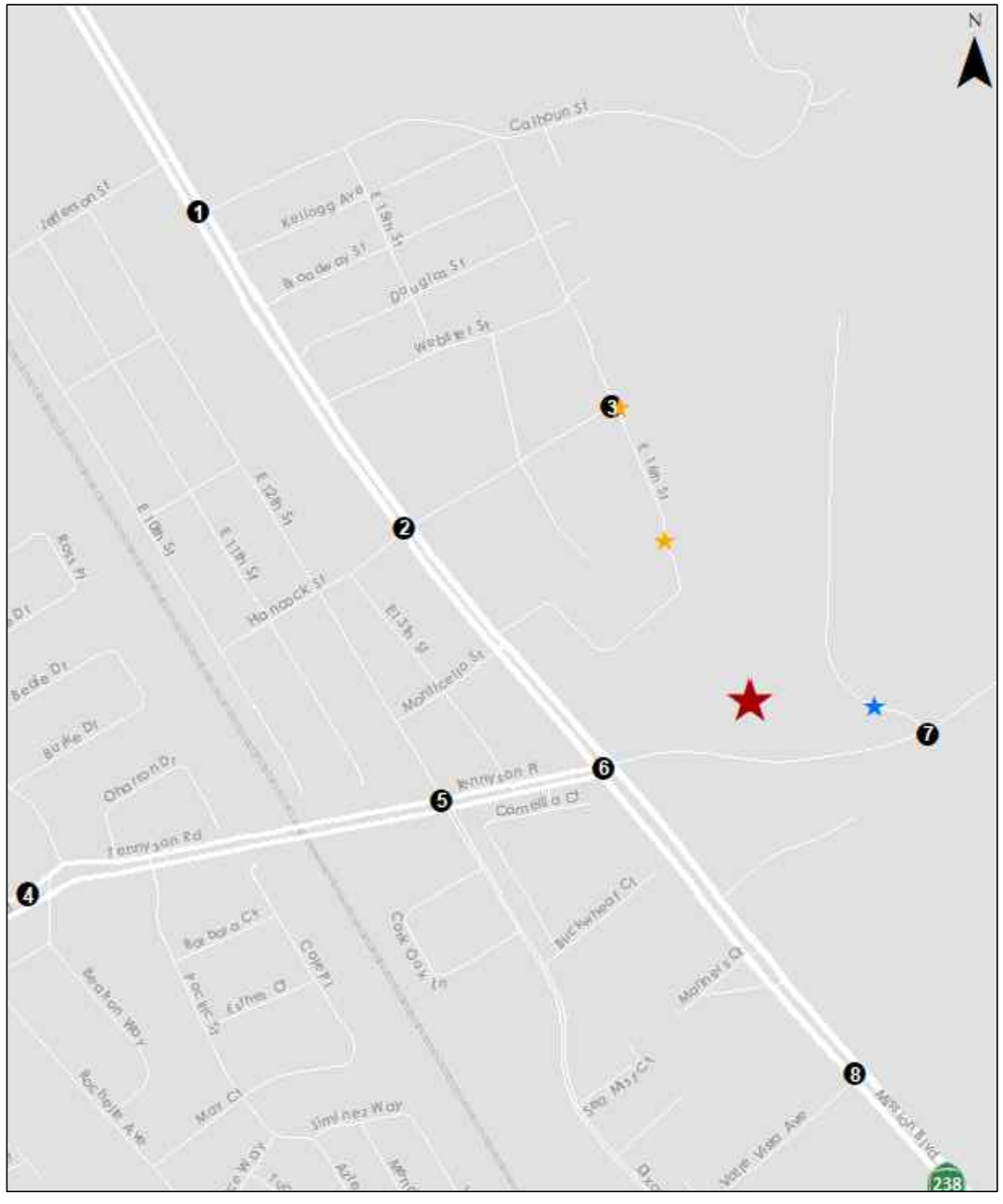
EXISTING TRAFFIC VOLUMES

Automobile Traffic Volumes

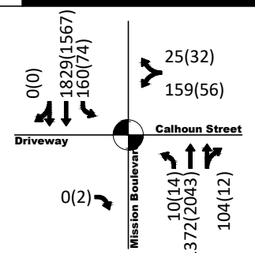
Vehicle turning movement data was collected in March 2020 during the weekday morning (7:00 AM to 9:00 AM) and evening (4:00 PM to 6:00 PM) peak periods. Because the traffic counts were collected shortly before the statewide COVID-19 shelter in place order, the counts were anticipated to be lower than normal. Therefore, the counts were compared to traffic counts collected during normal conditions in 2018 and 2019 at two of the study intersections (intersections #6 and #8) as well as two other adjacent intersections on Mission Boulevard. Generally, it was found that the AM peak hour counts were up to 15% lower during the pandemic and the PM peak hour counts were up to 5% lower. Therefore, it was concluded that:

- Historical counts would be used to analyze intersections #6 and #8.
- For the remaining intersections, the March 2020 counts would be used with growth applied uniformly (15% to the AM counts and 5% to the PM counts).
- The adjustment methodology was verified and approved by City Transportation staff

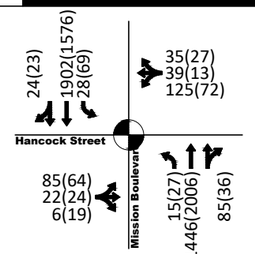
Figure 7 shows the existing automobile peak hour volumes at the study intersections, including the adjusted volumes where applicable. Intersection control (i.e., signalized or stop-controlled) and lane geometries are also shown. Field-collected count sheets and the COVID-19 adjustment calculations are provided in the appendix to this report.



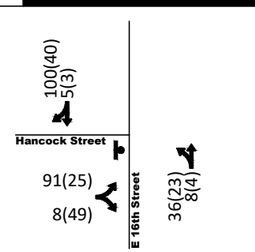
1 Mission & Calhoun



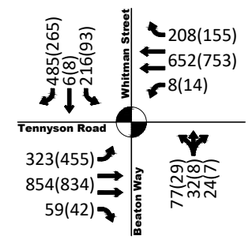
2 Mission & Hancock



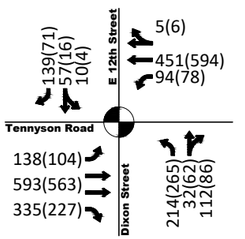
3 E 16th & Hancock



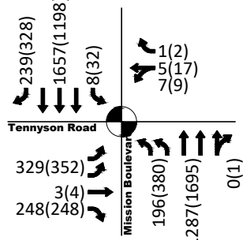
4 Beatron/Whitman & Tennyson



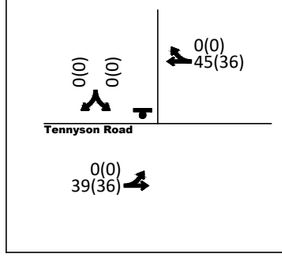
5 Dixon/E 12th & Tennyson



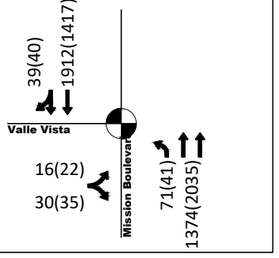
6 Mission & Tennyson



7 Tennyson & Main Entry Access



8 Mission & Valle Vista



AM(PM) - Traffic Volume
- All-Way Stop
- Stop Sign
- Traffic Signal

Existing Automobile Peak Hour Volumes
Hayward, California

Figure 7

KITTELSON & ASSOCIATES

Pedestrian and Bicycle Volumes

Pedestrian and bicycle volumes were collected at the study intersections as part of the data collection effort. Table 5 and Table 6 present the pedestrian and bicycle volume data for the weekday AM and weekday PM peak hours, respectively. Generally, most intersections experienced higher levels of bicycle and pedestrian activity during the PM peak hour. One exception is the intersection of Whitman Street/Beatron Way & Tennyson Road, which experienced more than twice the pedestrian volumes during the AM peak hour compared to the PM peak hour.

Table 5: Pedestrian and Bicycle Volumes (Weekday AM Peak Hour)

Intersection		Pedestrian Crossings (by intersection leg)				Northbound Bicycles			Southbound Bicycles			Eastbound Bicycles			Westbound Bicycles		
		N	S	E	W	L	T	R	L	T	R	L	T	R	L	T	R
1	Mission Boulevard & Calhoun Street	7	3	1	7	0	1	0	0	1	0	0	0	0	0	0	1
2	Mission Boulevard & Hancock Street	2	4	35	6	0	0	0	0	1	0	0	0	0	0	1	0
3	East 16th Street & Hancock Street	1	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	Whitman Street/Beatron Way & Tennyson Road	19	57	34	94	1	2	0	0	0	2	4	4	0	0	8	2
5	East 12th Street/Dixon Street & Tennyson Road	6	8	6	25	6	0	0	0	1	0	0	0	0	0	0	0
6	Mission Boulevard & Tennyson Road	2	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0
7	Site Access Road & Tennyson Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	Mission Boulevard & Valle Vista Avenue	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

SOURCE: QUALITY COUNTS MANUAL TURNING MOVEMENT COUNTS (MARCH 2020).
NOTE: AM PERIOD COUNTS WERE NOT COLLECTED AT INTERSECTION #8 IN MARCH 2020.

Table 6: Pedestrian and Bicycle Volumes (Weekday PM Peak Hour)

Intersection		Pedestrian Crossings (by intersection leg)				Northbound Bicycles			Southbound Bicycles			Eastbound Bicycles			Westbound Bicycles		
		N	S	E	W	L	T	R	L	T	R	L	T	R	L	T	R
1	Mission Boulevard & Calhoun Street	6	9	1	6	0	1	0	0	2	0	0	0	0	0	0	0
2	Mission Boulevard & Hancock Street	7	4	28	1	0	2	0	0	2	1	0	1	0	0	0	0
3	East 16th Street & Hancock Street	3	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0
4	Whitman Street/Beatron Way & Tennyson Road	5	57	8	18	0	0	0	2	0	4	3	12	0	0	4	1
5	East 12th Street/Dixon Street & Tennyson Road	17	10	8	23	2	1	0	0	0	0	1	3	3	1	0	0
6	Mission Boulevard & Tennyson Road	3	1	4	1	0	1	0	0	0	0	0	0	0	0	0	0
7	Site Access Road & Tennyson Road	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	Mission Boulevard & Valle Vista Avenue	0	5	3	5	1	0	0	0	5	1	0	0	4	0	0	0

SOURCE: QUALITY COUNTS MANUAL TURNING MOVEMENT COUNTS (MARCH 2020).

EXISTING TRAFFIC OPERATIONS AND PERFORMANCE

Traffic Signal Warrants

Traffic signal warrants are standards that provide guidelines in the determination of the need for a traffic signal. A traffic signal should not be installed if no warrants are met, since the installation of traffic signals may increase delays for the majority of through traffic and may increase the potential for accidents.

As stated in the FHWA/Caltrans 2014 California Manual of Uniform Traffic Control Devices (CA-MUTCD), "An engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic control signal is justified at a particular location. The investigation of the need for a traffic control signal shall include an analysis of the applicable factors contained in the following traffic signal warrants and other factors related to existing operation and safety at the study location:

- Warrant 1, Eight-Hour Vehicular Volume.
- Warrant 2, Four-Hour Vehicular Volume.
- Warrant 3, Peak Hour.
- Warrant 4, Pedestrian Volume.
- Warrant 5, School Crossing.
- Warrant 6, Coordinated Signal System.
- Warrant 7, Crash Experience.
- Warrant 8, Roadway Network.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

This local transportation assessment did not evaluate the full panoply of warrants for traffic signals, but instead focused on the peak hour warrant. The peak hour warrant is being used in this study as an "indicator" of the likelihood of an existing or future unsignalized intersection warranting a traffic signal.

Intersections that fail to exceed the peak hour warrant are considered (for the purposes of this impact analysis) to be unlikely to meet one or more of the other signal warrants (such as the 4-hour or 8-hour warrants). However, this does not mean that a signal is definitely unwarranted. A signal may be warranted by other criteria, some of which cannot be known until the intersection is constructed and operational. This peak hour analysis is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction.

As discussed earlier in this report, the need for improvements at unsignalized intersections is based on LOS and delay, and whether any of the following are met:

- Traffic signal warrant,
- Pedestrian signal warrant, or
- All-way stop warrant

Note that solely triggering a warrant does not trigger the need for an intersection improvement, but the City will at its discretion require or not require a signal be installed, where warranted.

Regardless of intersection control, per the City of Hayward Interim Traffic Study Guidelines (2017), improvements would be required at an intersection already operating at LOS F under an Existing or No Project scenario if the addition of project traffic results in an increase of 5.0 seconds or more in the intersection's average control delay. Unsignalized intersections were evaluated using the Peak Hour Volume Warrant (Warrant No. 3) in the CA-MUTCD. Even if the Peak Hour Volume Warrant is met, a more detailed signal warrant study is recommended before a signal is installed. The more detailed study should consider volumes during the daily peak hours of roadway traffic, pedestrian traffic, and collision histories.

Neither of the two unsignalized study intersections (#3 East 16th Street & Hancock Street and #7 Site Access Road & Tennyson Road) meet peak hour traffic signal warrants under existing conditions for either the AM or PM peak hour. Existing traffic signal warrant worksheets are provided in the appendix to this report.

Automobile Level of Service

LOS at the study intersections were evaluated based on the HCM 6th Edition methodology, as implemented in the Synchro 10 software package. LOS analysis was performed for the weekday AM and PM peak hours using COVID-adjusted traffic counts collected in the field. Table 7 provides a summary of the existing automobile level of service. As shown in the table, all study intersections operate acceptably at LOS C or better. The Existing Conditions LOS worksheets for the study intersections are provided in the appendix to this report.

Table 7: Automobile Level of Service, Existing Conditions

	Intersection	Traffic Control	Weekday AM		Weekday PM	
			Delay (sec)	LOS	Delay (sec)	LOS
1	Mission Boulevard & Calhoun Street	Signal	18.2	B	9.7	A
2	Mission Boulevard & Hancock Street	Signal	11.0	B	8.2	A
3	East 16th Street & Hancock Street	TWSC	11.3	B	8.9	A
4	Whitman Street/Beatron Way & Tennyson Road	Signal	26.8	C	23.1	C
5	East 12th Street/Dixon Street & Tennyson Road	Signal	30.2	C	26.1	C
6	Mission Boulevard & Tennyson Road	Signal	21.2	C	24.5	C
7	Site Access Road & Tennyson Road	TWSC	0.0	A	0.0	A
8	Mission Boulevard & Valle Vista Avenue	Signal	23.0	C	13.0	B

SOURCE: KITTELSON & ASSOCIATES, INC. 2021

Queue Storage

The 95th percentile queues at the study intersections were reviewed for informational purposes to identify locations where these may exceed the available storage. The 95th percentile queue lengths represent queues that have only a 5% probability of occurring within the analyzed peak hour. This measure is typically used in traffic engineering as a conservative measure of queuing. The average driver would experience shorter queue lengths than the reported 95th percentile queues.

For through movements and turning movements without a dedicated lane, the available storage is assumed to be the distance from the stop bar to the departure point of the nearest upstream stop-controlled or signalized intersection. For turning movements with an exclusive turn lane, the length of the turn bay is assumed to be the available storage. Table 8 details the movements which were found to queue beyond their available storage capacity at the 95th percentile demand level under Existing Conditions.

Table 8: Queue Lengths in Excess of Capacity, Existing Conditions

#	Intersection	Movement	Peak Hour	Description
1	Mission Boulevard & Calhoun Street	NBT/R	AM & PM	This movement spills back beyond the stop-controlled intersections with Kellogg Avenue and Broadway Street.
		SBL	AM	This movement spills back beyond the stop-controlled intersection with Jefferson Street but does not exceed the length of its exclusive turn lane.
		SBT/R	AM & PM	This movement spills back beyond the stop-controlled Jefferson Street intersection and the signal-controlled entrance to Moreau Catholic High School.
2	Mission Boulevard & Hancock Street	NBT/R	PM	This movement spills back beyond the intersection with Tennyson Road.
4	Whitman Street / Beatron Way & Tennyson Road	NBL/T/R	AM	This movement spills back beyond the adjacent uncontrolled intersection with Rochelle Avenue.
		SBL	AM	This movement spills back beyond the length of its exclusive turn lane and into the through lane.
		SBR	AM & PM	This movement spills back beyond the length of its exclusive turn lane, blocking access to the pocket bike lane.
		EBL	AM & PM	This movement spills back beyond the length of its exclusive turn lane and into the through lane.
		WBT	AM	This movement spills back beyond stop-controlled intersections with Oharron Drive and Pacific Street.
5	East 12th Street / Dixon Street & Tennyson Road	NBL	AM & PM	This movement spills back beyond the length of its exclusive turn lane and into the through lane.
		EBL	AM	This movement spills back beyond the length of its exclusive turn lane and into the through lane.
		EBR	AM & PM	This movement spills back beyond the length of its exclusive turn lane, blocking access to the pocket bike lane.
		WBT/R	AM & PM	This movement spills back beyond the stop-controlled intersection with 13th Street.
6	Mission Boulevard & Tennyson Road	SBT	AM	This movement spills back beyond the stop-controlled intersection with Monticello Street.
8	Mission Boulevard & Valle Vista Avenue	SBT/R	AM	This movement spills back beyond the stop-controlled intersection with Mariners Court.

SOURCE: KITTELSON & ASSOCIATES, INC. 2021.

Section 3 — Project Description

PROJECT DESCRIPTION

PG 3 is located at the northeastern corner of Mission Boulevard and Tennyson Road in Hayward, as shown in Figure 1. The proposed project consists of 176 affordable rental apartments (38 studios, 47 one-bedroom, 44 two-bedroom, 47 three-bedroom) and a charter school serving 384 elementary students. Primary access to the project site for the school portion will be provided via Tennyson Road, with secondary access for the residential portion via two driveways on 16th Street. The proposed site plan is shown in Figure 8.

The charter school will consist of a new 35,360 square foot school and early education facility which will ultimately grow to serve 384 students from age 3 through 5th/6th grade. The elementary school building will include 18 classrooms, an outdoor amphitheater, workrooms and administrative offices, an outdoor play area, and other spaces. The early childhood education center will include six classrooms, workrooms, administrative offices, a play area, and other spaces. Enrollment projections are provided in Table 9.

Table 9: Enrollment and Staffing Projections

Year	# Students	Grades	# Classrooms	# Staff (est. FTE)
2020-2021	48	PreK	3	17
2021-2022	96	PreK	6	28
2022-2023	144	PreK - Kinder	8	36
2023-2024	192	PreK - 1st	10	40
2024-2025	240	PreK - 2nd	12	45
2025-2026	288	PreK - 3rd	14	49
2026-2027	336	PreK - 4th	16	52
2027-2028	384	PreK - 5th	18	55

SOURCE: SCHOOL PROGRAM OVERVIEW

A total of 219 parking spaces would be provided in the parking areas located along the proposed internal site roadway. 24 of these spaces would be dedicated for school parking and six of these spaces would be shared between the residential and school uses. A total of 233 parking spaces would be provided for the proposed project overall, including 24 electric vehicle spaces, 51 compact spaces, and 10 accessible spaces.

A total of 44 dedicated school parking spaces would be provided, including 17 spaces along the site access road, 24 spaces within the proposed parking area, five spaces along the frontage of the elementary school building, and 4 spaces at the entrance to the early childhood education center. In addition, six shared spaces would be provided to accommodate both school and residential parking needs, for a total of 50 parking spaces available for school use.

Figure 8: Project Site Plan

Section 4 — Project Trip Generation/ Distribution/Assignment

PROJECT TRIP GENERATION/ DISTRIBUTION/ASSIGNMENT

This section provides the vehicle trip generation and distribution estimates for the proposed project.

TRIP GENERATION

Project trip generation was estimated for the following three time periods, as shown in Table 10:

- Weekday daily
- Weekday AM peak hour
- Weekday PM peak hour

Trip generation for the project's affordable housing component was estimated using rates for the Multifamily Housing Mid-Rise land use (Code 221) in the ITE Trip Generation Manual, 10th Edition. Trip generation for the project's charter school component was estimated using rates for the Charter Elementary School land use (Code 537). Given the charter school is in close proximity to residential units (including units adjacent to the project site), a 1% reduction was applied to the charter school trip generation to account for local non-motorized trips to the school. As shown in the table, the project is expected to generate 1,660 weekday daily vehicle trips, 485 weekday AM peak hour vehicle trips, and 131 weekday PM peak hour vehicle trips.

Table 10: Project Trip Generation Estimate

Trip Generation Rates								
Land Use	Rate	Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Multifamily Housing (Mid-Rise) (221)	Units	5.44	26%	74%	0.36	61%	39%	0.44
Charter Elementary School (537)	Students	1.85	53%	47%	1.11	35%	65%	0.14
Trip Generation								
Land Use	**Size**	**Daily**	**AM Peak Hour**			**PM Peak Hour**		
			In	**Out**	**Total**	**In**	**Out**	**Total**
Multifamily Housing (Mid-Rise) (221)	176 Units	957	16	47	63	47	30	77
Charter Elementary School (537)	384 Students	710	226	200	426	19	35	54
Local Non-Vehicle School Trips (1%)		*-7*	*-2*	*-2*	*-4*	*0*	*0*	*0*
TOTAL PROJECT TRIPS		**1,660**	**240**	**245**	**485**	**66**	**65**	**131**

SOURCE: : KITTELSON AND ASSOCIATES, INC., 2021; INSTITUTE OF TRANSPORTATION ENGINEERS, 2017.

Generally, the PM peak hour of trip generation for K-12 schools takes place earlier in the day compared to the standard PM peak hour of the adjacent roadway network. For example, the PM peak hour of trip generation for a school could take place between 2:00 PM and 3:00 PM, while the evening PM peak hour of the roadway network could take place between 5:00 PM and 6:00 PM. Table 11 shows the estimated trip generation for the charter school portion of the project during the PM peak hour of the trip generator. Note, the trip generation and assignment for the school's PM peak hour of generator is provided for informational purposes; Existing Plus Project operations analysis has not been conducted for this peak hour as the ambient/background traffic (e.g. Existing volumes) are lower than during the PM peak hour of the adjacent roadway network. Additionally, PM trip generation of schools tends to be staggered throughout

the afternoon as students may leave school at different times due to after-school activities, as opposed to AM trip generation where the majority of students generally arrive during the same time period.

Table 11: Charter Elementary School Trip Generation Estimate (PM Peak Hour of Generator)

Trip Generation Rates				
Land Use	Rate	PM Peak Hour		
		In	Out	Total
Charter Elementary School (537)	Students	46%	54%	0.69
Trip Generation				
Land Use	Size	PM Peak Hour		
		In	Out	Total
Charter Elementary School (537)	384 Students	122	143	265
Local Non-Vehicle School Trips (1%)		*-1*	*-1*	*-2*
TOTAL TRIPS		**121**	**142**	**263**

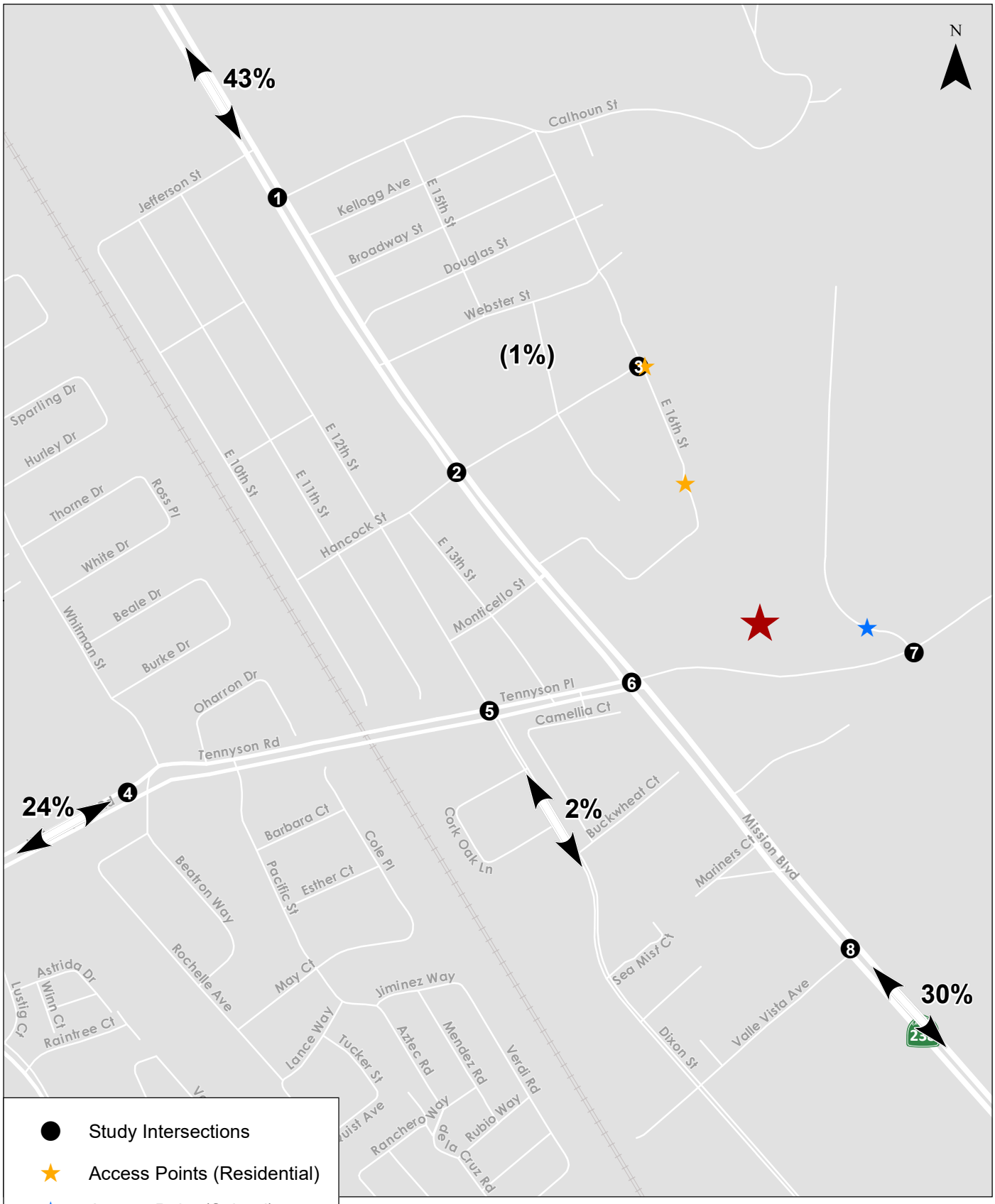
SOURCE: : KITTELSON AND ASSOCIATES, INC., 2021; INSTITUTE OF TRANSPORTATION ENGINEERS, 2017.

TRIP DISTRIBUTION AND ASSIGNMENT

Project trip distribution was developed using the City of Hayward General Plan Update travel demand model. The project trip distribution is based on the model's distribution of trips in and out of the traffic analysis zone (TAZ) representing the project site, as well as adjustments to reflect local travel patterns and circulation conditions. The project trip distribution and intersection count locations are shown in Figure 9. In addition, as shown in the figure, the trip distribution includes an assumption that 1% of school trips will be local walking and bicycling trips rather than vehicle trips on the local roadway network.

Figure 10 presents the weekday AM and PM project-only turning movements that were derived from the trip generation and trip distribution discussed in this section. School trips were assigned to the access point off Tennyson Road, while residential trips were assigned to 16th Street. These project-only volumes will be used in the Existing Plus Project operations analysis.

Charter school project trips for the PM peak hour of generator are shown for informational purposes in Figure 11.



Project Trip Distribution Percentages
Hayward, California

Figure
9

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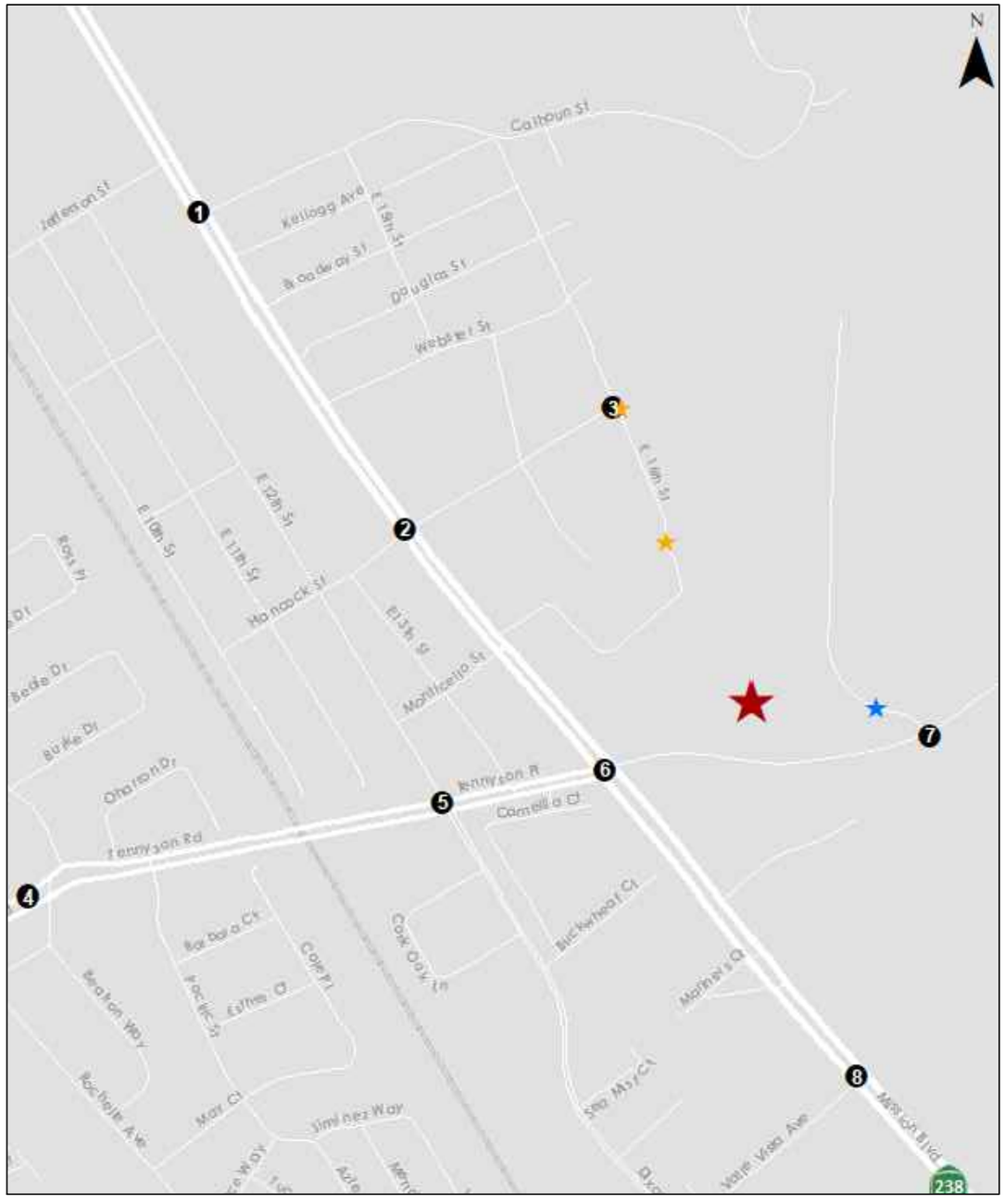
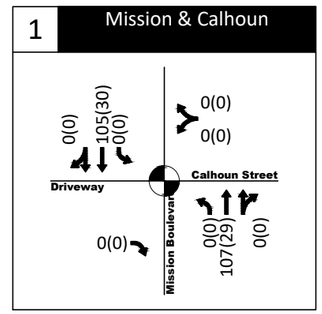
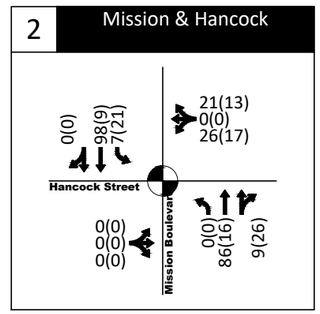
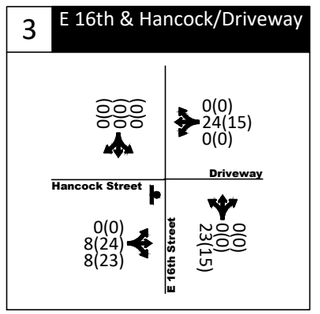
KITTELSON & ASSOCIATES

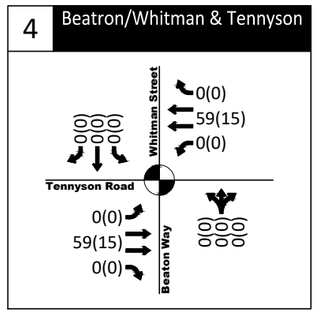
Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

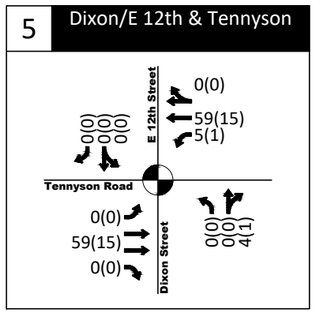


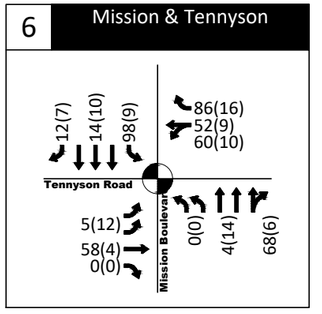


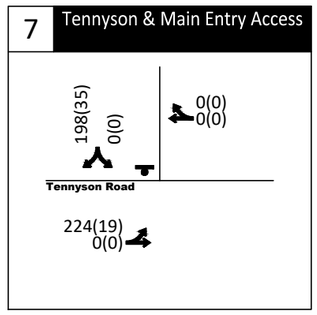


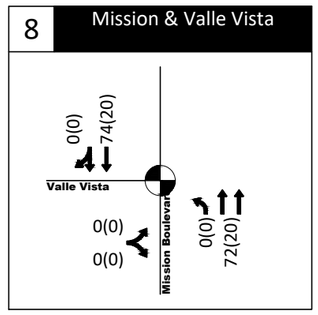










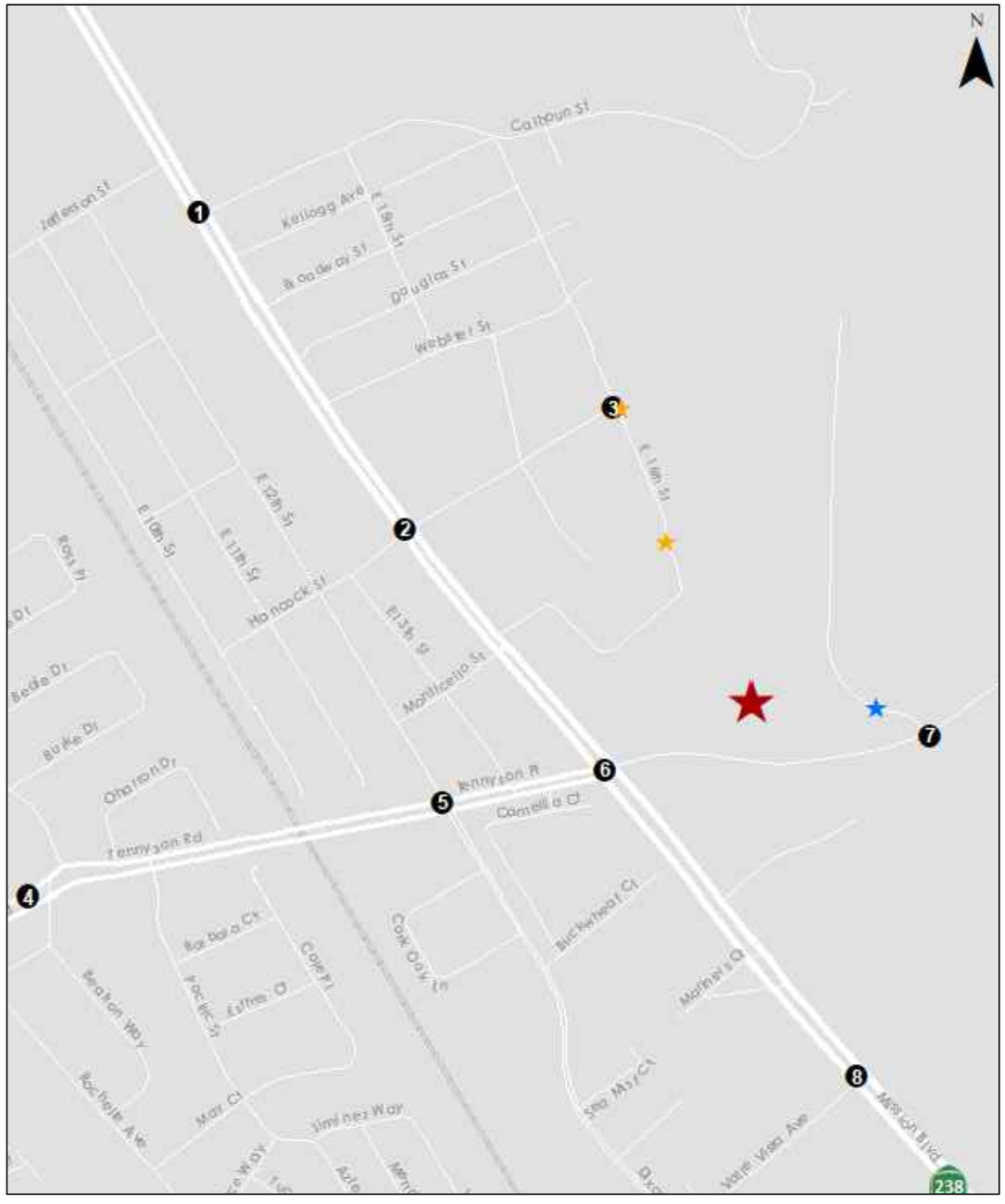


AM(PM) - Traffic Volume
STOP - All-Way Stop
- Stop Sign
- Traffic Signal

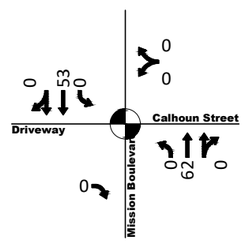
Project-Only Trips
Hayward, California

Figure
10

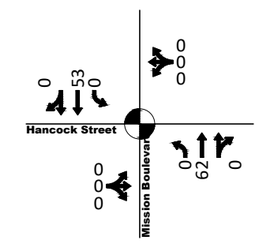
KITTELSON & ASSOCIATES



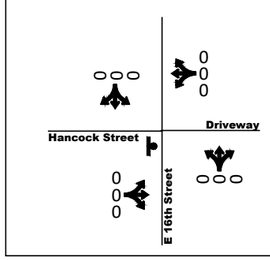
1 Mission & Calhoun



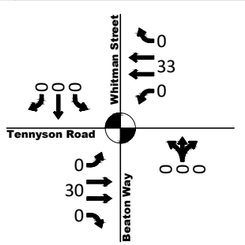
2 Mission & Hancock



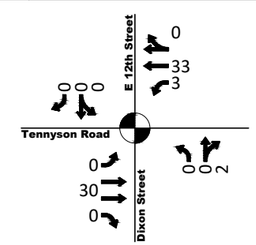
3 E 16th & Hancock/Driveway



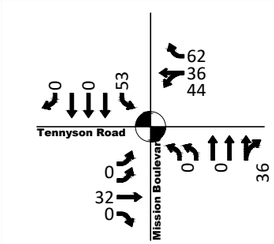
4 Beatron/Whitman & Tennyson



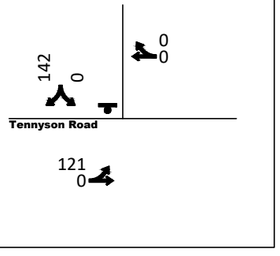
5 Dixon/E 12th & Tennyson



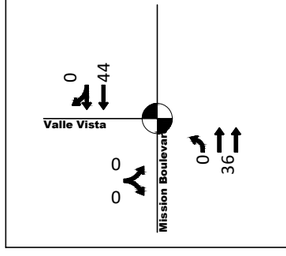
6 Mission & Tennyson



7 Tennyson & Main Entry Access



8 Mission & Valle Vista



- Stop Sign
- Traffic Signal

Charter School Project-Only Trips (PM Peak Hour of Generator)
Hayward, California

Figure
11

KITTELSON & ASSOCIATES

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Section 5 — Existing Plus Project Traffic Conditions

EXISTING PLUS PROJECT TRAFFIC CONDITIONS

This chapter discusses the results of the Existing Plus Project traffic operations analysis, which was conducted for non-CEQA local transportation analysis purposes.

EXISTING PLUS PROJECT AUTOMOBILE LEVEL OF SERVICE

The automobile turning movement counts for the Existing Plus Project scenario were developed from the sum of the Existing Conditions turning movement counts (Figure 7) and the Project Only turning movements (Figure 10). Figure 12 presents the Existing Plus Project turning movements.

Table 12 presents the Existing Conditions and Existing Plus Project delays and LOS for the study intersections. The table also compares the change in delay between the two scenarios. The Existing Plus Project LOS worksheets are provided in the appendix to this report.

As shown in the table, all study intersections continue to operate acceptably with the addition of project trips. Therefore, no operation improvements have been recommended.

Table 12: Automobile Level of Service, Existing Plus Project Conditions

Intersection		Traffic Control	Peak Hour	Weekday AM		Weekday PM		Change in Delay
				Delay (sec)	LOS	Delay (sec)	LOS	
1	Mission Boulevard & Calhoun Street	Signal	AM	18.2	B	20.5	C	2.3
			PM	9.7	A	10.1	B	0.4
2	Mission Boulevard & Hancock Street	Signal	AM	11.0	B	17.2	B	6.2
			PM	8.2	A	10.0	A	1.8
3	East 16th Street & Hancock Street	TWSC	AM	11.3	B	14.2	B	2.9
			PM	8.9	A	9.9	A	1.0
4	Whitman Street/Beatron Way & Tennyson Road	Signal	AM	26.8	C	27.5	C	0.7
			PM	23.1	C	23.3	C	0.2
5	East 12th Street/Dixon Street & Tennyson Road	Signal	AM	30.2	C	30.8	C	0.6
			PM	26.1	C	26.3	C	0.2
6	Mission Boulevard & Tennyson Road	Signal	AM	21.2	C	34.3	C	13.1
			PM	24.5	C	25.6	C	1.1
7	Site Access Road & Tennyson Road	TWSC	AM	0.0	A	10.3	B	10.3
			PM	0.0	A	8.7	A	8.7
8	Mission Boulevard & Valle Vista Avenue	Signal	AM	23.0	C	23.4	C	0.4
			PM	13.0	B	16.1	B	3.1

SOURCE: KITTELSON & ASSOCIATES, INC. 2021

EXISTING PLUS PROJECT QUEUE STORAGE

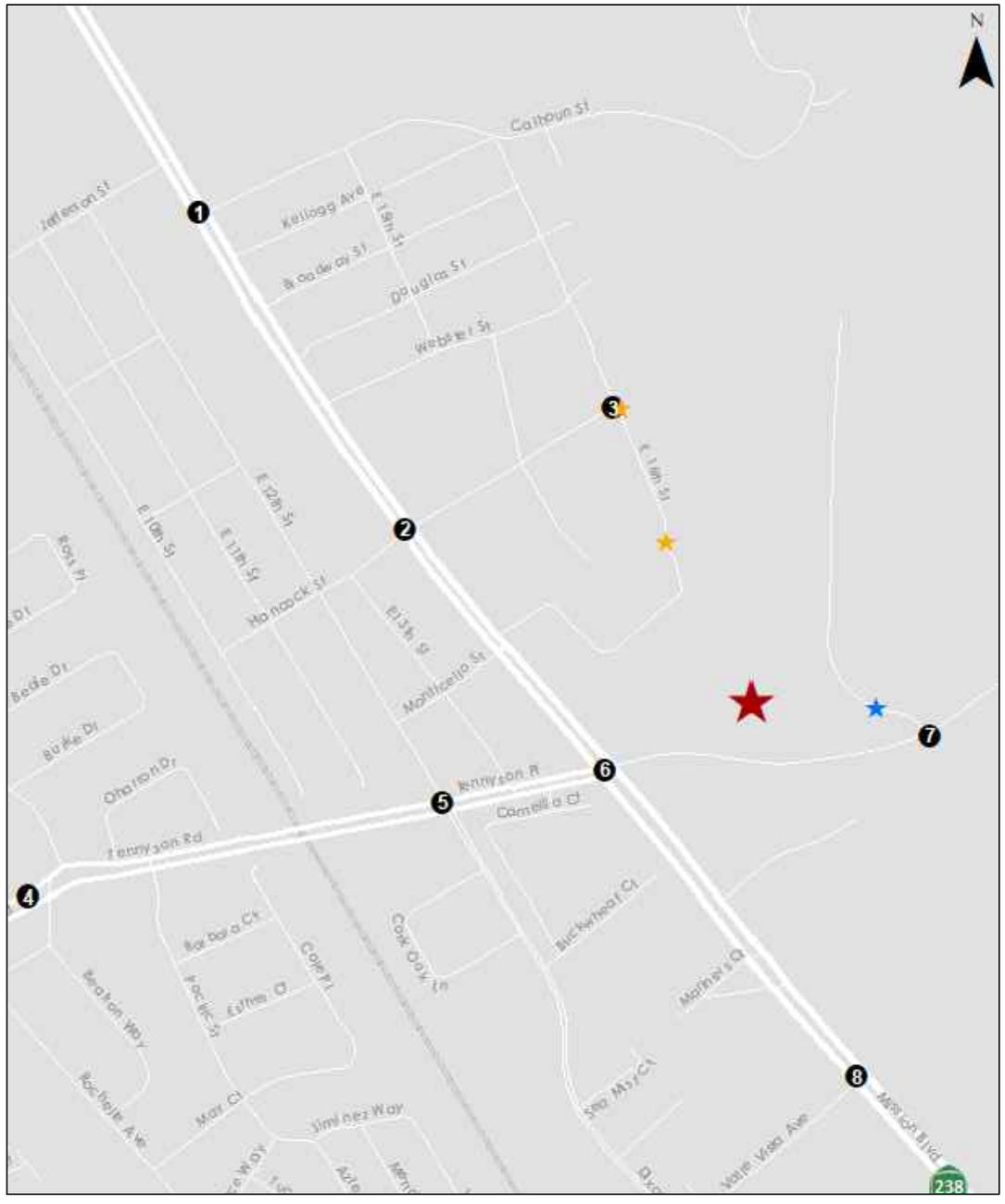
The 95th percentile queues at the study intersections were reviewed to identify locations where these may exceed the available storage. Table 13 details the movements which were found to queue beyond their available storage capacity at the 95th percentile demand level under Existing Plus Project conditions. The project is not anticipated to increase the queue lengths by more than eight (8) car lengths at any of the movements that exceed storage capacity. Generally, the Project increases queue lengths between one and three cars at most study intersections.

Table 13: Queue Lengths in Excess of Capacity, Existing Plus Project Conditions

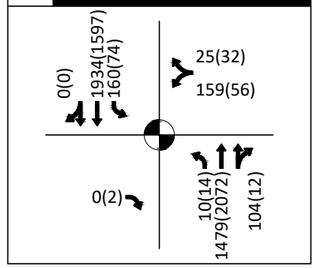
#	Intersection	Movement	Peak Hour	Description
1	Mission Boulevard & Calhoun Street	NBT/R	AM & PM	This movement continues to spill back beyond the stop-controlled intersections with Kellogg Avenue and Broadway Street. The addition of project trips in the AM peak hour is anticipated to increase the queue length by approximately eight car lengths. In the PM peak hour, the addition of project trips is expected to increase the queue by less than one car length.
		SBL	AM	This movement continues to spill back beyond the length of its exclusive turn lane and into the through lane. The addition of project trips is not anticipated to increase the queue length.
		SBT/R	AM & PM	This movement continues to spill back beyond the stop-controlled Jefferson Street intersection and the signal-controlled entrance to Moreau Catholic High School. The addition of project trips is anticipated to increase the queue by approximately five car lengths in the AM peak hour and one car length in the PM peak hour.
2	Mission Boulevard & Hancock Street	NBT/R	PM	This movement continues to spill back beyond the intersection with Tennyson Road. The addition of project trips is anticipated to increase the queue length by approximately one car length.
4	Whitman Street /Beatron Way & Tennyson Road	NBL/T/R	AM	This movement continues to spill back beyond the adjacent uncontrolled intersection with Rochelle Avenue. The addition of project trips is anticipated to increase the queue by less than one car length.
		SBL	AM	This movement continues to spill back beyond the length of its exclusive turn lane and into the through lane. The addition of project trips is anticipated to increase the queue length by approximately one car length.
		SBR	AM & PM	This movement spills back beyond the length of its exclusive turn lane, blocking access to the pocket bike lane. The addition of project trips is anticipated to increase the queue length by approximately one car length in the AM peak hour and less than one car length in the PM peak hour.
		EBL	AM & PM	This movement continues to spill back beyond the length of its exclusive turn lane and into the through lane. The addition of project trips is anticipated to increase the queue by approximately one car length in the AM and PM peak hours.
		WBT	AM	This movement continues to spill back beyond stop-controlled intersections with Oharron Drive and Pacific Street. The addition of project trips is anticipated to increase the queue length by approximately one car length.
		WBR	AM	With the addition of project trips, this movement spills back beyond the length of its exclusive turn lane, blocking access to the pocket bike lane.

#	Intersection	Movement	Peak Hour	Description
5	East 12th Street / Dixon Street & Tennyson Road	NBL	AM & PM	This movement continues to spill back beyond the length of its exclusive turn lane and into the through lane. The addition of project trips is anticipated to increase the queue length by approximately one car length in the AM peak hour and less than one car length in the PM peak hour.
		EBL	AM	This movement continues to spill back beyond the length of its exclusive turn lane and into the through lane. The addition of project trips is anticipated to increase the queue by less than one car length.
		EBR	AM & PM	This movement continues to spill back beyond the length of its exclusive turn lane, blocking access to the pocket bike lane. The addition of project trips is anticipated to increase the queue length by approximately one car length in the AM peak hour and less than one car length in the PM peak hour.
		WBT/R	AM & PM	This movement continues to spill back beyond the stop-controlled intersection with 13th Street. The addition of project trips is anticipated to increase the queue length by approximately one car length in the AM peak hour and less than one car length in the PM peak hour.
6	Mission Boulevard & Tennyson Road	SBT	AM	This movement continues to spill back beyond the stop-controlled intersection with Monticello Street. The addition of project trips is not anticipated to increase the queue length.
8	Mission Boulevard & Valle Vista Avenue	SBT/R	AM	This movement continues to spill back beyond the stop-controlled intersection with Mariners Court. The addition of project trips is anticipated to increase the queue length by approximately three car lengths.

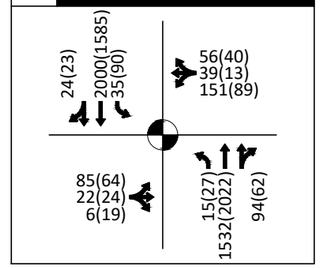
SOURCE: KITTELSON & ASSOCIATES, INC. 2021.



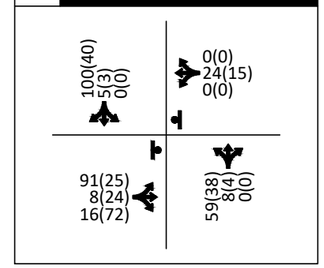
1 Mission & Calhoun



2 Mission & Hancock



3 E 16th & Hancock/Driveway



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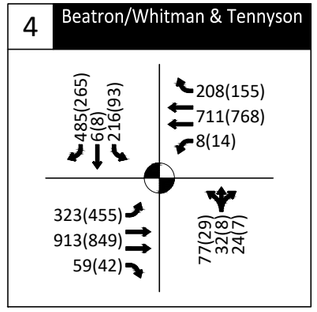
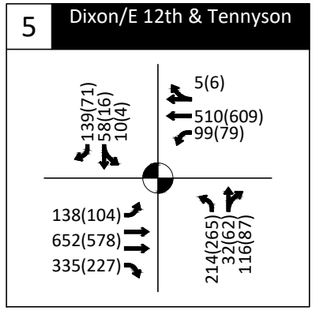


5 Dixon/E 12th & Tennyson



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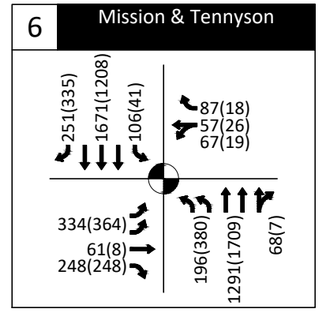
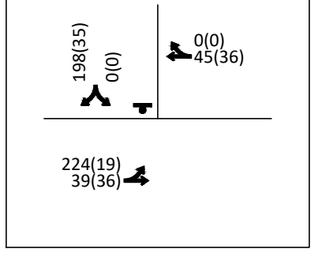
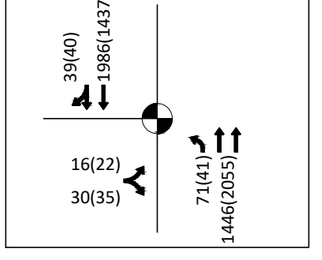


7 Tennyson & Main Entry Access



8 Mission & Valle Vista



AM(PM) - Traffic Volume
STOP - All-Way Stop
- Stop Sign
- Traffic Signal

Existing Plus Project Turning Movement Forecasts
Hayward, California

Figure
12

KITTELSON & ASSOCIATES

Section 6 — Public Transit, Pedestrian, and Bicycle Assessment

PUBLIC TRANSIT, PEDESTRIAN, AND BICYCLE ASSESSMENT

This section discussed potential project effects on public transit, pedestrians, and bicyclists.

PUBLIC TRANSIT ASSESSMENT

The Project is not expected to increase traffic levels at intersections serving local AC Transit buses to levels that would require improvements under the Existing Plus Project scenario. In addition, the project is not expected to degrade local access to bus stops along Mission Boulevard (such as the stops at the intersections with Tennyson Road and Hancock Street) which can be accessed via the local sidewalk network and existing facilities such as ADA curb ramps and crosswalks. There are no bus stops near the project or abutting the project driveways.

The project may increase the use of the nearby AC Transit bus stops along Mission Boulevard. While the bus stops at the intersection of Mission Boulevard & Tennyson Road include amenities such as a bench and shelter, the bus stops at the intersection of Mission Boulevard and Hancock Street do not. Therefore, the property owner should coordinate with AC Transit to improve user amenities at the two AC Transit bus stops at the intersection of Mission Boulevard and Hancock Street.

PEDESTRIAN ASSESSMENT

As discussed in the Existing Network section, arterial and collector roadways in the study area have mostly complete sidewalk coverage, but there are many gaps along local residential roads, including those near the 16th Street access points. Tennyson Road and Hancock Street provide access to the project site from Mission Boulevard and include sidewalks on both sides of the street. Marked, high-visibility continental crosswalks are provided at the signalized intersections of these two streets with Mission Boulevard. Within the residential neighborhood to the west of the project site and east of Mission Boulevard, curb ramps and marked crosswalks are not consistently present at stop-controlled intersections. In addition, there is no sidewalk on the eastern side of 16th Street. At the project's primary vehicular access points (the East 16th Street/Hancock Street and Site Access/Tennyson Road intersections) there are no marked crosswalks.

Students walking to the proposed school (on the southern portion of the project site) or residents accessing the affordable housing component from the south would generally access the site by walking east along Tennyson Road from Mission Boulevard. Vehicular access for pick-up and drop-off is provided on the eastern side of the school building from the site access road, but the project includes trail access between Tennyson Road and the school west of the access road for people walking, as shown in Figure 13. The trail connects to a sidewalk that allows for internal site access without the need to use the vehicular access driveway off Tennyson Road.

Residents or students accessing the project site from the northwest via 16th Street would benefit from a proposed sidewalk on the east side of 16th Street. However, other pedestrian amenities such as marked crosswalks are not present to facilitate pedestrian access to the project. In addition, given that residential vehicle trips would access the project via the 16th Street driveways, the project is expected add vehicle trips on streets such as 16th Street and Hancock Street, affecting local pedestrian conditions.

Pedestrian treatments should be considered at the project access points and within the study area to facilitate pedestrian access to the project site and generally improve pedestrian safety in the study area. Potential pedestrian-oriented treatments that could be considered as part of design review and conditions of approval could include:

- Ensure that the project driveways are designed for pedestrian visibility safety (sidewalks clearly delineated, improved visibility by minimizing bushes and large signs).
- Coordinate with the City of Hayward to install warning signage (such as caution signage for exiting vehicles) and continental crosswalks at Site Access/Tennyson Road intersection.
- Explore options to improve pedestrian accessibility west of the project site, including along 16th Street and Hancock Street. Improvements can include marked crosswalks and bulbouts at the East 16th Street/Hancock Street intersection.
- There is the opportunity to add yellow continental school crosswalks at the Tennyson Road/Mission Boulevard intersection.

BICYCLE ASSESSMENT

As discussed in the Existing Network section of this report, existing bikeways in the study area include Class II bike lanes in both directions along Tennyson Road. The Hayward BPMP includes planed Class IV separated bike lanes along Mission Boulevard and along Tennyson Road west of Mission Boulevard.

Bicyclists accessing the southern portion of the project site (primarily students accessing the school) can utilize the trail access off of Tennyson Road to avoid utilizing the project driveway off Tennyson Road. However, inbound bicyclists approaching from Mission Boulevard using the eastbound bike lanes may have difficulty turning into the project, especially due to the grade and lack of a turn pocket or other marked facility for crossing into the school. In addition, a substantial number of turning vehicles are being added to the Site Access/Tennyson Road intersection during peak hours. For bikes leaving westbound along Tennyson Road using the bike lane, downhill vehicle speeds combined with increased peak hour vehicle volumes and the bike lane being dropped for the 315-foot right turn lane could result in an uncomfortable bicycling environment for students and other bicyclists.

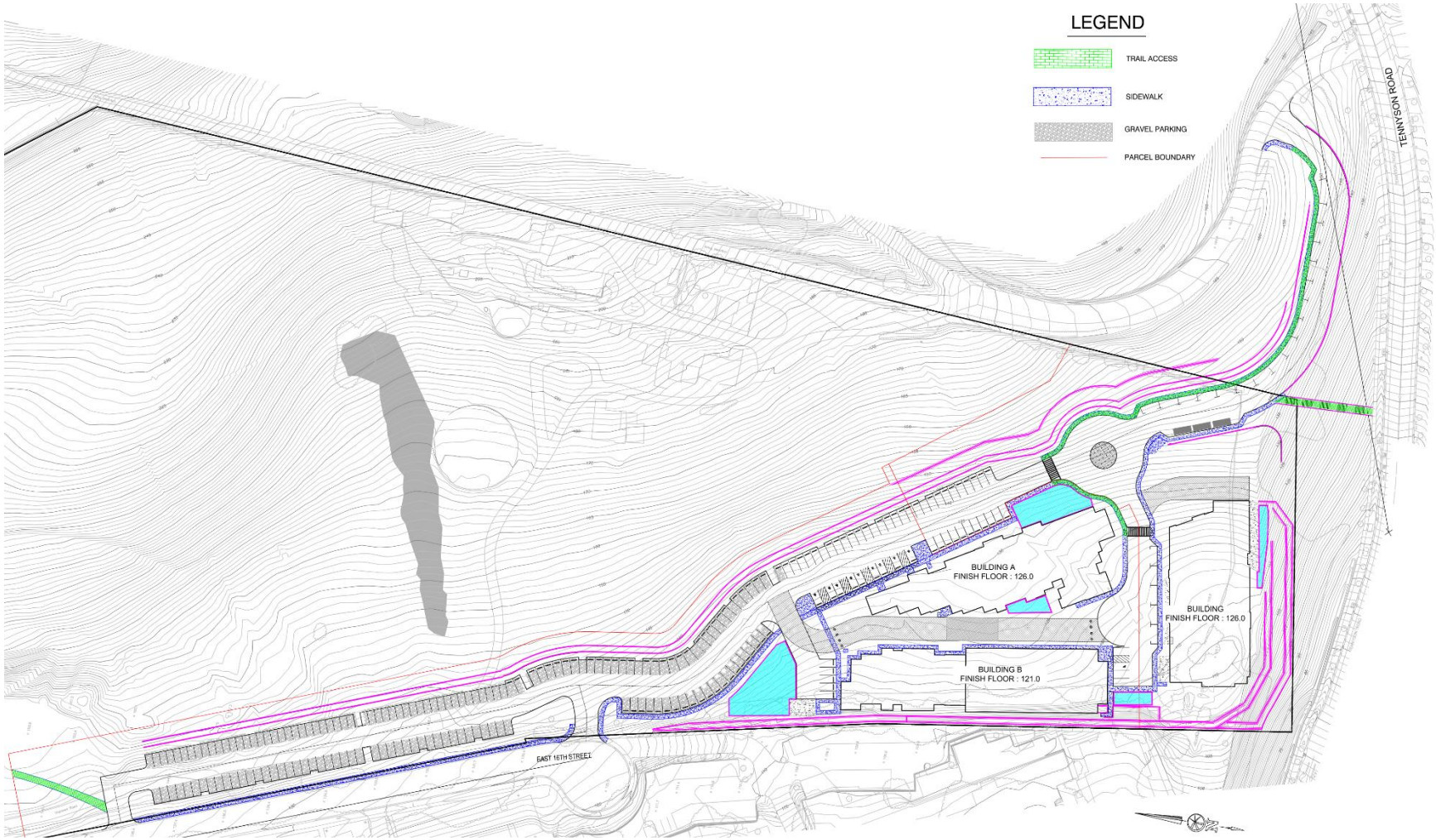
Bicyclists accessing the northern portion of the project must utilize the project's 16th Street driveways or dismount and use the sidewalks to access the project site. In addition, there are no designated bikeways on local residential streets such as 16th Street and Hancock Street. The project will also add vehicular traffic to these roads, especially during peak hours.

Bicycle treatments should be considered at the project access points and within the study area to facilitate bicyclist access to the project site and generally improve bicyclist safety in the study area. Potential bicycle-oriented treatments that could be considered as part of design review and conditions of approval could include:

- Coordinate with the City of Hayward to install signage (such as bikeway signage and caution signage) and green conflict zone markings through the Site Access Road/Tennyson Road intersection.
- Consider implementing facilities to accommodate bicyclists (and pedestrians) crossing Tennyson Road to access the project site (e.g., marked north/south crosswalk at the Site Access Road/Tennyson Road intersection or a midblock location).
- Consider a treatment to improve downhill westbound bicycling conditions approaching the Mission Boulevard/Tennyson Road intersection. Note, Solutions for this location are limited by multiple constraints:
    - A pocket bike lane between the through and right turn lanes may not be feasible due to the curb-to-curb right-of-way or to avoid offsetting the westbound through lane. The length of the pocket bike lane (more than 300 feet) could result in a high-stress situation with vehicles traveling on both sides of bicyclists for an extended period of time.
    - A shared bike/right turn lane may be high-stress for children and other users due to the length of the right-turn lane and downhill vehicle speeds.
    - Solutions may require shortening the westbound right-turn lane at the Mission Boulevard & Tennyson Road intersection to reduce bicyclist stress.

- Consider installing bike routes with sharrows along residential roads such as Hancock Street and 16th Street to facilitate bike access to and from the project. This could be combined with traffic calming strategies due to increased vehicle volumes (which will be discussed in a later chapter).

Figure 13: On-Site Pedestrian Facilities



Section 7 — Pick-Up and Drop-Off Analysis

STUDENT PICK-UP AND DROP-OFF ANALYSIS

This section provides an assessment of the proposed student pick-up and drop-off zone, including a determination if sufficient queuing area is provided for site access planning purposes.

The project site includes an internal circulation system to provide access for vehicles and pedestrians to the school and residential portions of the project, as well as pedestrian connectivity to Tennyson Road and 16th Street. The student pick-up and drop-off plan is presented in

Figure 14. Please note, the narrative and analysis provided below references north/south/east/west directionality relative to this figure, which is rotated 90 degrees so that Tennyson Road is running north/south.

VEHICULAR ACCESS

The school would be primarily accessed from Tennyson Road via the eastern project driveway. The school may also technically be accessed from 16th Street via a secondary access driveway and internal driveways that are primarily to provide access to the residential portion of the project, although that is not intended. The eastern driveway that will connect the school to Tennyson Road will have one 13-foot wide travel lane in each direction and parallel curbside parking. The northern/westbound lane side of the road will provide 17 parallel parking spaces. The access driveway south of the traffic circle will have one lane in each direction with 5 parallel parking spaces on the east/northbound lane side of the road, and 4 perpendicular parking spaces at the end of the cul-de-sac.

PEDESTRIAN ACCESS

The school would have multiple entrances. The primary school entrance for the elementary school building will be located on the northwestern portion of the building by the eastern end of the proposed crosswalk south of the traffic circle. An additional entry will be located to the south near the cul-de-sac.

The early childhood center building would be accessed by the cul-de-sac area at the terminus of the access driveway.

Sidewalks will be constructed along both sides of the roads in the vicinity of the school. Sidewalks along north side of access road providing access from 17 parking spaces, connecting to/from the school via two crosswalks. Crosswalks would be provided on the west and south legs of the traffic circle. A trail from north of the school building would provide direct pedestrian access from the school area to Tennyson Road.

PARKING

The vicinity of the school will include 9 parking spaces that would be provided on the south driveway, 17 parking spaces on the northern driveway east of the traffic circle, and 18 dedicated parking spaces. A total of 44 dedicated parking spaces plus 6 shared parking spaces west of the traffic circle would be available for school parking. The parking spaces located along the north side of the internal road would be accessible via crosswalks.

DROP-OFF/PICK-UP AREAS

The plan includes drop-off and pick-up areas that would facilitate students to exit or enter vehicles on the passenger side to prevent students from crossing between vehicles in the drop-off/pick-up queue. Drop-off areas will be located west and north of the elementary school building. The west area would have a length of over 100 feet, which would be able to accommodate 5 vehicles, and the north area would have a length of 78 feet, which would accommodate 3 vehicles. Both drop-off areas would provide easy access to the school buildings. The kindergarten building does not have a pick-up and drop-off area, as parents normally park and walk their young children in kindergarten/early childhood grades to school.

VEHICULAR LOOP DRIVE STACKING

The school is anticipated to accommodate almost 400 students, 96 of which are in the early childhood programs. The school will generate up to 422 trips (224 in/198 out) in the AM peak hour during the student drop-off and 263 trips (121 in/142 out) in the mid-afternoon hour during the student pick-up.

The circulation would consist of two drop-off/pick-up paths to provide a single-lane drive stacking loop as follows:

- **Early Childhood Student Drop-off/Pick-up**: The vehicular path would consist of utilizing the south drive aisle to access the early childhood building and turn around at the cul-de-sac with a loop drive stacking length of 790 feet. The site plan envisions this path to use the 9 parking spaces for student drop-off/pick-up, so parents can park and walk their children to the early childhood building. Parents may also park at other parking spaces dedicated for the school.
- **Elementary School Drop-off**: The vehicular path would consist of utilizing the east-west main access driveway to access the northern entrance of the elementary school building, utilizing the traffic circle to turn around. This queue would have a loop drive stacking length of 365 feet. The site plan envisions this path to primarily use the pick-up/drop-off area north of the elementary school building, where students would load directly from the vehicles to the curb/sidewalk.

POTENTIAL ISSUES

Potential pick-up and drop-off issues have been identified as follows:

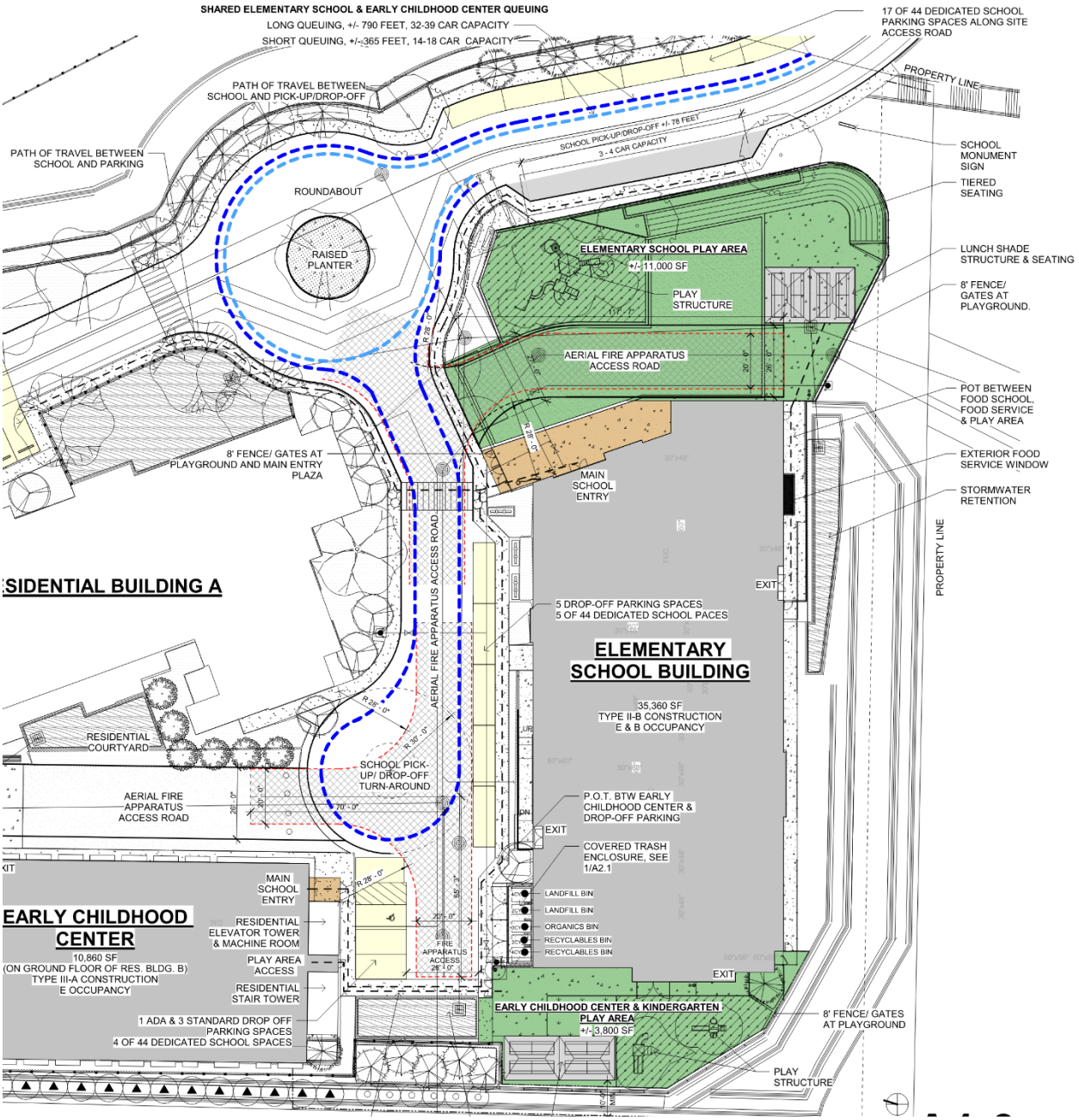
- **Potential vehicular/pedestrian conflicts**: The main school entrances are located in the northwest corner of the elementary school building, and the entrance on the eastern portion of the kindergarten building. Potential conflicts between vehicles and pedestrians may occur when pedestrians cross the internal access driveways. The primary locations where conflicts may occur are at the driveway north of the elementary school and the driveway south of the traffic circle. These driveways will also be the path for vehicles accessing the school drop-off and parking areas. To reduce conflicts and improve circulation for pedestrians and vehicles, pedestrians should be directed to only cross the streets at designated pedestrian facilities. Pedestrians should not cross driveways outside designated facilities.
- **Parking and Maneuvering**: The loop drive is single queue and does not provide a passing lane. Therefore, vehicles maneuvering in and out of the parking spaces located along the driveway loops will conflict with vehicles traveling in the queue. This may create friction especially during the student drop-off and pick-up periods.
- The drop-off area for the elementary school can only accommodate 3 vehicles. As the configuration is a single queue, parents that cannot stop at the drop-off area would either: (1) stop and block the single queue line and the traffic circle in close proximity, (2) drop-off at a non-designated location, or (3) exit the internal driveway to make a U-turn to reenter the queue.
- The drop-off queue is in close proximity of the traffic circle and will likely block traffic in all directions.
- During student pick-up, it would be difficult to move the single queue as parents in the queue need to locate their children.
- The southernmost spaces at the end of the cul-de-sac on both sides would require substantial vehicle maneuvering. During student drop-off and pick-up times, it would be difficult to find gaps in the queue, essentially trapping these vehicles.
- It is not clear where the school buses and vans for special education students would be located and if it is feasible to separate vehicles from school buses.
- According to published research, elementary schools with a student population of less than 500 students usually have a loop drive stacking length ranging from 400 to 750 feet. Given the site's characteristics with a short drop-off area and the single queue it is anticipated the queue would be in the upper range, possibly reaching the Site Access Road leading to Tennyson Road.

RECOMMENDATIONS

Recommended improvements to pick-up/drop-off circulation are provided below.

- Install school area signage and pavement markings according to MUTCD standards.
- Relocate the northern drop-off area away from the traffic circle.
- Short-term parking spaces should be identified past the student loading area and near the building entrance.
- Block access to the residential area of the parking lot during student drop-off/pick-up
- Assign staff parking to the areas west of the traffic circle, leaving the parking spaces within the loop drive open for parents during the drop-off and pick-up times.
- At the designated drop-off areas north and west of the elementary school building, paint the curb white and mark it as "passenger loading during student drop-off and pick-up times." "No Parking" signs should be installed indicating the times of the day when parking is not allowed.
- Traffic cones and other channelizing devices can be used to minimize pedestrian/vehicles conflicts.
- Student safety patrols and loading supervisors should be well trained and wear reflective safety vests.
- Install signage to indicate that parking is not allowed during drop-off/pick-up times and drivers must remain in the vehicles. Signage should also direct kindergarten/early childhood and lower grade drop-off/pick-up to the southern drop-off/pick-up zones, and upper grade drop-off/pick-up to the northern drop-off/pickup zone. Kindergarten/early childhood students should be walked to the school buildings by staff during drop-off times, as opposed to parents parking and walking their students.
- The applicant for the school should prepare a traffic and parking management plan. The plan would identify the parking areas for staff, visitors, parking restrictions, management of the student drop-off/pick-up, locations of crossing guards, staff and monitors assisting with student drop-off/pick-up, and an advanced student identification system so students can be matched to their parents. The plan should be prepared for the satisfaction of City of Hayward Public Works staff and submitted prior to building occupancy permits. The plan should include process to reduce or eliminate the need for the parents to get out of the vehicle at drop-off locations to provide an efficient and safe drop-off and pick-up procedure. The plan should also include staggered drop-off schedules.
- The applicant should prepare a transportation demand management (TDM) plan to encourage carpooling, rideshare, and other modes and facilitate carpool matching for staff and students.

Figure 14: Student Pick-Up and Drop-Off Plan



Section 8 — Traffic Calming

TRAFFIC CALMING

The City of Hayward has expressed concerns regarding the potential for vehicles to divert to or pass through residential streets to local arterial and regional roads in the study area. Generally, pass-through vehicle concerns can be addressed with traffic calming measures to slow vehicles down to safer speeds.

- Examples of traffic calming measures can include:
  - Narrowing roadways
  - Adding on-street parking
  - Installing a bike lane
  - Adding curb extensions and bulbouts
  - Adding bollards and planters
  - Removing lanes
- Vertical deflection such as speed bumps, humps, or tables
- Horizontal deflection
  - Lateral shift with a median island and curb extensions
  - Lateral shift with a chicane and curb extensions
- Enforcement and education
  - Speed cameras
  - Vehicle activated speed signs
- Lowering speed limits

The driveways for the project's residential component are located on East 16th Street. This could result in increased traffic on neighborhood streets in the area. Existing volumes and the anticipated project contribution are shown in Table 14.

Table 14: Anticipated Project Trip Contribution (Hancock Street and E. 16th Street)

Street	Peak Hour	Existing Volume	Project-Only Trips
East 16th Street (south of Hancock Street)	AM	57	31
	PM	79	38
Hancock Street (between Mission Boulevard and E. 16th Street)	AM	235 - 334	63
	PM	137 - 241	77

As shown in the table, it is anticipated that the project will increase traffic along East 16th Street south of Hancock Street by approximately 50% during both peak hours. Vehicle trips will also be added to Hancock Street east of Mission Boulevard. Therefore, the project applicant should work with the City of Hayward to explore options for implementing traffic calming techniques along these streets. These measures can also support improved bicycle and pedestrian conditions in the neighborhood and access to the project site. Potential traffic calming techniques that could be applied to these streets include:

- Narrowing lanes
- Adding curb extensions and bulbouts
- Horizontal deflection

In addition, on-site restrictions should be put in place to prohibit access to/from the project's charter school component from the East 16th Street driveways during peak periods of school pick-up and drop-off.

Section 9 — Circulation and Access

CIRCULATION AND ACCESS

This section provides an overview of site access and on-site circulation.

FIRE TRUCK AND WASTE MANAGEMENT TRUCK ACCESS

An analysis of the project driveways and internal site was prepared by the project team using AutoCAD to assess circulation and site access for fire trucks. The fire truck turning template is shown in Figure 15. As shown in the figure, a tandem axle ladder fire truck is able to navigate the project driveways and drive aisles.

The waste management access plan is shown in Figure 16. As shown in the figure, waste management trucks would utilize a one-way path of travel, entering from Tennyson Road and exiting through East 16th Street. An AutoTurn template was not prepared for waste management vehicles. However, given that the fire truck templates represent the largest vehicle expected to enter and exit the site, it is expected that the site is navigable for waste management trucks.

PASSENGER VEHICLES

AutoTurn templates were not prepared for passenger vehicles, since the fire truck template represents the largest vehicle expected to enter and exit the site. Given the results of the truck turning template, it is expected that the driveway and drive aisles are sufficient to accommodate passenger vehicles. In addition, the exiting vehicle queues at the project driveways and at the Site Access Road/Tennyson Road intersections are not expected to exceed 25 feet; therefore, no conflict is expected between exiting queuing vehicles, parking spaces, and internal drive aisle intersections. In addition, a single outbound lane at each driveway and at the Site Access Road/Tennyson Road intersection is sufficient, especially since exiting vehicles are expected to primarily turn right to exit.

Due to the hilly terrain and uncontrolled intersections east of Mission Boulevard in the vicinity of the project site, sight distance was assessed at uncontrolled intersections and project driveways:

- The school driveway near Tennyson Road – for eastbound vehicles leaving the site
- The residential driveways on 16th Street – for westbound vehicles leaving the site
- The intersection of East 16th Street & Hancock Street – for vehicles at the eastbound stop-controlled approach
- The intersection of Site Access Road & Tennyson Road – for southbound vehicles entering Tennyson Road

The line of sight for stop-controlled movements at these locations were analyzed to ensure that adequate sight distances are provided for vehicles to see both pedestrians in sidewalk areas and vehicles approaching the driveways. Line of sight was analyzed using standards and methodologies described in the American Association of State Highway and Transportation Officials (AASHTO) Geometric Design of Highways and Streets. AASHTO standards were used to develop departure sight triangles at each location that should be unobstructed for vehicles to provide sufficient view of approaching vehicles and pedestrians.

AASHTO recommends that the driver decision point of the sight triangle (the short side) should be 14.5 feet from the major road traveled way. However, where practical, AASHTO recommends increasing the distance to 18 feet. Given the presence of bike lanes and sidewalks along Tennyson Road, a decision point of 18 feet was assumed for the Site Access Road & Tennyson Road intersection.

The following formula was used to calculate the necessary intersection sight distance:

$$ISD = 1.47 * V_{major} * t_g$$

where:

ISD = intersection sight distance (length of the leg of sight distance triangle along major road) (ft)

V_{major} = design speed of major road (mph)

t_g = time gap for minor road vehicle to enter the major road (s)

Assuming a passenger car time gap of 6.5 seconds (based on AASHTO) and speed limits of 15 mph on alleys and 25 mph on other roads, the intersection sight distances were calculated and recommended departure sight triangles are provided below.

- At the school driveway, 239 feet of sight distance is needed. No obstructions are present.
- For vehicles existing the residential driveways, 239 feet of sight distance is needed to the north of the driveway and 143 feet to the south. Obstructions consist of trees and parked cars (no buildings).
- At the East 16th Street & Hancock intersection, eastbound vehicles require 239 feet of sight distance in each direction. Obstructions consist of trees and parked cars (no buildings).
- At the Site Access Road & Tennyson Road intersection, 239 feet of sight distance are needed in each direction. No obstructions are present.

Therefore, access points and intersections around the project site generally have acceptable sight distance, unobstructed by buildings. However, along 16th Street, ample trees and on-street parking could potentially obstruct sight distance. Parking should be prohibited within close proximity of the driveways to improve visibility and sight distance.

There is an incline along Tennyson Road as well as limited visibility due to the roadway's curve and the hilly terrain to the east of the Site Access Road. Currently, the intersection provides full inbound and outbound access and is stop-controlled on the southbound approach. Vehicles traveling along Tennyson Road are not controlled; this includes westbound vehicles traveling downhill. There is the potential for sight issues and conflicts between vehicles taking a left into the project and vehicles traveling westbound downhill along Tennyson due to the grade crest. Furthermore, inbound vehicles may queue back along Tennyson Road's shared left/through lane until a gap form in downhill vehicles; vehicles continuing eastbound along Tennyson Road would have to navigate around these waiting vehicles. In order to improve visibility and safety at the school access point on Tennyson Road for eastbound and westbound vehicles, it is recommended that an inbound left turn lane be added along Tennyson Road at the Site Access Road. Tennyson Road is currently approximately 35 feet wide (with two vehicle lanes and two bike lanes) adjacent to the project. Adding an inbound turn lane and its taper would require widening Tennyson Road by approximately 11 feet.

PEDESTRIANS AND BICYCLISTS

Pedestrians can access the project site using sidewalks at the project driveways or a trail access from Tennyson Road. Pedestrians will be able to use a network of on-site walkways and crosswalks through the project site. In addition, recommended pedestrian-oriented improvements are detailed in preceding chapters of this report.

Bicyclists accessing the site must either use the 16th Street driveways and sidewalks or the trail access from Tennyson Road. Once on site, bicyclists would need to dismount and use the internal pedestrian network. Recommended bicyclist-oriented improvements are detailed in preceding chapters of this report.

Figure 15: Fire Truck Access Plan

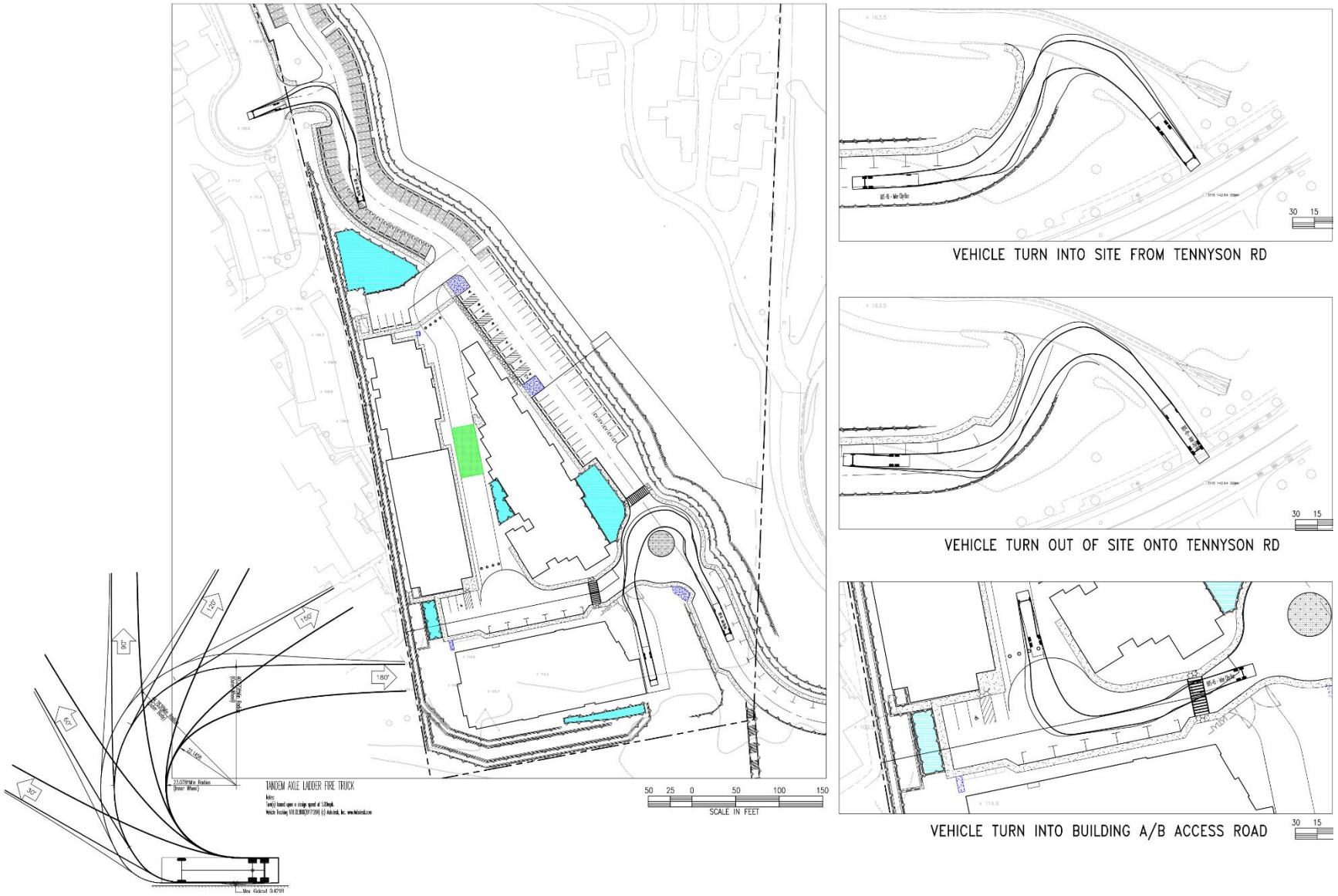
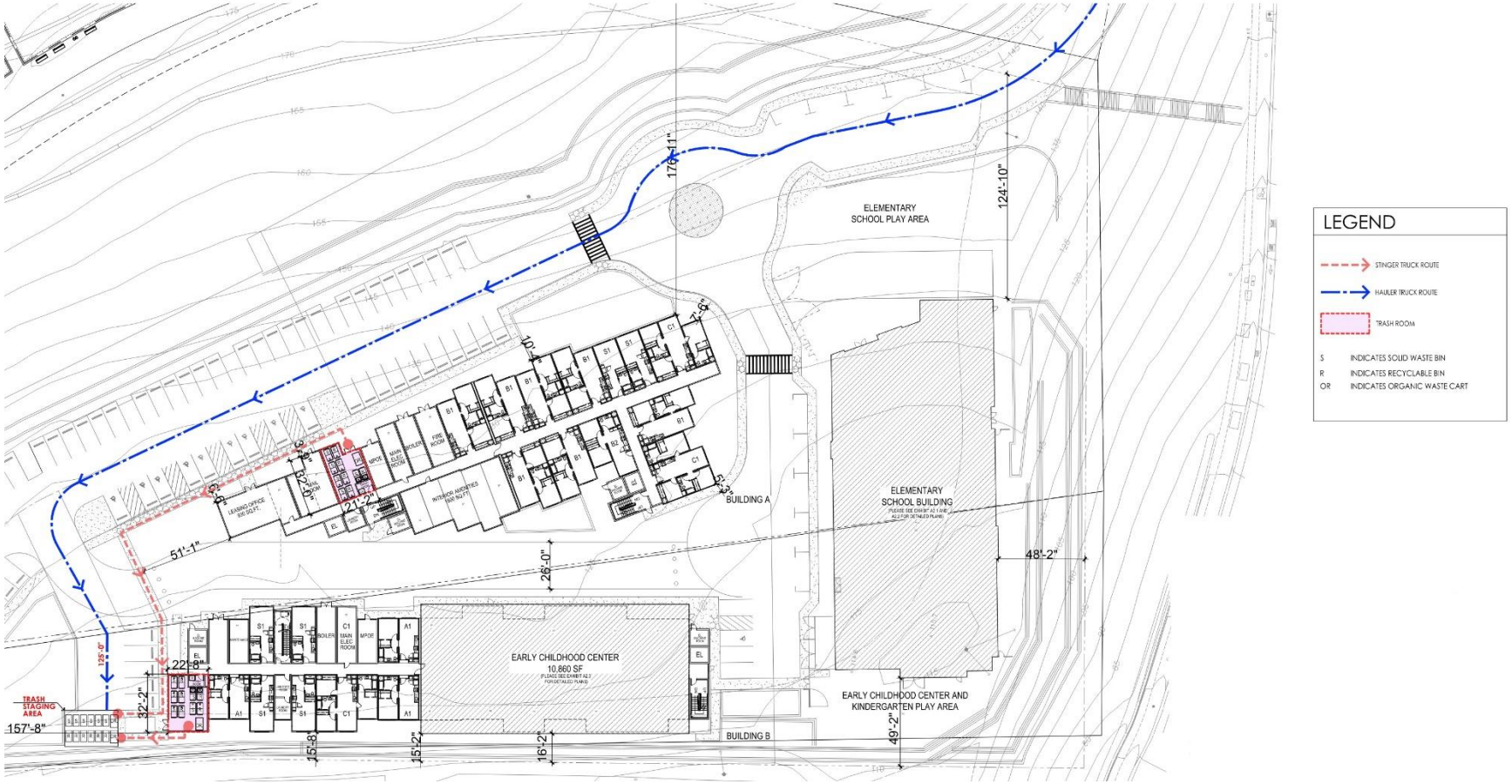


Figure 16: Waste Management Access Plan



Section 10 — Summary of Findings

SUMMARY OF FINDINGS AND RECOMMENDATIONS

The *VMT Impact Assessment Memorandum* previously determined that the project can be screened out of a detailed vehicle miles traveled (VMT) analysis under the City's Senate Bill 743-consistent VMT criteria. Therefore, it was determined that the project would have a **less-than-significant** VMT impact under CEQA. No mitigation measures were identified.

Non-CEQA recommendations have been made in this report to address multimodal transportation conditions and to be incorporated as part of this project.

To address local bus transit accessibility, the property owner should:

- Coordinate with AC Transit to improve user amenities at the two AC Transit bus stops at the intersection of Mission Boulevard and Hancock Street.

To address pedestrian conditions and accessibility, potential pedestrian-oriented treatments that could be considered as part of design review and conditions of approval include:

- Ensure that the project driveways are designed for pedestrian visibility safety (sidewalks clearly delineated, improved visibility by minimizing bushes and large signs).
- Coordinate with the City of Hayward to install warning signage (such as caution signage for exiting vehicles) and continental crosswalks at Site Access/Tennyson Road intersection.
- Explore options to improve pedestrian accessibility west of the project site, including along 16th Street and Hancock Street. Improvements can include marked crosswalks and bulbouts at the East 16th Street/Hancock Street intersection.
- There is the opportunity to add yellow continental school crosswalks at the Tennyson Road/Mission Boulevard intersection.

To address bicycling conditions and accessibility, potential bicycle-oriented treatments that could be considered as part of design review and conditions of approval include:

- Coordinate with the City of Hayward to install signage (such as bikeway signage and caution signage) and green conflict zone markings through the Site Access Road/Tennyson Road intersection.
- Consider implementing facilities to accommodate bicyclists (and pedestrians) crossing Tennyson Road to access the project site (e.g., marked north/south crosswalk at the Site Access Road/Tennyson Road intersection or a midblock location).
- Consider a treatment to improve downhill westbound bicycling conditions approaching the Mission Boulevard/Tennyson Road intersection. Note, Solutions for this location are limited by multiple constraints:
    - A pocket bike lane between the through and right turn lanes may not be feasible due to the curb-to-curb right-of-way or to avoid offsetting the westbound through lane. The length of the pocket bike lane (more than 300 feet) could result in a high-stress situation with vehicles traveling on both sides of bicyclists for an extended period of time.
    - A shared bike/right turn lane may be high-stress for children and other users due to the length of the right-turn lane and downhill vehicle speeds.
    - Solutions may require shortening the westbound right-turn lane at the Mission Boulevard & Tennyson Road intersection to reduce bicyclist stress.
- Consider installing bike routes with sharrows along residential roads such as Hancock Street and 16th Street to facilitate bike access to and from the project. This could be combined with traffic calming strategies due to increased vehicle volumes.

Recommendations to improve student pick-up/drop-off circulation consist of the following:

- Install school area signage and pavement markings according to MUTCD standards.
- Relocate the northern drop-off area away from the traffic circle.
- Short-term parking spaces should be identified past the student loading area and near the building entrance.
- Block access to the residential area of the parking lot during student drop-off/pick-up
- Assign staff parking to the areas west of the traffic circle, leaving the parking spaces within the loop drive open for parents during the drop-off and pick-up times.
- At the designated drop-off areas north and west of the elementary school building, paint the curb white and mark it as "passenger loading during student drop-off and pick-up times." "No Parking" signs should be installed indicating the times of the day when parking is not allowed.
- Traffic cones and other channelizing devices can be used to minimize pedestrian/vehicles conflicts.
- Student safety patrols and loading supervisors should be well trained and wear reflective safety vests.
- Install signage to indicate that parking is not allowed during drop-off/pick-up times and drivers must remain in the vehicles. Signage should also direct kindergarten/early childhood and lower grade drop-off/pick-up to the southern drop-off/pick-up zones, and upper grade drop-off/pick-up to the northern drop-off/pickup zone. Kindergarten/early childhood students should be walked to the school buildings by staff during drop-off times, as opposed to parents parking and walking their students.
- The applicant for the school should prepare a traffic and parking management plan. The plan would identify the parking areas for staff, visitors, parking restrictions, management of the student drop-off/pick-up, locations of crossing guards, staff and monitors assisting with student drop-off/pick-up, and an advanced student identification system so students can be matched to their parents. The plan should be prepared for the satisfaction of City of Hayward Public Works staff and submitted prior to building occupancy permits. The plan should include process to reduce or eliminate the need for the parents to get out of the vehicle at drop-off locations to provide an efficient and safe drop-off and pick-up procedure. The plan should also include staggered drop-off schedules.
- The applicant should prepare a transportation demand management (TDM) plan to encourage carpooling, rideshare, and other modes and facilitate carpool matching for staff and students.

Given the anticipated increase in traffic volumes on local residential streets such as 16th Street and Hancock Street, the project applicant should work with the City of Hayward to explore options for implementing traffic calming techniques along those streets. These measures can also support improved bicycle and pedestrian conditions in the neighborhood and access to the project site. Potential traffic calming techniques that could be applied to these streets include:

- Narrowing lanes
- Adding curb extensions and bulbouts
- Horizontal deflection
- On-site restrictions should be put in place to prohibit access to/from the project's charter school component from the East 16th Street driveways during peak periods of school pick-up and drop-off.

Recommendations to improve circulation and access are as follows:

- Along 16th Street, ample trees and on-street parking could potentially obstruct driveway sight distance. Parking should be prohibited within close proximity of the driveways to improve visibility and sight distance.
- In order to improve visibility and safety at the school access point on Tennyson Road for eastbound and westbound vehicles, it is recommended that an inbound left turn lane be added along Tennyson Road at the Site Access Road. Tennyson Road is currently approximately 35 feet wide (with two vehicle lanes and two bike lanes) adjacent to the project. Adding an inbound turn lane and its taper would require widening Tennyson Road by approximately 11 feet.

Appendix 1 — Traffic Counts and COVID-19 Adjustments

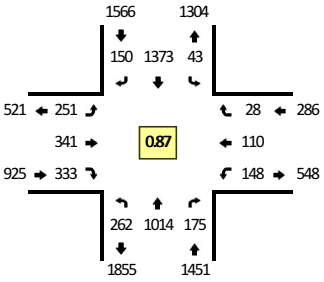
Type of peak hour being reported: Intersection Peak

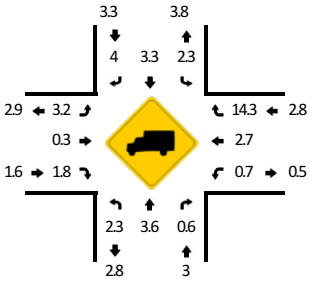
Method for determining peak hour: Total Entering Volume

LOCATION: 1. Mission Blvd -- Harder Rd
CITY/STATE: Hayward, CA

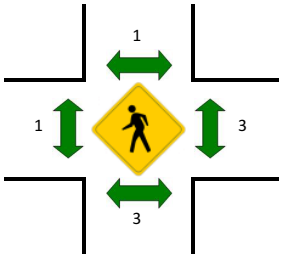
QC JOB #: 15203101
DATE: Tue, Mar 10 2020

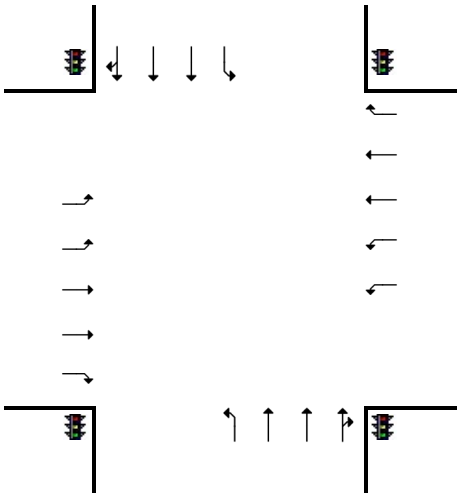
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

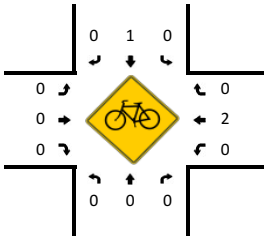


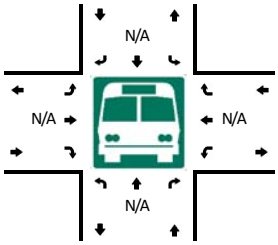


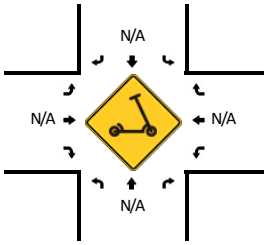
Quality Counts
DATA THAT DRIVES COMMUNITIES











15-Min Count Period Beginning At	1. Mission Blvd (Northbound)				1. Mission Blvd (Southbound)				Harder Rd (Eastbound)				Harder Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	28	179	13	0	4	370	20	2	50	20	40	0	21	13	6	0	766	
7:15 AM	34	193	17	0	7	385	23	0	51	37	87	0	40	17	4	0	895	
7:30 AM	54	232	41	0	8	382	31	3	54	83	69	0	35	29	7	0	1028	
7:45 AM	67	285	71	0	8	392	28	2	61	114	92	0	56	36	6	0	1218	3907
8:00 AM	82	242	39	0	7	287	39	2	81	95	115	0	34	25	8	0	1056	4197
8:15 AM	58	255	24	1	9	312	52	4	55	49	57	0	23	20	7	0	926	4228
8:30 AM	57	207	26	0	10	254	32	1	52	68	29	0	12	9	12	0	769	3969
8:45 AM	33	190	32	0	9	253	25	5	38	57	46	0	16	15	10	0	729	3480

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	268	1140	284	0	32	1568	112	8	244	456	368	0	224	144	24	0	4872
Heavy Trucks	0	56	4		0	40	8		4	0	4		4	8	4		132
Buses																	
Pedestrians		4				0				0				4			8
Bicycles	0	0	0		0	0	0		0	0	0		0	4	0		4
Scooters																	

Comments:

Report generated on 3/23/2020 4:52 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

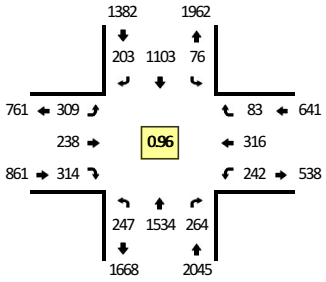
Type of peak hour being reported: Intersection Peak

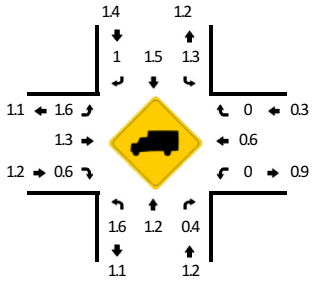
Method for determining peak hour: Total Entering Volume

LOCATION: 1. Mission Blvd -- Harder Rd
CITY/STATE: Hayward, CA

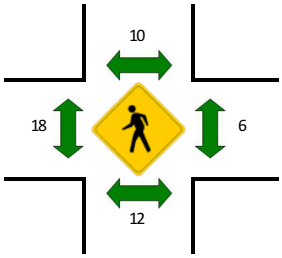
QC JOB #: 15203102
DATE: Tue, Mar 10 2020

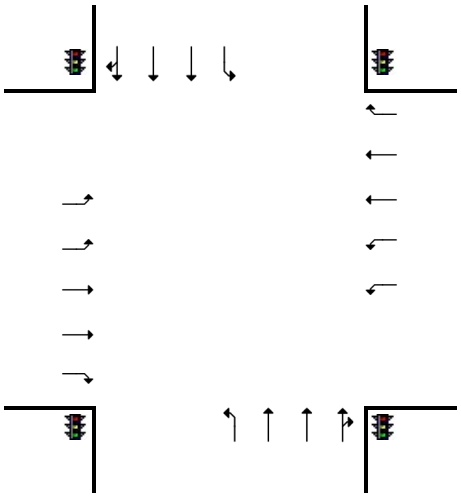
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:30 PM -- 5:45 PM

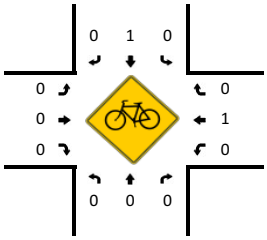


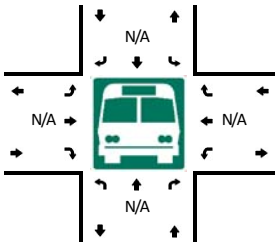


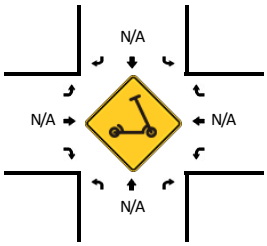
Quality Counts
DATA THAT DRIVES COMMUNITIES











15-Min Count Period Beginning At	1. Mission Blvd (Northbound)				1. Mission Blvd (Southbound)				Harder Rd (Eastbound)				Harder Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	59	410	73	3	11	265	41	15	77	61	76	0	59	88	19	0	1257	
4:15 PM	65	324	57	1	12	259	42	12	79	64	74	1	47	68	28	0	1133	
4:30 PM	54	386	51	1	9	276	54	8	66	44	83	0	48	74	15	0	1169	
4:45 PM	66	332	43	1	11	276	46	8	77	57	95	0	45	66	11	0	1134	4693
5:00 PM	59	376	57	3	9	277	47	12	65	51	83	1	56	85	27	0	1208	4644
5:15 PM	58	398	59	2	8	269	46	8	79	70	74	1	74	107	23	0	1276	4787
5:30 PM	66	364	83	1	13	314	63	13	71	62	91	2	64	65	18	0	1290	4908
5:45 PM	55	396	65	3	6	243	47	7	90	55	66	0	48	59	15	0	1155	4929

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	264	1456	332	4	52	1256	252	52	284	248	364	8	256	260	72	0	5160
Heavy Trucks	4	8	0		0	8	0		8	4	4		0	0	0		36
Buses																	
Pedestrians		8				20				20				8			56
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/23/2020 4:52 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

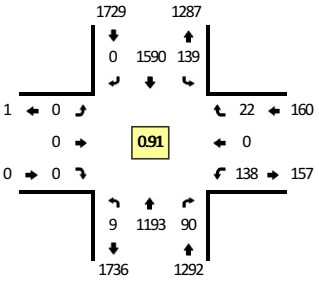
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

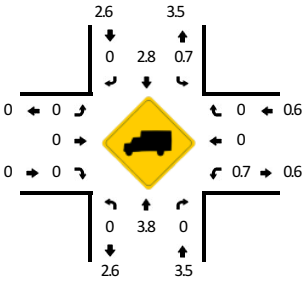
LOCATION: 2. Mission Blvd -- Calhoun St
CITY/STATE: Hayward, CA

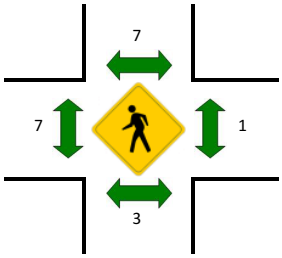
QC JOB #: 15203103
DATE: Tue, Mar 10 2020

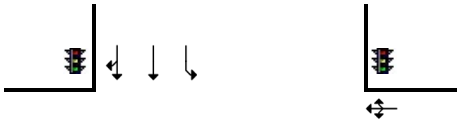
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

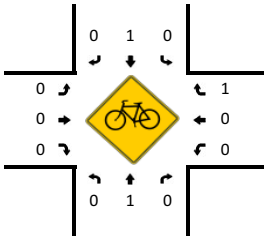


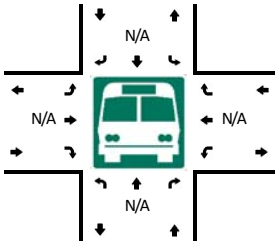
Quality Counts
DATA THAT DRIVES COMMUNITIES

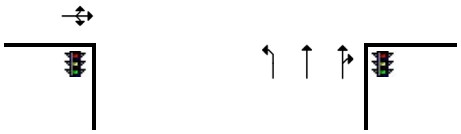


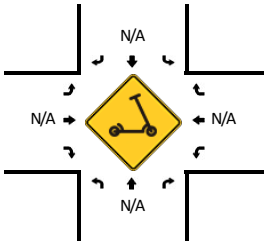












15-Min Count Period Beginning At	2. Mission Blvd (Northbound)				2. Mission Blvd (Southbound)				Calhoun St (Eastbound)				Calhoun St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	220	3	0	5	384	0	6	0	1	0	0	10	0	3	0	632	
7:15 AM	0	242	11	2	6	439	0	18	0	0	0	0	12	0	2	0	732	
7:30 AM	0	314	24	0	8	401	0	20	0	0	0	0	21	0	2	0	790	
7:45 AM	0	374	24	2	21	387	0	12	0	0	0	0	45	0	13	0	878	3032
8:00 AM	1	263	31	4	32	363	0	22	0	0	0	0	60	0	5	0	781	3181
8:15 AM	0	285	0	2	2	345	0	31	0	0	0	0	11	0	8	0	684	3133
8:30 AM	0	266	1	3	5	309	0	3	0	0	0	0	6	0	2	0	595	2938
8:45 AM	0	250	1	1	3	284	0	8	0	0	0	0	2	0	3	0	552	2612

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	1496	96	8	84	1548	0	48	0	0	0	0	180	0	52	0	3512
Heavy Trucks	0	52	0		0	32	0		0	0	0		0	0	0		84
Buses																	
Pedestrians		4				16				16				0			36
Bicycles	0	4	0		0	0	0		0	0	0		0	0	0		4
Scooters																	

Comments:

Report generated on 3/23/2020 4:52 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

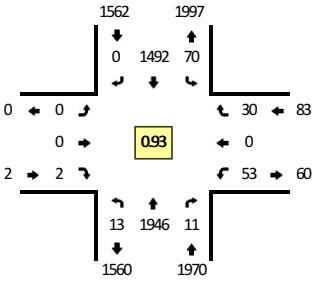
Type of peak hour being reported: Intersection Peak

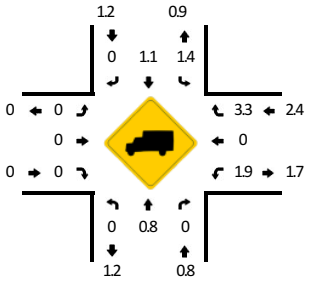
Method for determining peak hour: Total Entering Volume

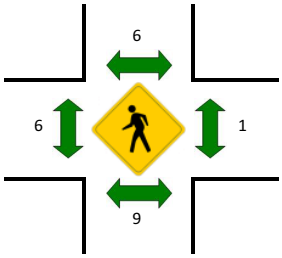
LOCATION: 2. Mission Blvd -- Calhoun St
CITY/STATE: Hayward, CA

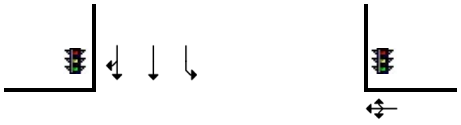
QC JOB #: 15203104
DATE: Tue, Mar 10 2020

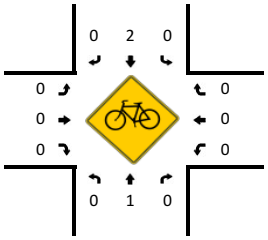
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

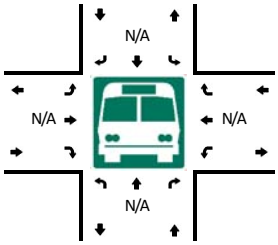


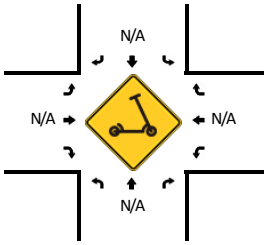












15-Min Count Period Beginning At	2. Mission Blvd (Northbound)				2. Mission Blvd (Southbound)				Calhoun St (Eastbound)				Calhoun St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	498	8	4	24	309	0	6	0	0	0	0	4	0	2	0	855	
4:15 PM	0	444	5	2	14	394	0	2	0	0	0	0	17	0	7	0	885	
4:30 PM	0	459	5	8	15	316	0	10	0	0	0	0	12	0	6	0	831	
4:45 PM	0	473	4	4	20	347	0	4	0	0	0	0	15	0	10	0	877	3448
5:00 PM	0	434	3	2	16	376	0	6	0	0	1	0	19	0	6	0	863	3456
5:15 PM	0	549	1	3	5	391	0	8	0	0	1	0	7	0	5	0	970	3541
5:30 PM	0	490	3	4	8	378	0	3	0	0	0	0	12	0	9	0	907	3617
5:45 PM	0	511	0	3	13	327	0	6	0	0	0	0	6	0	1	0	867	3607

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	2196	4	12	20	1564	0	32	0	0	4	0	28	0	20	0	3880
Heavy Trucks	0	16	0		4	12	0		0	0	0		0	0	4		36
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/23/2020 4:52 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

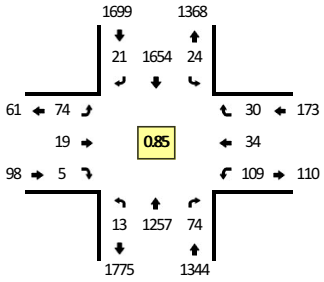
Type of peak hour being reported: Intersection Peak

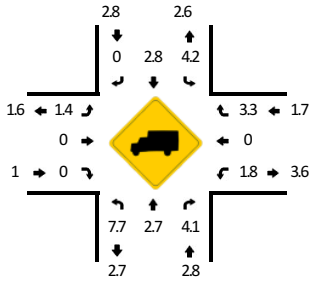
Method for determining peak hour: Total Entering Volume

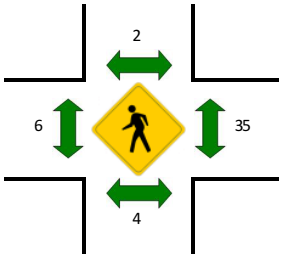
LOCATION: 3. Mission Blvd -- Hancock St
CITY/STATE: Hayward, CA

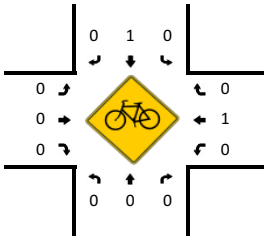
QC JOB #: 15203105
DATE: Tue, Mar 10 2020

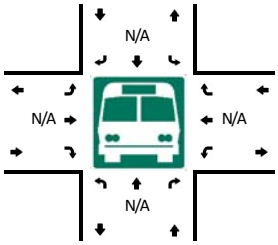
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

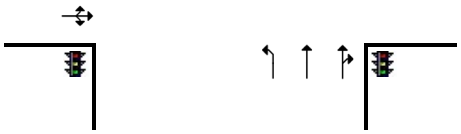


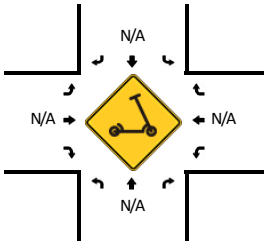












15-Min Count Period Beginning At	3. Mission Blvd (Northbound)				3. Mission Blvd (Southbound)				Hancock St (Eastbound)				Hancock St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	2	200	4	4	0	406	1	2	11	1	2	0	28	3	8	0	672	
7:15 AM	3	225	13	1	2	419	0	1	9	1	2	0	16	6	6	0	704	
7:30 AM	1	315	8	1	4	438	4	1	13	1	0	0	24	4	8	0	822	
7:45 AM	0	396	50	2	5	443	6	0	26	5	1	0	31	8	4	0	977	3175
8:00 AM	4	278	11	1	6	401	4	3	20	8	1	0	41	9	10	0	797	3300
8:15 AM	1	268	5	3	2	372	7	3	15	5	3	0	13	13	8	0	718	3314
8:30 AM	1	251	5	1	1	338	5	4	11	2	3	0	14	3	6	0	645	3137
8:45 AM	0	235	6	6	5	266	6	3	5	1	2	0	9	2	9	0	555	2715

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	1584	200	8	20	1772	24	0	104	20	4	0	124	32	16	0	3908
Heavy Trucks	0	52	4		4	44	0		0	0	0		0	0	0		104
Buses																	
Pedestrians		4				0				4				32			40
Bicycles	0	0	0		0	0	0		0	0	0		0	4	0		4
Scooters																	

Comments:

Report generated on 3/23/2020 4:52 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

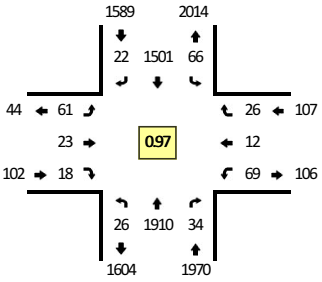
Type of peak hour being reported: Intersection Peak

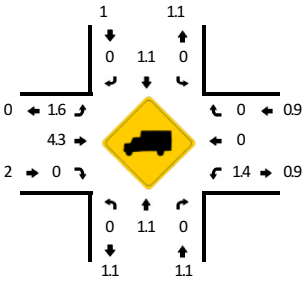
Method for determining peak hour: Total Entering Volume

LOCATION: 3. Mission Blvd -- Hancock St
CITY/STATE: Hayward, CA

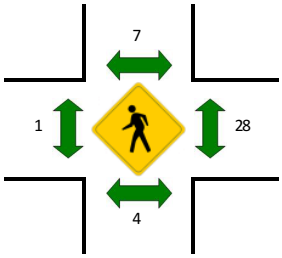
QC JOB #: 15203106
DATE: Tue, Mar 10 2020

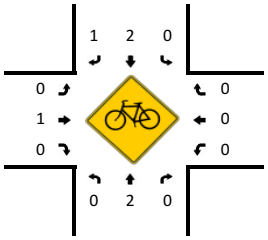
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

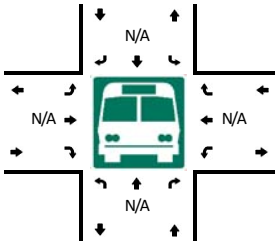


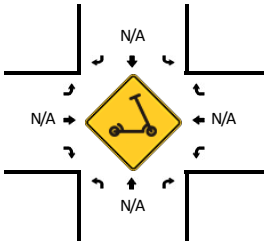


Quality Counts
DATA THAT DRIVES COMMUNITIES









15-Min Count Period Beginning At	3. Mission Blvd (Northbound)				3. Mission Blvd (Southbound)				Hancock St (Eastbound)				Hancock St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	485	13	2	7	314	7	4	22	4	4	0	19	5	4	0	892	
4:15 PM	0	418	4	2	6	375	8	4	23	3	0	0	18	4	9	0	874	
4:30 PM	2	445	9	6	17	307	6	7	25	1	0	0	14	3	4	0	846	
4:45 PM	2	451	9	4	13	327	4	6	16	6	3	0	9	3	7	0	860	3472
5:00 PM	3	483	9	3	12	390	7	10	15	9	3	0	16	5	7	0	972	3552
5:15 PM	0	464	11	3	12	390	4	2	20	6	5	0	20	3	5	0	945	3623
5:30 PM	2	474	9	5	15	386	3	2	16	4	7	0	18	2	9	0	952	3729
5:45 PM	5	489	5	5	10	335	8	3	10	4	3	0	15	2	5	0	899	3768

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	1932	36	12	48	1560	28	40	60	36	12	0	64	20	28	0	3888
Heavy Trucks	0	20	0		0	16	0		0	0	0		0	0	0		36
Buses																	
Pedestrians		0				12				4				60			76
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/23/2020 4:52 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

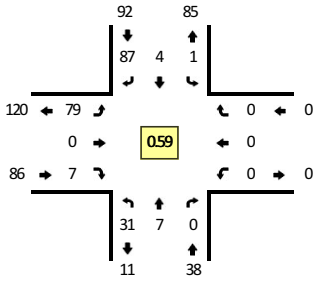
Type of peak hour being reported: Intersection Peak

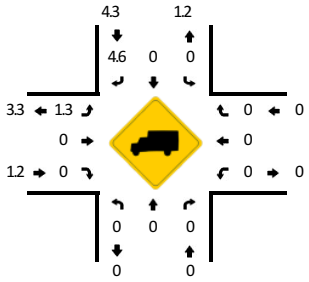
Method for determining peak hour: Total Entering Volume

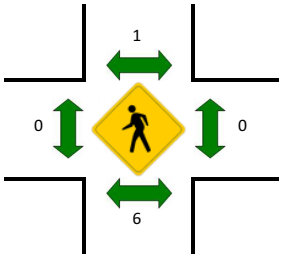
LOCATION: 4. E 16th St -- Hancock St
CITY/STATE: Hayward, CA

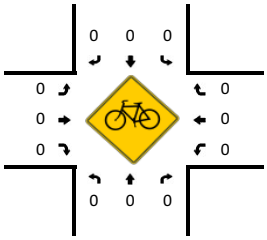
QC JOB #: 15203107
DATE: Tue, Mar 10 2020

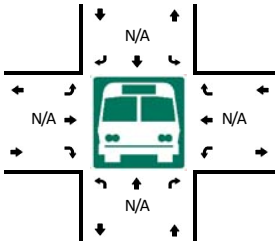
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

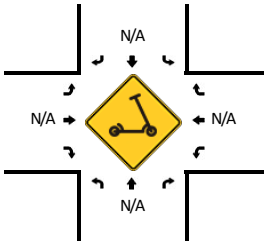












15-Min Count Period Beginning At	4. E 16th St (Northbound)				4. E 16th St (Southbound)				Hancock St (Eastbound)				Hancock St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	11	0	0	0	0	0	9	0	1	0	1	0	0	0	0	0	22	
7:15 AM	6	0	0	0	0	1	15	1	6	0	2	1	0	0	0	0	32	
7:30 AM	9	3	0	0	0	1	13	0	7	0	2	1	0	0	0	0	36	
7:45 AM	7	4	0	0	0	1	29	0	50	0	1	0	0	0	0	0	92	182
8:00 AM	9	0	0	0	0	1	30	0	14	0	2	0	0	0	0	0	56	216
8:15 AM	9	2	0	0	0	0	9	0	1	0	4	0	0	0	0	0	25	209
8:30 AM	7	1	0	0	0	0	5	0	3	0	1	0	0	0	0	0	17	190
8:45 AM	7	1	0	0	0	1	4	0	1	0	3	0	0	0	0	0	17	115

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	28	16	0	0	0	4	116	0	200	0	4	0	0	0	0	0	368
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Buses																	
Pedestrians		16				0				0				0			16
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

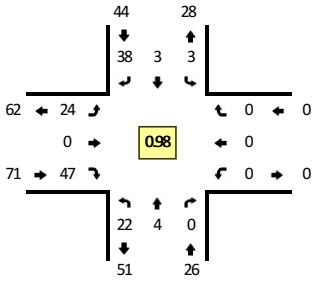
Report generated on 3/23/2020 4:52 PM

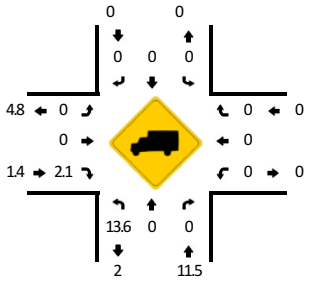
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

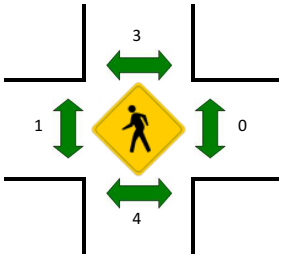
LOCATION: 4. E 16th St -- Hancock St | **QC JOB #:** 15203108
CITY/STATE: Hayward, CA | **DATE:** Tue, Mar 10 2020

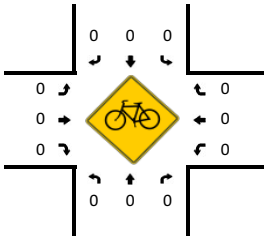
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 4:45 PM -- 5:00 PM

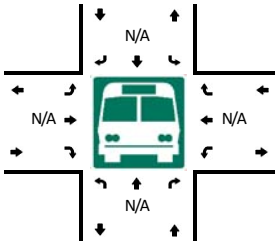


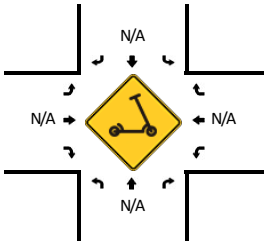


Quality Counts
DATA THAT DRIVES COMMUNITIES









15-Min Count Period Beginning At	4. E 16th St (Northbound)				4. E 16th St (Southbound)				Hancock St (Eastbound)				Hancock St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	5	1	0	0	0	1	8	0	4	0	9	2	0	0	0	0	30	
4:15 PM	5	1	0	0	0	2	12	0	6	0	3	0	0	0	0	0	29	
4:30 PM	3	2	0	0	0	4	5	0	2	0	8	0	0	0	0	0	24	
4:45 PM	7	0	0	0	0	1	8	1	4	0	14	1	0	0	0	0	36	119
5:00 PM	8	0	0	0	0	1	10	1	5	0	10	0	0	0	0	0	35	124
5:15 PM	2	2	0	1	0	1	9	1	7	0	13	0	0	0	0	0	36	131
5:30 PM	4	2	0	0	0	0	11	0	5	0	10	2	0	0	0	0	34	141
5:45 PM	7	3	0	0	0	0	6	0	4	0	8	0	0	0	0	0	28	133

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	28	0	0	0	0	4	32	4	16	0	56	4	0	0	0	0	144
Heavy Trucks	8	0	0		0	0	0		0	0	0		0	0	0		8
Buses																	
Pedestrians		0				4				4				0			8
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

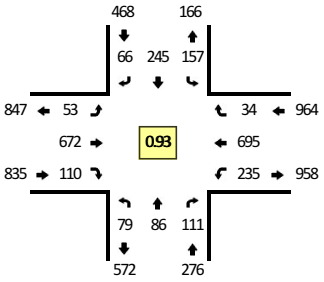
Comments:

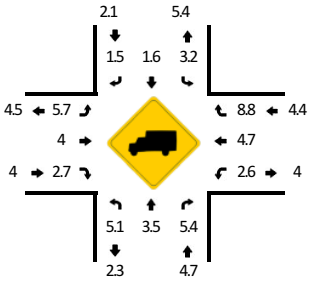
Report generated on 3/23/2020 4:52 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

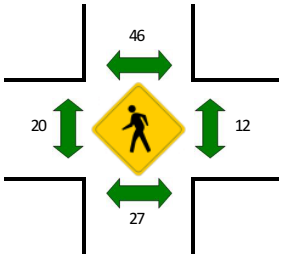
LOCATION: 5. Huntwood Ave -- Tennyson Rd | **QC JOB #:** 15203109
CITY/STATE: Hayward, CA | **DATE:** Tue, Mar 10 2020

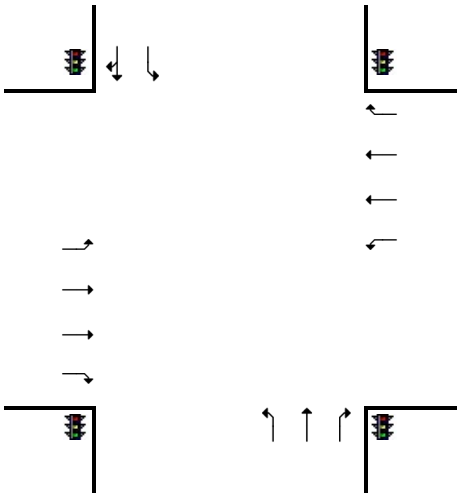
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

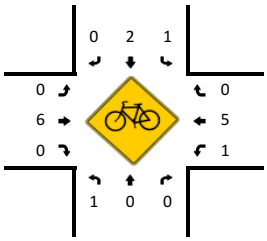


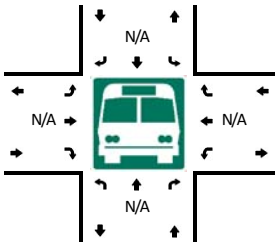


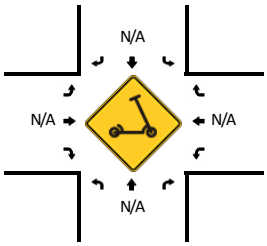
Quality Counts
DATA THAT DRIVES COMMUNITIES











15-Min Count Period Beginning At	5. Huntwood Ave (Northbound)				5. Huntwood Ave (Southbound)				Tennyson Rd (Eastbound)				Tennyson Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	15	17	13	0	17	44	17	0	9	99	26	1	36	144	1	1	440	
7:15 AM	24	20	15	0	24	69	24	0	12	120	36	0	50	152	3	2	551	
7:30 AM	26	28	23	0	32	71	16	0	6	142	31	2	62	151	5	2	597	
7:45 AM	24	17	33	0	47	69	11	0	10	193	26	1	49	190	7	4	681	2269
8:00 AM	16	30	38	0	40	63	22	0	9	159	22	0	51	180	12	7	649	2478
8:15 AM	13	11	17	0	38	42	17	0	21	178	31	4	55	174	10	5	616	2543
8:30 AM	18	19	10	0	15	38	12	0	13	89	24	4	44	160	6	2	454	2400
8:45 AM	20	16	14	0	12	34	11	0	9	70	14	1	26	127	3	3	360	2079

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	96	68	132	0	188	276	44	0	40	772	104	4	196	760	28	16	2724
Heavy Trucks	4	0	0		4	8	0		8	20	0		4	36	0		84
Buses																	
Pedestrians		28				64				24				8			124
Bicycles	0	0	0		0	8	0		0	16	0		4	4	0		32
Scooters																	

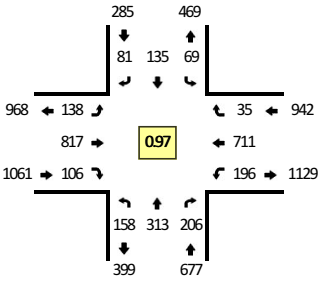
Comments:

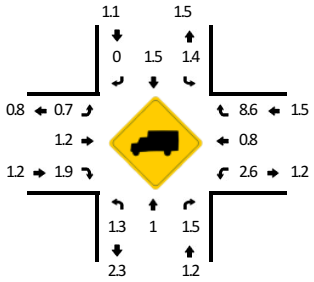
Report generated on 3/23/2020 4:52 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

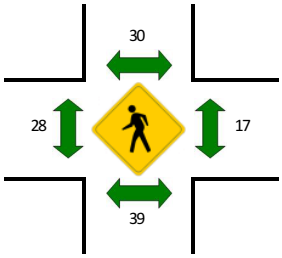
LOCATION: 5. Huntwood Ave -- Tennyson Rd | **QC JOB #:** 15203110
CITY/STATE: Hayward, CA | **DATE:** Tue, Mar 10 2020

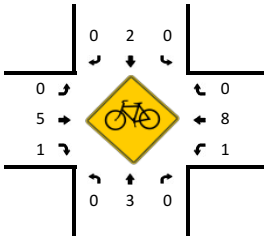
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

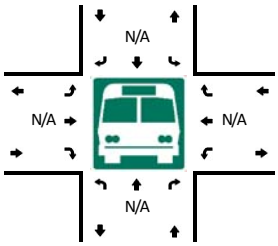


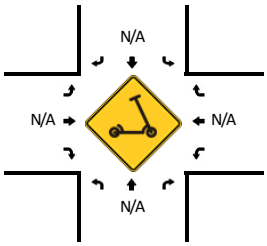


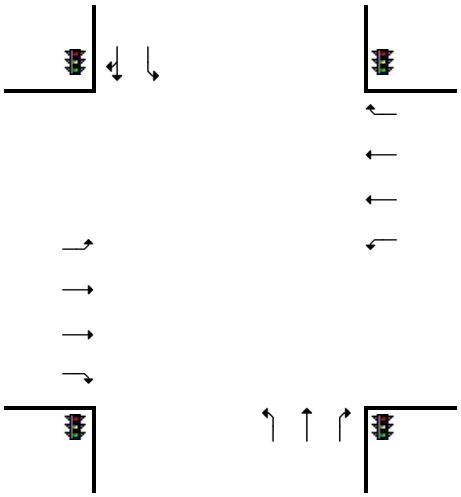
Quality Counts
DATA THAT DRIVES COMMUNITIES











15-Min Count Period Beginning At	5. Huntwood Ave (Northbound)				5. Huntwood Ave (Southbound)				Tennyson Rd (Eastbound)				Tennyson Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	37	58	44	0	28	32	14	0	24	194	29	5	35	170	3	12	685	
4:15 PM	38	75	47	0	16	39	19	0	31	184	26	5	37	142	6	7	672	
4:30 PM	60	87	52	0	14	38	20	0	32	207	29	3	39	146	9	10	746	
4:45 PM	44	83	39	0	14	29	14	0	23	206	35	3	42	156	9	4	701	2804
5:00 PM	38	97	58	0	12	38	23	0	26	189	25	4	42	198	7	9	766	2885
5:15 PM	38	83	56	0	19	31	14	0	31	198	36	5	40	161	8	14	734	2947
5:30 PM	41	67	46	0	18	32	21	0	22	217	21	6	43	172	11	8	725	2926
5:45 PM	41	66	46	0	19	34	23	1	41	213	24	3	33	180	9	7	740	2965

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	152	388	232	0	48	152	92	0	104	756	100	16	168	792	28	36	3064
Heavy Trucks	4	0	4		4	8	0		0	0	4		12	8	4		48
Buses																	
Pedestrians		44				28				76				20			168
Bicycles	0	8	0		0	4	0		0	0	0		0	8	0		20
Scooters																	

Comments:

Report generated on 3/23/2020 4:52 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

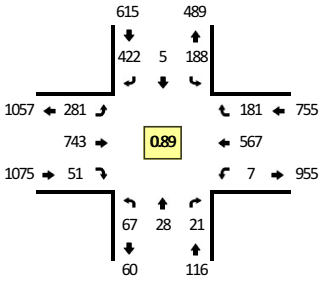
Type of peak hour being reported: Intersection Peak

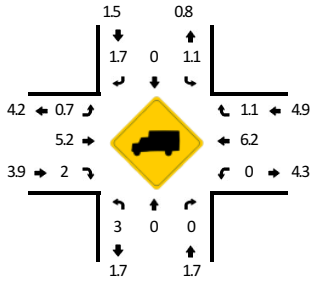
Method for determining peak hour: Total Entering Volume

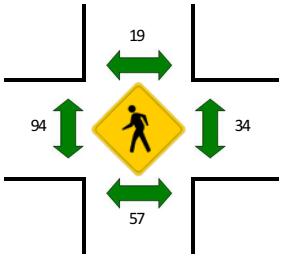
LOCATION: 6. Whitman St/Beatron Wy -- Tennyson Rd
CITY/STATE: Hayward, CA

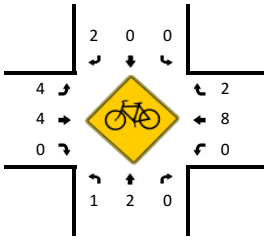
QC JOB #: 15203111
DATE: Tue, Mar 10 2020

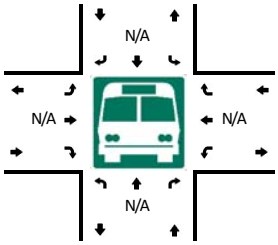
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

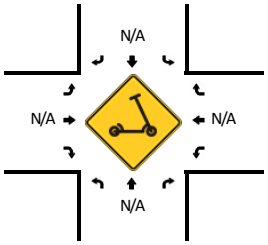


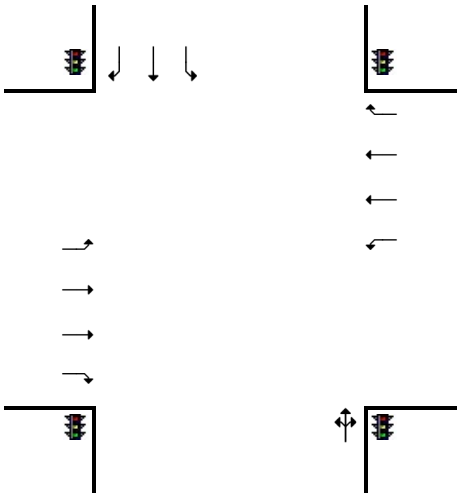












15-Min Count Period Beginning At	6. Whitman St/Beatron Wy (Northbound)				6. Whitman St/Beatron Wy (Southbound)				Tennyson Rd (Eastbound)				Tennyson Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	14	5	2	0	42	2	67	0	31	113	3	0	1	111	18	0	409	
7:15 AM	12	3	3	0	34	1	101	0	33	146	1	0	0	92	25	0	451	
7:30 AM	21	3	3	0	35	1	103	0	50	160	2	0	0	119	23	0	520	
7:45 AM	15	5	8	0	51	0	111	0	82	224	14	0	0	156	49	2	717	2097
8:00 AM	21	13	8	0	52	2	90	0	69	178	21	1	4	161	61	1	682	2370
8:15 AM	10	7	2	0	50	2	118	0	79	181	14	0	0	131	48	0	642	2561
8:30 AM	4	0	2	0	18	3	69	0	28	94	3	0	1	145	19	0	386	2427
8:45 AM	3	0	1	0	15	0	53	0	34	84	6	0	2	92	17	0	307	2017

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	60	20	32	0	204	0	444	0	328	896	56	0	0	624	196	8	2868
Heavy Trucks	0	0	0		4	0	4		0	40	0		0	36	4		88
Buses																	
Pedestrians		68				12				108				28			216
Bicycles	4	0	0		0	0	0		12	8	0		0	4	0		28
Scooters																	

Comments:

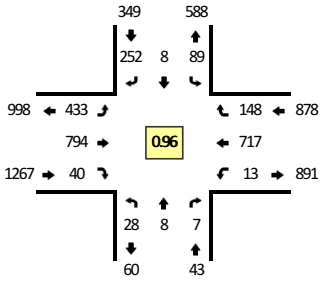
Report generated on 3/23/2020 4:52 PM

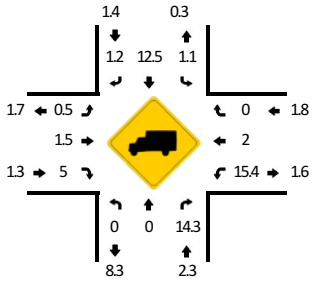
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

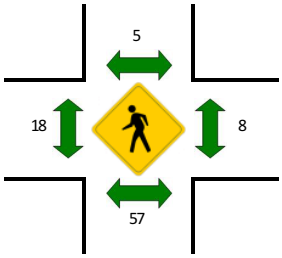
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

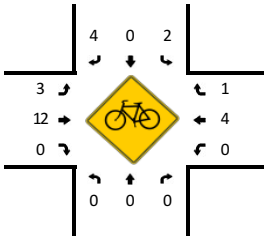
LOCATION: 6. Whitman St/Beatron Wy -- Tennyson Rd | **QC JOB #:** 15203112
CITY/STATE: Hayward, CA | **DATE:** Tue, Mar 10 2020

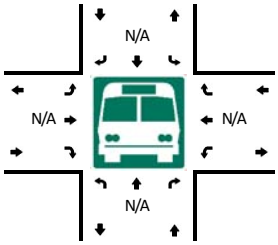
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:45 PM -- 6:00 PM

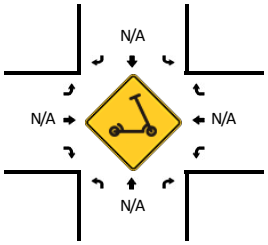


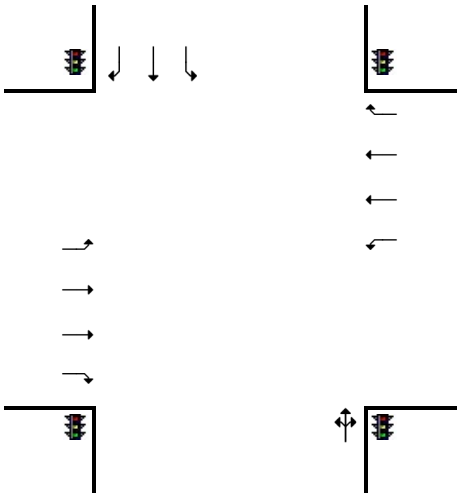












15-Min Count Period Beginning At	6. Whitman St/Beatron Wy (Northbound)				6. Whitman St/Beatron Wy (Southbound)				Tennyson Rd (Eastbound)				Tennyson Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	7	1	1	0	28	3	58	0	99	193	14	0	1	174	30	0	609	
4:15 PM	6	2	2	0	18	1	50	1	97	197	8	0	1	174	21	3	581	
4:30 PM	10	3	4	0	24	3	54	0	101	181	12	1	1	150	42	2	588	
4:45 PM	11	2	2	0	19	0	65	0	107	189	15	0	1	184	42	2	639	2417
5:00 PM	4	4	3	0	22	4	67	0	96	179	14	0	0	184	44	0	621	2429
5:15 PM	9	2	0	0	11	1	62	0	125	212	8	0	7	179	26	0	642	2490
5:30 PM	7	1	1	0	25	1	62	0	105	191	8	0	3	166	39	1	610	2512
5:45 PM	8	1	3	0	31	2	61	0	106	212	10	1	2	188	39	0	664	2537

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	32	4	12	0	124	8	244	0	424	848	40	4	8	752	156	0	2656
Heavy Trucks	0	0	0		0	0	4		4	20	0		0	8	0		36
Buses																	
Pedestrians		56				0				16				4			76
Bicycles	0	0	0		8	0	0		4	16	0		0	4	0		32
Scooters																	

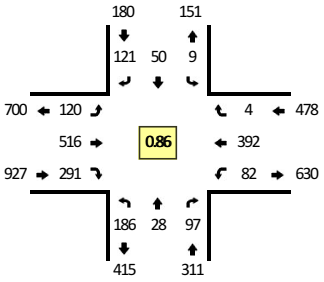
Comments:

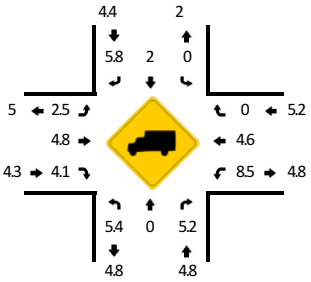
Report generated on 3/23/2020 4:52 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

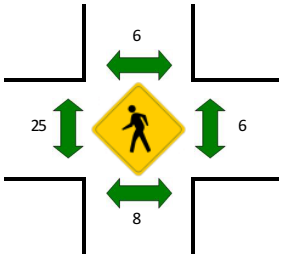
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

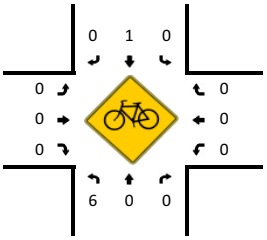
LOCATION: 7. E 12th St/Dixon St -- Tennyson Rd | **QC JOB #:** 15203113
CITY/STATE: Hayward, CA | **DATE:** Tue, Mar 10 2020

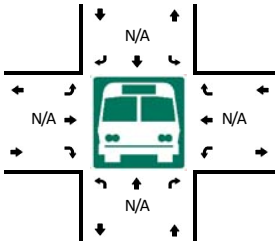
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

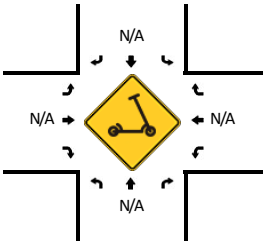


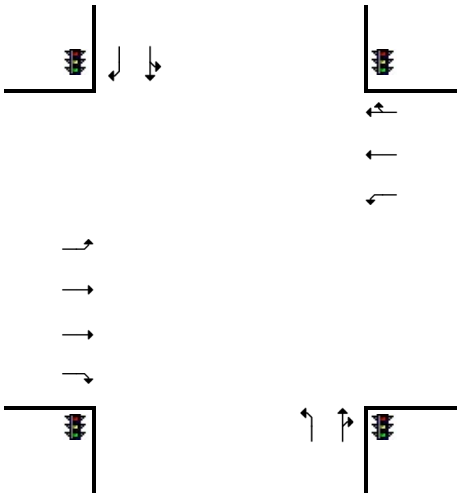












15-Min Count Period Beginning At	7. E 12th St/Dixon St (Northbound)				7. E 12th St/Dixon St (Southbound)				Tennyson Rd (Eastbound)				Tennyson Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	44	4	17	0	1	9	13	0	7	74	67	0	18	62	0	2	318	
7:15 AM	37	4	25	0	1	7	14	0	14	99	78	0	15	58	0	0	352	
7:30 AM	47	3	23	0	2	8	22	0	17	109	73	0	14	65	0	2	385	
7:45 AM	57	8	25	0	1	18	25	0	28	171	82	0	20	112	2	2	551	1606
8:00 AM	58	9	17	0	4	7	31	0	37	125	75	1	16	114	0	2	496	1784
8:15 AM	24	8	32	0	2	17	43	0	37	111	61	0	24	101	2	2	464	1896
8:30 AM	39	6	14	0	0	10	27	0	12	77	46	0	17	89	1	4	342	1853
8:45 AM	25	5	16	0	0	4	12	0	8	64	30	0	15	76	1	0	256	1558

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	228	32	100	0	4	72	100	0	112	684	328	0	80	448	8	8	2204
Heavy Trucks	8	0	8		0	0	8		4	36	20		8	24	0		116
Buses																	
Pedestrians		8				8				28				0			44
Bicycles	4	0	0		0	4	0		0	0	0		0	0	0		8
Scooters																	

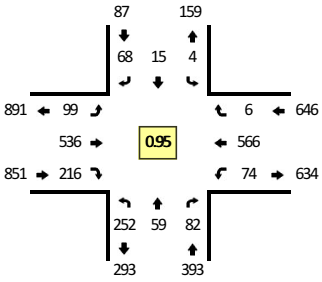
Comments:

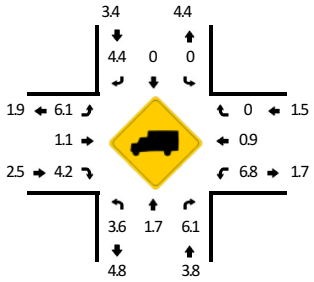
Report generated on 3/23/2020 4:52 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

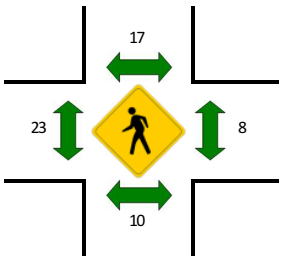
LOCATION: 7. E 12th St/Dixon St -- Tennyson Rd | **QC JOB #:** 15203114
CITY/STATE: Hayward, CA | **DATE:** Tue, Mar 10 2020

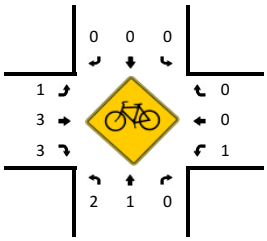
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:45 PM -- 6:00 PM

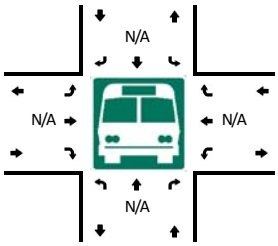


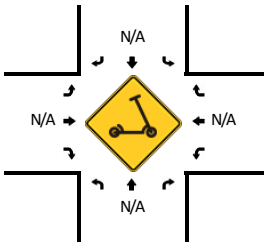


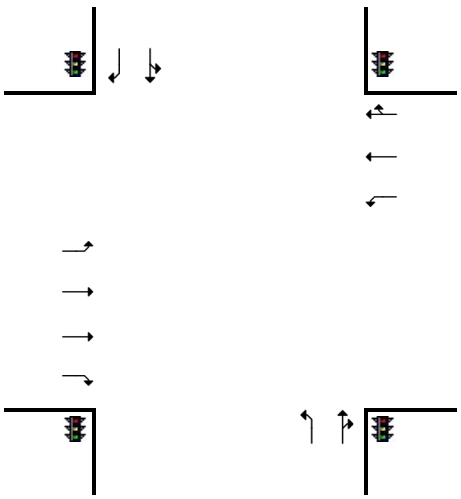
Quality Counts
DATA THAT DRIVES COMMUNITIES











15-Min Count Period Beginning At	7. E 12th St/Dixon St (Northbound)				7. E 12th St/Dixon St (Southbound)				Tennyson Rd (Eastbound)				Tennyson Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	46	11	18	0	1	4	29	0	30	130	44	1	16	123	1	4	458	
4:15 PM	35	16	19	0	0	1	15	0	25	120	49	4	10	138	0	0	432	
4:30 PM	55	12	16	0	1	7	10	0	17	136	37	0	12	133	2	3	441	
4:45 PM	61	21	17	0	2	9	12	0	25	128	51	0	13	144	2	3	488	1819
5:00 PM	69	12	25	0	2	6	16	0	19	131	56	3	9	155	1	3	507	1868
5:15 PM	58	20	16	0	0	1	15	0	33	130	51	0	19	126	2	3	474	1910
5:30 PM	43	18	20	0	0	4	14	0	18	126	55	2	19	152	0	4	475	1944
5:45 PM	82	9	21	0	2	4	23	0	24	149	54	0	15	133	3	2	521	1977

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	328	36	84	0	8	16	92	0	96	596	216	0	60	532	12	8	2084
Heavy Trucks	4	0	4		0	0	8		12	12	8		4	0	0		52
Buses																	
Pedestrians		8				20				32				4			64
Bicycles	0	0	0		0	0	0		0	8	0		4	0	0		12
Scooters																	

Comments:

Report generated on 3/23/2020 4:52 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

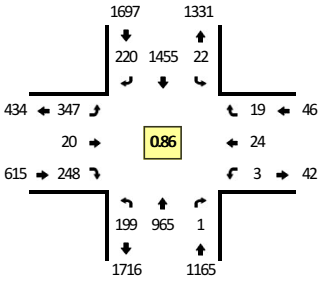
Type of peak hour being reported: Intersection Peak

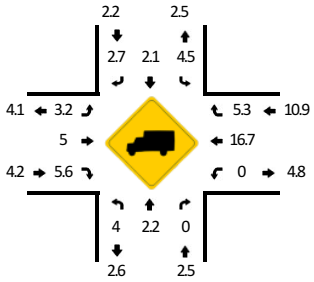
Method for determining peak hour: Total Entering Volume

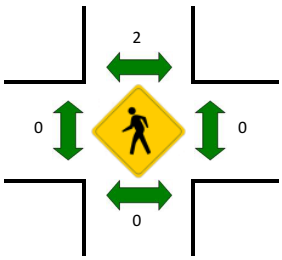
LOCATION: 8. Mission Blvd -- Tennyson Rd
CITY/STATE: Hayward, CA

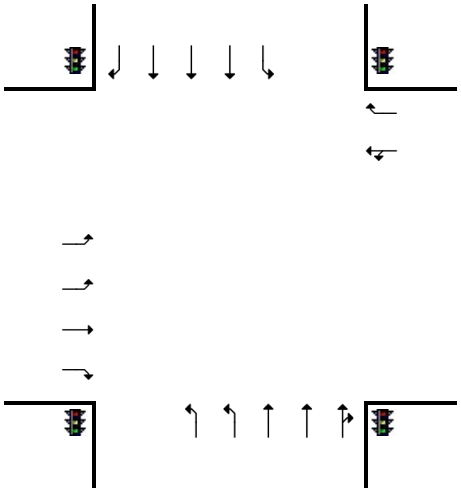
QC JOB #: 15203115
DATE: Tue, Mar 10 2020

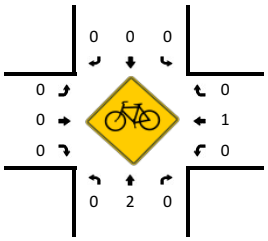
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

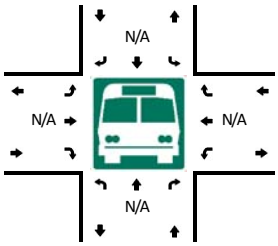


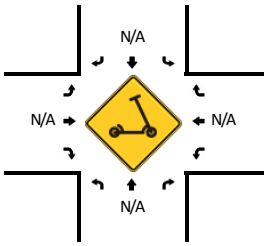












15-Min Count Period Beginning At	8. Mission Blvd (Northbound)				8. Mission Blvd (Southbound)				Tennyson Rd (Eastbound)				Tennyson Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	33	153	0	0	3	337	41	0	45	3	47	0	0	0	2	0	664	
7:15 AM	26	189	1	0	4	375	34	0	57	3	59	0	1	4	3	0	756	
7:30 AM	27	246	0	2	9	401	38	0	73	1	52	1	0	5	4	0	859	
7:45 AM	53	320	0	0	0	382	63	1	104	7	80	0	0	6	5	0	1021	3300
8:00 AM	52	203	0	0	7	351	58	0	83	7	60	0	2	7	7	0	837	3473
8:15 AM	57	196	1	8	5	321	61	0	86	5	56	0	1	6	3	0	806	3523
8:30 AM	41	188	0	0	1	259	44	2	54	1	35	2	0	4	1	1	633	3297
8:45 AM	40	192	1	6	4	234	44	2	47	0	32	0	1	3	7	0	613	2889

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	212	1280	0	0	0	1528	252	4	416	28	320	0	0	24	20	0	4084
Heavy Trucks	16	44	0		0	24	8		16	4	20		0	8	0		140
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	8	0		0	0	0		0	0	0		0	4	0		12
Scooters																	

Comments:

Report generated on 3/23/2020 4:52 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

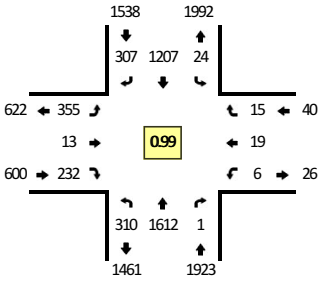
Type of peak hour being reported: Intersection Peak

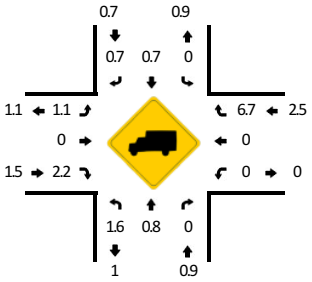
Method for determining peak hour: Total Entering Volume

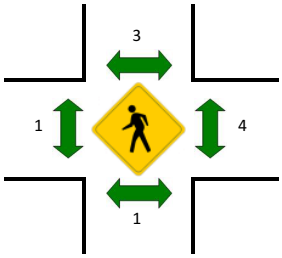
LOCATION: 8. Mission Blvd -- Tennyson Rd
CITY/STATE: Hayward, CA

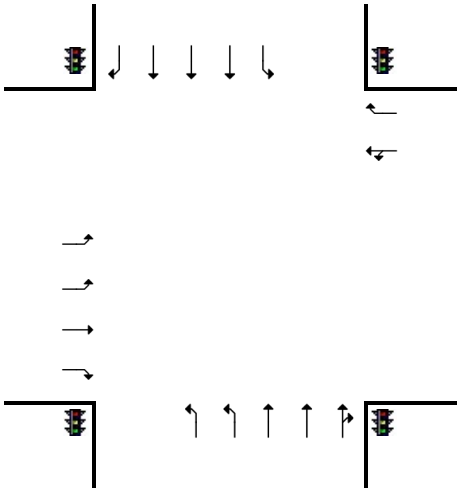
QC JOB #: 15203116
DATE: Tue, Mar 10 2020

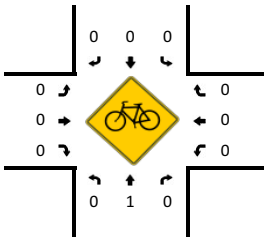
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

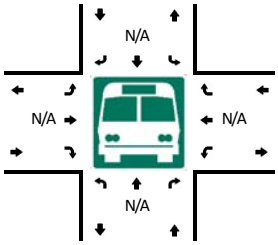


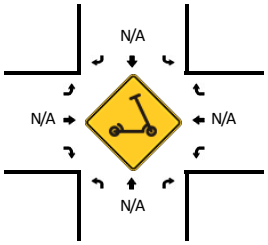












15-Min Count Period Beginning At	8. Mission Blvd (Northbound)				8. Mission Blvd (Southbound)				Tennyson Rd (Eastbound)				Tennyson Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	66	400	1	0	3	237	72	4	86	6	51	0	4	5	9	0	944	
4:15 PM	53	334	1	5	8	297	69	2	83	2	41	0	4	6	2	0	907	
4:30 PM	74	359	0	1	3	232	67	6	97	3	74	0	3	6	10	0	935	
4:45 PM	80	379	1	5	8	279	65	4	75	3	59	0	2	6	8	0	974	3760
5:00 PM	91	396	1	4	2	303	67	3	92	2	53	1	1	5	8	0	1029	3845
5:15 PM	70	391	0	7	4	305	92	5	87	1	59	1	3	3	3	0	1031	3969
5:30 PM	69	419	0	3	4	305	80	2	78	4	56	0	0	6	0	0	1026	4060
5:45 PM	64	406	0	2	2	294	68	2	96	6	64	0	2	5	4	0	1015	4101

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	280	1564	0	28	16	1220	368	20	348	4	236	4	12	12	12	0	4124
Heavy Trucks	4	16	0		0	8	4		0	0	8		0	0	0		40
Buses																	
Pedestrians		0				4				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/23/2020 4:52 PM

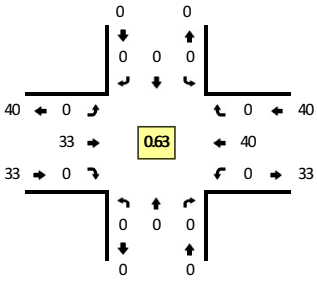
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

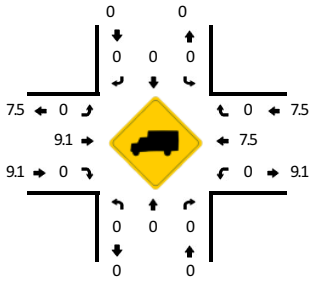
LOCATION: 9. Main Entry Access Rd -- Tennyson Rd
CITY/STATE: Hayward, CA

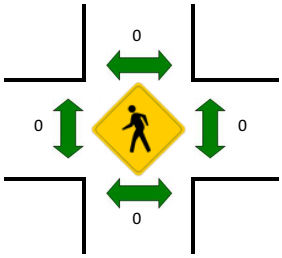
QC JOB #: 15203117
DATE: Tue, Mar 10 2020

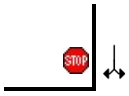
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 8:00 AM -- 8:15 AM

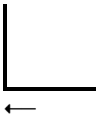


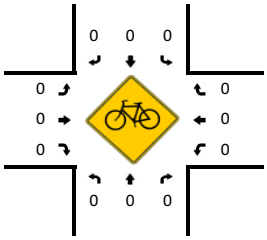
Quality Counts
DATA THAT DRIVES COMMUNITIES

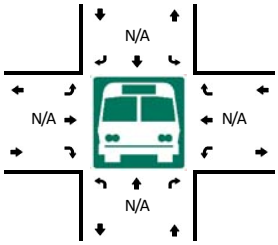


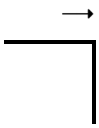


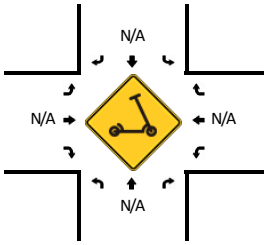












15-Min Count Period Beginning At	9. Main Entry Access Rd (Northbound)				9. Main Entry Access Rd (Southbound)				Tennyson Rd (Eastbound)				Tennyson Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	0	0	0	5	0	0	0	2	0	0	7	
7:15 AM	0	0	0	0	0	0	0	0	0	7	0	0	0	6	0	0	13	
7:30 AM	0	0	0	0	0	0	0	0	0	7	0	0	0	8	0	0	15	
7:45 AM	0	0	0	0	0	0	0	0	0	6	0	0	0	10	0	0	16	51
8:00 AM	0	0	0	0	0	0	0	0	0	13	0	0	0	16	0	0	29	73
8:15 AM	0	0	0	0	0	0	0	0	0	8	0	0	0	5	0	0	13	73
8:30 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	5	0	0	8	66
8:45 AM	0	0	0	0	0	0	0	0	0	5	0	0	0	7	0	0	12	62

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	0	52	0	0	0	64	0	0	116
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	8	0		8
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/23/2020 4:52 PM

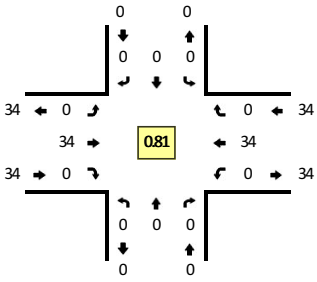
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

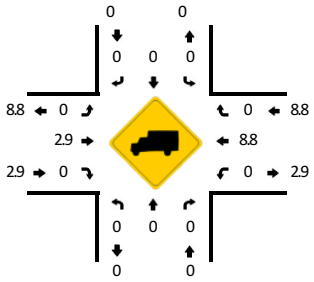
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: 9. Main Entry Access Rd -- Tennyson Rd
CITY/STATE: Hayward, CA

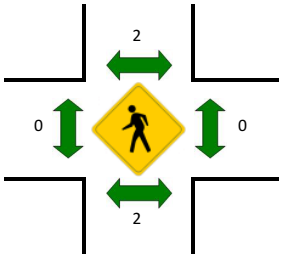
QC JOB #: 15203118
DATE: Tue, Mar 10 2020

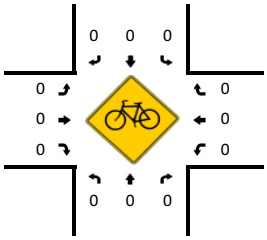
Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

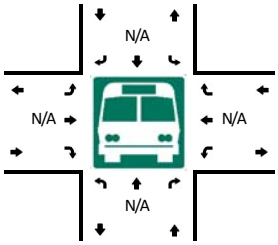


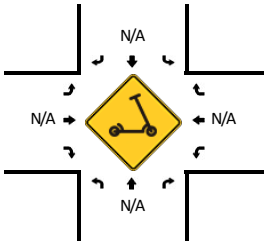


Quality Counts
DATA THAT DRIVES COMMUNITIES









15-Min Count Period Beginning At	9. Main Entry Access Rd (Northbound)				9. Main Entry Access Rd (Southbound)				Tennyson Rd (Eastbound)				Tennyson Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	0	0	0	7	0	0	0	11	0	0	18	
4:15 PM	0	0	0	0	0	0	0	0	0	9	0	0	0	4	0	0	13	
4:30 PM	0	0	0	0	0	0	0	0	0	5	0	0	0	12	0	0	17	
4:45 PM	0	0	0	0	0	0	0	0	0	10	0	0	0	7	0	0	17	65
5:00 PM	0	0	0	0	0	0	0	0	0	10	0	0	0	11	0	0	21	68
5:15 PM	0	0	0	0	0	0	0	0	0	7	0	0	0	2	0	0	9	64
5:30 PM	0	0	0	0	0	0	0	0	0	8	0	0	0	4	0	0	12	59
5:45 PM	0	0	0	0	0	0	0	0	0	6	0	0	0	9	0	0	15	57

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	0	40	0	0	0	44	0	0	84
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	4	0		4
Buses																	
Pedestrians		0				4				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/23/2020 4:52 PM

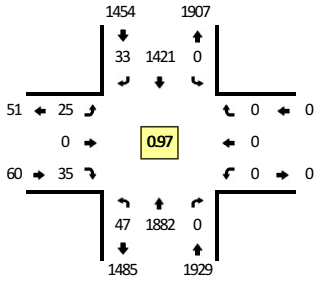
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

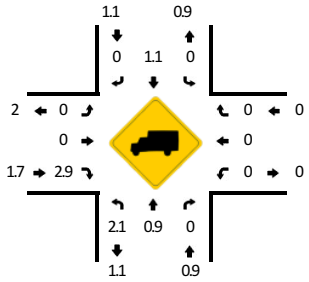
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: 10. Mission Blvd -- Valle Vista Ave
CITY/STATE: Hayward, CA

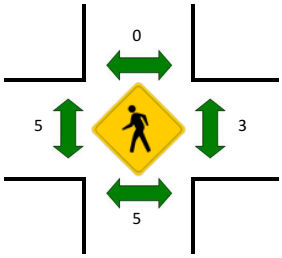
QC JOB #: 15203120
DATE: Tue, Mar 10 2020

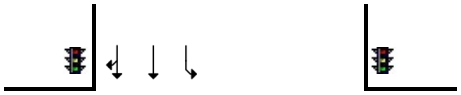
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

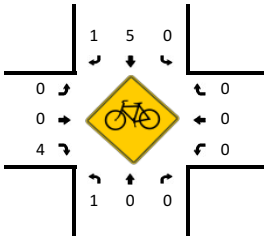


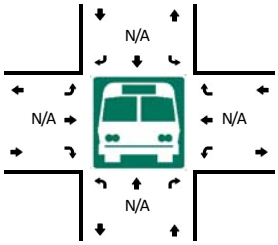


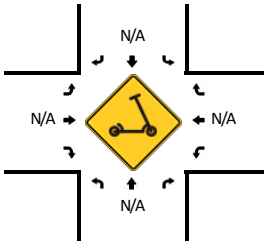
Quality Counts
DATA THAT DRIVES COMMUNITIES











15-Min Count Period Beginning At	10. Mission Blvd (Northbound)				10. Mission Blvd (Southbound)				Valle Vista Ave (Eastbound)				Valle Vista Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	421	0	9	0	308	14	0	9	0	9	0	0	0	0	0	772	
4:15 PM	4	381	0	6	0	315	6	0	3	0	10	0	0	0	0	0	725	
4:30 PM	4	440	0	6	0	297	11	0	7	0	7	0	0	0	0	0	772	
4:45 PM	5	456	0	5	0	316	11	0	2	0	10	0	0	0	0	0	805	3074
5:00 PM	2	487	0	4	0	361	13	0	10	0	8	0	0	0	0	0	885	3187
5:15 PM	4	446	0	10	0	354	5	0	8	0	11	0	0	0	0	0	838	3300
5:30 PM	6	479	0	7	0	339	8	0	3	0	9	0	0	0	0	0	851	3379
5:45 PM	6	470	0	8	0	367	7	0	4	0	7	0	0	0	0	0	869	3443

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	8	1948	0	16	0	1444	52	0	40	0	32	0	0	0	0	0	3540
Heavy Trucks	0	16	0		0	16	0		0	0	0		0	0	0		32
Buses																	
Pedestrians		8				0				0				0			8
Bicycles	0	0	0		0	4	0		0	0	0		0	0	0		4
Scooters																	

Comments:

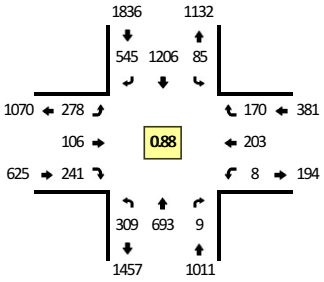
Report generated on 3/23/2020 4:52 PM

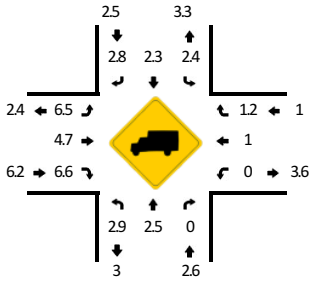
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

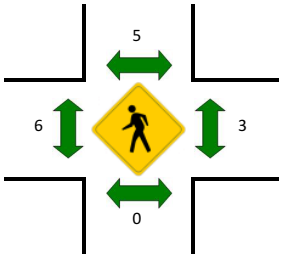
LOCATION: 11. Mission Blvd -- Industrial Pkwy | **QC JOB #:** 15203121
CITY/STATE: Hayward, CA | **DATE:** Tue, Mar 10 2020

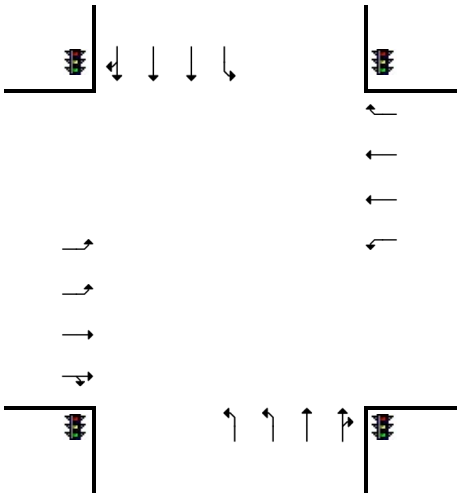
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

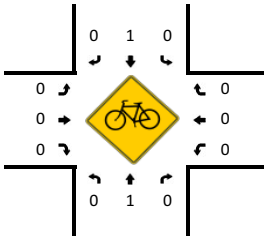


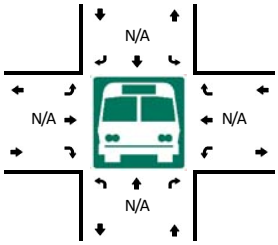


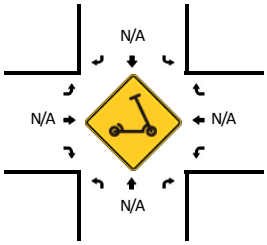
Quality Counts
DATA THAT DRIVES COMMUNITIES











15-Min Count Period Beginning At	11. Mission Blvd (Northbound)				11. Mission Blvd (Southbound)				Industrial Pkwy (Eastbound)				Industrial Pkwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	84	122	2	0	3	267	108	1	41	7	45	2	1	36	24	0	743	
7:15 AM	75	122	6	0	6	309	137	0	50	14	49	2	5	53	38	0	866	
7:30 AM	86	168	1	1	17	306	138	4	78	21	62	3	1	45	38	0	969	
7:45 AM	82	249	1	0	25	318	133	1	86	25	61	7	1	57	45	0	1091	3669
8:00 AM	64	154	1	1	31	273	137	1	49	46	69	3	1	48	49	0	927	3853
8:15 AM	75	155	1	0	22	224	146	4	34	31	57	0	0	50	58	0	857	3844
8:30 AM	94	162	0	1	12	168	118	2	46	30	55	5	1	43	31	0	768	3643
8:45 AM	48	167	6	1	4	144	112	2	40	13	43	1	2	17	19	0	619	3171

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	328	996	4	0	100	1272	532	4	344	100	244	28	4	228	180	0	4364
Heavy Trucks	4	28	0		0	28	24		16	4	16		0	0	4		124
Buses																	
Pedestrians		0				4				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

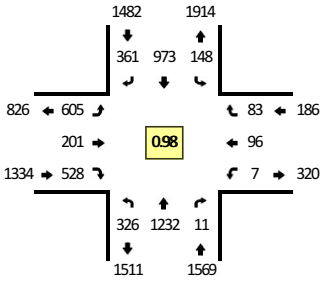
Comments:

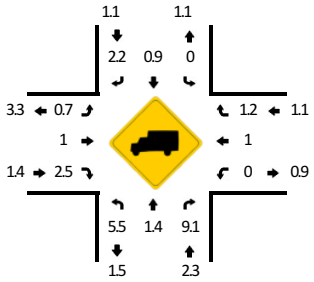
Report generated on 3/23/2020 4:52 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

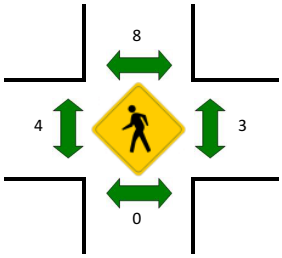
LOCATION: 11. Mission Blvd -- Industrial Pkwy | **QC JOB #:** 15203122
CITY/STATE: Hayward, CA | **DATE:** Tue, Mar 10 2020

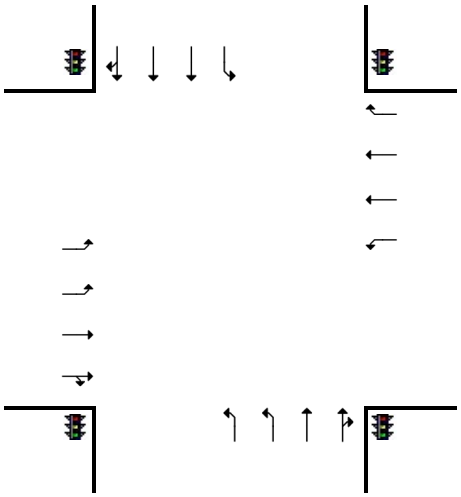
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

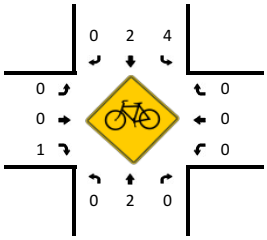


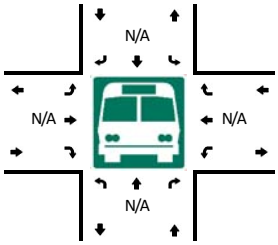


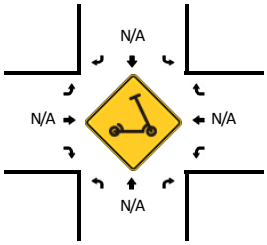
Quality Counts
DATA THAT DRIVES COMMUNITIES











15-Min Count Period Beginning At	11. Mission Blvd (Northbound)				11. Mission Blvd (Southbound)				Industrial Pkwy (Eastbound)				Industrial Pkwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	75	255	4	1	19	214	65	10	123	35	129	14	2	18	14	0	978	
4:15 PM	87	252	3	3	22	204	87	11	110	30	121	13	3	23	12	0	981	
4:30 PM	80	295	2	2	24	207	90	10	129	45	120	13	1	17	15	0	1050	
4:45 PM	82	297	3	2	17	205	74	5	124	43	130	12	4	16	26	0	1040	4049
5:00 PM	87	318	4	0	33	242	87	7	147	49	129	12	2	25	19	0	1161	4232
5:15 PM	79	304	4	2	26	244	97	8	138	44	128	11	0	21	20	0	1126	4377
5:30 PM	85	313	2	1	26	233	85	13	137	57	137	12	1	29	16	0	1147	4474
5:45 PM	72	297	1	0	23	254	92	12	137	51	134	11	4	21	28	0	1137	4571

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	348	1272	16	0	132	968	348	28	588	196	516	48	8	100	76	0	4644
Heavy Trucks	8	16	0		0	16	8		8	0	8		0	4	0		68
Buses																	
Pedestrians		0				16				8				4			28
Bicycles	0	4	0		0	4	0		0	0	0		0	0	0		8
Scooters																	

Comments:

Report generated on 3/23/2020 4:53 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Adjusted AM Turning Movement Counts - Vehicle Volumes														
Intersections #6 and #8 from previous projects with data from 2018 and 2019 - all other intersections used March 2020 counts with 15% increase in volumes														
ID	N-S STREET	E-W STREET	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	Mission Blvd	Calhoun St	10	1372	104	160	1829	0	0	0	0	159	0	25
2	Mission Blvd	Hancock St	15	1446	85	28	1902	24	85	22	6	125	39	35
3	E 16th St	Hancock St	36	8	0	0	5	100	91	0	8	0	0	0
4	Whitman St	Tennyson Rd	77	32	24	216	6	485	323	854	59	8	652	208
5	E 12th St	Tennyson Rd	214	32	112	10	58	139	138	593	335	94	451	5
6	Mission Blvd	Tennyson Rd	196	1287	0	8	1657	239	329	3	248	7	5	1
7	Site Access	Tennyson Rd	0	0	0	0	0	0	0	39	0	0	45	0
8	Mission Blvd	Valle Vista Ave	71	1374	0	0	1912	39	16	0	30	0	0	0

Adjusted PM Turning Movement Counts - Vehicle Volumes														
Intersections #6 and #8 from previous projects with data from 2018 and 2019 - all other intersections used March 2020 counts with 5% increase in volumes														
ID	N-S STREET	E-W STREET	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	Mission Blvd	Calhoun St	14	2043	12	74	1567	0	0	0	2	56	0	32
2	Mission Blvd	Hancock St	27	2006	36	69	1576	23	64	24	19	72	13	27
3	E 16th St	Hancock St	23	4	0	0	3	40	25	0	49	0	0	0
4	Whitman St	Tennyson Rd	29	8	7	93	8	265	455	834	42	14	753	155
5	E 12th St	Tennyson Rd	265	62	86	4	16	71	104	563	227	78	594	6
6	Mission Blvd	Tennyson Rd	380	1695	1	32	1198	328	352	4	248	9	17	2
7	Site Access	Tennyson Rd	0	0	0	0	0	0	0	36	0	0	36	0
8	Mission Blvd	Valle Vista Ave	41	2035	0	0	1417	40	22	0	35	0	0	0

Appendix 2 — Existing Level of Service, Queuing, and Peak Hour Traffic Signal Warrants Worksheets

1: Mission Boulevard & Driveway/Calhoun Street

Lane Group	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	202	11	1622	176	2010
v/c Ratio	0.77	0.13	0.71	0.73	0.72
Control Delay	56.6	52.4	17.5	77.2	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	56.6	52.4	17.5	77.2	11.2
Queue Length 50th (ft)	117	10	423	161	331
Queue Length 95th (ft)	196	m14	374	234	778
Internal Link Dist (ft)	729		1333		1909
Turn Bay Length (ft)		90		275	
Base Capacity (vph)	413	83	2277	275	2781
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.49	0.13	0.71	0.64	0.72

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

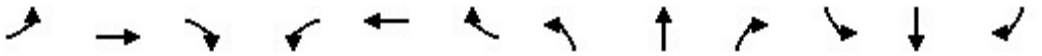
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	159	0	25	10	1372	104	160	1829	0
Future Volume (vph)	0	0	0	159	0	25	10	1372	104	160	1829	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0		4.0	5.0		4.0	5.0	
Lane Util. Factor					1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes					1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes					0.99		1.00	1.00		1.00	1.00	
Frt					0.98		1.00	0.99		1.00	1.00	
Flt Protected					0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)					1751		1805	3430		1787	3505	
Flt Permitted					0.96		0.95	1.00		0.95	1.00	
Satd. Flow (perm)					1751		1805	3430		1787	3505	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	175	0	27	11	1508	114	176	2010	0
RTOR Reduction (vph)	0	0	0	0	68	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	134	0	11	1619	0	176	2010	0
Confl. Peds. (#/hr)	3		8	8		3	1		8	8		1
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%	0%	4%	0%	1%	3%	0%
Turn Type			Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases					8		5	2		1	6	
Permitted Phases			4	8								
Actuated Green, G (s)					16.1		3.0	95.6		19.3	111.9	
Effective Green, g (s)					16.1		3.0	95.6		19.3	111.9	
Actuated g/C Ratio					0.11		0.02	0.66		0.13	0.78	
Clearance Time (s)					4.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)					3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)					195		37	2277		239	2723	
v/s Ratio Prot							0.01	0.47		c0.10	c0.57	
v/s Ratio Perm					0.08							
v/c Ratio					0.69		0.30	0.71		0.74	0.74	
Uniform Delay, d1					61.5		69.5	15.4		59.9	8.4	
Progression Factor					1.00		0.76	0.92		1.00	1.00	
Incremental Delay, d2					9.7		3.0	1.3		11.2	1.8	
Delay (s)					71.3		56.1	15.5		71.1	10.2	
Level of Service					E		E	B		E	B	
Approach Delay (s)		0.0			71.3			15.8			15.1	
Approach LOS		A			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	144.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	83.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	133	234	18	1801	33	2266
v/c Ratio	0.55	0.86	0.25	0.74	0.39	0.90
Control Delay	59.8	82.1	73.6	21.9	84.4	19.8
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay	59.8	82.1	73.6	22.2	84.4	19.8
Queue Length 50th (ft)	110	205	15	541	29	868
Queue Length 95th (ft)	167	282	m39	195	m47	#488
Internal Link Dist (ft)	518	789		1040		1333
Turn Bay Length (ft)			240		200	
Base Capacity (vph)	280	314	71	2422	87	2506
Starvation Cap Reductn	0	0	0	133	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.75	0.25	0.79	0.38	0.90

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	22	6	125	39	35	15	1446	85	28	1902	24
Future Volume (veh/h)	85	22	6	125	39	35	15	1446	85	28	1902	24
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	0.99		0.98	1.00		0.97	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1900	1900	1870	1900	1856	1781	1856	1841	1841	1856	1900
Adj Flow Rate, veh/h	100	26	7	147	46	41	18	1701	100	33	2238	28
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	1	0	0	2	0	3	8	3	4	4	3	0
Cap, veh/h	217	53	13	212	54	48	36	2373	138	54	2535	32
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.04	1.00	1.00	0.04	0.95	0.95
Sat Flow, veh/h	976	300	71	966	302	269	1697	3379	197	1753	3563	44
Grp Volume(v), veh/h	133	0	0	234	0	0	18	880	921	33	1104	1162
Grp Sat Flow(s),veh/h/ln	1347	0	0	1538	0	0	1697	1763	1813	1753	1763	1845
Q Serve(g_s), s	0.0	0.0	0.0	8.1	0.0	0.0	1.5	0.0	0.0	2.7	29.1	30.2
Cycle Q Clear(g_c), s	13.0	0.0	0.0	21.1	0.0	0.0	1.5	0.0	0.0	2.7	29.1	30.2
Prop In Lane	0.75		0.05	0.63		0.18	1.00		0.11	1.00		0.02
Lane Grp Cap(c), veh/h	282	0	0	313	0	0	36	1238	1273	54	1254	1312
V/C Ratio(X)	0.47	0.00	0.00	0.75	0.00	0.00	0.50	0.71	0.72	0.62	0.88	0.89
Avail Cap(c_a), veh/h	347	0	0	381	0	0	71	1238	1273	85	1254	1312
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.87	0.87	0.87	0.62	0.62	0.62
Uniform Delay (d), s/veh	54.0	0.0	0.0	57.3	0.0	0.0	68.2	0.0	0.0	68.2	1.9	1.9
Incr Delay (d2), s/veh	1.2	0.0	0.0	6.4	0.0	0.0	8.8	3.0	3.1	7.0	5.9	5.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	0.0	0.0	8.9	0.0	0.0	0.7	1.0	1.1	1.3	4.0	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.2	0.0	0.0	63.7	0.0	0.0	77.0	3.0	3.1	75.2	7.8	7.8
LnGrp LOS	E	A	A	E	A	A	E	A	A	E	A	A
Approach Vol, veh/h		133			234			1819			2299	
Approach Delay, s/veh		55.2			63.7			3.8			8.8	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.4	106.1		29.5	7.1	107.4		29.5				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	7.0	92.0		32.0	6.0	93.0		32.0				
Max Q Clear Time (g_c+I1), s	4.7	2.0		15.0	3.5	32.2		23.1				
Green Ext Time (p_c), s	0.0	26.7		0.6	0.0	39.7		0.9				

Intersection Summary			
HCM 6th Ctrl Delay		11.0	
HCM 6th LOS		B	

Intersection	
Int Delay, s/veh	5.6

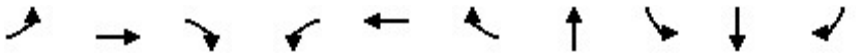
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	91	8	36	8	5	100
Future Vol, veh/h	91	8	36	8	5	100
Conflicting Peds, #/hr	7	1	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	59	59	59	59	59	59
Heavy Vehicles, %	1	0	0	0	0	5
Mvmt Flow	154	14	61	14	8	169

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	236	94	177	0	-	0
Stage 1	93	-	-	-	-	-
Stage 2	143	-	-	-	-	-
Critical Hdwy	6.41	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	754	968	1411	-	-	-
Stage 1	933	-	-	-	-	-
Stage 2	887	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	721	967	1411	-	-	-
Mov Cap-2 Maneuver	721	-	-	-	-	-
Stage 1	892	-	-	-	-	-
Stage 2	887	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	6.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1411	-	736	-	-
HCM Lane V/C Ratio	0.043	-	0.228	-	-
HCM Control Delay (s)	7.7	0	11.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.9	-	-

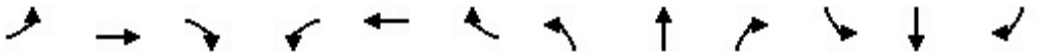
4: Beaton Way/Whitman Street & Tennyson Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	363	960	66	9	733	234	150	243	7	545
v/c Ratio	0.81	0.46	0.07	0.07	0.65	0.42	0.39	0.82	0.01	0.66
Control Delay	49.9	11.5	4.0	48.5	29.7	11.2	31.1	55.5	27.8	17.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.9	11.5	4.0	48.5	29.7	11.2	31.1	55.5	27.8	17.2
Queue Length 50th (ft)	205	145	3	5	201	32	69	136	3	171
Queue Length 95th (ft)	#410	264	24	23	271	94	139	#280	15	331
Internal Link Dist (ft)		470			1481		548		469	
Turn Bay Length (ft)	175		100	90		100		100		110
Base Capacity (vph)	508	2149	937	514	1745	771	496	390	649	882
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.45	0.07	0.02	0.42	0.30	0.30	0.62	0.01	0.62

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	323	854	59	8	652	208	77	32	24	216	6	485
Future Volume (veh/h)	323	854	59	8	652	208	77	32	24	216	6	485
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.92	1.00		0.88	0.95		0.88	0.92		0.89
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1826	1870	1900	1811	1885	1856	1900	1900	1885	1900	1870
Adj Flow Rate, veh/h	363	960	66	9	733	234	87	36	27	243	7	545
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	1	5	2	0	6	1	3	0	0	1	0	2
Cap, veh/h	395	1911	802	24	1185	483	230	93	58	428	570	772
Arrive On Green	0.22	0.55	0.55	0.01	0.34	0.34	0.30	0.30	0.30	0.30	0.30	0.30
Sat Flow, veh/h	1795	3469	1456	1810	3441	1402	578	310	195	1239	1900	1414
Grp Volume(v), veh/h	363	960	66	9	733	234	150	0	0	243	7	545
Grp Sat Flow(s),veh/h/ln	1795	1735	1456	1810	1721	1402	1083	0	0	1239	1900	1414
Q Serve(g_s), s	19.8	17.2	2.1	0.5	17.8	13.1	9.1	0.0	0.0	8.1	0.3	30.0
Cycle Q Clear(g_c), s	19.8	17.2	2.1	0.5	17.8	13.1	10.5	0.0	0.0	18.6	0.3	30.0
Prop In Lane	1.00		1.00	1.00		1.00	0.58		0.18	1.00		1.00
Lane Grp Cap(c), veh/h	395	1911	802	24	1185	483	382	0	0	428	570	772
V/C Ratio(X)	0.92	0.50	0.08	0.37	0.62	0.48	0.39	0.00	0.00	0.57	0.01	0.71
Avail Cap(c_a), veh/h	449	1911	802	452	1548	631	382	0	0	428	570	772
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.2	14.0	10.6	48.9	27.3	25.8	27.9	0.0	0.0	31.3	24.6	18.8
Incr Delay (d2), s/veh	21.3	0.7	0.2	3.6	1.9	2.7	0.2	0.0	0.0	1.1	0.0	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.8	6.4	0.7	0.2	7.6	4.7	2.9	0.0	0.0	5.3	0.1	10.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.5	14.7	10.7	52.5	29.2	28.5	28.1	0.0	0.0	32.4	24.6	21.3
LnGrp LOS	E	B	B	D	C	C	C	A	A	C	C	C
Approach Vol, veh/h		1389			976			150			795	
Approach Delay, s/veh		26.2			29.3			28.1			24.7	
Approach LOS		C			C			C			C	

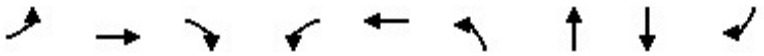
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.3	60.1		34.6	26.0	39.4		34.6				
Change Period (Y+Rc), s	4.0	5.0		4.6	4.0	5.0		4.6				
Max Green Setting (Gmax), s	25.0	45.0		30.0	25.0	45.0		30.0				
Max Q Clear Time (g_c+I1), s	2.5	19.2		32.0	21.8	19.8		12.5				
Green Ext Time (p_c), s	0.0	16.0		0.0	0.2	14.7		0.8				

Intersection Summary			
HCM 6th Ctrl Delay		26.8	
HCM 6th LOS		C	

Notes

User approved pedestrian interval to be less than phase max green.

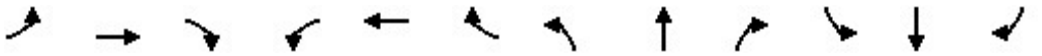
5: Dixon Street/E 12th Street & Tennyson Road



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	160	690	390	109	530	249	167	78	162
v/c Ratio	0.54	0.63	0.62	0.46	0.52	0.86	0.47	0.69	0.27
Control Delay	42.6	29.1	15.5	43.8	28.8	68.0	17.3	70.7	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.6	29.1	15.5	43.8	28.8	68.0	17.3	70.7	3.9
Queue Length 50th (ft)	84	173	74	57	130	139	22	42	3
Queue Length 95th (ft)	151	234	160	114	187	#314	83	#130	28
Internal Link Dist (ft)		1481			525		495	553	
Turn Bay Length (ft)	125		80	130		100			100
Base Capacity (vph)	494	1729	863	462	1726	288	359	113	765
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.40	0.45	0.24	0.31	0.86	0.47	0.69	0.21

Intersection Summary

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



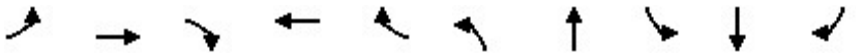
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	138	593	335	94	451	5	214	32	112	10	57	139
Future Volume (veh/h)	138	593	335	94	451	5	214	32	112	10	57	139
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.91	1.00		0.92
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1826	1841	1767	1826	1900	1826	1900	1826	1900	1870	1811
Adj Flow Rate, veh/h	160	690	390	109	524	6	249	37	130	12	66	162
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	5	4	9	5	0	5	0	5	0	2	6
Cap, veh/h	206	1399	622	143	1308	15	289	57	200	39	216	373
Arrive On Green	0.12	0.40	0.40	0.09	0.37	0.37	0.17	0.17	0.17	0.14	0.14	0.14
Sat Flow, veh/h	1781	3469	1543	1682	3512	40	1739	343	1205	286	1571	1419
Grp Volume(v), veh/h	160	690	390	109	259	271	249	0	167	78	0	162
Grp Sat Flow(s),veh/h/ln	1781	1735	1543	1682	1735	1818	1739	0	1547	1856	0	1419
Q Serve(g_s), s	7.6	13.0	17.7	5.6	9.6	9.6	12.2	0.0	8.8	3.3	0.0	8.4
Cycle Q Clear(g_c), s	7.6	13.0	17.7	5.6	9.6	9.6	12.2	0.0	8.8	3.3	0.0	8.4
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.78	0.15		1.00
Lane Grp Cap(c), veh/h	206	1399	622	143	646	677	289	0	257	256	0	373
V/C Ratio(X)	0.78	0.49	0.63	0.76	0.40	0.40	0.86	0.00	0.65	0.31	0.00	0.43
Avail Cap(c_a), veh/h	508	1782	792	480	891	934	298	0	265	318	0	421
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.6	19.5	20.9	39.2	20.3	20.3	35.5	0.0	34.1	34.0	0.0	27.6
Incr Delay (d2), s/veh	10.2	1.0	3.7	13.3	1.5	1.4	21.4	0.0	5.3	0.7	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	5.3	6.8	2.8	4.1	4.3	6.8	0.0	3.7	1.5	0.0	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.8	20.5	24.6	52.5	21.7	21.7	56.9	0.0	39.4	34.7	0.0	28.4
LnGrp LOS	D	C	C	D	C	C	E	A	D	C	A	C
Approach Vol, veh/h		1240			639			416			240	
Approach Delay, s/veh		25.3			26.9			49.9			30.4	
Approach LOS		C			C			D			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.5	40.3		16.7	14.1	37.6		19.2				
Change Period (Y+Rc), s	4.0	5.0		4.6	4.0	5.0		4.6				
Max Green Setting (Gmax), s	25.0	45.0		15.0	25.0	45.0		15.0				
Max Q Clear Time (g_c+I1), s	7.6	19.7		10.4	9.6	11.6		14.2				
Green Ext Time (p_c), s	0.5	15.6		0.4	0.7	9.1		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		30.2	
HCM 6th LOS		C	

Notes

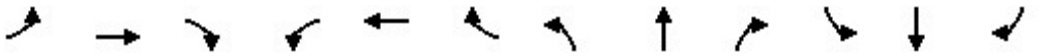
User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	370	3	279	14	1	220	1446	9	1862	269
v/c Ratio	0.67	0.01	0.58	0.09	0.00	0.61	0.43	0.12	0.67	0.30
Control Delay	62.3	46.0	10.2	56.6	0.0	68.7	15.8	60.6	30.9	17.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.3	46.0	10.2	56.6	0.0	68.7	15.8	60.6	30.9	17.1
Queue Length 50th (ft)	171	2	0	13	0	102	193	8	382	77
Queue Length 95th (ft)	205	11	72	30	0	#201	485	m10	#757	m128
Internal Link Dist (ft)		525		1121			1386		1040	
Turn Bay Length (ft)	335		225		315	520		230		210
Base Capacity (vph)	771	435	564	423	426	358	3383	73	2793	907
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.01	0.49	0.03	0.00	0.61	0.43	0.12	0.67	0.30

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	329	3	248	7	5	1	196	1287	0	8	1657	239
Future Volume (veh/h)	329	3	248	7	5	1	196	1287	0	8	1657	239
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.96	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1900	1841	1900	1900	1900	1811	1856	1900	1811	1870	1856
Adj Flow Rate, veh/h	370	3	279	8	6	1	220	1446	0	9	1862	269
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	4	0	4	0	0	0	6	3	0	6	2	3
Cap, veh/h	688	384	313	45	34	66	209	3126	0	22	2896	876
Arrive On Green	0.20	0.20	0.20	0.04	0.04	0.04	0.06	0.62	0.00	0.03	1.00	1.00
Sat Flow, veh/h	3401	1900	1546	1056	792	1543	3346	5233	0	1725	5106	1545
Grp Volume(v), veh/h	370	3	279	14	0	1	220	1446	0	9	1862	269
Grp Sat Flow(s),veh/h/ln	1700	1900	1546	1847	0	1543	1673	1689	0	1725	1702	1545
Q Serve(g_s), s	14.0	0.2	25.3	1.1	0.0	0.1	9.0	22.0	0.0	0.7	0.0	0.0
Cycle Q Clear(g_c), s	14.0	0.2	25.3	1.1	0.0	0.1	9.0	22.0	0.0	0.7	0.0	0.0
Prop In Lane	1.00		1.00	0.57		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	688	384	313	79	0	66	209	3126	0	22	2896	876
V/C Ratio(X)	0.54	0.01	0.89	0.18	0.00	0.02	1.05	0.46	0.00	0.41	0.64	0.31
Avail Cap(c_a), veh/h	779	435	354	423	0	354	209	3126	0	72	2896	876
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	0.74	0.74	0.74	1.00	0.00	1.00	0.87	0.87	0.00	0.31	0.31	0.31
Uniform Delay (d), s/veh	51.4	45.9	55.9	66.4	0.0	66.0	67.5	14.8	0.0	69.7	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	17.3	1.0	0.0	0.1	72.4	0.4	0.0	3.9	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	0.1	11.4	0.5	0.0	0.0	5.9	8.2	0.0	0.3	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.9	45.9	73.2	67.5	0.0	66.1	139.9	15.2	0.0	73.5	0.3	0.3
LnGrp LOS	D	D	E	E	A	E	F	B	A	E	A	A
Approach Vol, veh/h		652			15			1666			2140	
Approach Delay, s/veh		61.0			67.4			31.7			0.6	
Approach LOS		E			E			C			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.0	86.7		10.2	5.8	93.8		34.1				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	9.0	51.0		33.0	6.0	54.0		33.0				
Max Q Clear Time (g_c+I1), s	11.0	2.0		3.1	2.7	24.0		27.3				
Green Ext Time (p_c), s	0.0	25.1		0.0	0.0	12.3		1.3				

Intersection Summary												
HCM 6th Ctrl Delay			21.2									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	39	45	0	0	0
Future Vol, veh/h	0	39	45	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	63	63	63	63	63	63
Heavy Vehicles, %	0	6	10	0	0	0
Mvmt Flow	0	62	71	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	71	0	-	0	133	71
Stage 1	-	-	-	-	71	-
Stage 2	-	-	-	-	62	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1542	-	-	-	866	997
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	966	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1542	-	-	-	866	997
Mov Cap-2 Maneuver	-	-	-	-	866	-
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	966	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1542	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	52	80	1544	2192
v/c Ratio	0.47	0.67	0.49	0.78
Control Delay	43.1	91.0	2.3	10.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	43.1	91.0	2.3	10.7
Queue Length 50th (ft)	17	73	103	580
Queue Length 95th (ft)	60	#170	171	641
Internal Link Dist (ft)	364		816	1386
Turn Bay Length (ft)		225		
Base Capacity (vph)	323	120	3168	2828
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.16	0.67	0.49	0.78

Intersection Summary

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	30	71	1374	1912	39
Future Volume (veh/h)	16	30	71	1374	1912	39
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.98	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1559	1885	1856	1870	1900
Adj Flow Rate, veh/h	18	34	80	1544	2148	44
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	23	1	3	2	0
Cap, veh/h	28	53	380	3130	2284	47
Arrive On Green	0.05	0.05	0.21	0.89	0.64	0.64
Sat Flow, veh/h	563	1063	1795	3618	3653	73
Grp Volume(v), veh/h	53	0	80	1544	1068	1124
Grp Sat Flow(s),veh/h/ln	1657	0	1795	1763	1777	1855
Q Serve(g_s), s	4.6	0.0	5.3	12.7	78.2	79.9
Cycle Q Clear(g_c), s	4.6	0.0	5.3	12.7	78.2	79.9
Prop In Lane	0.34	0.64	1.00			0.04
Lane Grp Cap(c), veh/h	83	0	380	3130	1140	1191
V/C Ratio(X)	0.64	0.00	0.21	0.49	0.94	0.94
Avail Cap(c_a), veh/h	331	0	380	3130	1164	1215
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.71	0.71
Uniform Delay (d), s/veh	67.6	0.0	47.2	1.6	23.3	23.6
Incr Delay (d2), s/veh	7.9	0.0	0.3	0.6	11.7	12.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	2.4	1.9	33.4	35.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	75.5	0.0	47.4	2.2	35.0	35.8
LnGrp LOS	E	A	D	A	D	D
Approach Vol, veh/h	53			1624	2192	
Approach Delay, s/veh	75.5			4.4	35.4	
Approach LOS	E			A	D	

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	35.7	98.1				133.7	11.3
Change Period (Y+Rc), s	5.0	* 5				5.0	4.0
Max Green Setting (Gmax), s	8.0	* 95				107.0	29.0
Max Q Clear Time (g_c+I1), s	7.3	81.9				14.7	6.6
Green Ext Time (p_c), s	0.0	11.2				18.9	0.1

Intersection Summary	
HCM 6th Ctrl Delay	23.0
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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Project #: 24641
Project Name: Hayward Parcel 3 Entitlements
Analyst: MZS
Date: 1/19/2021
File: H:\24\24641 - Hayward Parcel 3 Entitlements\analysis\LTA\Signal Warrants\[Existing intersection 3 AM.xlsm]War #3 -
Intersection: 3. East 16th Street & Hancock Street
Scenario: Existing AM

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	NB	SB	EB	WB
7:15 AM	8:15 AM	44	106	99	0
2nd Highest Hour		42	100	94	0
3rd Highest Hour		41	99	92	0
4th Highest Hour		39	95	88	0
5th Highest Hour		39	93	87	0
6th Highest Hour		39	93	87	0
7th Highest Hour		37	89	83	0
8th Highest Hour		36	88	82	0
9th Highest Hour		35	85	79	0
10th Highest Hour		33	79	74	0
11th Highest Hour		32	76	71	0
12th Highest Hour		31	75	70	0
13th Highest Hour		30	72	67	0
14th Highest Hour		26	62	58	0
15th Highest Hour		21	49	46	0
16th Highest Hour		19	47	44	0
17th Highest Hour		13	33	30	0
18th Highest Hour		11	27	25	0
19th Highest Hour		6	14	13	0
20th Highest Hour		4	10	9	0
21st Highest Hour		4	8	8	0
22nd Highest Hour		2	6	5	0
23rd Highest Hour		1	3	3	0
24th Highest Hour		1	3	3	0

Warrant Summary

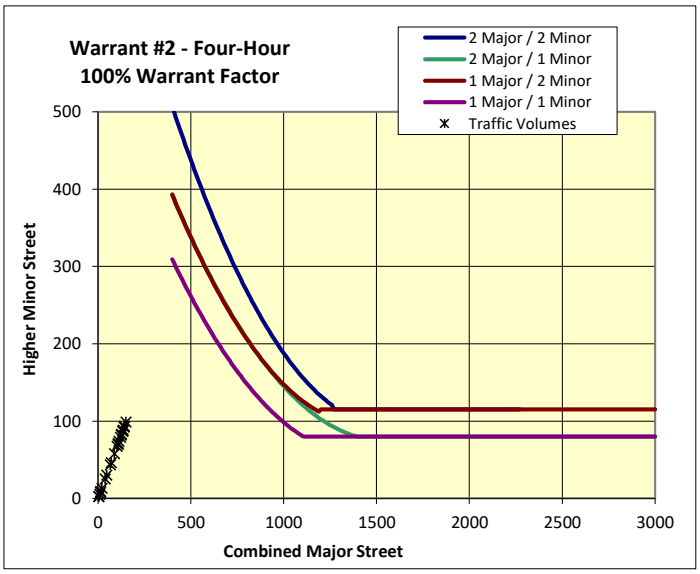
Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	No
#2	Four-Hour Vehicular volume	Yes	No
#3	Peak Hour	Yes	No
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

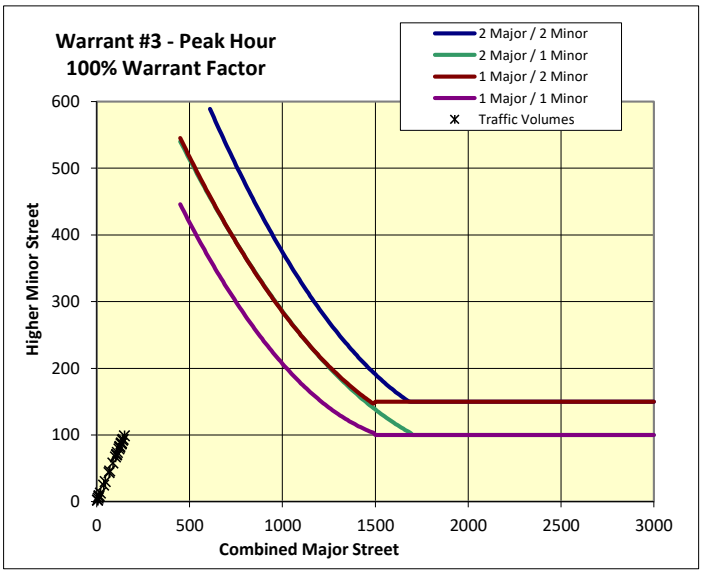
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	1
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	89%
Minor Street: 8th-Highest Hour / Peak Hour	83%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	500	150	0	No	**No**
	B	750	75	0	No	
80%	A	400	120	0	No	**No**
	B	600	60	0	No	
70%	A	350	105	0	No	**No**
	B	525	53	0	No	
56%	A	280	84	0	No	**No**
	B	420	42	0	No	





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Project #: 24641
Project Name: Hayward Parcel 3 Entitlements
Analyst: MZS
Date: 1/19/2021
File: H:\24\24641 - Hayward Parcel 3 Entitlements\analysis\LTA\Signal Warrants\[Existing intersection 3 AM.xlsm]War #3 -
Intersection: 7. Site Access Road & Tennyson Road
Scenario: Existing AM

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	EB	WB	NB	SB
7:15 AM	8:15 AM	39	45	0	0
2nd Highest Hour		37	43	0	0
3rd Highest Hour		36	42	0	0
4th Highest Hour		35	40	0	0
5th Highest Hour		34	40	0	0
6th Highest Hour		34	40	0	0
7th Highest Hour		33	38	0	0
8th Highest Hour		32	37	0	0
9th Highest Hour		31	36	0	0
10th Highest Hour		29	34	0	0
11th Highest Hour		28	32	0	0
12th Highest Hour		28	32	0	0
13th Highest Hour		27	31	0	0
14th Highest Hour		23	26	0	0
15th Highest Hour		18	21	0	0
16th Highest Hour		17	20	0	0
17th Highest Hour		12	14	0	0
18th Highest Hour		10	11	0	0
19th Highest Hour		5	6	0	0
20th Highest Hour		4	4	0	0
21st Highest Hour		3	4	0	0
22nd Highest Hour		2	2	0	0
23rd Highest Hour		1	1	0	0
24th Highest Hour		1	1	0	0

Warrant Summary

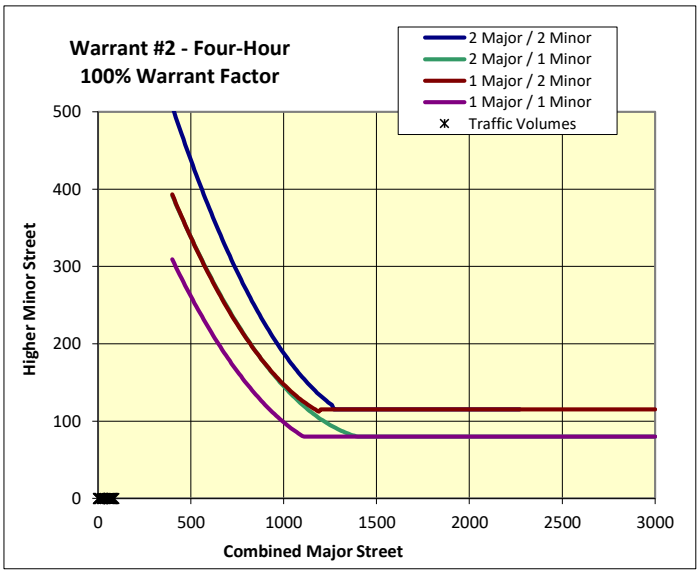
Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	No
#2	Four-Hour Vehicular volume	Yes	No
#3	Peak Hour	Yes	No
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

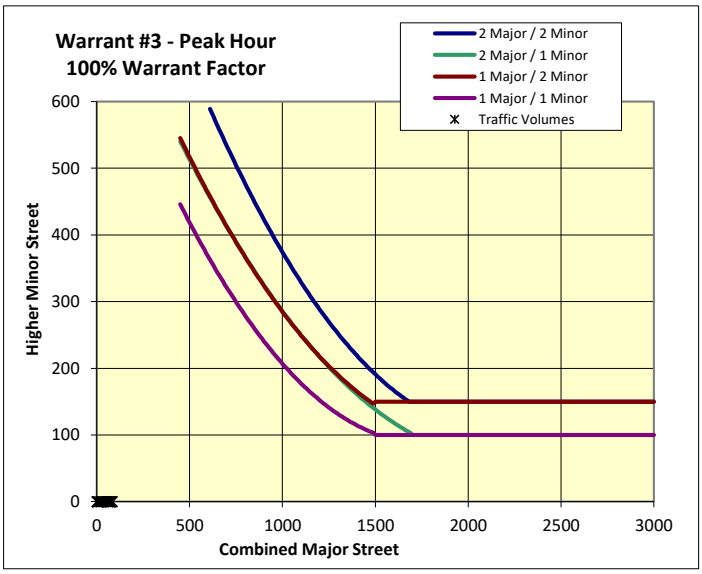
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	1
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	89%
Minor Street: 8th-Highest Hour / Peak Hour	83%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	500	150	0	No	**No**
	B	750	75	0	No	
80%	A	400	120	0	No	**No**
	B	600	60	0	No	
70%	A	350	105	0	No	**No**
	B	525	53	0	No	
56%	A	280	84	0	No	**No**
	B	420	42	0	No	





1: Mission Boulevard & Driveway/Calhoun Street

Lane Group	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	2	94	15	2210	80	1685
v/c Ratio	0.01	0.61	0.18	0.81	0.55	0.56
Control Delay	0.0	54.6	61.3	8.8	80.9	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	0.0	54.6	61.3	8.8	80.9	5.5
Queue Length 50th (ft)	0	50	15	251	78	153
Queue Length 95th (ft)	0	109	m19	380	133	421
Internal Link Dist (ft)		729		1334		1909
Turn Bay Length (ft)			90		275	
Base Capacity (vph)	385	354	82	2732	150	3007
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.27	0.18	0.81	0.53	0.56

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

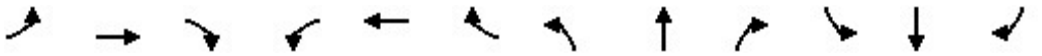
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	2	56	0	32	14	2043	12	74	1567	0
Future Volume (vph)	0	0	2	56	0	32	14	2043	12	74	1567	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0		4.0		4.0	5.0		4.0	5.0	
Lane Util. Factor			1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes			0.98		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes			1.00		0.99		1.00	1.00		1.00	1.00	
Frt			0.86		0.95		1.00	1.00		1.00	1.00	
Flt Protected			1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)			1608		1685		1805	3570		1787	3574	
Flt Permitted			1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (perm)			1608		1685		1805	3570		1787	3574	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	2	60	0	34	15	2197	13	80	1685	0
RTOR Reduction (vph)	0	0	2	0	40	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	54	0	15	2210	0	80	1685	0
Confl. Peds. (#/hr)	9		6	6		9	1		6	6		1
Confl. Bikes (#/hr)									1			2
Heavy Vehicles (%)	0%	0%	0%	2%	0%	3%	0%	1%	0%	1%	1%	0%
Turn Type			Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases					8		5	2		1	6	
Permitted Phases			4	8								
Actuated Green, G (s)			10.4		10.4		3.2	117.1		12.5	126.4	
Effective Green, g (s)			10.4		10.4		3.2	117.1		12.5	126.4	
Actuated g/C Ratio			0.07		0.07		0.02	0.77		0.08	0.83	
Clearance Time (s)			4.0		4.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)			3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)			109		114		37	2732		145	2952	
v/s Ratio Prot							0.01	c0.62		c0.04	0.47	
v/s Ratio Perm			0.00		0.03							
v/c Ratio			0.00		0.47		0.41	0.81		0.55	0.57	
Uniform Delay, d1			66.5		68.7		74.0	11.1		67.6	4.4	
Progression Factor			1.00		1.00		0.83	0.56		1.00	1.00	
Incremental Delay, d2			0.0		3.1		4.4	1.7		4.5	0.8	
Delay (s)			66.5		71.7		66.0	7.8		72.0	5.2	
Level of Service			E		E		E	A		E	A	
Approach Delay (s)		66.5			71.7			8.2			8.2	
Approach LOS		E			E			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	153.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	111	115	28	2105	71	1649
v/c Ratio	0.69	0.74	0.30	0.81	0.52	0.60
Control Delay	82.0	85.8	90.5	21.7	84.1	6.5
Queue Delay	0.0	0.0	0.0	1.6	0.0	0.0
Total Delay	82.0	85.8	90.5	23.3	84.1	6.5
Queue Length 50th (ft)	102	103	25	886	72	210
Queue Length 95th (ft)	164	168	m57	1242	129	213
Internal Link Dist (ft)	518	789		1040		1334
Turn Bay Length (ft)			240		200	
Base Capacity (vph)	290	278	94	2586	141	2764
Starvation Cap Reductn	0	0	0	295	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.41	0.30	0.92	0.50	0.60

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	24	19	72	13	27	27	2006	36	69	1576	23
Future Volume (veh/h)	64	24	19	72	13	27	27	2006	36	69	1576	23
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.97	0.99		0.98	1.00		0.96	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1841	1900	1885	1900	1900	1900	1885	1900	1900	1885	1900
Adj Flow Rate, veh/h	66	25	20	74	13	28	28	2068	37	71	1625	24
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	4	0	1	0	0	0	1	0	0	1	0
Cap, veh/h	135	50	32	145	29	43	49	2672	48	89	2761	41
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.05	1.00	1.00	0.10	1.00	1.00
Sat Flow, veh/h	793	405	263	864	232	353	1810	3597	64	1810	3611	53
Grp Volume(v), veh/h	111	0	0	115	0	0	28	1026	1079	71	805	844
Grp Sat Flow(s),veh/h/ln	1461	0	0	1449	0	0	1810	1791	1870	1810	1791	1873
Q Serve(g_s), s	0.0	0.0	0.0	0.7	0.0	0.0	2.3	0.0	0.0	5.9	0.0	0.0
Cycle Q Clear(g_c), s	11.0	0.0	0.0	11.6	0.0	0.0	2.3	0.0	0.0	5.9	0.0	0.0
Prop In Lane	0.59		0.18	0.64		0.24	1.00		0.03	1.00		0.03
Lane Grp Cap(c), veh/h	217	0	0	217	0	0	49	1330	1389	89	1369	1432
V/C Ratio(X)	0.51	0.00	0.00	0.53	0.00	0.00	0.57	0.77	0.78	0.80	0.59	0.59
Avail Cap(c_a), veh/h	342	0	0	343	0	0	71	1330	1389	106	1369	1432
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.82	0.82	0.82	0.81	0.81	0.81
Uniform Delay (d), s/veh	63.5	0.0	0.0	63.8	0.0	0.0	71.4	0.0	0.0	68.3	0.0	0.0
Incr Delay (d2), s/veh	1.8	0.0	0.0	2.0	0.0	0.0	8.1	3.6	3.6	24.7	1.5	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	0.0	4.4	0.0	0.0	1.2	1.3	1.4	3.2	0.6	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.3	0.0	0.0	65.8	0.0	0.0	79.6	3.6	3.6	92.9	1.5	1.5
LnGrp LOS	E	A	A	E	A	A	E	A	A	F	A	A
Approach Vol, veh/h		111			115			2133			1720	
Approach Delay, s/veh		65.3			65.8			4.6			5.3	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.5	118.7		22.8	8.2	122.0		22.8				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	9.0	99.0		32.0	6.0	102.0		32.0				
Max Q Clear Time (g_c+I1), s	7.9	2.0		13.0	4.3	2.0		13.6				
Green Ext Time (p_c), s	0.0	41.7		0.5	0.0	21.2		0.5				

Intersection Summary	
HCM 6th Ctrl Delay	8.2
HCM 6th LOS	A

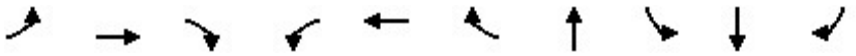
Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	25	49	23	4	3	40
Future Vol, veh/h	25	49	23	4	3	40
Conflicting Peds, #/hr	4	3	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	0	2	14	0	0	0
Mvmt Flow	26	50	23	4	3	41

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	78	27	44	0	-	0
Stage 1	24	-	-	-	-	-
Stage 2	54	-	-	-	-	-
Critical Hdwy	6.4	6.22	4.24	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.318	2.326	-	-	-
Pot Cap-1 Maneuver	930	1048	1491	-	-	-
Stage 1	1004	-	-	-	-	-
Stage 2	974	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	916	1045	1491	-	-	-
Mov Cap-2 Maneuver	916	-	-	-	-	-
Stage 1	989	-	-	-	-	-
Stage 2	974	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.9	6.3	0
HCM LOS	A		

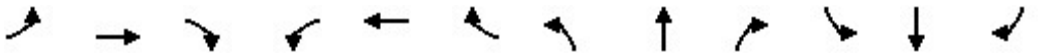
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1491	-	998	-	-
HCM Lane V/C Ratio	0.016	-	0.076	-	-
HCM Control Delay (s)	7.5	0	8.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	474	869	44	15	784	161	45	97	8	276
v/c Ratio	0.74	0.32	0.04	0.11	0.63	0.29	0.19	0.46	0.03	0.35
Control Delay	33.8	5.3	1.7	38.2	22.7	9.1	29.1	39.3	30.5	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.8	5.3	1.7	38.2	22.7	9.1	29.1	39.3	30.5	10.5
Queue Length 50th (ft)	196	57	0	7	156	18	16	43	3	53
Queue Length 95th (ft)	#451	166	10	28	234	62	49	98	16	124
Internal Link Dist (ft)		459			1481		548		469	
Turn Bay Length (ft)	175		100	90		100		100		110
Base Capacity (vph)	637	2685	1131	554	2251	921	611	571	719	787
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.32	0.04	0.03	0.35	0.17	0.07	0.17	0.01	0.35

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	455	834	42	14	753	155	29	8	7	93	8	265
Future Volume (veh/h)	455	834	42	14	753	155	29	8	7	93	8	265
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.90	0.98		0.97	0.97		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1870	1826	1678	1870	1900	1900	1900	1693	1885	1722	1885
Adj Flow Rate, veh/h	474	869	44	15	784	161	30	8	7	97	8	276
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	5	15	2	0	0	0	14	1	12	1
Cap, veh/h	506	2258	912	33	1339	545	215	57	37	349	323	737
Arrive On Green	0.28	0.64	0.64	0.02	0.38	0.38	0.19	0.19	0.19	0.19	0.19	0.19
Sat Flow, veh/h	1810	3554	1435	1598	3554	1447	778	302	199	1370	1722	1549
Grp Volume(v), veh/h	474	869	44	15	784	161	45	0	0	97	8	276
Grp Sat Flow(s),veh/h/ln	1810	1777	1435	1598	1777	1447	1279	0	0	1370	1722	1549
Q Serve(g_s), s	22.3	10.3	1.0	0.8	15.4	6.8	1.2	0.0	0.0	2.6	0.3	10.1
Cycle Q Clear(g_c), s	22.3	10.3	1.0	0.8	15.4	6.8	2.2	0.0	0.0	4.8	0.3	10.1
Prop In Lane	1.00		1.00	1.00		1.00	0.67		0.16	1.00		1.00
Lane Grp Cap(c), veh/h	506	2258	912	33	1339	545	309	0	0	349	323	737
V/C Ratio(X)	0.94	0.38	0.05	0.45	0.59	0.30	0.15	0.00	0.00	0.28	0.02	0.37
Avail Cap(c_a), veh/h	519	2258	912	458	1835	747	503	0	0	564	593	980
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.6	7.7	6.0	42.2	21.7	19.0	29.6	0.0	0.0	30.6	28.9	15.1
Incr Delay (d2), s/veh	24.0	0.4	0.1	3.4	1.5	1.1	0.1	0.0	0.0	0.2	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.6	3.4	0.3	0.4	6.5	2.4	0.8	0.0	0.0	1.8	0.1	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.7	8.1	6.1	45.6	23.2	20.1	29.6	0.0	0.0	30.7	28.9	15.2
LnGrp LOS	D	A	A	D	C	C	C	A	A	C	C	B
Approach Vol, veh/h		1387			960			45			381	
Approach Delay, s/veh		23.9			23.0			29.6			19.4	
Approach LOS		C			C			C			B	

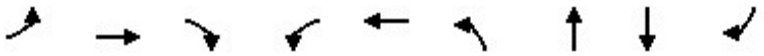
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.8	60.4		20.9	28.4	37.8		20.9				
Change Period (Y+Rc), s	4.0	5.0		4.6	4.0	5.0		4.6				
Max Green Setting (Gmax), s	25.0	45.0		30.0	25.0	45.0		30.0				
Max Q Clear Time (g_c+I1), s	2.8	12.3		12.1	24.3	17.4		4.2				
Green Ext Time (p_c), s	0.0	16.5		0.7	0.1	15.5		0.1				

Intersection Summary			
HCM 6th Ctrl Delay		23.1	
HCM 6th LOS		C	

Notes

User approved pedestrian interval to be less than phase max green.

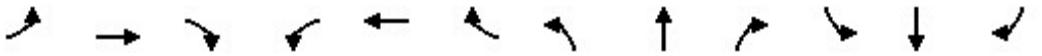
5: Dixon Street/E 12th Street & Tennyson Road



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	109	593	239	82	631	279	156	21	75
v/c Ratio	0.35	0.49	0.40	0.29	0.54	0.64	0.35	0.09	0.18
Control Delay	31.5	20.3	9.9	32.0	21.8	36.9	22.7	32.6	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	20.3	9.9	32.0	21.8	36.9	22.7	32.6	4.1
Queue Length 50th (ft)	34	84	19	25	93	87	30	6	0
Queue Length 95th (ft)	104	186	89	84	206	#316	117	33	18
Internal Link Dist (ft)		1481			525		495	553	
Turn Bay Length (ft)	125		80	130		100			100
Base Capacity (vph)	717	2597	1099	710	2593	438	441	366	771
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.23	0.22	0.12	0.24	0.64	0.35	0.06	0.10

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	104	563	227	78	594	6	265	62	86	4	16	71
Future Volume (veh/h)	104	563	227	78	594	6	265	62	86	4	16	71
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.97	1.00		0.92	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1885	1841	1796	1885	1900	1841	1870	1811	1900	1900	1841
Adj Flow Rate, veh/h	109	593	239	82	625	6	279	65	91	4	17	75
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	6	1	4	7	1	0	4	2	6	0	0	4
Cap, veh/h	147	1270	527	114	1222	12	334	127	178	49	209	336
Arrive On Green	0.09	0.35	0.35	0.07	0.34	0.34	0.19	0.19	0.19	0.14	0.14	0.14
Sat Flow, veh/h	1725	3582	1485	1711	3634	35	1753	667	934	358	1524	1478
Grp Volume(v), veh/h	109	593	239	82	308	323	279	0	156	21	0	75
Grp Sat Flow(s),veh/h/ln	1725	1791	1485	1711	1791	1878	1753	0	1602	1882	0	1478
Q Serve(g_s), s	4.5	9.3	9.0	3.4	10.0	10.0	11.1	0.0	6.3	0.7	0.0	3.0
Cycle Q Clear(g_c), s	4.5	9.3	9.0	3.4	10.0	10.0	11.1	0.0	6.3	0.7	0.0	3.0
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.58	0.19		1.00
Lane Grp Cap(c), veh/h	147	1270	527	114	602	631	334	0	305	258	0	336
V/C Ratio(X)	0.74	0.47	0.45	0.72	0.51	0.51	0.84	0.00	0.51	0.08	0.00	0.22
Avail Cap(c_a), veh/h	594	2220	920	589	1110	1164	362	0	331	389	0	438
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	32.4	18.1	18.0	33.2	19.3	19.3	28.3	0.0	26.4	27.3	0.0	23.1
Incr Delay (d2), s/veh	11.8	1.0	2.2	13.4	2.4	2.3	14.6	0.0	1.3	0.1	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	3.9	3.3	1.8	4.4	4.6	5.9	0.0	2.5	0.3	0.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.3	19.1	20.2	46.6	21.7	21.6	42.9	0.0	27.7	27.5	0.0	23.5
LnGrp LOS	D	B	C	D	C	C	D	A	C	C	A	C
Approach Vol, veh/h		941			713			435			96	
Approach Delay, s/veh		22.3			24.6			37.4			24.3	
Approach LOS		C			C			D			C	

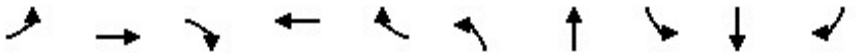
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.9	30.7		14.6	10.2	29.4		18.4				
Change Period (Y+Rc), s	4.0	5.0		4.6	4.0	5.0		4.6				
Max Green Setting (Gmax), s	25.0	45.0		15.0	25.0	45.0		15.0				
Max Q Clear Time (g_c+I1), s	5.4	11.3		5.0	6.5	12.0		13.1				
Green Ext Time (p_c), s	0.3	14.5		0.2	0.5	11.1		0.4				

Intersection Summary		
HCM 6th Ctrl Delay		26.1
HCM 6th LOS		C

Notes

User approved pedestrian interval to be less than phase max green.

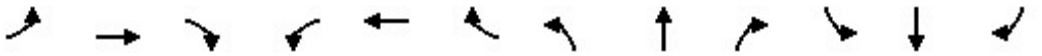
6: Mission Boulevard & Tennyson Road



Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	359	4	253	26	2	388	1731	33	1222	335
v/c Ratio	0.68	0.01	0.56	0.18	0.01	0.80	0.53	0.39	0.45	0.35
Control Delay	67.3	50.5	10.7	63.5	0.0	81.9	17.6	76.1	29.0	13.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.3	50.5	10.7	63.5	0.0	81.9	17.7	76.1	29.0	13.5
Queue Length 50th (ft)	177	3	0	26	0	211	236	33	226	37
Queue Length 95th (ft)	215	14	77	49	0	258	567	m59	424	173
Internal Link Dist (ft)		525		1123			1386		1040	
Turn Bay Length (ft)	335		225		315	520		230		210
Base Capacity (vph)	747	409	534	387	424	541	3291	85	2714	946
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	193	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.01	0.47	0.07	0.00	0.72	0.56	0.39	0.45	0.35

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	352	4	248	9	17	2	380	1695	1	32	1198	328
Future Volume (veh/h)	352	4	248	9	17	2	380	1695	1	32	1198	328
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.96	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1900	1870	1900	1811	1900	1870	1885	1900	1900	1870	1885
Adj Flow Rate, veh/h	359	4	253	9	17	2	388	1730	1	33	1222	335
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	0	2	0	6	0	2	1	0	0	2	1
Cap, veh/h	645	352	290	35	67	88	441	3242	2	54	2615	805
Arrive On Green	0.19	0.19	0.19	0.06	0.06	0.06	0.13	0.61	0.61	0.06	1.00	1.00
Sat Flow, veh/h	3483	1900	1565	616	1164	1543	3456	5312	3	1810	5106	1571
Grp Volume(v), veh/h	359	4	253	26	0	2	388	1117	614	33	1222	335
Grp Sat Flow(s),veh/h/ln	1742	1900	1565	1780	0	1543	1728	1716	1885	1810	1702	1571
Q Serve(g_s), s	14.3	0.3	24.0	2.1	0.0	0.2	16.9	28.8	28.8	2.7	0.0	0.0
Cycle Q Clear(g_c), s	14.3	0.3	24.0	2.1	0.0	0.2	16.9	28.8	28.8	2.7	0.0	0.0
Prop In Lane	1.00		1.00	0.35		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	645	352	290	102	0	88	441	2094	1150	54	2615	805
V/C Ratio(X)	0.56	0.01	0.87	0.25	0.00	0.02	0.88	0.53	0.53	0.62	0.47	0.42
Avail Cap(c_a), veh/h	751	410	337	384	0	333	542	2094	1150	71	2615	805
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	0.87	0.87	0.87	1.00	0.00	1.00	0.71	0.71	0.71	0.77	0.77	0.77
Uniform Delay (d), s/veh	56.6	50.9	60.6	69.0	0.0	68.1	65.6	17.2	17.2	71.1	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.0	17.3	1.3	0.0	0.1	9.9	0.7	1.3	8.6	0.5	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.5	0.1	11.0	1.0	0.0	0.1	8.0	11.2	12.5	1.4	0.1	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.3	50.9	77.8	70.3	0.0	68.2	75.5	17.9	18.5	79.7	0.5	1.2
LnGrp LOS	E	D	E	E	A	E	E	B	B	E	A	A
Approach Vol, veh/h		616			28			2119			1590	
Approach Delay, s/veh		65.7			70.1			28.6			2.3	
Approach LOS		E			E			C			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	23.5	83.4		12.8	8.5	98.4		33.4				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	24.0	45.0		33.0	6.0	63.0		33.0				
Max Q Clear Time (g_c+I1), s	18.9	2.0		4.1	4.7	30.8		26.0				
Green Ext Time (p_c), s	0.7	13.5		0.1	0.0	15.1		1.4				

Intersection Summary												
HCM 6th Ctrl Delay			24.5									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	36	36	0	0	0
Future Vol, veh/h	0	36	36	0	0	0
Conflicting Peds, #/hr	2	0	0	2	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	0	3	9	0	0	0
Mvmt Flow	0	44	44	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	46	0	-	0	90	46
Stage 1	-	-	-	-	46	-
Stage 2	-	-	-	-	44	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1575	-	-	-	915	1029
Stage 1	-	-	-	-	982	-
Stage 2	-	-	-	-	984	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1572	-	-	-	911	1027
Mov Cap-2 Maneuver	-	-	-	-	911	-
Stage 1	-	-	-	-	980	-
Stage 2	-	-	-	-	982	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1572	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	59	43	2120	1518
v/c Ratio	0.48	0.43	0.65	0.51
Control Delay	45.7	82.3	3.4	7.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	45.7	82.3	3.4	7.0
Queue Length 50th (ft)	23	42	202	141
Queue Length 95th (ft)	71	85	328	248
Internal Link Dist (ft)	364		816	1386
Turn Bay Length (ft)		225		
Base Capacity (vph)	347	112	3243	2983
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.17	0.38	0.65	0.51

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	22	35	41	2035	1417	40
Future Volume (veh/h)	22	35	41	2035	1417	40
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.97	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1856	1900	1885	1885	1870
Adj Flow Rate, veh/h	23	36	43	2120	1476	42
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	3	0	1	1	2
Cap, veh/h	40	62	719	3146	1592	45
Arrive On Green	0.06	0.06	0.40	0.88	0.90	0.90
Sat Flow, veh/h	634	993	1810	3676	3648	101
Grp Volume(v), veh/h	60	0	43	2120	742	776
Grp Sat Flow(s),veh/h/ln	1655	0	1810	1791	1791	1864
Q Serve(g_s), s	5.4	0.0	2.2	27.0	38.6	39.4
Cycle Q Clear(g_c), s	5.4	0.0	2.2	27.0	38.6	39.4
Prop In Lane	0.38	0.60	1.00			0.05
Lane Grp Cap(c), veh/h	104	0	719	3146	802	835
V/C Ratio(X)	0.58	0.00	0.06	0.67	0.93	0.93
Avail Cap(c_a), veh/h	314	0	719	3146	1194	1243
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.88	0.88
Uniform Delay (d), s/veh	69.7	0.0	28.4	2.8	6.4	6.4
Incr Delay (d2), s/veh	5.0	0.0	0.0	1.2	16.4	16.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	1.0	5.3	6.7	7.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	74.7	0.0	28.5	4.0	22.8	22.8
LnGrp LOS	E	A	C	A	C	C
Approach Vol, veh/h	60			2163	1518	
Approach Delay, s/veh	74.7			4.4	22.8	
Approach LOS	E			A	C	

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	71.6	67.8				139.4	13.6
Change Period (Y+Rc), s	5.0	* 5				5.0	4.0
Max Green Setting (Gmax), s	9.0	* 1E2				115.0	29.0
Max Q Clear Time (g_c+I1), s	4.2	41.4				29.0	7.4
Green Ext Time (p_c), s	0.0	15.6				38.7	0.1

Intersection Summary	
HCM 6th Ctrl Delay	13.0
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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Portland, Oregon 97205
(503) 228-5230

Project #: 24641
Project Name: Hayward Parcel 3 Entitlements
Analyst: MZS
Date: 1/19/2021
File: H:\24\24641 - Hayward Parcel 3 Entitlements\analysis\LTA\Signal Warrants\[Existing intersection 3 AM.xlsm]War #3 -
Intersection: 3. East 16th Street & Hancock Street
Scenario: Existing PM

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	NB	SB	EB	WB
4:45 PM	5:45 PM	27	46	74	0
2nd Highest Hour		26	44	70	0
3rd Highest Hour		25	43	69	0
4th Highest Hour		24	41	66	0
5th Highest Hour		24	40	65	0
6th Highest Hour		24	40	65	0
7th Highest Hour		23	39	62	0
8th Highest Hour		22	38	61	0
9th Highest Hour		22	37	59	0
10th Highest Hour		20	34	55	0
11th Highest Hour		19	33	53	0
12th Highest Hour		19	33	52	0
13th Highest Hour		18	31	50	0
14th Highest Hour		16	27	43	0
15th Highest Hour		13	21	35	0
16th Highest Hour		12	20	33	0
17th Highest Hour		8	14	23	0
18th Highest Hour		7	12	19	0
19th Highest Hour		4	6	10	0
20th Highest Hour		3	4	7	0
21st Highest Hour		2	4	6	0
22nd Highest Hour		1	2	4	0
23rd Highest Hour		1	1	2	0
24th Highest Hour		1	1	2	0

Warrant Summary

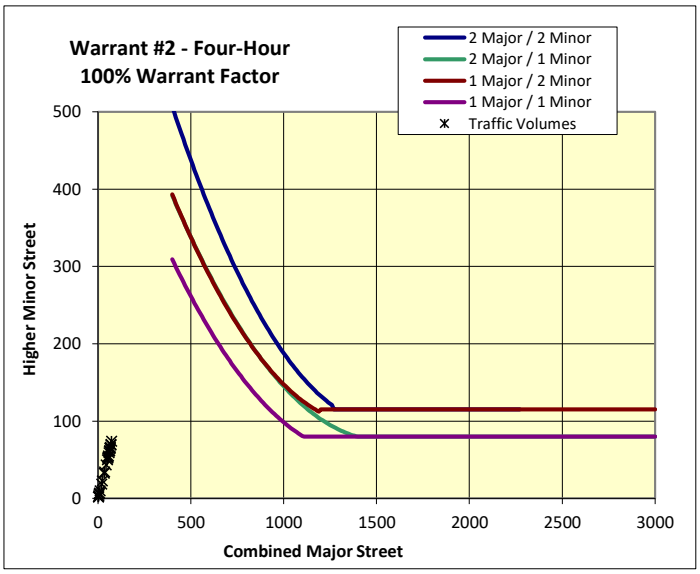
Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	No
#2	Four-Hour Vehicular volume	Yes	No
#3	Peak Hour	Yes	No
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

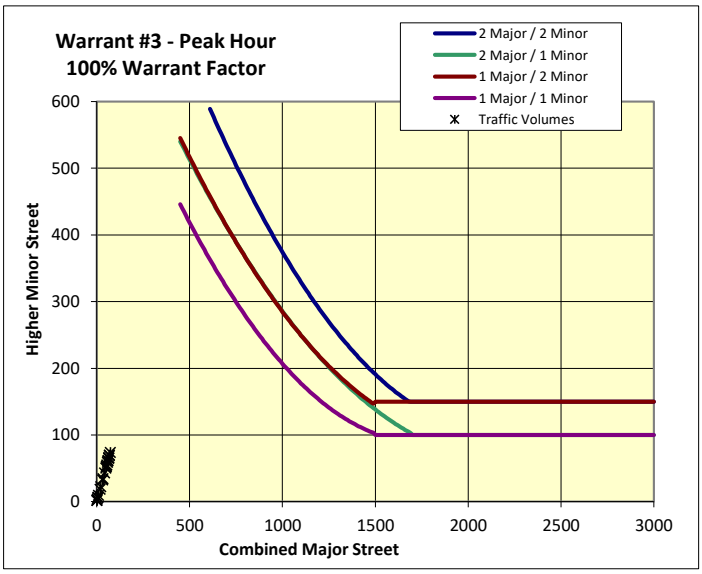
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	1
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	89%
Minor Street: 8th-Highest Hour / Peak Hour	83%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	500	150	0	No	**No**
	B	750	75	0	No	
80%	A	400	120	0	No	**No**
	B	600	60	0	No	
70%	A	350	105	0	No	**No**
	B	525	53	0	No	
56%	A	280	84	0	No	**No**
	B	420	42	0	No	





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Project #: 24641
Project Name: Hayward Parcel 3 Entitlements
Analyst: MZS
Date: 1/19/2021
File: H:\24\24641 - Hayward Parcel 3 Entitlements\analysis\LTA\Signal Warrants\[Existing intersection 3 AM.xlsm]War #3 -
Intersection: 7. Site Access Road & Tennyson Road
Scenario: Existing PM

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	EB	WB	NB	SB
4:15 PM	5:15 PM	36	36	0	0
2nd Highest Hour		34	34	0	0
3rd Highest Hour		34	34	0	0
4th Highest Hour		32	32	0	0
5th Highest Hour		32	32	0	0
6th Highest Hour		32	32	0	0
7th Highest Hour		30	30	0	0
8th Highest Hour		30	30	0	0
9th Highest Hour		29	29	0	0
10th Highest Hour		27	27	0	0
11th Highest Hour		26	26	0	0
12th Highest Hour		25	25	0	0
13th Highest Hour		24	24	0	0
14th Highest Hour		21	21	0	0
15th Highest Hour		17	17	0	0
16th Highest Hour		16	16	0	0
17th Highest Hour		11	11	0	0
18th Highest Hour		9	9	0	0
19th Highest Hour		5	5	0	0
20th Highest Hour		3	3	0	0
21st Highest Hour		3	3	0	0
22nd Highest Hour		2	2	0	0
23rd Highest Hour		1	1	0	0
24th Highest Hour		1	1	0	0

Warrant Summary

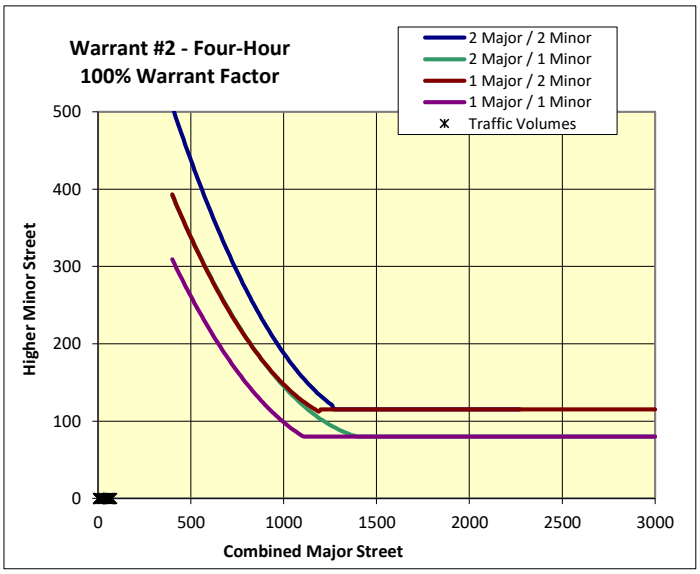
Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	No
#2	Four-Hour Vehicular volume	Yes	No
#3	Peak Hour	Yes	No
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

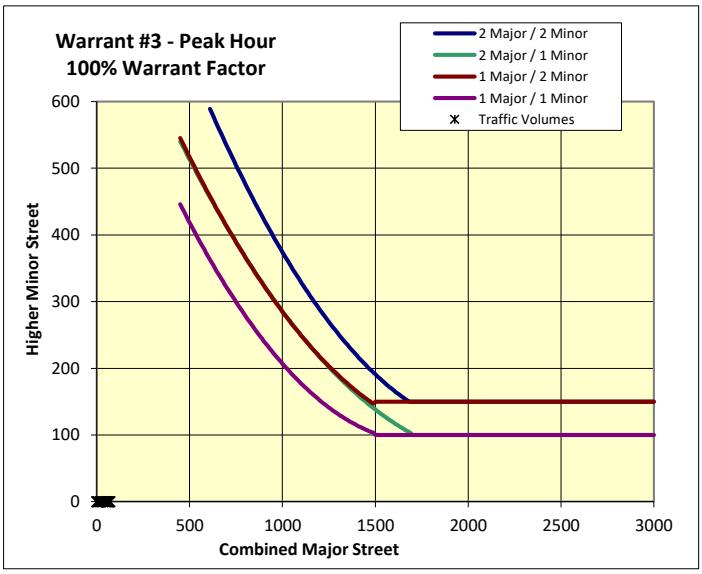
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	1
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	89%
Minor Street: 8th-Highest Hour / Peak Hour	83%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	500	150	0	No	**No**
	B	750	75	0	No	
80%	A	400	120	0	No	**No**
	B	600	60	0	No	
70%	A	350	105	0	No	**No**
	B	525	53	0	No	
56%	A	280	84	0	No	**No**
	B	420	42	0	No	





Appendix 3 — Intersection Queuing Analysis Spreadsheet

#	Intersection	Control	Movement		Storage	Existing				Existing Plus Project				Project Contribution			
						AM Queue (ft.)	Exceed Storage?	PM Queue (ft.)	Exceed Storage?	AM Queue (ft.)	Exceed Storage?	PM Queue (ft.)	Exceed Storage?	AM Queue	AM Cars	PM Queue	PM Cars
1	Mission Boulevard & Calhoun Street	Signal	NB	Left	95	< 25 [b]		< 25 [b]		< 25 [b]		< 25 [b]		-2	0	0	0
				Thru/Right	145	374	Yes	380	Yes	571	Yes	391	Yes	197	8	11	0
			SB	Left	175	234	Yes	133		234	Yes	133		0	0	0	0
				Thru/Right	175	778	Yes	421	Yes	894	Yes	437	Yes	116	5	16	1
			EB	RIght	155	< 25		< 25		< 25		< 25		0	0	0	0
			WB	Left/Thru/Right	510	196		109		196		109		0	0	0	0
2	Mission Boulevard & Hancock Street	Signal	NB	Left	240	39 [b]		57 [b]		26 [b]		54 [b]		-13	-1	-3	0
				Thru/Right	1,055	195		1,242	Yes	215		1,265	Yes	20	1	23	1
			SB	Left	195	47 [b]		129		57 [b]		178 [c]		10	0	49	2
				Thru/Right	1,315	488 [c]		213		1257 [c]		214		769	31	1	0
			EB	Left/Thru/Right	185	167		164		168		159		1	0	-5	0
			WB	Left/Thru/Right	780	282		168		402 [c]		201		120	5	33	1
3	East 16th Street & Hancock Street [a]	TWSC	NB	Left/Thru/Right	460	< 25		< 25		< 25		< 25		2	0	3	0
			SB	Left/Thru/Right	345	N/A		N/A		< 25		< 25		0	0	0	0
			EB	Left/Thru/Right	780	< 25		< 25		38		< 25		15	1	8	0
			WB	Left/Thru/Right	75	N/A		N/A		< 25		< 25		8	0	3	0
4	Whitman Street/Beatron Way & Tennyson Road	Signal	NB	Left/Thru/Right	110	139	Yes	49		145	Yes	50		6	0	1	0
			SB	Left	100	280 [c]	Yes	98		295 [c]	Yes	100		15	1	2	0
				Thru	275	< 25		< 25		< 25		< 25		0	0	0	0
				Right	100	331	Yes	124	Yes	365	Yes	129	Yes	34	1	5	0
			EB	Left	175	410 [c]	Yes	451 [c]	Yes	432 [c]	Yes	464 [c]	Yes	22	1	13	1
				Thru	425	264		166		287		171		23	1	5	0
				Right	105	< 25		< 25		< 25		< 25		-1	0	0	0
			WB	Left	90	< 25		28		< 25		28		1	0	0	0
				Thru	265	271	Yes	234		298	Yes	240		27	1	6	0
				Right	95	94		62		101	Yes	62		7	0	0	0
5	East 12th Street/Dixon Street & Tennyson Road	Signal	NB	Left	100	314 [c]	Yes	316 [c]	Yes	334 [c]	Yes	320 [c]	Yes	20	1	4	0
				Thru/Right	170	83		117		89		118		6	0	1	0
			SB	Left/Thru	275	130 [c]		33		139 [c]		33		9	0	0	0
				Right	95	28		< 25		40		< 25		12	0	0	0
			EB	Left	120	151	Yes	104		158	Yes	105		7	0	1	0
				Thru	1,020	234		186		264		192		30	1	6	0
				Right	80	160	Yes	89	Yes	175	Yes	92	Yes	15	1	3	0
			WB	Left	125	114		84		124		86		10	0	2	0
				Thru/Right	160	187	Yes	206	Yes	213	Yes	212	Yes	26	1	6	0
6	Mission Boulevard & Tennyson Road	Signal	NB	Left	515	201 [c]		258		201 [c]		259		0	0	1	0
				Thru/Right	1,320	485		567		521		575		36	1	8	0
			SB	Left	235	< 25 [b]		59 [b]		167 [b] [c]		72 [b]		157	6	13	1
				Thru	490	757 [c]	Yes	424		690 [b] [c]	Yes	417		-67	-3	-7	0
				Right	210	128 [b]		173		113 [b]		181		-15	-1	8	0
			EB	Left	465	205		215		207		223		2	0	8	0
				Thru	465	< 25		< 25		95		< 25		84	3	9	0
				Right	215	72		77		72		77		0	0	0	0
			WB	Left/Thru	1,115	30		49		173		75		143	6	26	1
				Right	315	< 25		< 25		46		< 25		46	2	0	0
7	Site Access Road & Tennyson Road	TWSC	SB	Left/Right	115	< 25		< 25		35		< 25		35	1	3	0
			EB	Left/Thru	1,115	< 25		< 25		< 25		< 25		23	1	0	0
8	Mission Boulevard & Valle Vista Avenue	Signal	NB	Left	225	170 [c]		85		170 [c]		85		0	0	0	0
				Thru	1,075	171		328		187		337		16	1	9	0
			SB	Thru/Right	390	641	Yes	248		710	Yes	254		69	3	6	0
			EB	Left/Right	80	60		71		60		71		0	0	0	0

Notes:

a) One of the project's residential driveways forms this intersection's eastern leg under Plus Project conditions.

b) At this movement, the volume for the 95th percentile queue is metered by an upstream signal.

c) At this movement, the 95th percentile volume exceeds capacity and the queue may be longer.

Appendix 4 —

Existing Plus Project Level of Service, Queuing, and Peak Hour Traffic Signal Warrants Worksheets

1: Mission Boulevard & Driveway/Calhoun Street

Lane Group	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	202	11	1739	176	2125
v/c Ratio	0.77	0.13	0.76	0.73	0.76
Control Delay	56.6	51.4	23.2	77.2	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	56.6	51.4	23.2	77.2	12.5
Queue Length 50th (ft)	117	10	438	161	380
Queue Length 95th (ft)	196	m12	571	234	894
Internal Link Dist (ft)	729		1333		1909
Turn Bay Length (ft)		90		275	
Base Capacity (vph)	413	83	2279	275	2781
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.49	0.13	0.76	0.64	0.76

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	159	0	25	10	1479	104	160	1934	0
Future Volume (vph)	0	0	0	159	0	25	10	1479	104	160	1934	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0		4.0	5.0		4.0	5.0	
Lane Util. Factor					1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes					1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes					0.99		1.00	1.00		1.00	1.00	
Frt					0.98		1.00	0.99		1.00	1.00	
Flt Protected					0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)					1751		1805	3433		1787	3505	
Flt Permitted					0.96		0.95	1.00		0.95	1.00	
Satd. Flow (perm)					1751		1805	3433		1787	3505	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	175	0	27	11	1625	114	176	2125	0
RTOR Reduction (vph)	0	0	0	0	68	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	134	0	11	1736	0	176	2125	0
Confl. Peds. (#/hr)	3		8	8		3	1		8	8		1
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%	0%	4%	0%	1%	3%	0%
Turn Type			Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases					8		5	2		1	6	
Permitted Phases			4	8								
Actuated Green, G (s)					16.1		3.0	95.6		19.3	111.9	
Effective Green, g (s)					16.1		3.0	95.6		19.3	111.9	
Actuated g/C Ratio					0.11		0.02	0.66		0.13	0.78	
Clearance Time (s)					4.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)					3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)					195		37	2279		239	2723	
v/s Ratio Prot							0.01	0.51		c0.10	c0.61	
v/s Ratio Perm					0.08							
v/c Ratio					0.69		0.30	0.76		0.74	0.78	
Uniform Delay, d1					61.5		69.5	16.5		59.9	9.1	
Progression Factor					1.00		0.75	1.16		1.00	1.00	
Incremental Delay, d2					9.7		2.4	1.4		11.2	2.3	
Delay (s)					71.3		54.9	20.5		71.1	11.4	
Level of Service					E		D	C		E	B	
Approach Delay (s)		0.0			71.3			20.7			16.0	
Approach LOS		A			E			C			B	

Intersection Summary			
HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	144.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

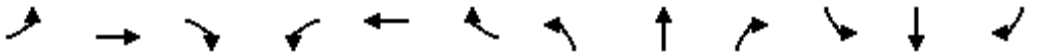
Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	133	290	18	1913	41	2381
v/c Ratio	0.50	0.95	0.26	0.84	0.50	1.00
Control Delay	55.9	94.4	88.8	20.8	89.1	37.2
Queue Delay	0.0	0.0	0.0	0.6	0.0	0.0
Total Delay	55.9	94.4	88.8	21.5	89.1	37.2
Queue Length 50th (ft)	108	262	18	997	36	~1287
Queue Length 95th (ft)	168	#402	m26	215	m57	#1257
Internal Link Dist (ft)	518	789		1040		1333
Turn Bay Length (ft)			240		200	
Base Capacity (vph)	273	312	69	2287	84	2372
Starvation Cap Reductn	0	0	0	118	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.93	0.26	0.88	0.49	1.00

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	22	6	151	39	56	15	1532	94	35	2000	24
Future Volume (veh/h)	85	22	6	151	39	56	15	1532	94	35	2000	24
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	0.99		0.98	1.00		0.97	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1781	1856	1856	1841	1856	1856
Adj Flow Rate, veh/h	100	26	7	178	46	66	18	1802	111	41	2353	28
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	0	0	0	0	0	0	8	3	3	4	3	3
Cap, veh/h	241	59	14	234	50	72	36	2257	137	59	2433	29
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.04	1.00	1.00	0.04	0.91	0.91
Sat Flow, veh/h	955	288	69	940	243	349	1697	3369	205	1753	3566	42
Grp Volume(v), veh/h	133	0	0	290	0	0	18	933	980	41	1160	1221
Grp Sat Flow(s),veh/h/ln	1312	0	0	1532	0	0	1697	1763	1811	1753	1763	1845
Q Serve(g_s), s	0.0	0.0	0.0	13.8	0.0	0.0	1.5	0.0	0.0	3.3	70.3	73.6
Cycle Q Clear(g_c), s	12.8	0.0	0.0	26.6	0.0	0.0	1.5	0.0	0.0	3.3	70.3	73.6
Prop In Lane	0.75		0.05	0.61		0.23	1.00		0.11	1.00		0.02
Lane Grp Cap(c), veh/h	314	0	0	356	0	0	36	1181	1214	59	1203	1259
V/C Ratio(X)	0.42	0.00	0.00	0.81	0.00	0.00	0.50	0.79	0.81	0.70	0.96	0.97
Avail Cap(c_a), veh/h	337	0	0	380	0	0	71	1181	1214	85	1203	1259
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.68	0.68	0.68	0.56	0.56	0.56
Uniform Delay (d), s/veh	50.3	0.0	0.0	55.8	0.0	0.0	68.2	0.0	0.0	68.1	5.4	5.5
Incr Delay (d2), s/veh	0.9	0.0	0.0	12.2	0.0	0.0	7.0	3.7	4.0	8.0	12.7	13.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	0.0	0.0	11.6	0.0	0.0	0.7	1.2	1.4	1.6	8.3	8.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.3	0.0	0.0	67.9	0.0	0.0	75.1	3.7	4.0	76.1	18.1	18.6
LnGrp LOS	D	A	A	E	A	A	E	A	A	E	B	B
Approach Vol, veh/h		133			290			1931			2422	
Approach Delay, s/veh		51.3			67.9			4.6			19.3	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.8	101.5		33.7	7.1	103.2		33.7				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	7.0	92.0		32.0	6.0	93.0		32.0				
Max Q Clear Time (g_c+I1), s	5.3	2.0		14.8	3.5	75.6		28.6				
Green Ext Time (p_c), s	0.0	31.5		0.6	0.0	15.5		0.6				

Intersection Summary												
HCM 6th Ctrl Delay			17.2									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	7.7

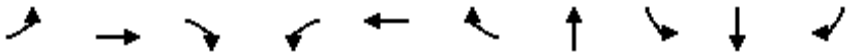
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	91	8	16	0	24	0	59	8	0	0	5	100
Future Vol, veh/h	91	8	16	0	24	0	59	8	0	0	5	100
Conflicting Peds, #/hr	7	0	1	1	0	7	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	59	59	59	59	59	59	59	59	59	59	59	59
Heavy Vehicles, %	1	0	0	0	0	0	0	0	0	0	0	5
Mvmt Flow	154	14	27	0	41	0	100	14	0	0	8	169

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	335	307	94	328	391	21	177	0	0	14	0	0
Stage 1	93	93	-	214	214	-	-	-	-	-	-	-
Stage 2	242	214	-	114	177	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.11	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	621	610	968	629	548	1062	1411	-	-	1617	-	-
Stage 1	916	822	-	793	729	-	-	-	-	-	-	-
Stage 2	764	729	-	896	756	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	548	567	967	567	509	1055	1411	-	-	1617	-	-
Mov Cap-2 Maneuver	548	567	-	567	509	-	-	-	-	-	-	-
Stage 1	851	822	-	737	677	-	-	-	-	-	-	-
Stage 2	663	677	-	856	756	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.2	12.7	6.8	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1411	-	-	585	509	1617	-	-
HCM Lane V/C Ratio	0.071	-	-	0.333	0.08	-	-	-
HCM Control Delay (s)	7.7	0	-	14.2	12.7	0	-	-
HCM Lane LOS	A	A	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	1.5	0.3	0	-	-

4: Beaton Way/Whitman Street & Tennyson Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	363	1026	66	9	799	234	150	243	7	545
v/c Ratio	0.83	0.48	0.07	0.08	0.67	0.41	0.40	0.84	0.01	0.68
Control Delay	54.3	11.6	3.8	50.5	29.7	11.9	32.9	60.1	29.5	19.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.3	11.6	3.8	50.5	29.7	11.9	32.9	60.1	29.5	19.9
Queue Length 50th (ft)	218	164	3	6	227	39	73	143	3	194
Queue Length 95th (ft)	#432	287	23	24	298	101	145	#295	15	365
Internal Link Dist (ft)		470			1481		548		469	
Turn Bay Length (ft)	175		100	90		100		100		110
Base Capacity (vph)	487	2157	941	492	1673	738	476	372	622	849
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.48	0.07	0.02	0.48	0.32	0.32	0.65	0.01	0.64

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	323	913	59	8	711	208	77	32	24	216	6	485
Future Volume (veh/h)	323	913	59	8	711	208	77	32	24	216	6	485
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.92	1.00		0.88	0.95		0.88	0.92		0.89
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1826	1870	1900	1811	1885	1900	1900	1900	1885	1900	1870
Adj Flow Rate, veh/h	363	1026	66	9	799	234	87	36	27	243	7	545
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	1	5	2	0	6	1	0	0	0	1	0	2
Cap, veh/h	393	1952	820	24	1228	502	224	90	57	414	555	759
Arrive On Green	0.22	0.56	0.56	0.01	0.36	0.36	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	1795	3469	1458	1810	3441	1407	577	310	195	1238	1900	1409
Grp Volume(v), veh/h	363	1026	66	9	799	234	150	0	0	243	7	545
Grp Sat Flow(s),veh/h/ln	1795	1735	1458	1810	1721	1407	1081	0	0	1238	1900	1409
Q Serve(g_s), s	20.3	18.9	2.1	0.5	20.0	13.2	9.5	0.0	0.0	8.5	0.3	30.0
Cycle Q Clear(g_c), s	20.3	18.9	2.1	0.5	20.0	13.2	11.0	0.0	0.0	19.5	0.3	30.0
Prop In Lane	1.00		1.00	1.00		1.00	0.58		0.18	1.00		1.00
Lane Grp Cap(c), veh/h	393	1952	820	24	1228	502	371	0	0	414	555	759
V/C Ratio(X)	0.92	0.53	0.08	0.38	0.65	0.47	0.40	0.00	0.00	0.59	0.01	0.72
Avail Cap(c_a), veh/h	437	1952	820	440	1506	616	371	0	0	414	555	759
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.3	14.0	10.3	50.3	27.7	25.5	29.3	0.0	0.0	33.0	25.9	20.0
Incr Delay (d2), s/veh	22.8	0.8	0.2	3.6	2.2	2.4	0.3	0.0	0.0	1.5	0.0	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.2	7.0	0.7	0.3	8.5	4.7	3.0	0.0	0.0	5.6	0.1	10.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.1	14.8	10.4	53.9	29.9	27.9	29.6	0.0	0.0	34.5	25.9	22.9
LnGrp LOS	E	B	B	D	C	C	C	A	A	C	C	C
Approach Vol, veh/h		1455			1042			150			795	
Approach Delay, s/veh		26.4			29.6			29.6			26.5	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.4	62.8		34.6	26.5	41.7		34.6				
Change Period (Y+Rc), s	4.0	5.0		4.6	4.0	5.0		4.6				
Max Green Setting (Gmax), s	25.0	45.0		30.0	25.0	45.0		30.0				
Max Q Clear Time (g_c+I1), s	2.5	20.9		32.0	22.3	22.0		13.0				
Green Ext Time (p_c), s	0.0	16.1		0.0	0.2	14.7		0.7				

Intersection Summary			
HCM 6th Ctrl Delay		27.5	
HCM 6th LOS		C	

Notes

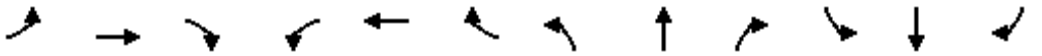
User approved pedestrian interval to be less than phase max green.

5: Dixon Street/E 12th Street & Tennyson Road

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	160	758	390	115	599	249	172	79	162
v/c Ratio	0.55	0.66	0.61	0.49	0.55	0.90	0.49	0.73	0.28
Control Delay	44.6	29.4	16.4	45.9	28.8	75.2	18.2	79.6	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.6	29.4	16.4	45.9	28.8	75.2	18.2	79.6	5.7
Queue Length 50th (ft)	88	197	87	64	152	146	23	45	10
Queue Length 95th (ft)	158	264	175	124	213	#334	89	#139	40
Internal Link Dist (ft)		1481			525		495	553	
Turn Bay Length (ft)	125		80	130		100			100
Base Capacity (vph)	477	1669	830	446	1666	278	353	108	728
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.45	0.47	0.26	0.36	0.90	0.49	0.73	0.22

Intersection Summary

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



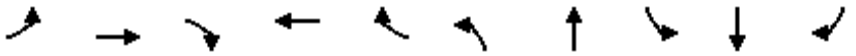
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	138	652	335	99	510	5	214	32	116	10	58	139
Future Volume (veh/h)	138	652	335	99	510	5	214	32	116	10	58	139
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.91	1.00		0.92
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1826	1841	1767	1826	1826	1826	1900	1900	1870	1870	1811
Adj Flow Rate, veh/h	160	758	390	115	593	6	249	37	135	12	67	162
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	5	4	9	5	5	5	0	0	2	2	6
Cap, veh/h	205	1411	627	150	1339	14	286	55	199	39	215	371
Arrive On Green	0.12	0.41	0.41	0.09	0.38	0.38	0.16	0.16	0.16	0.14	0.14	0.14
Sat Flow, veh/h	1781	3469	1543	1682	3518	36	1739	332	1212	282	1574	1418
Grp Volume(v), veh/h	160	758	390	115	292	307	249	0	172	79	0	162
Grp Sat Flow(s),veh/h/ln	1781	1735	1543	1682	1735	1819	1739	0	1544	1856	0	1418
Q Serve(g_s), s	7.8	14.9	18.0	6.0	11.2	11.3	12.5	0.0	9.4	3.4	0.0	8.6
Cycle Q Clear(g_c), s	7.8	14.9	18.0	6.0	11.2	11.3	12.5	0.0	9.4	3.4	0.0	8.6
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.78	0.15		1.00
Lane Grp Cap(c), veh/h	205	1411	627	150	660	692	286	0	254	253	0	371
V/C Ratio(X)	0.78	0.54	0.62	0.77	0.44	0.44	0.87	0.00	0.68	0.31	0.00	0.44
Avail Cap(c_a), veh/h	497	1742	775	469	871	913	291	0	258	311	0	414
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.5	20.2	21.1	39.9	20.7	20.7	36.5	0.0	35.2	34.9	0.0	28.3
Incr Delay (d2), s/veh	10.4	1.2	3.6	13.0	1.7	1.6	23.4	0.0	6.8	0.7	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	6.1	6.9	3.0	4.8	5.0	7.1	0.0	4.0	1.6	0.0	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.9	21.3	24.8	52.8	22.4	22.3	59.9	0.0	42.0	35.6	0.0	29.1
LnGrp LOS	D	C	C	D	C	C	E	A	D	D	A	C
Approach Vol, veh/h		1308			714			421			241	
Approach Delay, s/veh		25.7			27.2			52.6			31.2	
Approach LOS		C			C			D			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.0	41.4		16.8	14.3	39.1		19.3				
Change Period (Y+Rc), s	4.0	5.0		4.6	4.0	5.0		4.6				
Max Green Setting (Gmax), s	25.0	45.0		15.0	25.0	45.0		15.0				
Max Q Clear Time (g_c+I1), s	8.0	20.0		10.6	9.8	13.3		14.5				
Green Ext Time (p_c), s	0.5	16.4		0.4	0.7	10.3		0.1				

Intersection Summary			
HCM 6th Ctrl Delay		30.8	
HCM 6th LOS		C	

Notes

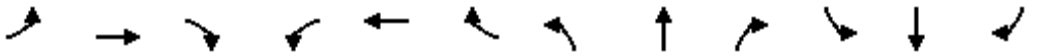
User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	375	69	279	139	98	220	1527	119	1878	282
v/c Ratio	0.66	0.21	0.57	0.59	0.34	0.61	0.70	0.49	0.79	0.35
Control Delay	61.0	51.2	9.9	67.8	11.9	68.7	35.7	54.8	40.4	21.2
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Total Delay	61.0	51.2	9.9	67.8	12.0	68.7	35.7	54.8	40.4	21.2
Queue Length 50th (ft)	172	57	0	127	0	102	406	110	480	112
Queue Length 95th (ft)	207	95	72	173	46	#201	521	m#167	m#690	m113
Internal Link Dist (ft)		525		1121			1386		1040	
Turn Bay Length (ft)	335		225		315	520		230		210
Base Capacity (vph)	771	435	564	424	438	358	2185	241	2387	798
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	29	0	66	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.16	0.49	0.33	0.24	0.61	0.72	0.49	0.79	0.35

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	334	61	248	67	57	87	196	1291	68	106	1671	251
Future Volume (veh/h)	334	61	248	67	57	87	196	1291	68	106	1671	251
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1900	1841	1900	1900	1900	1811	1856	1856	1811	1870	1856
Adj Flow Rate, veh/h	375	69	279	75	64	98	220	1451	76	119	1878	282
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	4	0	4	0	0	0	6	3	3	6	2	3
Cap, veh/h	692	387	315	109	93	173	209	2561	134	72	2552	772
Arrive On Green	0.20	0.20	0.20	0.11	0.11	0.11	0.06	0.52	0.52	0.08	1.00	1.00
Sat Flow, veh/h	3401	1900	1546	998	852	1584	3346	4920	258	1725	5106	1544
Grp Volume(v), veh/h	375	69	279	139	0	98	220	996	531	119	1878	282
Grp Sat Flow(s),veh/h/ln	1700	1900	1546	1850	0	1584	1673	1689	1800	1725	1702	1544
Q Serve(g_s), s	14.2	4.3	25.3	10.4	0.0	8.5	9.0	28.9	28.9	6.0	0.1	0.0
Cycle Q Clear(g_c), s	14.2	4.3	25.3	10.4	0.0	8.5	9.0	28.9	28.9	6.0	0.1	0.0
Prop In Lane	1.00		1.00	0.54		1.00	1.00		0.14	1.00		1.00
Lane Grp Cap(c), veh/h	692	387	315	202	0	173	209	1758	937	72	2552	772
V/C Ratio(X)	0.54	0.18	0.89	0.69	0.00	0.57	1.05	0.57	0.57	1.66	0.74	0.37
Avail Cap(c_a), veh/h	779	435	354	424	0	363	209	1758	937	72	2552	772
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	0.71	0.71	0.71	1.00	0.00	1.00	0.85	0.85	0.85	0.09	0.09	0.09
Uniform Delay (d), s/veh	51.3	47.4	55.7	61.8	0.0	60.9	67.5	23.5	23.5	66.0	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.2	16.1	4.1	0.0	2.9	71.7	1.1	2.1	300.7	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	2.1	11.3	5.2	0.0	3.6	5.9	11.5	12.5	8.5	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.8	47.6	71.8	65.9	0.0	63.8	139.2	24.6	25.6	366.7	0.2	0.1
LnGrp LOS	D	D	E	E	A	E	F	C	C	F	A	A
Approach Vol, veh/h		723			237			1747			2279	
Approach Delay, s/veh		59.1			65.0			39.3			19.3	
Approach LOS		E			E			D			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.0	77.0		19.7	10.0	80.0		34.3				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	9.0	51.0		33.0	6.0	54.0		33.0				
Max Q Clear Time (g_c+I1), s	11.0	2.1		12.4	8.0	30.9		27.3				
Green Ext Time (p_c), s	0.0	25.5		1.1	0.0	11.1		1.6				

Intersection Summary			
HCM 6th Ctrl Delay		34.3	
HCM 6th LOS		C	

Intersection	
Int Delay, s/veh	7.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	224	39	45	0	0	198
Future Vol, veh/h	224	39	45	0	0	198
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	63	63	63	63	63	63
Heavy Vehicles, %	0	6	10	0	0	0
Mvmt Flow	356	62	71	0	0	314

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	71	0	-	0	845	71
Stage 1	-	-	-	-	71	-
Stage 2	-	-	-	-	774	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1542	-	-	-	336	997
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	458	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1542	-	-	-	256	997
Mov Cap-2 Maneuver	-	-	-	-	256	-
Stage 1	-	-	-	-	728	-
Stage 2	-	-	-	-	458	-

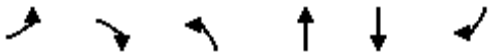
Approach	EB	WB	SB
HCM Control Delay, s	6.8	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1542	-	-	-	997
HCM Lane V/C Ratio	0.231	-	-	-	0.315
HCM Control Delay (s)	8	0	-	-	10.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.9	-	-	-	1.4

Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	52	80	1625	2275
v/c Ratio	0.47	0.75	0.51	0.80
Control Delay	43.1	103.5	2.4	11.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	43.1	103.5	2.4	11.0
Queue Length 50th (ft)	17	76	113	520
Queue Length 95th (ft)	60	#170	187	710
Internal Link Dist (ft)	364		816	1386
Turn Bay Length (ft)		225		
Base Capacity (vph)	323	107	3168	2854
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.16	0.75	0.51	0.80

Intersection Summary

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



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	30	71	1446	1986	39
Future Volume (veh/h)	16	30	71	1446	1986	39
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.98	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1885	1856	1870	1870
Adj Flow Rate, veh/h	18	34	80	1625	2231	44
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	0	1	3	2	2
Cap, veh/h	28	53	364	3130	2319	46
Arrive On Green	0.05	0.05	0.20	0.89	0.65	0.65
Sat Flow, veh/h	563	1063	1795	3618	3656	70
Grp Volume(v), veh/h	53	0	80	1625	1108	1167
Grp Sat Flow(s),veh/h/ln	1657	0	1795	1763	1777	1856
Q Serve(g_s), s	4.6	0.0	5.4	13.9	83.9	85.7
Cycle Q Clear(g_c), s	4.6	0.0	5.4	13.9	83.9	85.7
Prop In Lane	0.34	0.64	1.00			0.04
Lane Grp Cap(c), veh/h	83	0	364	3130	1156	1208
V/C Ratio(X)	0.64	0.00	0.22	0.52	0.96	0.97
Avail Cap(c_a), veh/h	331	0	364	3130	1164	1216
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.57	0.57
Uniform Delay (d), s/veh	67.6	0.0	48.3	1.7	23.5	23.8
Incr Delay (d2), s/veh	7.9	0.0	0.3	0.6	12.3	13.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	2.4	2.1	35.6	38.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	75.5	0.0	48.6	2.3	35.8	36.8
LnGrp LOS	E	A	D	A	D	D
Approach Vol, veh/h	53			1705	2275	
Approach Delay, s/veh	75.5			4.5	36.3	
Approach LOS	E			A	D	

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	34.4	99.4				133.7	11.3
Change Period (Y+Rc), s	5.0	* 5				5.0	4.0
Max Green Setting (Gmax), s	8.0	* 95				107.0	29.0
Max Q Clear Time (g_c+I1), s	7.4	87.7				15.9	6.6
Green Ext Time (p_c), s	0.0	6.6				21.1	0.1

Intersection Summary	
HCM 6th Ctrl Delay	23.4
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

KITTELSON & ASSOCIATES, INC.
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Project #: 24641
Project Name: Hayward Parcel 3 Entitlements
Analyst: MZS
Date: 5/19/2021
File: H:\24\24641 - Hayward Parcel 3 Entitlements\analysis\LTA\Signal Warrants\Existing PP\[ExistingPP_intersection_3_AM.xlsm]War #3 - Peak
Intersection: 3. East 16th Street & Hancock Street
Scenario: Existing Plus Project AM

Analysis Traffic Volumes

Hour Begin	Hour End	Major Street NB	Major Street SB	Minor Street EB	Minor Street WB
7:15 AM	8:15 AM	67	198	263	45
2nd Highest Hour		63	187	249	43
3rd Highest Hour		63	185	245	42
4th Highest Hour		60	177	235	40
5th Highest Hour		59	174	231	40
6th Highest Hour		59	174	231	40
7th Highest Hour		56	166	221	38
8th Highest Hour		55	164	217	37
9th Highest Hour		54	158	210	36
10th Highest Hour		50	148	196	34
11th Highest Hour		48	143	189	32
12th Highest Hour		47	140	186	32
13th Highest Hour		46	135	179	31
14th Highest Hour		39	116	154	26
15th Highest Hour		31	92	123	21
16th Highest Hour		29	87	116	20
17th Highest Hour		21	61	81	14
18th Highest Hour		17	50	67	11
19th Highest Hour		9	26	35	6
20th Highest Hour		6	18	25	4
21st Highest Hour		5	16	21	4
22nd Highest Hour		4	11	14	2
23rd Highest Hour		2	5	7	1
24th Highest Hour		2	5	7	1

Warrant Summary

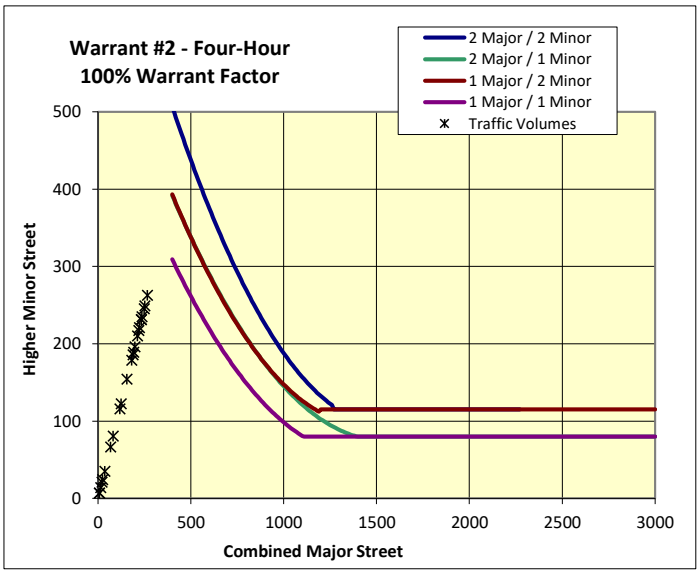
Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	No
#2	Four-Hour Vehicular volume	Yes	No
#3	Peak Hour	Yes	No
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

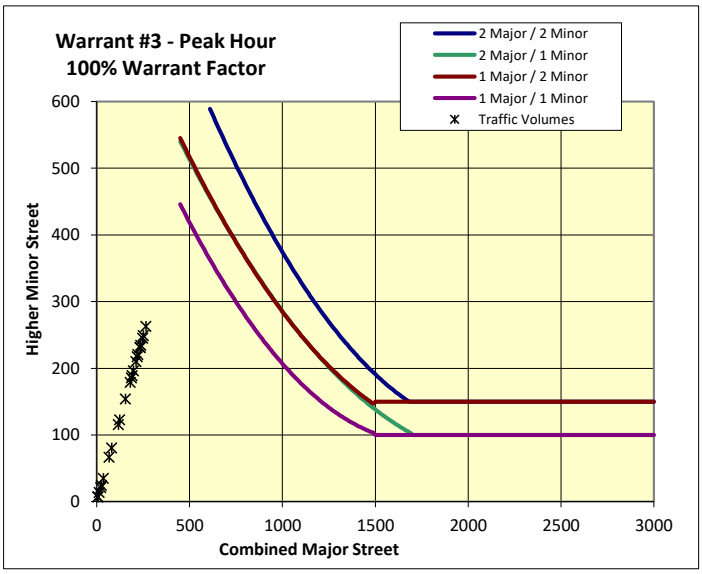
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	1
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	89%
Minor Street: 8th-Highest Hour / Peak Hour	83%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	500	150	0	No	**No**
	B	750	75	0	No	
80%	A	400	120	0	No	**No**
	B	600	60	0	No	
70%	A	350	105	0	No	**No**
	B	525	53	0	No	
56%	A	280	84	0	No	**No**
	B	420	42	0	No	





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610 SW Alder, Suite 700
Portland, Oregon 97205
(503) 228-5230

Project #: 24641
Project Name: Hayward Parcel 3 Entitlements
Analyst: MZS
Date: 5/19/2021
File: H:\24\24641 - Hayward Parcel 3 Entitlements\analysis\LTA\Signal Warrants\Existing PP\[ExistingPP intersection 3 AM.xlsm]War #3 - Peak
Intersection: 7. Site Access Road & Tennyson Road
Scenario: Existing Plus Project AM

Analysis Traffic Volumes

Hour Begin	Hour End	Major Street EB	Major Street WB	Minor Street NB	Minor Street SB
7:15 AM	8:15 AM	263	45	0	198
2nd Highest Hour		249	43	0	187
3rd Highest Hour		245	42	0	185
4th Highest Hour		235	40	0	177
5th Highest Hour		231	40	0	174
6th Highest Hour		231	40	0	174
7th Highest Hour		221	38	0	166
8th Highest Hour		217	37	0	164
9th Highest Hour		210	36	0	158
10th Highest Hour		196	34	0	148
11th Highest Hour		189	32	0	143
12th Highest Hour		186	32	0	140
13th Highest Hour		179	31	0	135
14th Highest Hour		154	26	0	116
15th Highest Hour		123	21	0	92
16th Highest Hour		116	20	0	87
17th Highest Hour		81	14	0	61
18th Highest Hour		67	11	0	50
19th Highest Hour		35	6	0	26
20th Highest Hour		25	4	0	18
21st Highest Hour		21	4	0	16
22nd Highest Hour		14	2	0	11
23rd Highest Hour		7	1	0	5
24th Highest Hour		7	1	0	5

Warrant Summary

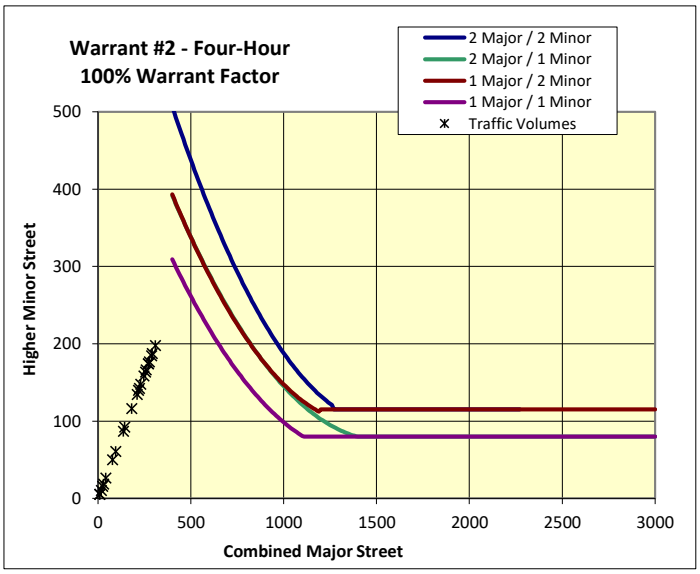
Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	No
#2	Four-Hour Vehicular volume	Yes	No
#3	Peak Hour	Yes	No
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

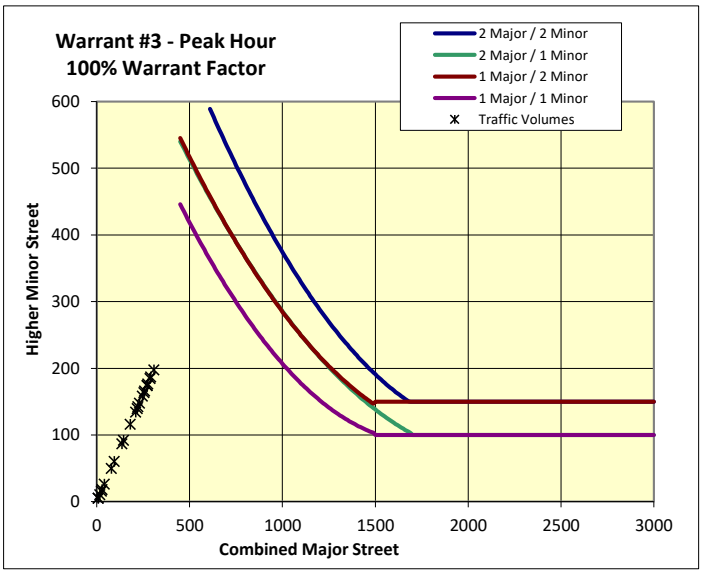
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	1
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	89%
Minor Street: 8th-Highest Hour / Peak Hour	83%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	500	150	0	No	**No**
	B	750	75	0	No	
80%	A	400	120	0	No	**No**
	B	600	60	0	No	
70%	A	350	105	0	No	**No**
	B	525	53	0	No	
56%	A	280	84	3	No	**No**
	B	420	42	0	No	





1: Mission Boulevard & Driveway/Calhoun Street

Lane Group	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	2	94	15	2241	80	1717
v/c Ratio	0.01	0.61	0.18	0.82	0.55	0.57
Control Delay	0.0	54.6	58.6	9.7	80.9	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	0.0	54.6	58.6	9.7	80.9	5.7
Queue Length 50th (ft)	0	50	14	265	78	158
Queue Length 95th (ft)	0	109	m19	391	133	437
Internal Link Dist (ft)		729		1334		1909
Turn Bay Length (ft)			90		275	
Base Capacity (vph)	382	354	82	2732	150	3007
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.27	0.18	0.82	0.53	0.57

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

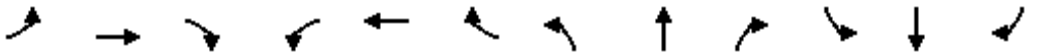
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	2	56	0	32	14	2072	12	74	1597	0
Future Volume (vph)	0	0	2	56	0	32	14	2072	12	74	1597	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0		4.0		4.0	5.0		4.0	5.0	
Lane Util. Factor			1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes			0.98		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes			1.00		0.99		1.00	1.00		1.00	1.00	
Frt			0.86		0.95		1.00	1.00		1.00	1.00	
Flt Protected			1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)			1608		1685		1805	3570		1787	3574	
Flt Permitted			1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (perm)			1608		1685		1805	3570		1787	3574	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	2	60	0	34	15	2228	13	80	1717	0
RTOR Reduction (vph)	0	0	2	0	40	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	54	0	15	2241	0	80	1717	0
Confl. Peds. (#/hr)	9		6	6		9	1		6	6		1
Confl. Bikes (#/hr)									1			2
Heavy Vehicles (%)	0%	0%	0%	2%	0%	3%	0%	1%	0%	1%	1%	0%
Turn Type			Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases					8		5	2		1	6	
Permitted Phases			4	8								
Actuated Green, G (s)			10.4		10.4		3.2	117.1		12.5	126.4	
Effective Green, g (s)			10.4		10.4		3.2	117.1		12.5	126.4	
Actuated g/C Ratio			0.07		0.07		0.02	0.77		0.08	0.83	
Clearance Time (s)			4.0		4.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)			3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)			109		114		37	2732		145	2952	
v/s Ratio Prot							0.01	c0.63		c0.04	0.48	
v/s Ratio Perm			0.00		0.03							
v/c Ratio			0.00		0.47		0.41	0.82		0.55	0.58	
Uniform Delay, d1			66.5		68.7		74.0	11.3		67.6	4.5	
Progression Factor			1.00		1.00		0.80	0.62		1.00	1.00	
Incremental Delay, d2			0.0		3.1		3.8	1.6		4.5	0.8	
Delay (s)			66.5		71.7		63.1	8.5		72.0	5.3	
Level of Service			E		E		E	A		E	A	
Approach Delay (s)		66.5			71.7			8.9			8.3	
Approach LOS		E			E			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	153.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	111	146	28	2149	93	1658
v/c Ratio	0.59	0.78	0.31	0.87	0.60	0.62
Control Delay	69.7	83.9	93.3	27.7	90.8	7.4
Queue Delay	0.0	0.0	0.0	1.5	0.0	0.0
Total Delay	69.7	83.9	93.3	29.2	90.8	7.4
Queue Length 50th (ft)	99	132	24	994	97	421
Queue Length 95th (ft)	159	201	m54	1265	#178	214
Internal Link Dist (ft)	518	789		1040		1334
Turn Bay Length (ft)			240		200	
Base Capacity (vph)	284	282	89	2466	155	2692
Starvation Cap Reductn	0	0	0	164	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.52	0.31	0.93	0.60	0.62

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	24	19	89	13	40	27	2022	62	90	1585	23
Future Volume (veh/h)	64	24	19	89	13	40	27	2022	62	90	1585	23
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.97	0.99		0.98	1.00		0.96	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1900	1900	1900	1900	1885	1885	1900	1885	1885
Adj Flow Rate, veh/h	66	25	20	92	13	41	28	2085	64	93	1634	24
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	4	4	4	0	0	0	0	1	1	0	1	1
Cap, veh/h	146	54	36	159	24	57	49	2539	77	106	2702	40
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.05	1.00	1.00	0.12	1.00	1.00
Sat Flow, veh/h	779	388	256	866	172	405	1810	3543	108	1810	3611	53
Grp Volume(v), veh/h	111	0	0	146	0	0	28	1047	1102	93	809	849
Grp Sat Flow(s),veh/h/ln	1423	0	0	1443	0	0	1810	1791	1860	1810	1791	1873
Q Serve(g_s), s	0.0	0.0	0.0	3.8	0.0	0.0	2.3	0.0	0.0	7.7	0.0	0.0
Cycle Q Clear(g_c), s	11.1	0.0	0.0	14.9	0.0	0.0	2.3	0.0	0.0	7.7	0.0	0.0
Prop In Lane	0.59		0.18	0.63		0.28	1.00		0.06	1.00		0.03
Lane Grp Cap(c), veh/h	236	0	0	240	0	0	49	1283	1333	106	1340	1401
V/C Ratio(X)	0.47	0.00	0.00	0.61	0.00	0.00	0.57	0.82	0.83	0.87	0.60	0.61
Avail Cap(c_a), veh/h	337	0	0	341	0	0	71	1283	1333	106	1340	1401
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.79	0.79	0.79	0.80	0.80	0.80
Uniform Delay (d), s/veh	61.3	0.0	0.0	63.0	0.0	0.0	71.4	0.0	0.0	66.9	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.0	2.5	0.0	0.0	7.8	4.6	4.8	42.8	1.6	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.0	0.0	5.7	0.0	0.0	1.2	1.7	1.8	4.6	0.6	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.7	0.0	0.0	65.5	0.0	0.0	79.3	4.6	4.8	109.8	1.6	1.6
LnGrp LOS	E	A	A	E	A	A	E	A	A	F	A	A
Approach Vol, veh/h		111			146			2177			1751	
Approach Delay, s/veh		62.7			65.5			5.7			7.3	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.0	114.6		25.4	8.2	119.5		25.4				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	9.0	99.0		32.0	6.0	102.0		32.0				
Max Q Clear Time (g_c+I1), s	9.7	2.0		13.1	4.3	2.0		16.9				
Green Ext Time (p_c), s	0.0	44.4		0.5	0.0	21.5		0.7				

Intersection Summary												
HCM 6th Ctrl Delay			10.0									
HCM 6th LOS			A									

Intersection	
Int Delay, s/veh	7.2

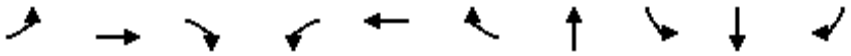
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	24	72	0	15	0	38	4	0	0	3	40
Future Vol, veh/h	25	24	72	0	15	0	38	4	0	0	3	40
Conflicting Peds, #/hr	4	0	3	3	0	4	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	0	0	2	0	0	0	14	0	0	0	0	0
Mvmt Flow	26	24	73	0	15	0	39	4	0	0	3	41

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	118	106	27	157	126	8	44	0	0	4	0	0
Stage 1	24	24	-	82	82	-	-	-	-	-	-	-
Stage 2	94	82	-	75	44	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.22	7.1	6.5	6.2	4.24	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.318	3.5	4	3.3	2.326	-	-	2.2	-	-
Pot Cap-1 Maneuver	863	788	1048	814	768	1080	1491	-	-	1631	-	-
Stage 1	999	879	-	931	831	-	-	-	-	-	-	-
Stage 2	918	831	-	939	862	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	829	768	1045	722	748	1076	1491	-	-	1631	-	-
Mov Cap-2 Maneuver	829	768	-	722	748	-	-	-	-	-	-	-
Stage 1	973	879	-	907	809	-	-	-	-	-	-	-
Stage 2	874	809	-	846	862	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.5	9.9	6.8	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1491	-	-	929	748	1631	-	-
HCM Lane V/C Ratio	0.026	-	-	0.133	0.02	-	-	-
HCM Control Delay (s)	7.5	0	-	9.5	9.9	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.1	0	-	-

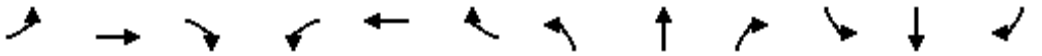
4: Beaton Way/Whitman Street & Tennyson Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	474	884	44	15	800	161	45	97	8	276
v/c Ratio	0.75	0.33	0.04	0.11	0.63	0.29	0.19	0.46	0.03	0.35
Control Delay	34.5	5.3	1.6	38.8	22.6	9.2	29.5	39.8	30.9	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.5	5.3	1.6	38.8	22.6	9.2	29.5	39.8	30.9	11.0
Queue Length 50th (ft)	197	58	0	7	161	19	16	43	3	55
Queue Length 95th (ft)	#464	171	10	28	240	62	50	100	16	129
Internal Link Dist (ft)		459			1481		548		469	
Turn Bay Length (ft)	175		100	90		100		100		110
Base Capacity (vph)	633	2691	1133	550	2234	915	607	567	713	781
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.33	0.04	0.03	0.36	0.18	0.07	0.17	0.01	0.35

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	455	849	42	14	768	155	29	8	7	93	8	265
Future Volume (veh/h)	455	849	42	14	768	155	29	8	7	93	8	265
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.90	0.98		0.97	0.97		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1870	1826	1678	1870	1900	1900	1900	1900	1885	1722	1885
Adj Flow Rate, veh/h	474	884	44	15	800	161	30	8	7	97	8	276
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	5	15	2	0	0	0	0	1	12	1
Cap, veh/h	505	2266	915	33	1349	549	214	56	37	347	322	736
Arrive On Green	0.28	0.64	0.64	0.02	0.38	0.38	0.19	0.19	0.19	0.19	0.19	0.19
Sat Flow, veh/h	1810	3554	1435	1598	3554	1447	778	302	199	1370	1722	1549
Grp Volume(v), veh/h	474	884	44	15	800	161	45	0	0	97	8	276
Grp Sat Flow(s),veh/h/ln	1810	1777	1435	1598	1777	1447	1279	0	0	1370	1722	1549
Q Serve(g_s), s	22.5	10.6	1.0	0.8	15.9	6.8	1.2	0.0	0.0	2.6	0.3	10.2
Cycle Q Clear(g_c), s	22.5	10.6	1.0	0.8	15.9	6.8	2.2	0.0	0.0	4.8	0.3	10.2
Prop In Lane	1.00		1.00	1.00		1.00	0.67		0.16	1.00		1.00
Lane Grp Cap(c), veh/h	505	2266	915	33	1349	549	307	0	0	347	322	736
V/C Ratio(X)	0.94	0.39	0.05	0.45	0.59	0.29	0.15	0.00	0.00	0.28	0.02	0.38
Avail Cap(c_a), veh/h	513	2266	915	453	1815	739	498	0	0	557	586	973
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.0	7.7	6.0	42.6	21.9	19.1	29.9	0.0	0.0	31.0	29.3	15.3
Incr Delay (d2), s/veh	24.7	0.4	0.1	3.5	1.5	1.1	0.1	0.0	0.0	0.2	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.8	3.5	0.3	0.4	6.8	2.4	0.8	0.0	0.0	1.8	0.1	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.7	8.1	6.0	46.1	23.4	20.2	30.0	0.0	0.0	31.1	29.3	15.4
LnGrp LOS	E	A	A	D	C	C	C	A	A	C	C	B
Approach Vol, veh/h		1402			976			45			381	
Approach Delay, s/veh		24.1			23.2			30.0			19.7	
Approach LOS		C			C			C			B	

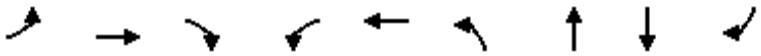
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.8	61.2		21.1	28.6	38.4		21.1				
Change Period (Y+Rc), s	4.0	5.0		4.6	4.0	5.0		4.6				
Max Green Setting (Gmax), s	25.0	45.0		30.0	25.0	45.0		30.0				
Max Q Clear Time (g_c+I1), s	2.8	12.6		12.2	24.5	17.9		4.2				
Green Ext Time (p_c), s	0.0	16.7		0.7	0.1	15.6		0.1				

Intersection Summary			
HCM 6th Ctrl Delay		23.3	
HCM 6th LOS		C	

Notes

User approved pedestrian interval to be less than phase max green.

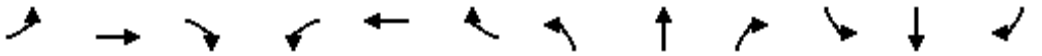
5: Dixon Street/E 12th Street & Tennyson Road



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	109	608	239	83	647	279	157	21	75
v/c Ratio	0.35	0.49	0.40	0.30	0.55	0.64	0.36	0.09	0.18
Control Delay	32.0	20.3	10.1	32.4	21.8	37.6	23.1	33.1	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.0	20.3	10.1	32.4	21.8	37.6	23.1	33.1	4.2
Queue Length 50th (ft)	34	87	20	26	96	87	30	6	0
Queue Length 95th (ft)	105	192	92	86	212	#320	118	33	18
Internal Link Dist (ft)		1481			525		495	553	
Turn Bay Length (ft)	125		80	130		100			100
Base Capacity (vph)	711	2580	1091	704	2577	434	438	352	766
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.24	0.22	0.12	0.25	0.64	0.36	0.06	0.10

Intersection Summary

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



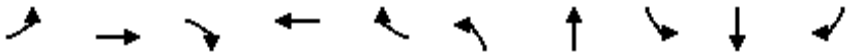
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	104	578	227	79	609	6	265	62	87	4	16	71
Future Volume (veh/h)	104	578	227	79	609	6	265	62	87	4	16	71
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.97	1.00		0.92	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1885	1841	1796	1885	1885	1841	1870	1870	1900	1900	1841
Adj Flow Rate, veh/h	109	608	239	83	641	6	279	65	92	4	17	75
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	6	1	4	7	1	1	4	2	2	0	0	4
Cap, veh/h	147	1285	533	114	1238	12	333	126	178	49	208	334
Arrive On Green	0.09	0.36	0.36	0.07	0.34	0.34	0.19	0.19	0.19	0.14	0.14	0.14
Sat Flow, veh/h	1725	3582	1486	1711	3635	34	1753	663	938	358	1524	1478
Grp Volume(v), veh/h	109	608	239	83	316	331	279	0	157	21	0	75
Grp Sat Flow(s),veh/h/ln	1725	1791	1486	1711	1791	1878	1753	0	1600	1882	0	1478
Q Serve(g_s), s	4.5	9.6	9.0	3.5	10.4	10.4	11.2	0.0	6.5	0.7	0.0	3.1
Cycle Q Clear(g_c), s	4.5	9.6	9.0	3.5	10.4	10.4	11.2	0.0	6.5	0.7	0.0	3.1
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.59	0.19		1.00
Lane Grp Cap(c), veh/h	147	1285	533	114	610	639	333	0	304	257	0	334
V/C Ratio(X)	0.74	0.47	0.45	0.73	0.52	0.52	0.84	0.00	0.52	0.08	0.00	0.22
Avail Cap(c_a), veh/h	588	2198	912	583	1099	1153	359	0	327	385	0	435
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	32.8	18.2	18.0	33.6	19.4	19.4	28.6	0.0	26.7	27.7	0.0	23.4
Incr Delay (d2), s/veh	11.9	1.0	2.1	14.0	2.5	2.4	15.1	0.0	1.4	0.1	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	4.0	3.3	1.9	4.5	4.8	6.0	0.0	2.5	0.3	0.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.6	19.1	20.1	47.5	21.8	21.7	43.8	0.0	28.0	27.8	0.0	23.7
LnGrp LOS	D	B	C	D	C	C	D	A	C	C	A	C
Approach Vol, veh/h		956			730			436			96	
Approach Delay, s/veh		22.3			24.7			38.1			24.6	
Approach LOS		C			C			D			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.9	31.3		14.6	10.2	30.0		18.5				
Change Period (Y+Rc), s	4.0	5.0		4.6	4.0	5.0		4.6				
Max Green Setting (Gmax), s	25.0	45.0		15.0	25.0	45.0		15.0				
Max Q Clear Time (g_c+I1), s	5.5	11.6		5.1	6.5	12.4		13.2				
Green Ext Time (p_c), s	0.3	14.7		0.2	0.5	11.4		0.4				

Intersection Summary			
HCM 6th Ctrl Delay		26.3	
HCM 6th LOS		C	

Notes

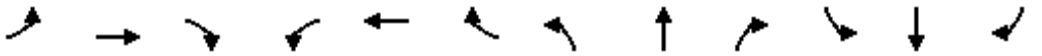
User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	371	8	253	46	18	388	1751	42	1233	342
v/c Ratio	0.68	0.03	0.55	0.29	0.08	0.80	0.56	0.45	0.48	0.37
Control Delay	67.1	50.8	10.5	66.3	0.6	84.3	19.6	76.7	31.9	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Delay	67.1	50.8	10.5	66.3	0.6	84.3	19.7	76.7	31.9	15.0
Queue Length 50th (ft)	184	7	0	45	0	211	289	41	261	58
Queue Length 95th (ft)	223	23	77	75	0	259	575	m72	417	181
Internal Link Dist (ft)		525		1123			1386		1040	
Turn Bay Length (ft)	335		225		315	520		230		210
Base Capacity (vph)	747	409	534	388	424	541	3144	93	2593	916
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	200	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.02	0.47	0.12	0.04	0.72	0.59	0.45	0.48	0.37

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	364	8	248	19	26	18	380	1709	7	41	1208	335
Future Volume (veh/h)	364	8	248	19	26	18	380	1709	7	41	1208	335
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.96	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1900	1870	1811	1811	1900	1870	1885	1885	1900	1870	1885
Adj Flow Rate, veh/h	371	8	253	19	27	18	388	1744	7	42	1233	342
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	0	2	6	6	0	2	1	1	0	2	1
Cap, veh/h	646	353	290	48	68	102	441	3168	13	59	2572	791
Arrive On Green	0.19	0.19	0.19	0.07	0.07	0.07	0.13	0.60	0.60	0.07	1.00	1.00
Sat Flow, veh/h	3483	1900	1565	733	1042	1551	3456	5290	21	1810	5106	1571
Grp Volume(v), veh/h	371	8	253	46	0	18	388	1131	620	42	1233	342
Grp Sat Flow(s),veh/h/ln	1742	1900	1565	1774	0	1551	1728	1716	1881	1810	1702	1571
Q Serve(g_s), s	14.9	0.5	24.0	3.8	0.0	1.7	16.9	30.2	30.2	3.5	0.0	0.0
Cycle Q Clear(g_c), s	14.9	0.5	24.0	3.8	0.0	1.7	16.9	30.2	30.2	3.5	0.0	0.0
Prop In Lane	1.00		1.00	0.41		1.00	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	646	353	290	116	0	102	441	2054	1126	59	2572	791
V/C Ratio(X)	0.57	0.02	0.87	0.40	0.00	0.18	0.88	0.55	0.55	0.71	0.48	0.43
Avail Cap(c_a), veh/h	751	410	337	383	0	335	542	2054	1126	71	2572	791
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	0.86	0.86	0.86	1.00	0.00	1.00	0.71	0.71	0.71	0.75	0.75	0.75
Uniform Delay (d), s/veh	56.8	51.0	60.5	68.6	0.0	67.6	65.6	18.4	18.4	70.8	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.0	17.0	2.2	0.0	0.8	9.9	0.8	1.4	17.8	0.5	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	0.3	11.0	1.8	0.0	0.7	8.0	11.8	13.1	1.9	0.1	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.5	51.0	77.5	70.8	0.0	68.4	75.5	19.1	19.8	88.6	0.5	1.3
LnGrp LOS	E	D	E	E	A	E	E	B	B	F	A	A
Approach Vol, veh/h		632			64			2139			1617	
Approach Delay, s/veh		65.4			70.1			29.5			2.9	
Approach LOS		E			E			C			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	23.5	82.1		14.0	9.0	96.6		33.4				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	24.0	45.0		33.0	6.0	63.0		33.0				
Max Q Clear Time (g_c+I1), s	18.9	2.0		5.8	5.5	32.2		26.0				
Green Ext Time (p_c), s	0.7	13.8		0.3	0.0	15.1		1.5				

Intersection Summary												
HCM 6th Ctrl Delay			25.6									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	19	36	36	0	0	35
Future Vol, veh/h	19	36	36	0	0	35
Conflicting Peds, #/hr	2	0	0	2	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	0	3	9	0	0	0
Mvmt Flow	23	44	44	0	0	43

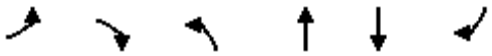
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	46	0	-	0	136	46
Stage 1	-	-	-	-	46	-
Stage 2	-	-	-	-	90	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1575	-	-	-	862	1029
Stage 1	-	-	-	-	982	-
Stage 2	-	-	-	-	939	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1572	-	-	-	846	1027
Mov Cap-2 Maneuver	-	-	-	-	846	-
Stage 1	-	-	-	-	965	-
Stage 2	-	-	-	-	937	-

Approach	EB	WB	SB
HCM Control Delay, s	2.5	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1572	-	-	-	1027
HCM Lane V/C Ratio	0.015	-	-	-	0.042
HCM Control Delay (s)	7.3	0	-	-	8.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	59	43	2141	1539
v/c Ratio	0.48	0.43	0.66	0.52
Control Delay	45.7	82.2	3.5	7.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	45.7	82.2	3.5	7.4
Queue Length 50th (ft)	23	42	208	163
Queue Length 95th (ft)	71	85	337	254
Internal Link Dist (ft)	364		816	1386
Turn Bay Length (ft)		225		
Base Capacity (vph)	347	113	3243	2983
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.17	0.38	0.66	0.52

Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	22	35	41	2055	1437	40
Future Volume (veh/h)	22	35	41	2055	1437	40
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.97	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1885	1885	1885
Adj Flow Rate, veh/h	23	36	43	2141	1497	42
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	1	1	1
Cap, veh/h	40	62	738	3146	1557	44
Arrive On Green	0.06	0.06	0.41	0.88	0.88	0.88
Sat Flow, veh/h	634	993	1810	3676	3650	100
Grp Volume(v), veh/h	60	0	43	2141	753	786
Grp Sat Flow(s),veh/h/ln	1655	0	1810	1791	1791	1864
Q Serve(g_s), s	5.4	0.0	2.2	27.7	50.1	51.3
Cycle Q Clear(g_c), s	5.4	0.0	2.2	27.7	50.1	51.3
Prop In Lane	0.38	0.60	1.00			0.05
Lane Grp Cap(c), veh/h	104	0	738	3146	784	816
V/C Ratio(X)	0.58	0.00	0.06	0.68	0.96	0.96
Avail Cap(c_a), veh/h	314	0	738	3146	1194	1243
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.87	0.87
Uniform Delay (d), s/veh	69.7	0.0	27.5	2.8	8.5	8.5
Incr Delay (d2), s/veh	5.0	0.0	0.0	1.2	21.7	21.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	1.0	5.4	8.5	8.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	74.7	0.0	27.5	4.0	30.2	30.3
LnGrp LOS	E	A	C	A	C	C
Approach Vol, veh/h	60			2184	1539	
Approach Delay, s/veh	74.7			4.5	30.2	
Approach LOS	E			A	C	

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	66.5	72.8				139.4	13.6
Change Period (Y+Rc), s	5.0	* 5				5.0	4.0
Max Green Setting (Gmax), s	9.0	* 1E2				115.0	29.0
Max Q Clear Time (g_c+I1), s	4.2	53.3				29.7	7.4
Green Ext Time (p_c), s	0.0	15.4				39.5	0.1

Intersection Summary	
HCM 6th Ctrl Delay	16.1
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

KITTELSON & ASSOCIATES, INC.
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Project #: 24641
Project Name: Hayward Parcel 3 Entitlements
Analyst: MZS
Date: 5/19/2021
File: H:\24\24641 - Hayward Parcel 3 Entitlements\analysis\LTA\Signal Warrants\Existing PP\[ExistingPP_intersection_3_AM.xlsm]War #3 - Peak
Intersection: 3. East 16th Street & Hancock Street
Scenario: Existing Plus Project PM

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	NB	SB	EB	WB
4:45 PM	5:45 PM	42	43	121	15
2nd Highest Hour		40	41	115	14
3rd Highest Hour		39	40	113	14
4th Highest Hour		38	38	108	13
5th Highest Hour		37	38	106	13
6th Highest Hour		37	38	106	13
7th Highest Hour		35	36	102	13
8th Highest Hour		35	36	100	12
9th Highest Hour		34	34	97	12
10th Highest Hour		31	32	90	11
11th Highest Hour		30	31	87	11
12th Highest Hour		30	30	86	11
13th Highest Hour		29	29	82	10
14th Highest Hour		25	25	71	9
15th Highest Hour		20	20	56	7
16th Highest Hour		18	19	53	7
17th Highest Hour		13	13	37	5
18th Highest Hour		11	11	31	4
19th Highest Hour		6	6	16	2
20th Highest Hour		4	4	11	1
21st Highest Hour		3	3	10	1
22nd Highest Hour		2	2	6	1
23rd Highest Hour		1	1	3	0
24th Highest Hour		1	1	3	0

Warrant Summary

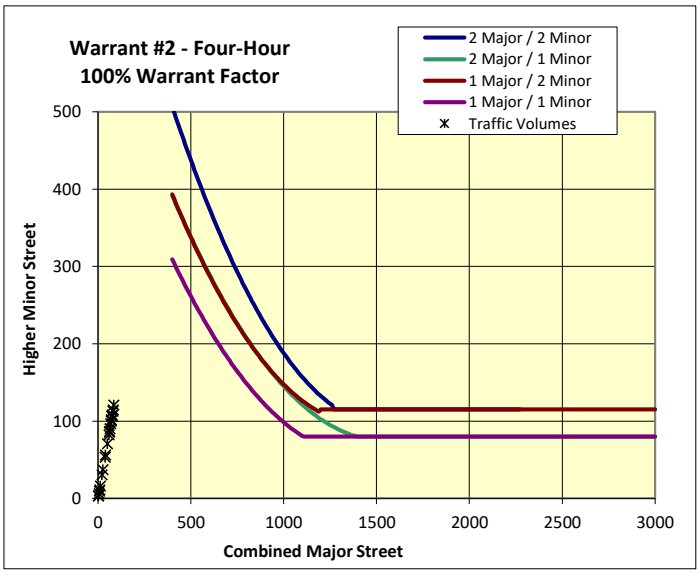
Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	No
#2	Four-Hour Vehicular volume	Yes	No
#3	Peak Hour	Yes	No
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

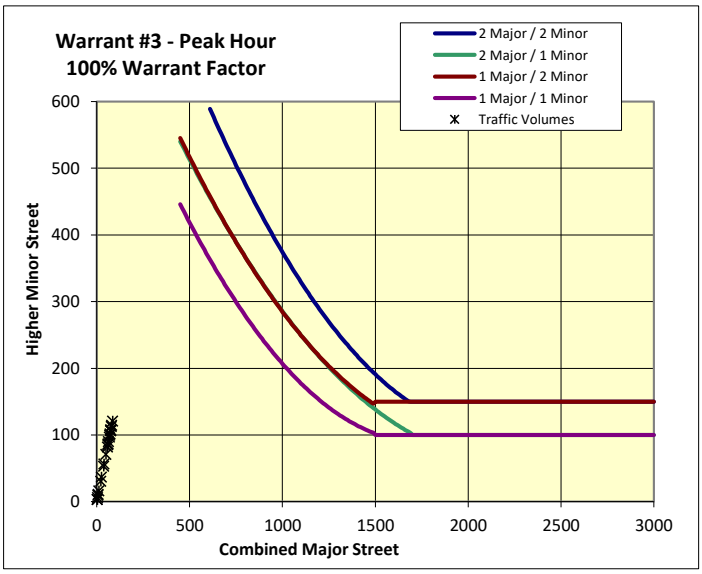
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	1
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	89%
Minor Street: 8th-Highest Hour / Peak Hour	83%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	500	150	0	No	**No**
	B	750	75	0	No	
80%	A	400	120	0	No	**No**
	B	600	60	0	No	
70%	A	350	105	0	No	**No**
	B	525	53	0	No	
56%	A	280	84	0	No	**No**
	B	420	42	0	No	





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Portland, Oregon 97205
(503) 228-5230

Project #: 24641
Project Name: Hayward Parcel 3 Entitlements
Analyst: MZS
Date: 5/19/2021
File: H:\24\24641 - Hayward Parcel 3 Entitlements\analysis\LTA\Signal Warrants\Existing PP\[ExistingPP intersection 3 AM.xlsm]War #3 - Peak
Intersection: 7. Site Access Road & Tennyson Road
Scenario: Existing Plus Project PM

Analysis Traffic Volumes

Hour Begin	Hour End	Major Street EB	Major Street WB	Minor Street NB	Minor Street SB
4:15 PM	5:15 PM	55	36	0	35
2nd Highest Hour		52	34	0	33
3rd Highest Hour		51	34	0	33
4th Highest Hour		49	32	0	31
5th Highest Hour		48	32	0	31
6th Highest Hour		48	32	0	31
7th Highest Hour		46	30	0	29
8th Highest Hour		45	30	0	29
9th Highest Hour		44	29	0	28
10th Highest Hour		41	27	0	26
11th Highest Hour		40	26	0	25
12th Highest Hour		39	25	0	25
13th Highest Hour		37	24	0	24
14th Highest Hour		32	21	0	21
15th Highest Hour		26	17	0	16
16th Highest Hour		24	16	0	15
17th Highest Hour		17	11	0	11
18th Highest Hour		14	9	0	9
19th Highest Hour		7	5	0	5
20th Highest Hour		5	3	0	3
21st Highest Hour		4	3	0	3
22nd Highest Hour		3	2	0	2
23rd Highest Hour		1	1	0	1
24th Highest Hour		1	1	0	1

Warrant Summary

Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	No
#2	Four-Hour Vehicular volume	Yes	No
#3	Peak Hour	Yes	No
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	1
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	89%
Major Street: 8th-Highest Hour / Peak Hour	83%
Minor Street: 4th-Highest Hour / Peak Hour	89%
Minor Street: 8th-Highest Hour / Peak Hour	83%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	500	150	0	No	**No**
	B	750	75	0	No	
80%	A	400	120	0	No	**No**
	B	600	60	0	No	
70%	A	350	105	0	No	**No**
	B	525	53	0	No	
56%	A	280	84	0	No	**No**
	B	420	42	0	No