Appendix E
Transportation Impact Analysis

ESA

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November 20, 2020

Final

Transportation Impact Analysis Report

Bayview Estates

Prepared for:
Contra Costa County
Environmental Science Associates (ESA)

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Executive Summary

This report presents the results of the Transportation Impact Analysis (TIA) conducted for the proposed Bayview Estates development (project). The project is in the Vine Hill area of unincorporated Contra Costa County, California east of the I-680/Arthur Road interchange. The undeveloped project site is zoned for Heavy Industrial under the existing Contra Costa County General Plan. The project proposes to amend the General Plan to reflect a Single Family Residential (High Density) land use on the project site. The site would be developed with 144 single-family dwelling units and a private park. The analysis contained in this report updates a previous TIA documented in an Administrative Draft EIR (ADEIR) for the project that was completed in 2018; updates to the analysis were required to update baseline analysis information and to bring the analysis into conformity with the latest CEQA Guidelines and Senate Bill 743.

The trip generation analysis completed for the 2018 ADEIR appears to be consistent with the latest version of the *Trip Generation Manual, 10th Edition*. At buildout, the project is anticipated to add 1,360 daily vehicle trip ends (680 inbound and outbound daily vehicle trips) to the roadway network. The proposed project is expected to generate approximately 107 trips during the AM peak hour and 143 trips during the PM peak hour.

Given that the project is expected to generate more than 100 peak hour trips, the *Contra Costa County Transportation Analysis Guidelines* indicate that the project should assess its effects on congestion at intersections with over 50 peak hour trips. The signalized intersection of Pacheco Boulevard/Arthur Road was chosen based on the County guidelines and consultation with County staff.

Project effects on intersection operations at the Pacheco Boulevard/Arthur Road study intersection was evaluated in a manner consistent with the Contra Costa Transportation Authority's (CCTA) technical guidelines. Intersection operations were evaluated under the following study scenarios:

- Existing (without Project) Conditions
- Existing with Project Conditions
- Cumulative (Year 2040) without Project Conditions
- Cumulative (Year 2040) with Project Conditions

Project Effect on Vehicle-Miles of Travel (VMT) – CEQA Analysis

The proposed project would result in the generation of about 8,164 total VMT per weekday. Because the project is located on vacant land, the project's effect on VMT would be similar to its VMT generated.

The State Office of Planning and Research's (OPR) interpretation of CEQA Guidelines §15064.3 suggests that VMT analysis in the Transportation section of a CEQA document should be focused on automobiles and light duty truck trips; for residential uses, most automobile and light duty truck trips are commute trips.

Data from the CCTA travel demand model indicates that the Contra Costa County average home-based VMT per resident per weekday is about 19.4. Using the OPR's advisory CEQA threshold of 15 percent below the Countywide average, the threshold used in the analysis is 16.5 VMT per resident per weekday. The project generates about 20.6 VMT per resident per day, or 4.1 VMT above the threshold. The project would need a 20 percent reduction in home-based VMT in the near-term to result in a less-than-significant impact.

Impact TRANS-1 Project VMT: Total Home-Based VMT per resident generated by the project would be greater than 15 percent below the regional VMT for similar uses in Contra Costa County, resulting in a significant impact for the project. (*Significant and Unavoidable*)

Mitigation TRANS-1: Transportation and Parking Demand Management (TDM) Plan.

Mitigation Measure Effectiveness

Transportation Demand Management (TDM) strategies work best when they are applied at a city or regional scale and when the travel characteristics of the users or tenants of a site are known. The effectiveness of TDM measures for land use projects in unincorporated areas of Contra Costa County is difficult to quantify as the literature documenting the effectiveness of land use project-level TDM strategies are generally related to suburban and urban areas, not unincorporated areas. If the project site is ultimately considered to be part of a suburban setting, studies[1] show the maximum VMT reduction associated with the implementation of TDM strategies that can be expected for this project is 10 percent. Even this reduction is likely difficult to achieve given the greenfield nature of the project and its proximate location to available transit services. The requirement to reduce daily VMT by 20 percent in the near-term exceeds the expected level of VMT reduction supported by the research. However, while the level of VMT reduction associated with TDM measures are unlikely to mitigate the project's impact to a less-than-significant level, CEQA requires that feasible mitigation measures be implemented to reduce a project level of impact.

Significance after Mitigation: Significant and unavoidable.

The project is anticipated to require a General Plan amendment to change the current Heavy Industrial zone to Single Family Residential (High Density) zone, indicating that the project may not be consistent with the current General Plan. Therefore, a Cumulative scenario VMT analysis was required. The project would result in a net increase of 2,731 VMT Countywide versus current General Plan zoning conditions, thus resulting in a significant impact.

[1] *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures*, California Air Pollution Control Officers Association, August, 2010, page 55.

Impact TRANS-1.CU Cumulative VMT: The project with a General Plan amendment would increase the Countywide VMT, resulting in a significant impact for the project. (*Significant and Unavoidable*)

> **Mitigation Measure TRANS-1: Transportation and Parking Demand Management (TDM) Plan.** (See Impact Trans-1)

Significance after Mitigation: Significant and unavoidable.

Vehicle System CEQA Impacts

Vehicular site access is proposed on Central Avenue and Palms Drive. Palms Drive has poor pavement conditions and Central Avenue between Darcie Way and the project site is unpaved.

Impact TRANS-2a: The poor pavement conditions and narrow travel-way widths on Palms Drive and the private ownership and unpaved condition on Central Avenue represent obstacles (or hazards) for project vehicle traffic using Palms Drive and Central Avenue, resulting in a significant impact for the project. (*Less-than-significant with mitigation*)

> **Mitigation TRANS-2a: In accordance with County requirements and design standards, provide even surface pavement, appropriate signage, delineation, and other features on Palms Drive and Central Avenue to improve vehicle transportation conditions and eliminate obstacles (or hazards).**
>
> **Mitigation Measure Effectiveness**
>
> Implementing the County requirements and design standards would ensure that the street(s) used by the project's traffic are in good condition, provide width to accommodate concurrent two-way traffic flow, and provide appropriate signing, marking, and other features to facilitate the safe movement of vehicles. This would be less than significant related to obstacles.
>
> **Significance after Mitigation:** Less than significant.

The proposed on-site streets generally meet the private road standards required in the County Ordinance Code.

Impact TRANS-2b: The project would not have adverse impacts to the project site's vehicle system. (*Less-than-significant*)

> **Mitigation:** None required.

Transit System CEQA Impacts

Fixed-route bus service operates west of the project site with stops located beyond the typical transit access walking distance of about one-half mile from the proposed development. It is unlikely that the project would generate new demand for the transit services and facilities that serve the area because of the substantial walking distance between the project and the nearest transit stops. The project is not expected to conflict with existing or planned transit facilities.

Impact TRANS-3: The project would not have adverse impacts to the transit system. (*Less-than-significant*)

Mitigation: None required.

Pedestrian and Bicycle Systems CEQA Impacts

The project would increase pedestrian and bike activity along Arthur Road, Palms Drive, and Central Avenue as well as within the project site. Arthur Road currently provides sidewalks and has a planned Class III bike facility. However, Palms Drive and the privately owned portion of Central Avenue currently do not provide pedestrian or bicycle facilities. Central Avenue generally provides sidewalks on one side of the street but there are sidewalk gaps between Arthur Road and the project site, and these gaps pose hazards to pedestrians. The current maintenance state of Palms Drive and Central Avenue is poor: Palms Drive has poor pavement conditions as well as a narrow travel-way that may restrict concurrent two-way vehicle movements, and Central Avenue at the project frontage is not paved; these conditions pose hazards to bicycle riders. Off-site improvements at Palms Drive and Central Avenue are needed to create a better-connected circulation system without hazards for pedestrian and bicycle riders.

The right-of-way within the project site is 50 feet when housing fronts both sides and 44 feet when housing fronts one side of the right-of-way. This width accommodates County requirements for private street standards; 52 feet would be required to meet public street standards. It is unclear whether the project's streets would provide sidewalks on both sides of the street. If sidewalks are not provided on both sides of the street pedestrians would be required to share the street with vehicle traffic.

The project design would not eliminate pedestrian facilities that connect to the area circulation system and would not conflict with existing or planned pedestrian and bicycle facilities, but would increase pedestrian and bicycle activity and the increased activity would be incompatible with the existing transportation infrastructure by exposing users to hazards.

Impact TRANS-4: The project would increase pedestrian and bicycle activity and the increased activity would be incompatible with the existing transportation infrastructure for pedestrian and bicycle use by exposing users to hazards, resulting in a significant impact for the project. (*Less-than-significant with mitigation*)

Mitigation TRANS-4: In accordance with County requirements and design standards provide:

- **Continuous sidewalks on at least one side of Palms Drive and Central Avenue to connect the project site to the existing pedestrian facilities on Arthur Road to improve pedestrian transportation conditions.**

- **Even surface pavement, appropriate signage, delineation, and other features on Palms Drive and Central Avenue to improve bicycle transportation conditions.**
- **Sidewalks for all streets within the project site including facilities on both sides of each street and curb ramps at each street intersection.**

Mitigation Measure Effectiveness

Implementing the County requirements and design standards would ensure that the street(s) used by the project's pedestrians and bicyclists are in good condition, provide space to accommodate walking and biking, and provide appropriate signing, marking, and other features to facilitate the safe movement of pedestrians and bicyclists. This would be less than significant related to hazards.

Significance after Mitigation: Less than significant.

Emergency Access CEQA Impacts

Emergency vehicles would access the site on Palms Drive and Central Avenue. However, the current maintenance condition of Palms Drive would present obstacles (roadway width and uneven surface) to access and maneuverability of emergency vehicles. Under current conditions, the privately owned portion of Central Avenue at the project frontage would present similar obstacles to emergency vehicle access to the site. Emergency services would be required to access the project via Palms Drive and Central Avenue and the increased activity would be incompatible with the existing transportation infrastructure by exposing emergency service vehicles to hazards.

Impact TRANS-5a: Emergency access to the project site would be through existing streets that would be incompatible with the existing transportation infrastructure by exposing emergency vehicles to hazards, resulting in a significant impact for the project. (*Less-than-significant with mitigation*)

Mitigation TRANS-5a: In accordance with County requirements and design standards provide even surface pavement, appropriate signage, delineation, and other features on Palms Drive and Central Avenue to accommodate emergency vehicles.

Mitigation Measure Effectiveness

Implementing the County requirements and design standards would ensure that the street(s) used by emergency vehicles to access the project site are in good condition and include other features to facilitate the safe movement of emergency vehicles. This would be less than significant related to hazards.

Significance after Mitigation: Less than significant.

The proposed on-site roadway design would provide adequate emergency vehicle circulation, and planned right-of-way lane widths would accommodate truck turning movements.

Impact TRANS-5b: The project would not have adverse impacts to the project site's emergency vehicle system. (*Less-than-significant*)

Mitigation: None required.

Intersection Operations Recommendations (Non-CEQA)

The determination of whether the project would result in a substantial adverse effect to the study intersection operations was determined using criteria from Contra Costa County. **Table E-1** provides a summary of this analysis. The project results in a substantial adverse effect to intersection operations at Arthur Road/Pacheco Boulevard in the PM peak period under Cumulative with Project Conditions. The addition of project traffic is expected to add more than 5 seconds of average delay to an unacceptable intersection operations of LOS E.

Table E-1: Summary of Project Effect on Intersection Operations

Intersection	Intersection Operations Substantially Affected under Scenario?		
	Existing with Project	Cumulative with Project	Cumulative with Project with Improvements
1. Pacheco Boulevard/Arthur Road	No	Yes	No

Source: Fehr & Peers, August 2020.

Recommendation Intersection Operations 1: Modify the current north/south split phasing to protected left-turn phasing. The existing roadway is appropriately striped to accommodate the proposed protected left-turn phasing, but new signal heads and (potentially) controller equipment and signal poles would be required. After construction of the improvements, the project's effect would be a delay increase of less than 5 seconds. Thus, the improvements would alleviate the substantial effect on intersection operations. The project's contribution towards these improvements may be satisfied through the payment of the County's traffic impact fees.

Parking Recommendations (Non-CEQA)

The site plan does not provide the number of parking spaces. The Contra Costa County Zoning Code requires a minimum of two parking spaces per single-family dwelling unit. The Contra Costa County Transportation Analysis Guidelines require single-family residences with attached private garages to install one listed raceway to accommodate a dedicated electric vehicle charging outlet per dwelling unit. Bicycle parking spaces are not required for single-family residential uses but there will be demand for bicycle parking at the project's park which is expected to attract people walking and biking from within the project.

Recommendation Parking 1: Provide at least two parking spaces and dedicated electric vehicle charging outlet per dwelling unit in accordance with County requirements and design standards.

Recommendation Parking 2: Provide at least 25 feet between the back of sidewalk and the garage for each residence so vehicles in the driveway do not encroach onto the sidewalk.

Recommendation Parking 3: Provide on-street parking within the project site to accommodate visitor and overflow parking for the single-family residential uses.

Recommendation Parking 4: Provide storage at the park area for short-term bicycle parking and include appropriate amenities like lighting and benches.

1. Introduction

This report presents the results of the Transportation Impact Analysis (TIA) for the proposed Bayview Estates development (project) located in the Vine Hill area of unincorporated Contra Costa County, California. The currently undeveloped project site is located east of the I-680/Arthur Road interchange as shown on **Figure 1**. According to the Contra Costa General Plan, the project site is zoned for Heavy Industrial uses. The project proposes to amend the General Plan to reflect Single Family Residential (High Density) land use on the project site. The proposed project includes construction of 144 single-family dwelling units and a park in the eastern portion of the site. The park is proposed to be a private neighborhood park for passive activities such as walking, viewing, and picnicking. Sport courts, sports fields, or programmed event features would not be provided. The proposed site plan for the project is presented on **Figure 2**.

In June 2020, Contra Costa County adopted the *Contra Costa County Transportation Analysis Guidelines,* which provide guidance on the performance of CEQA transportation impact analysis and informational congestion-based analyses. The required analysis methods and relevant criteria to assess if CEQA VMT mitigations or intersection operations improvements would be required are summarized below.

1.1 CEQA Transportation Analysis Methods and Impact Criteria

CEQA impacts are identified based on the project's effect on VMT and its effects on the pedestrian, bicycle, and transit modes of travel. For land use projects, intersection operation impacts (as measured by Level of Service and similar congestion-based metrics) are specifically excluded from CEQA consideration per CEQA Guidelines §15064.3 and Senate Bill 743 (Steinberg, 2013). The detailed CEQA Transportation Section impact criteria are presented below.

1.1.1 CEQA Vehicle-Miles of Travel (VMT) Analysis

CEQA Guidelines §15064.3(a) notes that, for the purposes of §15064.3 and CEQA Transportation analysis, VMT "refers to the amount and distance of automobile travel attributable to a project." This statement has been interpreted by the State Office of Planning and Research (OPR) to mean automobile and light-duty truck travel (e.g., pickup trucks). The *Contra Costa County Transportation Analysis Guidelines* prescribe the following analysis parameters for the VMT analysis of residential projects in the unincorporated areas of Contra Costa County:

- Metric: Total weekday home-based VMT per resident
- Method: Contra Costa Transportation Authority (CCTA) countywide travel demand model
- Threshold: 15 percent below baseline County-wide average home-based VMT per resident

- Analysis Scenario: Impacts evaluated against the near-term and far-term baseline

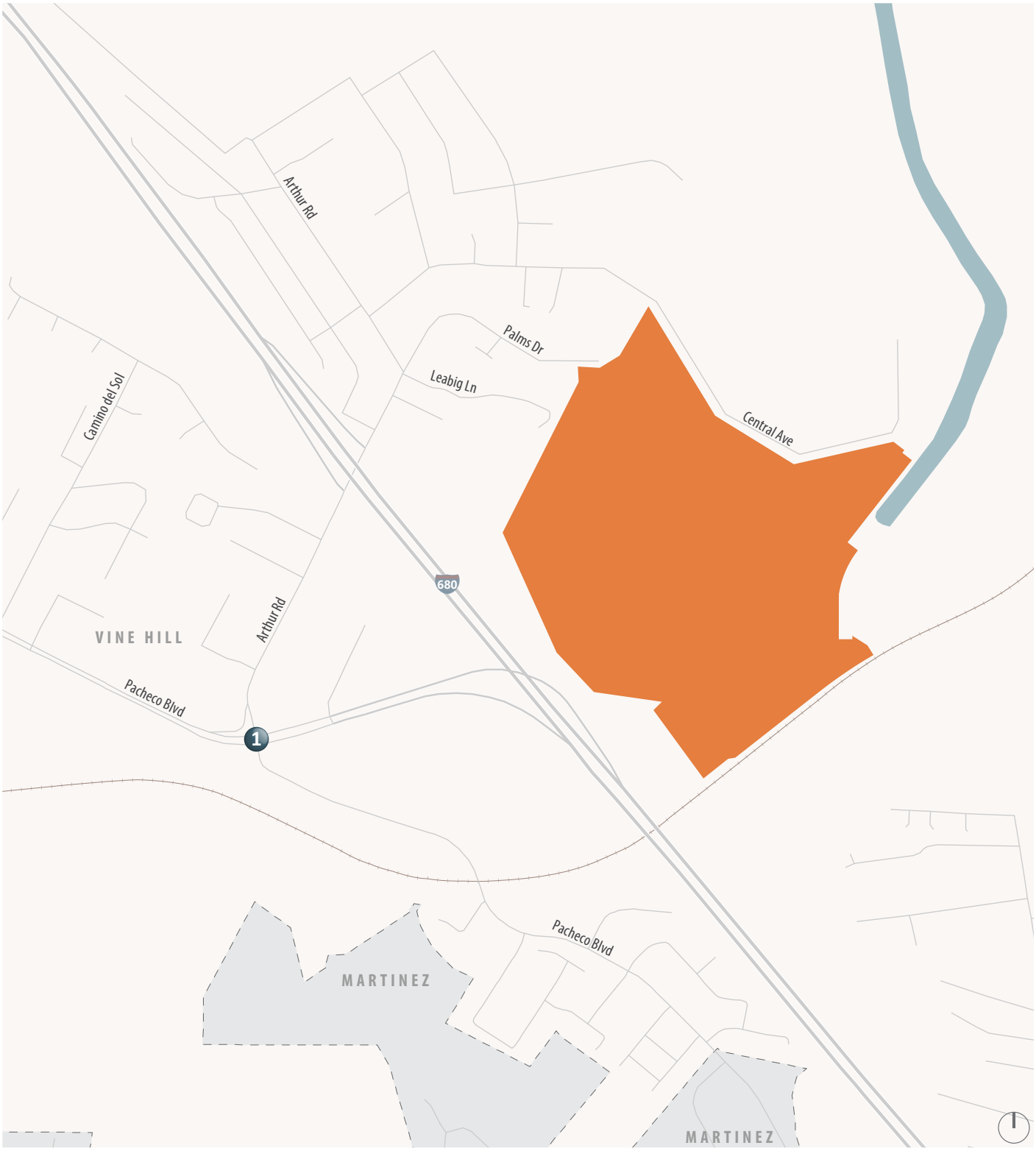
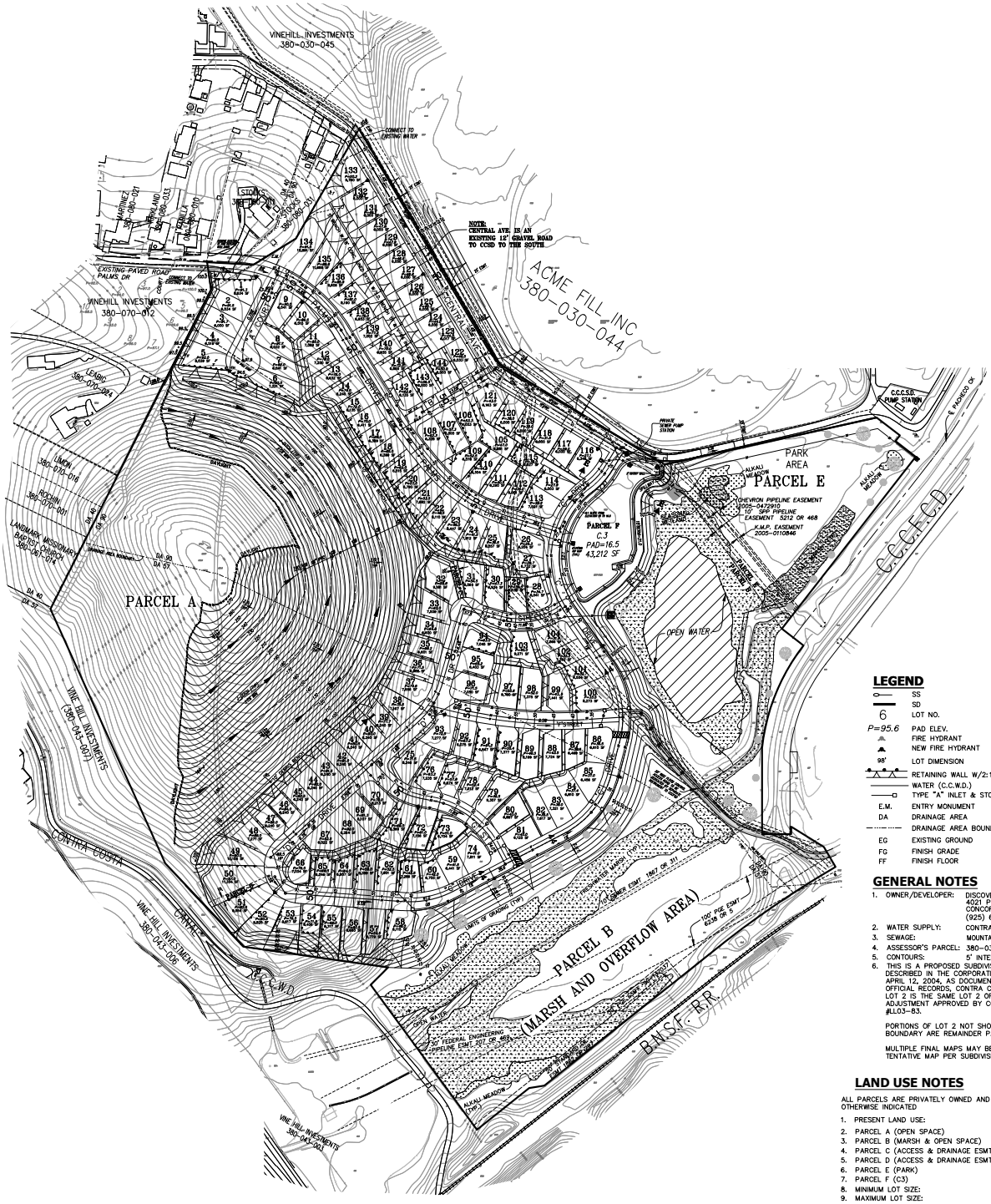


Figure 1

Project Location and Study Intersection

WC20-3738_1_ProjLoc



GENERAL NOTES

1. OWNER/DEVELOPER: DISCOVERY BUILDERS, INC.
   4021 PORT CHICAGO HWY
   CONCORD, CA 94520
   (925) 682-6419
2. WATER SUPPLY: CONTRA COSTA WATER DIST.
3. SEWAGE: MOUNTAIN VIEW SANITARY DIST.
4. ASSESSOR'S PARCEL: 380-030-046
5. CONTOURS: 5' INTERVALS
6. THIS IS A PROPOSED SUBDIVISION OF A PORTION OF LOT 2 DESCRIBED IN THE CORPORATION GRANT DEED RECORDED ON APRIL 12, 2004, AS DOCUMENT NO. 2004-0125819-00 OF OFFICIAL RECORDS, CONTRA COSTA COUNTY RECORDER. SAID LOT 2 IS THE SAME LOT 2 OF THAT CERTAIN LOT LINE ADJUSTMENT APPROVED BY CONTRA COSTA COUNTY FILE #LL03-83.

   PORTIONS OF LOT 2 NOT SHOWN WITHIN THE SUBDIVISION BOUNDARY ARE REMAINDER PARCELS.

   MULTIPLE FINAL MAPS MAY BE FILED UNDER THIS VESTING TENTATIVE MAP PER SUBDIVISION MAP ACT SECTION 66456.1

LAND USE NOTES

ALL PARCELS ARE PRIVATELY OWNED AND MAINTAINED UNLESS OTHERWISE INDICATED

1.	PRESENT LAND USE:	VACANT
2.	PARCEL A (OPEN SPACE)	20.07 ACRES
3.	PARCEL B (MARSH & OPEN SPACE)	19.85 ACRES
4.	PARCEL C (ACCESS & DRAINAGE ESMT)	3,222 S.F.
5.	PARCEL D (ACCESS & DRAINAGE ESMT)	2,546 S.F.
6.	PARCEL E (PARK)	4.53 ACRES
7.	PARCEL F (C3)	2.04 ACRES
8.	MINIMUM LOT SIZE:	6,000 S.F.
9.	MAXIMUM LOT SIZE:	15,891 S.F.
10.	TYPICAL LOT DIMENSIONS:	AS SHOWN
11.	TOTAL DEVELOPABLE ACREAGE:	31.79 ACRES (RESIDENTIAL=23.71 NET AC)
12.	TOTAL ACREAGE:	78.28 ACRES
13.	BUILDABLE AREA:	40%
14.	TOTAL NUMBER OF LOTS:	144
15.	GENERAL PLAN DESIGNATION:	HEAVY INDUSTRIAL (HI)
16.	EXISTING ZONING:	HEAVY INDUSTRIAL (H-I)
17.	PROPOSED GENERAL PLAN DESIGNATION:	SINGLE FAMILY RESIDENTIAL HIGH DENSITY (SH)
18.	PROPOSED ZONING:	PLANNED UNIT DISTRICT (P-1)
19.	DWELLING UNITS PER NET A.C.:	6.1 D.U./NET A.C.

Figure 2

Project Site Plan (Vesting Tentative Map)

As further described in **Section 2.4**, the Existing Conditions average home-based trip VMT per resident in Contra Costa County is 19.4. Therefore, the threshold for home-based trip VMT per resident is 16.5 for the Existing plus Project Conditions.

In addition to the Existing plus Project Conditions analysis, a Cumulative (Year 2040) analysis has been prepared to evaluate the project's consistency with the General Plan and associated VMT estimates. The threshold for a Cumulative plus Project Conditions VMT impact is if the project increases total VMT compared to the County General Plan (Envision 2040) assumptions.

1.1.2 Vehicle System

The project would create a significant impact related to the vehicle system if any of the following criteria are met:

- The project design would not provide or would eliminate vehicle facilities to connect to the area circulation system, or
- The project design would create hazardous conditions for vehicle drivers, or
- The project conflicts with existing or planned vehicle facilities.

1.1.3 Pedestrian System

The project would create a significant impact related to the pedestrian system if any of the following criteria are met:

- The project design would not provide or would eliminate pedestrian facilities to connect to the area circulation system, or
- The project design would create hazardous conditions for pedestrians, or
- The project conflicts with existing or planned pedestrian facilities.

1.1.4 Bicycle System

The project would create a significant impact related to the bicycle system if any of the following criteria are met:

- The project design would not provide or would eliminate bicycle facilities that connect to the area circulation system; or
- The project design would create hazardous conditions for bicyclists; or
- The project conflicts with existing or planned bicycle facilities.

1.1.5 Transit System

The project would create a significant impact related to transit service if either of the following criteria are met:

- The project generates a substantial increase in transit riders that cannot be adequately served by existing transit services; or,
- The project conflicts with existing or planned transit facilities.

1.1.6 Emergency Access

The project would create a significant impact related to emergency vehicle access if the following criterion is met:

- The project incorporates design features that limit or result in inadequate emergency vehicle access.

1.2 Informational (Non-CEQA) Intersection Operations and Parking

This section presents the study parameters of the informational intersection operations analysis prepared for the project. This intersection operations analysis is not for CEQA purposes, although the County retains the right to place conditions of approval on the project if the operations analysis finds that the project would result in new deficiencies with respect to adopted County General Plan goals or polices related to the efficient operations of the circulation system.

1.2.1 Analysis Scenarios

The informational intersection operations analysis was performed for the following scenarios:

Scenario 1: Existing (without Project) Conditions – Intersection turning movement volumes from the StreetLight Data turning movement count database, which were processed to reflect Year 2019 conditions[2].

Scenario 2: Existing with Project Conditions – Scenario 1 volumes plus traffic generated by the proposed project.

Scenario 3: Cumulative (Year 2040) without Project Conditions – Existing volumes plus traffic generated from regional growth anticipated to occur by Year 2040 based on Plan Bay Area projections per the CCTA travel demand model.

[2] StreetLight Data intersection turning movement volume estimates were used to assess Year 2019 conditions due to the effects of the COVID-19 pandemic in 2020. See **Section 2.5** for a more detailed description of the data and the process used to convert the StreetLight Data intersection turning movement volume estimates into peak hour intersection turning movement volumes.

Scenario 4: Cumulative (Year 2040) with Project Conditions – Scenario 3 volumes plus traffic generated by the proposed project.

1.2.2 Intersection Operations Analysis Study Area

The intersection operations analysis study area includes the area immediately adjacent to the project site, along with areas in the vicinity of the site where the project may affect operations of the transportation network. Project effects on the study area roadway facilities were determined by measuring the effect that the addition of project traffic would have on intersection operations during the morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak commute periods.

The *Contra Costa County Transportation Analysis Guidelines* generally requires the analysis of signalized or unsignalized intersections where the project would add 50 or more peak hour trips. Based on the *Guidelines*, the 2018 ADEIR included five study intersections:

- 2018 ADEIR study intersection 1: Pacheco Boulevard/Arthur Road (signalized)
- 2018 ADEIR study intersection 2: Arthur Road/I-680 Off-Ramp (unsignalized)
- 2018 ADEIR study intersection 3: Arthur Road/I-680 On-Ramp (unsignalized)
- 2018 ADEIR study intersection 4: Arthur Road/Leabig Lane & Palm Drive (unsignalized)
- 2018 ADEIR study intersection 5: Arthur Road/Central Avenue (unsignalized)

The 2018 ADEIR traffic analysis indicated that 2018 ADEIR study intersections 2-5 operated at LOS D or better under Cumulative with Project Conditions. Based on the *Guidelines*, the project would not be required to sponsor improvements at these four intersections because they operate acceptably after the addition of project trips. Detailed intersection LOS calculations from the 2018 ADEIR are provided in **Appendix A**.

Based on the 2018 ADEIR information and further consultation with County staff, it was determined that the updated intersection operations analysis would not need to study the four intersections previously identified as operating at LOS D or better under Cumulative with Project Conditions. Accordingly, the intersection operations analysis in this report includes the following study intersection (also shown on **Figure 1**):

1. Pacheco Boulevard/Arthur Road (signalized)

The intersection of Pacheco Boulevard/Arthur Road is under the joint jurisdiction of Contra Costa County and Caltrans.

1.2.3 Intersection Operations Analysis Methodology

The operations of roadway facilities are described with the term level of service ("LOS", a qualitative description of traffic flow based on such factors as speed, travel time, delay, and freedom to maneuver). Six levels are defined from LOS A, as the best operating conditions, to LOS F, or the worst operating conditions. LOS E represents "at-capacity" operations. When traffic volumes exceed intersection capacity, stop-and-go conditions result, and operations are designated as LOS F.

Signalized Intersections

Operations of signalized intersections were evaluated using the method from Transportation Research Board's *Highway Capacity Manual, 6th Edition,* which uses various intersection characteristics (such as traffic volumes, lane geometry, and signal phasing) to estimate the average control delay experienced by motorists traveling through an intersection. Control delay incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. **Table 1** summarizes the relationship between average delay per vehicle and LOS for signalized intersections. This method evaluates each intersection in isolation, and the effects of vehicle queue spillback are not considered in the analysis results.

Table 1: Signalized Intersection LOS Definitions

Level of Service	Description	Delay in Seconds
A	Progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	< 10.0
B	Progression is good, cycle lengths are short, or both. More vehicles stop than with LOS A, causing higher levels of average delay.	> 10.0 to 20.0
C	Higher congestion may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, though many still pass through the intersection without stopping.	> 20.0 to 35.0
D	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume to capacity (V/C) ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	> 35.0 to 55.0
E	This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	> 55.0 to 80.0
F	This level is considered unacceptable with oversaturation, which is when arrival flow rates exceed the capacity of the intersection. This level may also occur at high V/C ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to such delay levels.	> 80.0

Source: *Highway Capacity Manual*, 6th Edition.

1.2.4 Intersection Substantial Adverse Effect Criteria

The determination of whether the project results in a substantial adverse effect at a study location is based on applicable policies, regulations, goals, and guidelines defined by Contra Costa County. The detailed intersection operations substantial adverse effect criteria for this study are presented below.

Signalized Intersections

The project would result in a substantial adverse effect if one of the two following criteria are met:

- The addition of project traffic to an intersection results in the degradation of intersection operations from acceptable operations (LOS D or better) to unacceptable operations (LOS E or LOS F)
- The addition of project traffic to an intersection results in the exacerbation of unacceptable operations (LOS E or F) by increasing the average control delay at the intersection by more than 5.0 seconds.

1.2.5 Parking Substantial Adverse Effect Criteria

The determination of whether the project results in a substantial adverse effect on parking is based on applicable policies, regulations, goals, and guidelines defined by Contra Costa County.

2. Existing Conditions

This chapter describes the existing transportation conditions in the study area, including the roadway network and the transit, pedestrian, and bicycle facilities in the vicinity of the project site.

2.1 Roadway System

Regional access to the project site is provided by I-680 and Pacheco Boulevard. Local access to the site is provided by Arthur Road, Central Avenue, and Palms Drive.

2.1.1 Regional Roadways

Interstate 680 (I-680) is a major north-south freeway that connects Fairfield to San Jose via Concord, Walnut Creek, and Pleasanton. I-680 is located west of the project site. Project traffic would access I-680 to and from the north using the unsignalized ramp terminal intersections at Arthur Road. Project traffic would access I-680 to and from the south using the signalized intersection at Pacheco Boulevard/Arthur Road. Within the study area, I-680 has three general purpose travel lanes and one High-Occupancy Vehicle (HOV) lane in each direction for vehicles with two or more people during the morning and evening commute hours[3]. The speed limit of the facility is 65 miles-per-hour.

Pacheco Boulevard is a northwest-southeast oriented arterial with one travel lane in each direction in the study area. Pacheco Boulevard connects downtown Martinez to Pacheco, and the roadway provides access to residential and commercial uses west of the project site. The posted speed limit in the study area is 35 miles-per-hour.

2.2.2 Local Roadways

Arthur Road is a southwest-northeast oriented collector and extends from Pacheco Boulevard to a residential area north of the project site. West of the project site, the roadway has one travel lane in each direction. The I-680/Arthur Road interchanges provides access to/from points north along I-680. The posted speed limit is 25 miles-per-hour.

Central Avenue is a local road with one travel lane in each direction north of the project site. This roadway is maintained by the County between Arthur Road and Darcie Way, and becomes an unpaved private road as it extends to the project site and CCCSD Maltby pump station. The posted speed limit between Arthur Road and Darcie Way is 25 miles-per-hour and has a suggested speed limit of 5 miles-per-hour on the

[3] A project currently under construction will convert the southbound I-680 HOV lanes to an HOV2+/Express Lane, whereby single-occupant vehicles can use the lane by paying a toll that varies by time of day. HOVs with two or more occupants may use the lane without paying a toll.

privately owned segment. Central Avenue currently is not a through street and would serve as a main access roadway to the project site.

Palms Drive is a local road with one travel lane in each direction north of the project site. The surface pavement conditions are poor with uneven and missing pavement. The road is not a through street and would be extended to the project site as a secondary access. The speed limit is not posted.

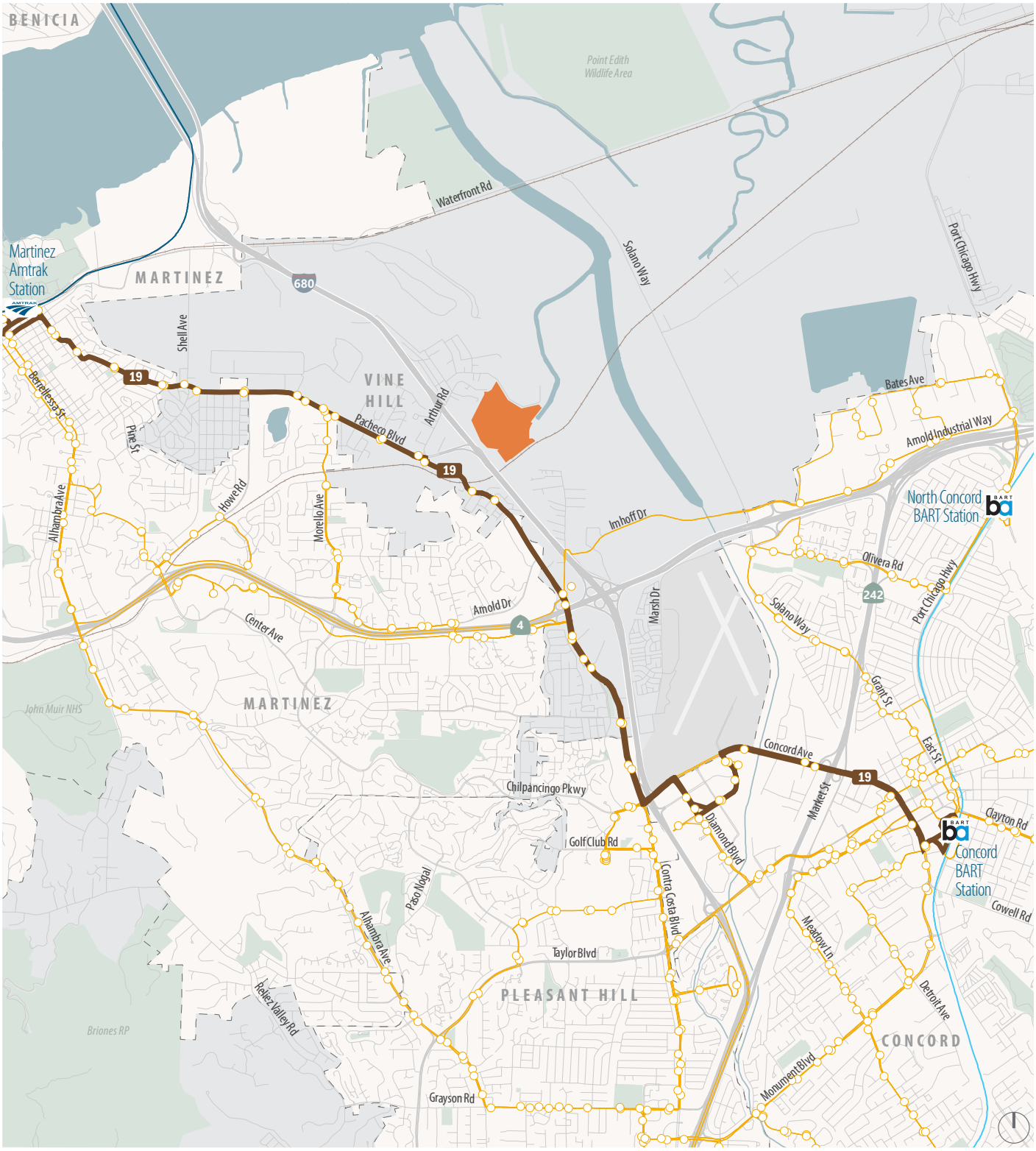
2.2 Transit Service

The Vine Hill area is primarily served by County Connection and its connections to Bay Area Rapid Transit (BART) and Amtrak. Transit routes and stations are shown on **Figure 3**. **Table 2** summarizes hours of operation and headways for routes near and connecting to the project site during COVID-19 reduced service conditions.

County Connection provides fixed-route and paratransit bus service for communities in Central Contra Costa County. The project site is closest in proximity to Route 19, which extends from the Martinez Amtrak station to Concord BART. The closest bus stop for this route is at the Pacheco Boulevard and Arthur Road intersection, approximately 0.6 miles west of the project site.

BART operates commuter passenger rail service throughout the Contra Costa, Alameda, San Francisco, San Mateo, and Santa Clara counties. The project site is located approximately 5.5 miles from the North Concord/Martinez BART station and 6.2 miles from the Concord BART station. The Vine Hill area is connected to the Concord BART station via County Connection Route 19 and to the North Concord BART station via personal vehicle.

Amtrak is rail passenger service that serves various locations throughout the United States. The Martinez Amtrak station is served by the San Joaquins and Capitol Corridor routes.



Project Site | 19 County Connection Route 19 | Other County Connection Routes | County Connection Bus Stop | Amtrak | BART

Figure 3

Existing Transit Facilities

Table 2: Existing Transit Services Schedule (COVID-19 Affected)

Route	From	To	Weekdays		Saturday		Sunday	
			Operating Hours[1]	Peak Headway	Operating Hours[1]	Headway	Operating Hours[1]	Headway
County Connection								
Route 19	Martinez Amtrak	Concord BART	7:00 AM to 7:35 PM	90 minutes	*No weekend service*			
Bay Area Rapid Transit (BART)								
Antioch-SFO/ Millbrae	Antioch	SFO	4:45 AM to 11:00 PM	30 minutes	7:40 AM to 10:35 PM	20 minutes	7:55 AM to 11:10 PM	25 minutes
Amtrak[2]								
San Joaquins	Oakland, CA	Bakersfield, CA	*Mixed train and bus service with varying schedules based on rider preference.*					
Capitol Corridor	Auburn, CA	San Jose, CA	*Mixed train and bus service with varying schedules based on rider preference.*					

Note: Schedule reflects COVID-19 reduced service conditions.

1. Rounded to the nearest five minutes.
2. Amtrak provides very limited service during COVID-19. California Zephyr and Coastal Starlight routes serve the Martinez station once a day in each direction. San Joaquins and Capitol Corridor routes provide mixed train and bus service with schedule information for rider-specified origin, destination, and travel time.

Sources: BART, County Connection, and Amtrak, August 2020.

2.3 Pedestrian and Bicycle Facilities

This section presents the existing pedestrian and bicycle facilities in the vicinity of the project site.

2.3.1 Pedestrian Facilities

Pedestrian facilities include sidewalks, shared-use pathways, crosswalks, and pedestrian signals. A continuous sidewalk of about six feet wide is provided on the north side of Pacheco Boulevard west of Arthur Road. Narrow sidewalks of about five feet in width are present along either side of Arthur Road from Pacheco Boulevard to Central Avenue and along Central Avenue between Arthur Road and Darcie Way. Sidewalks are not provided on the privately owned portion of Central Avenue, and on Palms Drive. At the signalized intersection of Pacheco Boulevard/Arthur Road, crosswalks, pedestrian push buttons, and pedestrian signals are provided. Crosswalks at unsignalized intersections in the study area are limited. There are four unsignalized intersections with marked crosswalks along Arthur Road: Karen Lane, I-680 southbound off-ramp, I-680 northbound on-ramp, and Central Avenue. All other unsignalized intersections do not provide marked crosswalks within the study area. Existing pedestrian facilities in the study area are shown on **Figure 4**.

Project Site

Crosswalk

Sidewalk Inventory

Sidewalk on Both Sides

Sidewalk on One Side

No Sidewalk

Figure 4

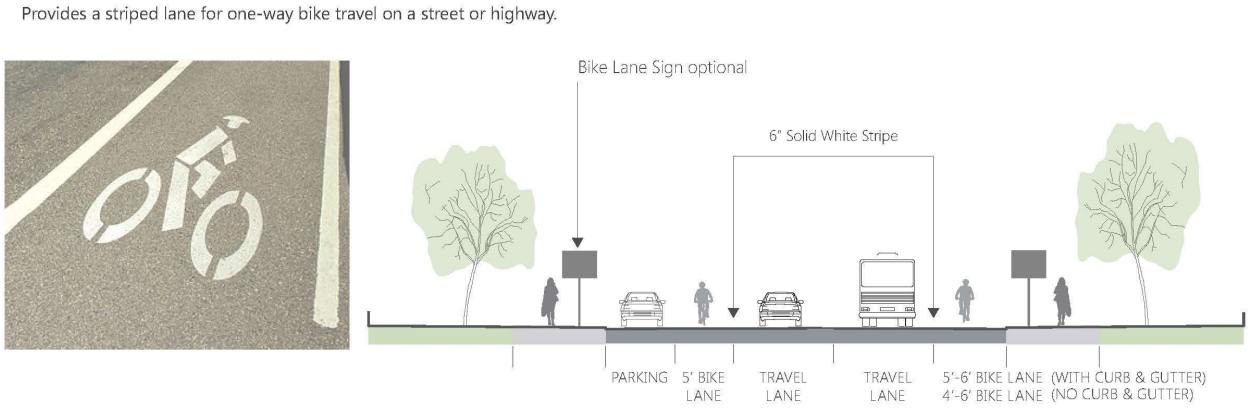
Existing Pedestrian Facilities

2.3.2 Bicycle Facilities

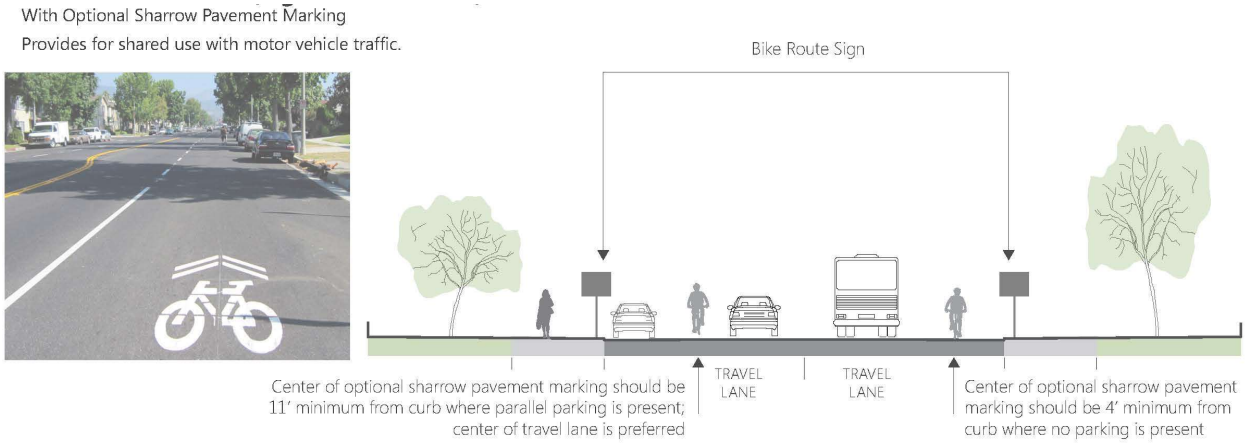
The CCTA Countywide Bicycle and Pedestrian Plan identifies the following four bikeway classifications from Chapter 1000 of the Caltrans *Highway Design Manual*:

- *Class I Bikeway (Bicycle Path)* provides a completely separate right-of-way and is designated for the exclusive use of bicycles and pedestrians with vehicle and pedestrian cross-flow minimized.

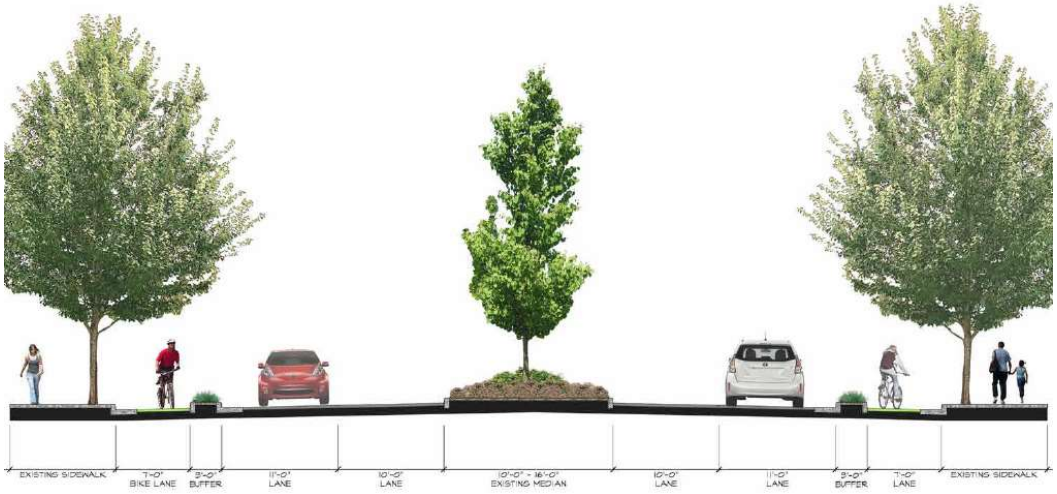
- *Class II Bikeway (Bicycle Lane)* provides a restricted right-of-way and is designated for the use of bicycles with a striped lane on a street or highway. Bicycle lanes are generally four to six feet wide. Adjacent vehicle parking and vehicle/pedestrian cross-flow are permitted.



- *Class III Bikeway (Bicycle Route)* provides for a right-of-way designated by signs or pavement markings (sharrows) for shared use with pedestrians or motor vehicles. Sharrows are a type of pavement marking (bike and arrow stencil) placed to guide bicyclists to the best place to ride on the road, avoid car doors, and remind drivers to share the road with cyclists.

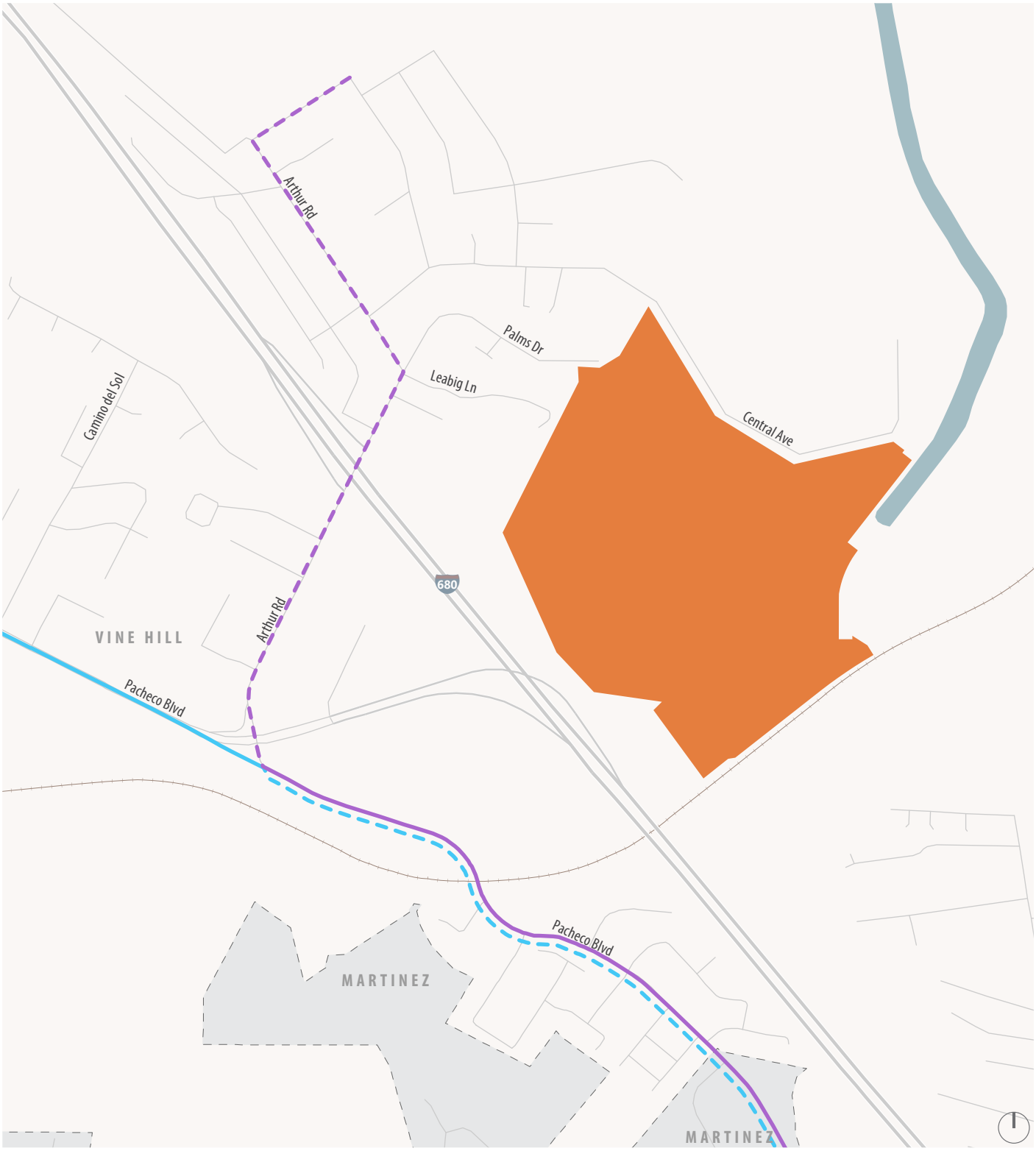


- *Class IV Bikeway*, also known as "cycle tracks" or "protected bike lanes," provide a right-of-way designated exclusively for bicycle travel within a roadway and which are protected from other vehicle traffic with devices, including, but not limited to, grade separation, flexible posts, inflexible physical barriers, or parked cars.



Pacheco Boulevard provides a Class III bike facility south of Arthur Road and a Class II bike facility west of Arthur Road. The 2018 Contra Costa Countywide Bicycle and Pedestrian Plan (CBPP) identified a proposed Class III bicycle facility along Arthur Road north of Pacheco Boulevard. The CBPP also identified Pacheco Boulevard as a "Proposed Low Stress Bikeway", which means future roadway improvements are planned to create a more comfortable and safe bicycling environment. Central Avenue and Palms Drive directly connected to the project site do not provide any bicycle facilities and do not have planned bikeways.

Existing and proposed bicycle facilities in the study area are shown on **Figure 5**.



Project Site

Existing	*Proposed*	
		Class 1 Bike Path
		Class 2 Bike Lane
		Class 3 Bike Route
		Class 4 Separated Bikeway

Figure 5

Existing and Proposed Bicycle Facilities

2.4 Baseline VMT

The Contra Costa Transportation Authority's (CCTA) travel demand model covers the entire nine-county MTC region and provides information regarding the characteristics of home-based trips made by residents throughout the Bay Area. Per guidance from the *Contra Costa County Transportation Analysis Guidelines,* the CCTA travel demand model was chosen to assess baseline home-based trip lengths and average home-based trip VMT per resident in Contra Costa County.

All home-based trips were analyzed for this VMT analysis. Data from the CCTA travel demand model indicates that the average Contra Costa County home-based VMT per resident is 19.4. This average takes into account all residents, including those who travel by automobile, as well as residents who travel (either in full or in part) by modes that do not generate automobile VMT, such as transit, walking, bicycling, or working from home.

2.5 Existing Intersection Volumes

The ADEIR LOS analyses were based on counts from one day in May 2017; counts older than two years are typically considered to be stale by the transportation profession as they do not reflect a more current baseline. Due to the suppressed travel conditions occurring because of the COVID-19 pandemic, traditional intersection counts are not a reliable source of data. As an alternative approach, mobile device "Big Data" tools, such as StreetLight Data, can be used to estimate count volumes. The advantage of using StreetLight Data over traditional counts is that StreetLight Data provides the average count volumes over multiple days instead of just the one day of count volumes provided by traditional counts. Therefore, StreetLight Data can provide a more technically robust baseline of traffic volumes for LOS analysis[4].

The following steps were performed to develop the baseline analysis volumes at the Arthur Road/Pacheco Boulevard intersection:

Step 1: Define analysis periods in StreetLight Data

- Year: 2019
- Months with schools in normal session before COVID-19 shelter-in-place orders: February, March, April, May, September, October, November
- Days: Tuesdays, Wednesdays, and Thursdays (holidays excluded)
- Morning peak period: 7:00 AM to 8:00 AM; 8:00 AM to 9:00 AM

[4] For more about the performance of StreetLight Data's intersection turning movement count product, please review Fehr & Peers' whitepaper detailing our independent review of the data source: https://www.fehrandpeers.com/transformative-data-collection-solution/

- Evening peak period: 4:00 PM to 5:00 PM; 5:00 PM to 6:00 PM

Step 2: Download StreetLight Data count volumes

Step 3: Choose 60-minute period with the highest traffic volumes during the two-hour morning and evening count periods as AM and PM peak hours of traffic

Step 4: Based on the ADEIR traffic count data, factor up peak 60-minute period 2019 StreetLight Data counts by 5% to provide a more conservative volume estimate. Round factored volumes up to the next highest 10.

Peak hour factors from the counts used in the previous ADEIR were used in this study, and truck, pedestrian, and bicycle activity was factored into the analysis. The Existing Conditions AM and PM peak hour volumes, lane configuration, and traffic control devices are presented on **Figure 6**.

2.6 Existing Intersection Levels of Service

Existing intersection operations were evaluated using the methodology described in **Section 1.2**. The intersection operations results are summarized in **Table 3**. Detailed intersection LOS calculation worksheets are provided in **Appendix B**. As shown in **Table 3**, the study intersection operates acceptably based on the Contra Costa County's LOS criteria under Existing Conditions.

Table 3: Existing Conditions Peak Hour Intersection Levels of Service

Intersection	Control	Peak Hour	Existing Conditions	
			Delay[1]	LOS
1. Arthur Road/Pacheco Boulevard	Signalized	AM PM	19.2 30.0	B C

1. Average delay calculated per HCM 6th Edition methodologies.
Source: Fehr & Peers, August 2020.

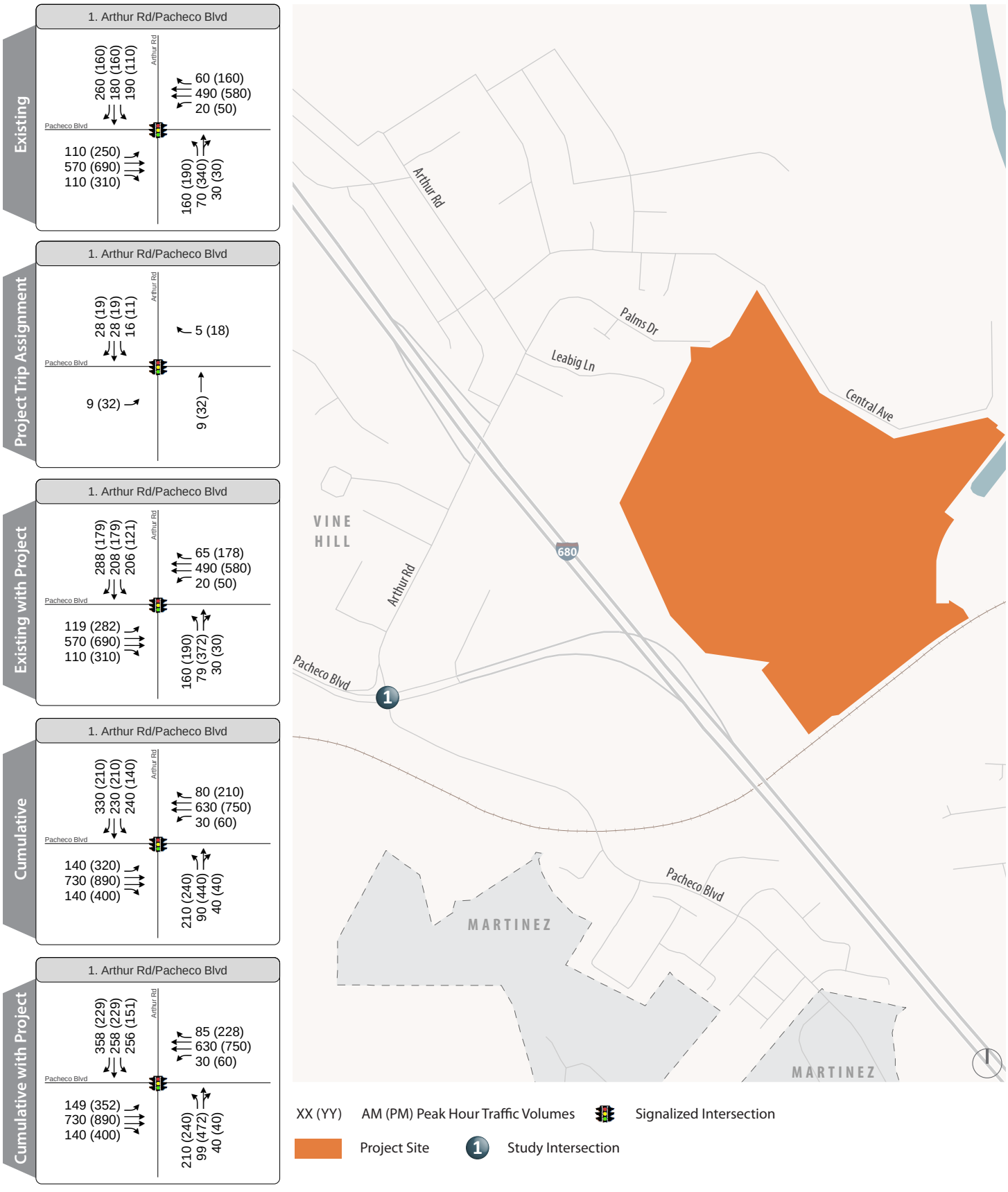


Figure 6

Peak Hour Intersection Traffic Volumes, Lane Configurations, and Traffic Controls

WC20-3738_X_Volumes

3. Project Trip Estimates

This chapter provides a review of the trip generation, distribution and assignment analysis completed for the project. The proposed project trip generation, trip distribution, and trip assignment allow for an evaluation of project effects on the surrounding roadway network. The amount of project traffic estimated to be added to the transportation system after completion of the Project was estimated using a three-step process:

1. **Trip Generation** – The amount of vehicle traffic entering/exiting the site was estimated.
2. **Trip Distribution** – The directions of trips to compatible land uses and their general routes of approach/departure to the Project site were identified.
3. **Trip Assignment** – Trips were then assigned to specific roadway segments and intersection turning movements based on likely paths of travel.

3.1 Project Trip Generation

Trip generation refers to the process of estimating the amount of vehicular traffic a project would add to the surrounding roadway system. Project trip generation estimates are prepared for the one-hour peak period during the weekday morning and evening commute when traffic volumes on the adjacent streets are typically the highest, as well as for the 24-hour weekday period.

The trip generation estimates for the project were prepared using data from the Institute of Transportation Engineers' *Trip Generation Manual, 10th Edition*. Based on the assumed residential land use type, data from Land Use Code 210 (Single-Family, Detached Housing) was used.

Vehicle trip generation estimates for the project are presented in **Table 4**. The project is anticipated to add 1,360 weekday daily trips (680 inbound and outbound daily vehicle trips), 107 AM peak hour trips and 143 PM peak hour vehicle trips to the roadway network.

Table 4: Project Trip Generation Estimates

Land Use	Quantity[1]	Daily Trips	Weekday AM Peak Hour Trips			Weekday PM Peak Hour Trips		
			In	Out	Total	In	Out	Total
Single-Family, Detached Housing[2]	144	1,360	27	80	107	90	53	143

Notes:
1. Land use quantities expressed in units of dwelling unit.
2. Trip generation estimated using data from the Institute of Transportation Engineers' *Trip Generation Manual, 10th Edition*, using Land Use Code 210 – Single-Family, Detached Housing

Fehr & Peers, August 2020.

3.2 Project Trip Distribution & Assignment

Project trip distribution refers to the directions of approach and departure that vehicles would take to access and leave the site. The project trip distribution was estimated based on a select zone analysis using the CCTA model, project site access, existing traffic count data, existing travel patterns, the trip making characteristics of the proposed project, and the location of complementary land uses. The resulting trip distribution is shown on **Figure 7**. Project trip assignment refers to project trip loading on specific roadway segments and intersection turning movements in the study area, as shown on **Figure 6**.

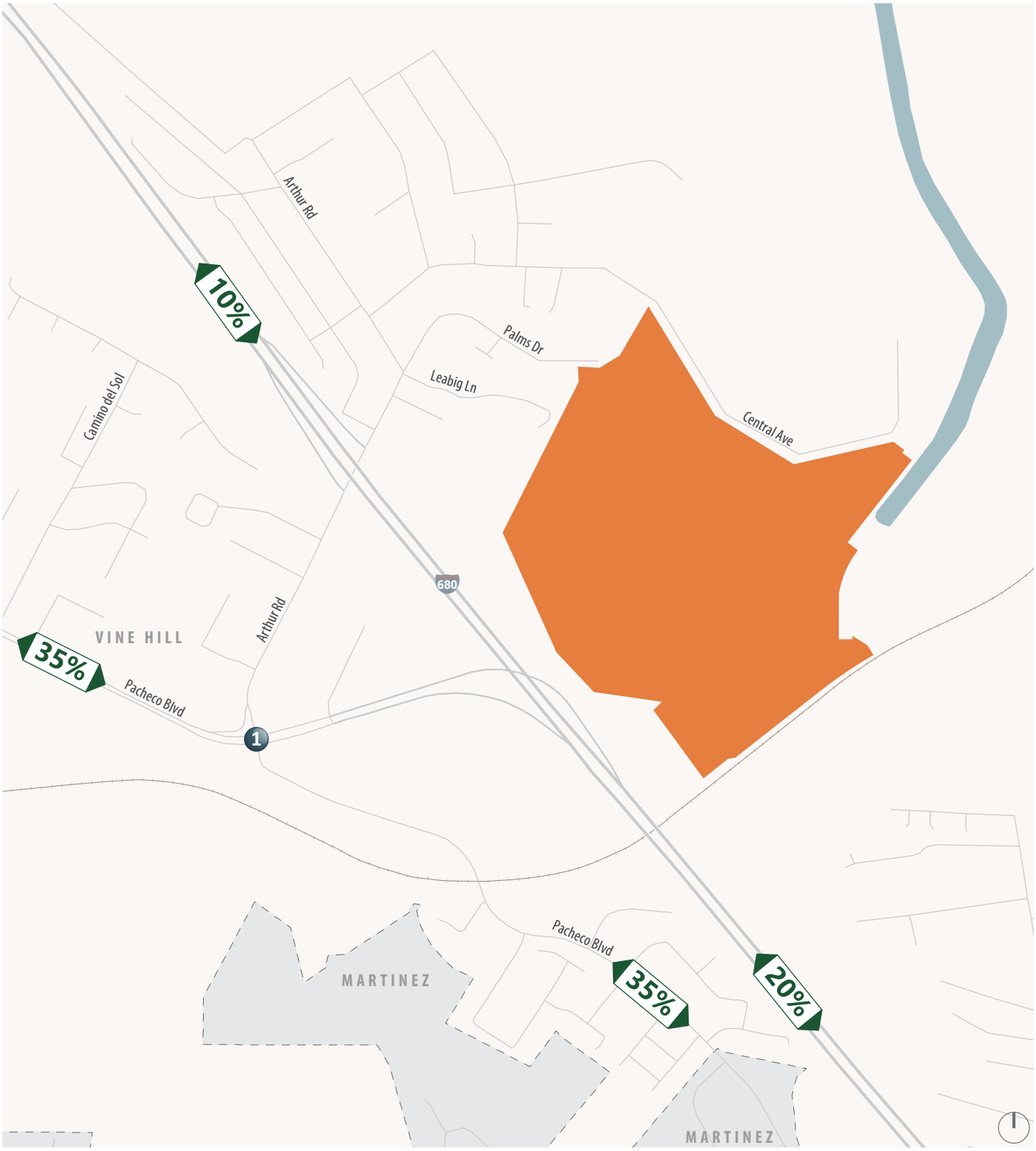


Figure 7

Project Trip Distribution

WC20-3738_7_TripDistro

4. Existing with Project Conditions

This chapter evaluates the project's potential impacts on VMT and multimodal transportation and effects on intersection operations under Existing with Project Conditions.

4.1 Project Vehicle-Miles Traveled (CEQA)

Impact TRANS-1 Project VMT: Total Home-Based VMT per resident generated by the project would be greater than 15 percent below the regional VMT for similar uses in Contra Costa County, resulting in a significant impact for the project. (*Significant and Unavoidable*)

Consistent with County requirements, the CCTA travel demand model was used in the analysis of the project's effect on VMT. As the project site is located on an undeveloped parcel of land, and the project will generate new trips, it is anticipated that the project's near-term effect on VMT would be nearly identical to the VMT generated by the project. Based on the CCTA model runs, the project is expected to generate 8,164 VMT per weekday. As noted in **Section 1.1**, the CEQA VMT analysis metric is total home-based VMT per resident. **Table 5** presents the total home-based VMT per resident for Existing with Project Conditions.

Table 5: Existing with Project Conditions Generated VMT

Scenario	Project TAZ Total Home-Based VMT per Resident	VMT Threshold Value [1]	Impact?
Existing with Project	20.6	16.5	Yes

Note:
1. The VMT threshold represents 15 percent below the Countywide average VMT per resident of 19.4.
Fehr & Peers, September 2020.

As noted in **Section 1.1**, the project would result in a significant CEQA transportation impact if the project's home-based trip VMT per resident is greater than 16.5 VMT per resident (15 percent below the Contra Costa County average for residential uses). The project's total home-based VMT per resident is 20.6, which is 4.1 VMT per resident greater than 15 percent below the Contra Costa County average for residential uses. Therefore, the project's effect on VMT would result in a ***significant impact***.

Mitigation TRANS-1: Transportation and Parking Demand Management (TDM) Plan.

Prior to issuance of building permits, the project applicant shall develop a TDM program for the proposed project, including any anticipated phasing, and shall submit the TDM Program to the County Department of Conservation and Development for review and approval. The TDM Program shall identify trip reduction strategies as well as mechanisms for funding and overseeing the delivery of trip reduction programs and strategies. The TDM Program shall be designed to achieve the trip

reduction, as required to reduce the VMT per resident from 20.6 to 16.5 consistent with a 20 percent reduction in the near-term.

Trip reduction strategies may include, but are not limited to, the following:

1. Pedestrian improvements, on-site or off-site, to connect to existing and planned pedestrian facilities, nearby transit stops, services, schools, shops, etc.
2. Bicycle network improvements, on-site or off-site, to connect to existing and planned bicycle facilities, nearby transit stops, services, schools, shops, etc.
3. Enhancements to bus service during peak commute times
4. Compliance with a future County VMT/TDM ordinance
5. Participation in a future County VMT fee program

VMT forecasts presented in this assessment do not consider some foreseeable travel changes, including increased use of transportation network companies, such as Uber and Lyft, nor the potential for autonomous vehicles. Although the technology for autonomous vehicles is expected to be available over the planning horizon, the federal and State legal and policy frameworks are uncertain. Initial modeling of an autonomous future indicates that with automated and connected vehicles, the capacity of the existing transportation system would increase as vehicles can travel closer together; however, these efficiencies are only realized when a high percentage of vehicles on the roadway are automated and connected. There is also the potential for vehicle travel to increase with zero-occupancy vehicles on the roadway. Additionally, the VMT forecasts are based on a model that was developed using data reflecting travel conditions before COVID-19; the effects of COVID-19 may be a near-term suppression in travel activity on the basis of reduced economic output and permanently modified travel habits.

The County Public Works team will also need to review the TDM Plan once it is submitted.

Mitigation Measure Effectiveness

Transportation Demand Management (TDM) strategies work best when they are applied at a city or regional scale and when the travel characteristics of the users or tenants of a site are known. The effectiveness of TDM measures for land use projects in unincorporated areas of Contra Costa County is difficult to quantify as the literature documenting the effectiveness of land use project-level TDM strategies are generally related to suburban and urban areas, not unincorporated areas. If the project site is ultimately considered to be part of a suburban setting, studies[5] show the maximum VMT reduction associated with the implementation of TDM strategies that can be expected for this project is 10 percent. Even this reduction is likely difficult to achieve given the greenfield nature of the project and its proximate location to available transit services. The requirement to reduce daily VMT by 20 percent in the near-term exceeds the expected level of VMT reduction supported by the research. However, while the level of VMT reduction associated with TDM measures are unlikely to mitigate the project's impact to a less-than-significant level, CEQA requires that feasible mitigation measures be implemented to reduce a project level of impact.

Significance after Mitigation: Significant and unavoidable.

[5] *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures*, California Air Pollution Control Officers Association, August, 2010, page 55.

4.2 Vehicle System (CEQA)

Impact TRANS-2a: The poor pavement conditions and narrow travel-way widths on Palms Drive and the private ownership and unpaved condition on Central Avenue represent obstacles (or hazards) for project vehicle traffic using Palms Drive and Central Avenue, resulting in a significant impact for the project. (*Less-than-significant with mitigation*)

Vehicular site access is proposed on Central Avenue and Palms Drive. Palms Drive has poor pavement conditions and Central Avenue between Darcie Way and the project site is unpaved.

Palms Drive is a right-of-way and would provide access to the site. The paved travel-way on Palms Drive is less than 20 feet in some locations, restricting concurrent two-way vehicle movements, and does not meet County requirements and design standards. Palms Drive could carry an additional 1,360 daily vehicles generated by the project if designed to County standards. The County design standards with this level of traffic, combined with the existing traffic loads, would require a 34-foot paved cross-section (two 12-foot lanes, two 5-foot shoulders) to meet rural road standards.[6] The poor pavement conditions and narrow travel-way width represent obstacles for project vehicle traffic using Palms Drive. Therefore, the project's effect on vehicle drivers using Palms Drive would result in a ***significant impact***.

Central Avenue between Darcie Way and the project site is privately-owned. The County will not be acquiring the right-of-way nor will construct road improvements to support the development of the project. The project would need to improve the privately-owned segment of Central Avenue to County standards for private roads to provide safe and adequate access to the project site. If Central Avenue remains unimproved, then a single public access point on Palms Drive would still operate well for general traffic use if it were improved to accommodate two-way traffic movements consistent with County standards. The unpaved road presents obstacles for project traffic using Central Avenue. Therefore, the project's effect on vehicles using Central Avenue would result in a ***significant impact***.

> **Mitigation TRANS-2a: In accordance with County requirements and design standards provide even surface pavement, appropriate signage, delineation, and other features on Palms Drive and Central Avenue to improve vehicle transportation conditions and eliminate obstacles (or hazards).**
>
> **Mitigation Measure Effectiveness**
>
> Implementing the County requirements and design standards would ensure that the street(s) used by the project's traffic are in good condition, provide width to accommodate concurrent two-way traffic flow, and provide appropriate signing, marking and other features to facilitate the safe movement of vehicles. This would be less than significant related to obstacles.
>
> **Significance after Mitigation:** Less-than-significant.

---

[6] County Standard Plans, Two Lane Rural Road Guidelines, Plan Number CA53

Impact TRANS-2b: The project would not have adverse impacts to the project site's vehicle system. (*Less-than-significant*)

Proposed internal vehicular circulation provides through streets, except for the 'A' Court cul-de-sac which includes a turnaround at the cul-de-sac end. The proposed on-site streets generally meet the private road standards required in the County Ordinance Code. If the on-site streets are planned to be public, then right-of-way and construction to meet public road standards would be required. Whether the streets are private or public, the proposed right-of-way—50 feet for housing fronting both sides and 44 feet for housing fronting one side of the street—would be sufficient to provide two 10-foot travel lanes which accommodates concurrent two-way vehicle movements. The project's internal road system is expected to be consistent with County requirements and design standards. Therefore, impacts to vehicles using the internal road system are ***less-than-significant***.

Mitigation: None required.

4.3 Transit System (CEQA)

Impact TRANS-3: The project would not have adverse impacts to the transit system. (*Less-than-significant*)

Fixed-route bus service operates west of the project site with stops located beyond the typical transit access trip walking distance (about one-half mile) from the proposed development. It is unlikely that the project would generate large amounts of new demand for the transit services and facilities that serve the area. Most residents would drive to the BART or Amtrak stations, so local commute transit vehicle capacities are not expected to be exceeded. The project is not expected to conflict with existing or planned transit facilities. Therefore, impacts to transit are ***less-than-significant***.

Mitigation: None required.

4.4 Pedestrian and Bicycle Systems (CEQA)

Impact TRANS-4: The project would increase pedestrian and bicycle activity and the increased activity would be incompatible with the existing transportation infrastructure for pedestrian and bicycle use by exposing users to hazards, resulting in a significant impact for the project. (*Less-than-significant with mitigation*)

Direct pedestrian and bicycle access to the site would be provided on Palms Drive and Central Avenue from Arthur Road. The nearest elementary school is located about 0.75 miles from the project and could attract students walking or biking between the project site and the school. These students would probably use Palms Drive since it provides the most direct walking and biking route to Arthur Road. The project would include a park which would attract people walking and biking from the surrounding neighborhoods. As a result, the project would increase pedestrian and bike activity along Arthur Road, Palms Drive, and Central Avenue as well as within the project site.

Arthur Road currently provides sidewalks and has a planned Class III bike facility. However, Palms Drive and the privately owned portion of Central Avenue currently do not provide pedestrian or bicycle facilities. Central Avenue generally provides sidewalks on one side of the street but there are sidewalk gaps between Arthur Road and the project site, and these gaps pose hazards to pedestrians. The current maintenance state of Palms Drive and Central Avenue is poor: Palms Drive has poor pavement conditions as well as a narrow travel-way that may restrict concurrent two-way vehicle movements, and Central Avenue at the project frontage is not paved and these conditions pose hazards to bicycle riders. Off-site improvements at Palms Drive and Central Avenue are needed to create a better-connected circulation system without hazards for pedestrian and bicycle riders.

The right-of-way within the project site is 50 feet when housing fronts both sides and 44 feet when housing fronts one side of the right-of-way. This width accommodates County requirements for private street standards; 52 feet would be required to meet public street standards. It is unclear whether the project's streets would provide sidewalks on both sides of the street. If sidewalks are not provided on both sides of the street pedestrians would be required to share the street with vehicle traffic.

The project design would not eliminate pedestrian facilities that connect to the area circulation system and would not conflict with existing or planned pedestrian and bicycle facilities, but would increase pedestrian and bicycle activity and the increased activity would be incompatible with the existing transportation infrastructure by exposing users to hazards. Therefore, the project's effect on pedestrians and bicyclists would result in a **significant impact**.

Mitigation TRANS-4: In accordance with County requirements and design standards provide:

- **Continuous sidewalks on at least one side of Palms Drive and Central Avenue to connect the project site to the existing pedestrian facilities on Arthur Road to improve pedestrian transportation conditions.**
- **Even surface pavement, appropriate signage, delineation, and other features on Palms Drive and Central Avenue to improve bicycle transportation conditions.**
- **Sidewalks for all streets within the project site including facilities on both sides of each street and curb ramps at each street intersection.**

Mitigation Measure Effectiveness

Implementing the County requirements and design standards would ensure that the street(s) used by the project's pedestrians and bicyclists are in good condition, provide space to accommodate walking and biking, and provide appropriate signing, marking, and other features to facilitate the safe movement of pedestrians and bicyclists. This would be less than significant related to hazards.

Significance after Mitigation: Less than significant.

4.5 Emergency Access (CEQA)

Impact TRANS-5a: Emergency access to the project site would be through existing streets that would be incompatible with the existing transportation infrastructure by exposing emergency vehicles to hazards, resulting in a significant impact for the project. (*Less-than-significant with mitigation*)

Emergency vehicles would access the site on Palms Drive and Central Avenue. However, the current maintenance condition of Palms Drive would present obstacles (roadway width and uneven surface) to access and maneuverability of emergency vehicles. Under current conditions, the privately owned portion of Central Avenue at the project frontage would present similar obstacles to emergency vehicle access to the site. Emergency services would be required to access the project via Palms Drive and Central Avenue and the increased activity would be incompatible with the existing transportation infrastructure by exposing emergency service vehicles to hazards. Therefore, the project's effect on emergency access would result in a **significant impact**.

> **Mitigation TRANS-5a: In accordance with County requirements and design standards provide even surface pavement, appropriate signage, delineation, and other features on Palms Drive and Central Avenue to accommodate emergency vehicles.**
>
> **Mitigation Measure Effectiveness**
>
> Implementing the County requirements and design standards would ensure that the street(s) used by emergency vehicles to access the project site are in good condition and include other features to facilitate the safe movement of emergency vehicles. This would be less than significant related to hazards.
>
> **Significance after Mitigation:** Less than significant.

Impact TRANS-5b: The project would not have adverse impacts to the project site's emergency vehicle system. (*Less-than-significant*)

The proposed on-site roadway design would provide adequate emergency vehicle circulation, and planned right-of-way lane widths would accommodate truck turning movements. Central Avenue and Palms Drive would be connected via two intersecting streets ("B" Street and "C" Drive). "C" Drive would be built within a 44-foot-wide right-of-way (two 12-foot-wide travel lanes, 8-foot-wide parking lane on one side only, and 5-foot-wide sidewalks on both sides), running along the proposed on-site park area. "B" Street, as well as the other internal streets ("A" Court, "D" Drive, and "E", "F", and "G" streets), would be built within a 50-foot-wide right-of-way (two 18-foot wide travel lanes, 5-foot-wide sidewalks on both sides, and on-street parking could be accommodated within each 18-foot travel lane). The "A" Court would serve 8 homes and incorporate a turnaround for emergency vehicles. The project is not expected to result in impacts to emergency access within the project and is therefore ***less-than-significant***.

> **Mitigation:** None required.

4.7 Intersection Operations (Non-CEQA)

Existing with Project Conditions peak hour intersection turning movement volumes are shown on **Figure 6**. These volumes were derived by adding the Existing Conditions traffic volumes to the project trip assignment volumes. **Table 6** presents the Existing with Project Conditions intersection LOS results. Detailed intersection LOS calculation worksheets are provided in **Appendix B**. While the addition of project-generated traffic at the study intersection increases average delay, the intersection continues to operate at an acceptable LOS B in the AM peak hour and LOS D in the PM peak hour.

Table 6: Existing with Project Conditions Peak Hour Intersection Levels Service

Intersection	Control	Peak Hour	Existing Conditions		Existing with Project Conditions		
			Delay[1]	LOS	Delay[1]	LOS	Δ Delay[2]
1. Arthur Road/ Pacheco Boulevard	Signalized	AM	19.2	B	19.6	B	+0.4
		PM	30.0	C	35.7	D	+5.7

Note: **Bold** indicates unacceptable intersection operations. Results in **Bold and Highlighted** indicates a substantial adverse effect on intersection operations.

1. Average delay calculated per HCM 6th Edition methodologies.
2. Change in average delay at intersection between Existing with Project and Existing Conditions.

Source: Fehr & Peers, September 2020.

4.8 Parking (Non-CEQA)

The site plan does not provide the number of parking spaces. Residents and visitors in single family residential areas often park on the street as well as within their driveways and as a result street widths and driveway depths should be designed to accommodate vehicle parking while not blocking pedestrian mobility. Streets that are too narrow and driveways that have limited setback to building facades result in parked vehicles encroaching into the pedestrian sidewalk area. The Contra Costa County Zoning Code requires a minimum of two parking spaces per single-family dwelling unit. The *Contra Costa County Transportation Analysis Guidelines* require single-family residences with attached private garages to install one listed raceway to accommodate a dedicated electric vehicle charging outlet per dwelling unit. Bicycle parking spaces are not required for single-family residential uses but there will be demand for bicycle parking at the project's park which is expected to attract people walking and biking from the surrounding neighborhoods.

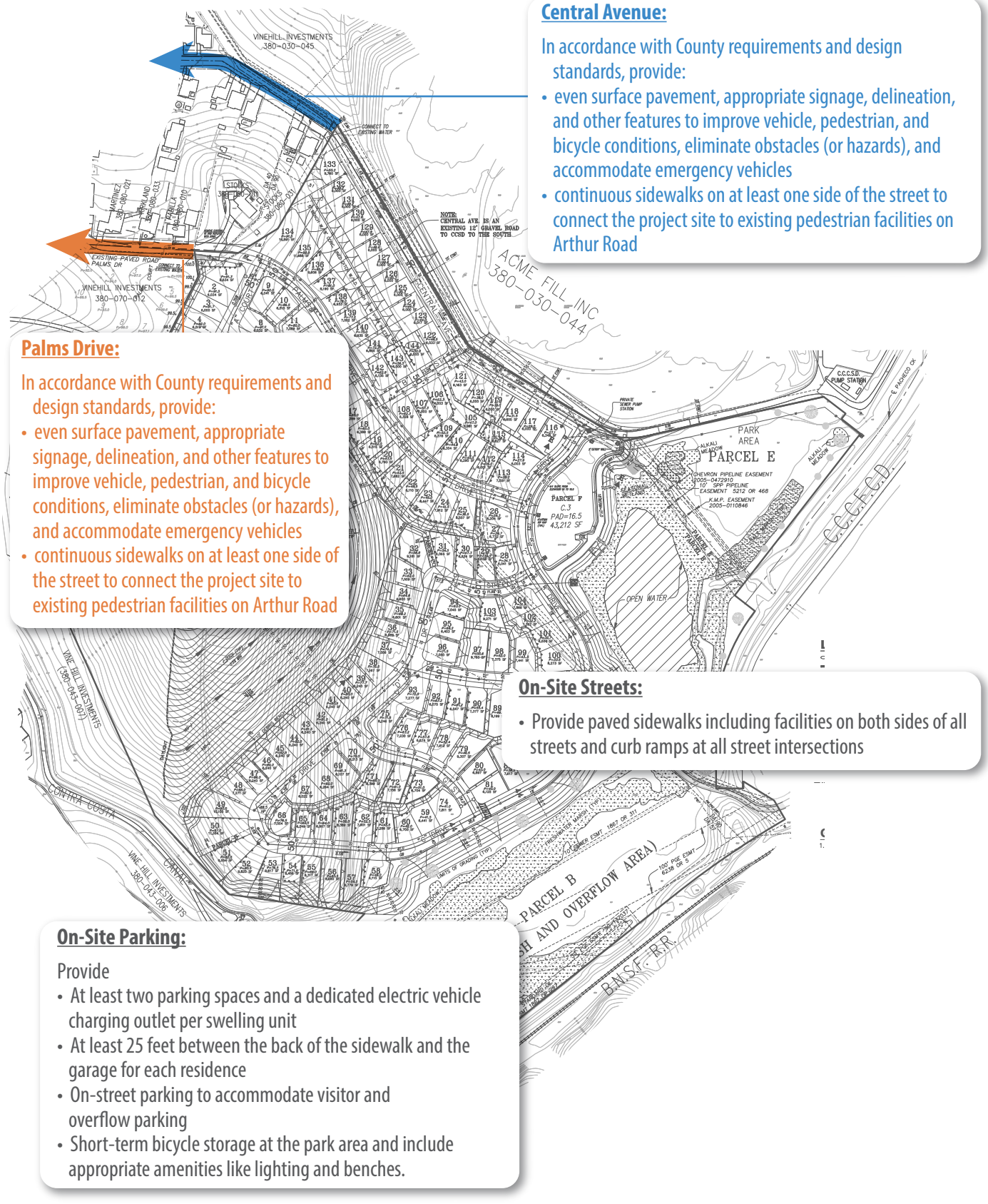
Recommendation Parking 1: Provide at least two parking spaces and dedicated electric vehicle charging outlet per dwelling unit in accordance with County requirements and design standards.

Recommendation Parking 2: Provide at least 25 feet between the back of sidewalk and the garage for each residence so vehicles in the driveway do not encroach onto the sidewalk.

Recommendation Parking 3: Provide on-street parking within the project site to accommodate visitor and overflow parking for the single-family residential uses.

Recommendation Parking 4: Provide storage at the park area for short-term bicycle parking and include appropriate amenities like lighting and benches.

All site plan recommendations are provided on **Figure 8**.



Central Avenue:

In accordance with County requirements and design standards, provide:

- even surface pavement, appropriate signage, delineation, and other features to improve vehicle, pedestrian, and bicycle conditions, eliminate obstacles (or hazards), and accommodate emergency vehicles
- continuous sidewalks on at least one side of the street to connect the project site to existing pedestrian facilities on Arthur Road

Palms Drive:

In accordance with County requirements and design standards, provide:

- even surface pavement, appropriate signage, delineation, and other features to improve vehicle, pedestrian, and bicycle conditions, eliminate obstacles (or hazards), and accommodate emergency vehicles
- continuous sidewalks on at least one side of the street to connect the project site to existing pedestrian facilities on Arthur Road

On-Site Streets:

- Provide paved sidewalks including facilities on both sides of all streets and curb ramps at all street intersections

On-Site Parking:

Provide

- At least two parking spaces and a dedicated electric vehicle charging outlet per swelling unit
- At least 25 feet between the back of the sidewalk and the garage for each residence
- On-street parking to accommodate visitor and overflow parking
- Short-term bicycle storage at the park area and include appropriate amenities like lighting and benches.

Figure 8

Site Plan Recommendations

5. Cumulative Conditions

This chapter presents the results of the Cumulative year VMT analysis and the informational intersection operations analysis under Cumulative without Project and Cumulative with Project Conditions.

For the informational intersection operations analysis, Cumulative without Project Conditions are defined as future volumes generated by planned local and regional growth to occur by 2040 that would affect the transportation system in the study area. The basis for the growth projections are the Year 2040 employment and housing projections from Plan Bay Area. Cumulative with Project Conditions are defined as Cumulative without Project Conditions plus traffic generated by the proposed project.

5.1 Project Effect on Vehicle-Miles Traveled (CEQA)

Impact TRANS-1.CU Cumulative VMT: The project with a General Plan amendment would increase the Countywide VMT, resulting in a significant impact for the project. (*Significant and Unavoidable*)

The proposed project is anticipated to require a General Plan amendment to update the current zoning from Heavy Industrial to Single Family Residential (High Density), thus indicating that the project is not consistent with the current General Plan. Therefore, a Cumulative scenario VMT analysis was required, whereby the CCTA model is used to assess whether the project increases Countywide VMT versus the General Plan land use designation for the site. **Table 7** presents the comparative VMT analysis.

Table 7: Cumulative Countywide VMT

Scenario	Cumulative with General Plan Designation (Heavy Industrial) Total VMT	Cumulative with Project (Single Family Residential) Total VMT	Δ Total VMT	Impact?
Cumulative Conditions	29,432,734	29,435,465	+2,731	Yes

Fehr & Peers, October 2020.

As shown in **Table 7**, the project would result in a net increase of 2,731 VMT Countywide versus current General Plan zoning conditions. Thus, the project would result in a significant impact.

> **Mitigation Measure TRANS-1: Transportation and Parking Demand Management (TDM) Plan.** (See Impact Trans-1)
>
> **Significance after Mitigation:** Significant and unavoidable.

5.2 Cumulative Traffic Volume Forecasts and Assumptions

Cumulative without Project traffic volumes were calculated based on data extracted from the Contra Costa Transportation Authority (CCTA) travel demand model. An annual linear growth rate (1.4% per year straight-line growth) was calculated for the AM and PM peak hours based on a comparison between the 2020 and 2040 CCTA travel demand models. Cumulative without Project Conditions and Cumulative with Project Conditions peak hour intersection turning movement volumes are shown on **Figure 6**.

5.3 Intersection Operations (Non-CEQA)

Table 8 presents the Cumulative without Project and Cumulative with Project intersection level of service results. Detailed intersection LOS calculation worksheets are provided in **Appendix B**.

Table 8: Cumulative (Year 2040) Peak Hour Intersection Levels of Service

Intersection	Control	Peak Hour	Cumulative without Project Conditions		Cumulative with Project Conditions		
			Delay[1]	LOS	Delay[1]	LOS	Δ Delay[2]
1. Arthur Road/ Pacheco Boulevard	Signalized	AM	22.3	C	23.3	C	+1.0
		PM	**56.8**	**E**	**64.2**	**E**	**+7.4**

Note: **Bold** indicates unacceptable intersection operations. Results in **Bold and Highlighted** indicates a substantial adverse effect on intersection operations.

1. Average delay calculated per HCM 6th Edition methodologies.
2. Change in delay at intersection between Cumulative with Project and Cumulative without Project Conditions.

Source: Fehr & Peers, August 2020.

Under Cumulative without Project and Cumulative with Project Conditions, the intersection of Pacheco Boulevard/Arthur Road operates at an unacceptable LOS E in the PM peak hour. The addition of project traffic is expected to exacerbate unacceptable intersection operations (LOS E) by increasing the average delay by more than 5.0 seconds during the PM peak hour. Therefore, the project results in a substantial adverse effect and improvement measures are required.

> **Recommendation Intersection Operations 1:** Modify the current north/south split phasing to protected left-turn phasing. The existing roadway is appropriately striped to accommodate the proposed protected left-turn phasing, but new signal heads and (potentially) controller equipment and signal poles would be required. After construction of the improvements, the project's effect would be a delay increase of less than 5 seconds. Thus, the improvements would alleviate the substantial effect on intersection operations. The project's contribution towards these improvements may be satisfied through the payment of the County's traffic impact fees.

Appendix A – 2018 ADEIR Cumulative Conditions LOS Calculation Worksheets

The table below summarizes the 2018 ADEIR Cumulative Conditions intersection LOS. With the addition of project trips, intersections 2-5 are expected to operate acceptably at LOS D or better. Based on the *Contra Costa County Transportation Analysis Guidelines*, the project would not be required to sponsor improvements at these four intersections because they operate acceptably after the addition of project trips and therefore omitted in the current study.

TABLE 4.13-13
CUMULATIVE AND CUMULATIVE PLUS PROJECT CONDITIONS
INTERSECTION LEVEL OF SERVICE (LOS)

	Intersection	Control[a]	Peak Hour	Cumulative No Project		Cumulative Plus Project	
				Delay[b]	LOS	Delay[b]	LOS
1	Arthur Road / Pacheco Boulevard	Signal	AM	37.5	D	40.0	D
			PM	64.2	E	69.0	E
2	Arthur Road / I-680 SB Off-Ramp	SSSC	AM	21.4	C	26.2	D
			PM	17.3	C	23.8	C
3	Arthur Road / I-680 NB On –Ramp	SSSC	AM	13.4	B	15.1	C
			PM	19.1	C	22.7	C
4	Arthur Road / Palms Drive	SSSC	AM	11.6	B	12.7	B
			PM	19.4	C	27.8	D
5	Arthur Road / Central Avenue	SSSC	AM	11.4	B	10.3	B
			PM	10.6	B	11.3	B

[a] Signal = Signalized intersection, SSSC = Side-street stop-controlled intersection

[b] Average control delay per vehicle (in seconds) for the worst-case stop controlled movement or approach at side-street stop-controlled intersections according to the *Highway Capacity Manual* (Transportation Research Board, 2010).

SOURCE: ESA 2017

2040 BASELINE AM PEAK HOUR

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	593	303	45	421	77	380	207	61	200	293	285
Future Volume (veh/h)	190	593	303	45	421	77	380	207	61	200	293	285
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	196	611	312	46	434	79	392	213	63	206	302	0
Adj No. of Lanes	1	2	1	1	2	1	1	2	0	1	1	1
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	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	231	1148	513	69	824	369	429	782	226	247	346	294
Arrive On Green	0.13	0.32	0.32	0.04	0.23	0.23	0.24	0.29	0.29	0.14	0.19	0.00
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	2712	782	1774	1863	1583
Grp Volume(v), veh/h	196	611	312	46	434	79	392	137	139	206	302	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1725	1774	1863	1583
Q Serve(g_s), s	9.3	12.1	14.2	2.2	9.2	3.5	18.5	5.1	5.4	9.7	13.5	0.0
Cycle Q Clear(g_c), s	9.3	12.1	14.2	2.2	9.2	3.5	18.5	5.1	5.4	9.7	13.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.45	1.00		1.00
Lane Grp Cap(c), veh/h	231	1148	513	69	824	369	429	510	497	247	346	294
V/C Ratio(X)	0.85	0.53	0.61	0.67	0.53	0.21	0.91	0.27	0.28	0.84	0.87	0.00
Avail Cap(c_a), veh/h	238	1148	513	136	824	369	465	510	497	384	390	332
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	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	36.5	23.7	24.4	40.7	28.8	26.6	31.7	23.6	23.7	36.0	34.0	0.0
Incr Delay (d2), s/veh	23.5	1.8	5.3	10.6	2.4	1.3	21.6	0.3	0.3	9.0	17.7	0.0
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	6.0	6.2	6.9	1.3	4.7	1.6	11.6	2.6	2.6	5.4	8.7	0.0
LnGrp Delay(d),s/veh	60.0	25.5	29.7	51.4	31.2	27.9	53.3	23.9	24.0	45.0	51.7	0.0
LnGrp LOS	E	C	C	D	C	C	D	C	C	D	D	
Approach Vol, veh/h		1119			559			668			508	
Approach Delay, s/veh		32.7			32.4			41.2			49.0	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.8	32.4	25.3	20.4	15.7	24.5	16.4	29.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.6	24.9	22.5	18.0	11.5	20.0	18.6	21.9
Max Q Clear Time (g_c+I1), s	4.2	16.2	20.5	15.5	11.3	11.2	11.7	7.4
Green Ext Time (p_c), s	0.0	3.5	0.3	0.4	0.0	2.1	0.3	1.3

Intersection Summary	
HCM 2010 Ctrl Delay	37.5
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	18	103	0	530	674	0
Future Vol, veh/h	18	103	0	530	674	0
Conflicting Peds, #/hr	0	0	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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	112	0	576	733	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1309	733	-	0	-	0
Stage 1	733	-	-	-	-	-
Stage 2	576	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	-	-
Pot Cap-1 Maneuver	176	421	0	-	-	0
Stage 1	475	-	0	-	-	0
Stage 2	562	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	176	421	-	-	-	-
Mov Cap-2 Maneuver	176	-	-	-	-	-
Stage 1	475	-	-	-	-	-
Stage 2	562	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	21.4	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT
Capacity (veh/h)	-	349	-
HCM Lane V/C Ratio	-	0.377	-
HCM Control Delay (s)	-	21.4	-
HCM Lane LOS	-	C	-
HCM 95th %tile Q(veh)	-	1.7	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	493	185	474	50
Future Volume (Veh/h)	0	0	493	185	474	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	0	560	210	539	57
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				861		
pX, platoon unblocked						
vC, conflicting volume	1898	568	596			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1898	568	596			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	43			
cM capacity (veh/h)	33	523	980			

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	560	210	596
Volume Left	560	0	0
Volume Right	0	0	57
cSH	980	1700	1700
Volume to Capacity	0.57	0.12	0.35
Queue Length 95th (ft)	93	0	0
Control Delay (s)	13.4	0.0	0.0
Lane LOS	B		
Approach Delay (s)	9.8		0.0
Approach LOS			

Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	292	4	0	0	120	3	0	0	20	0
Future Volume (Veh/h)	0	0	292	4	0	0	120	3	0	0	20	0
Sign Control		Free			Free			Yield			Yield	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	344	5	0	0	141	4	0	0	24	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			344			22	10	0	184	354	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			344			22	10	0	184	354	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			85	100	100	100	96	100
cM capacity (veh/h)	1623			1215			955	881	1085	772	569	1085

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	344	5	145	24
Volume Left	0	5	141	0
Volume Right	344	0	0	0
cSH	1700	1215	953	569
Volume to Capacity	0.20	0.00	0.15	0.04
Queue Length 95th (ft)	0	0	13	3
Control Delay (s)	0.0	8.0	9.5	11.6
Lane LOS		A	A	B
Approach Delay (s)	0.0	8.0	9.5	11.6
Approach LOS			A	B

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	34.7%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	156	64	45	115	3
Future Vol, veh/h	2	156	64	45	115	3
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	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	184	75	53	135	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	128	0	-	0	290	102
Stage 1	-	-	-	-	102	-
Stage 2	-	-	-	-	188	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1458	-	-	-	701	953
Stage 1	-	-	-	-	922	-
Stage 2	-	-	-	-	844	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1458	-	-	-	700	953
Mov Cap-2 Maneuver	-	-	-	-	700	-
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	844	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	11.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1458	-	-	-	705
HCM Lane V/C Ratio	0.002	-	-	-	0.197
HCM Control Delay (s)	7.5	0	-	-	11.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.7

2040 BASELINE PM PEAK HOUR

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	413	584	635	60	490	123	383	647	50	90	250	212
Future Volume (veh/h)	413	584	635	60	490	123	383	647	50	90	250	212
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	449	635	690	65	533	134	416	703	54	98	272	0
Adj No. of Lanes	1	2	1	1	2	1	1	2	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	429	1338	599	83	648	290	401	1072	82	124	309	263
Arrive On Green	0.24	0.38	0.38	0.05	0.18	0.18	0.23	0.32	0.32	0.07	0.17	0.00
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	3331	256	1774	1863	1583
Grp Volume(v), veh/h	449	635	690	65	533	134	416	373	384	98	272	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1818	1774	1863	1583
Q Serve(g_s), s	23.8	13.4	37.2	3.6	14.2	7.4	22.2	17.8	17.8	5.3	14.0	0.0
Cycle Q Clear(g_c), s	23.8	13.4	37.2	3.6	14.2	7.4	22.2	17.8	17.8	5.3	14.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.14	1.00		1.00
Lane Grp Cap(c), veh/h	429	1338	599	83	648	290	401	570	585	124	309	263
V/C Ratio(X)	1.05	0.47	1.15	0.78	0.82	0.46	1.04	0.66	0.66	0.79	0.88	0.00
Avail Cap(c_a), veh/h	429	1338	599	115	648	290	401	570	585	155	341	290
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	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	37.3	23.2	30.6	46.3	38.6	35.8	38.1	28.6	28.7	45.0	40.0	0.0
Incr Delay (d2), s/veh	55.8	1.2	86.6	19.9	11.3	5.2	55.3	2.7	2.7	19.3	21.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.2	6.8	30.6	2.2	8.0	3.7	16.9	9.1	9.4	3.3	9.0	0.0
LnGrp Delay(d),s/veh	93.1	24.4	117.2	66.2	49.9	41.1	93.3	31.4	31.3	64.3	61.0	0.0
LnGrp LOS	F	C	F	E	D	D	F	C	C	E	E	
Approach Vol, veh/h		1774			732			1173			370	
Approach Delay, s/veh		77.9			49.7			53.3			61.9	
Approach LOS		E			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.1	41.7	26.7	20.8	28.3	22.5	11.4	36.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.4	35.4	22.2	18.0	23.8	18.0	8.6	31.6
Max Q Clear Time (g_c+I1), s	5.6	39.2	24.2	16.0	25.8	16.2	7.3	19.8
Green Ext Time (p_c), s	0.0	0.0	0.0	0.3	0.0	0.7	0.0	3.7

Intersection Summary	
HCM 2010 Ctrl Delay	64.2
HCM 2010 LOS	E

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	170	0	1185	260	0
Future Vol, veh/h	20	170	0	1185	260	0
Conflicting Peds, #/hr	0	0	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	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	183	0	1274	280	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1554	280	-	0	-	0
Stage 1	280	-	-	-	-	-
Stage 2	1274	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	-	-
Pot Cap-1 Maneuver	125	759	0	-	-	0
Stage 1	767	-	0	-	-	0
Stage 2	263	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	125	759	-	-	-	-
Mov Cap-2 Maneuver	125	-	-	-	-	-
Stage 1	767	-	-	-	-	-
Stage 2	263	-	-	-	-	-

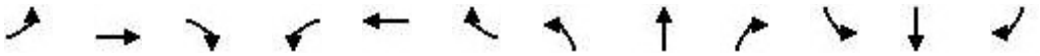
Approach	EB	NB	SB
HCM Control Delay, s	17.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT
Capacity (veh/h)	-	495	-
HCM Lane V/C Ratio	-	0.413	-
HCM Control Delay (s)	-	17.3	-
HCM Lane LOS	-	C	-
HCM 95th %tile Q(veh)	-	2	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	970	235	255	40
Future Volume (Veh/h)	0	0	970	235	255	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	1021	247	268	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				861		
pX, platoon unblocked						
vC, conflicting volume	2578	289	310			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2578	289	310			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	18			
cM capacity (veh/h)	5	750	1250			

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	1021	247	310
Volume Left	1021	0	0
Volume Right	0	0	42
cSH	1250	1700	1700
Volume to Capacity	0.82	0.15	0.18
Queue Length 95th (ft)	248	0	0
Control Delay (s)	19.1	0.0	0.0
Lane LOS	C		
Approach Delay (s)	15.4		0.0
Approach LOS			

Intersection Summary			
Average Delay	12.4		
Intersection Capacity Utilization	80.6%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	150	1	0	0	215	20	0	0	12	1
Future Volume (Veh/h)	0	0	150	1	0	0	215	20	0	0	12	1
Sign Control		Yield			Yield			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	176	1	0	0	253	24	0	0	14	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	544	544	14	720	545	24	15			24		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	544	544	14	720	545	24	15			24		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	83	100	100	100	84			100		
cM capacity (veh/h)	395	376	1065	252	375	1052	1603			1591		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	176	1	277	15
Volume Left	0	1	253	0
Volume Right	176	0	0	1
cSH	1065	252	1603	1700
Volume to Capacity	0.17	0.00	0.16	0.01
Queue Length 95th (ft)	15	0	14	0
Control Delay (s)	9.0	19.4	7.1	0.0
Lane LOS	A	C	A	
Approach Delay (s)	9.0	19.4	7.1	0.0
Approach LOS	A	C		

Intersection Summary				
Average Delay	7.6			
Intersection Capacity Utilization	29.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	95	95	95	60	3
Future Vol, veh/h	3	95	95	95	60	3
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	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	108	108	108	68	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	216	0	-	0	276	162
Stage 1	-	-	-	-	162	-
Stage 2	-	-	-	-	114	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1354	-	-	-	714	883
Stage 1	-	-	-	-	867	-
Stage 2	-	-	-	-	911	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1354	-	-	-	713	883
Mov Cap-2 Maneuver	-	-	-	-	713	-
Stage 1	-	-	-	-	865	-
Stage 2	-	-	-	-	911	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1354	-	-	-	720
HCM Lane V/C Ratio	0.003	-	-	-	0.099
HCM Control Delay (s)	7.7	0	-	-	10.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3

2040 BASE + PROJECT AM PEAK HOUR

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	198	593	303	45	421	85	380	215	61	236	315	300
Future Volume (veh/h)	198	593	303	45	421	85	380	215	61	236	315	300
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	204	611	312	46	434	88	392	222	63	243	325	0
Adj No. of Lanes	1	2	1	1	2	1	1	2	0	1	1	1
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	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	232	1134	507	68	806	361	427	758	210	283	364	309
Arrive On Green	0.13	0.32	0.32	0.04	0.23	0.23	0.24	0.28	0.28	0.16	0.20	0.00
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	2739	759	1774	1863	1583
Grp Volume(v), veh/h	204	611	312	46	434	88	392	142	143	243	325	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1729	1774	1863	1583
Q Serve(g_s), s	9.9	12.4	14.6	2.2	9.5	4.0	18.9	5.5	5.7	11.7	14.9	0.0
Cycle Q Clear(g_c), s	9.9	12.4	14.6	2.2	9.5	4.0	18.9	5.5	5.7	11.7	14.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.44	1.00		1.00
Lane Grp Cap(c), veh/h	232	1134	507	68	806	361	427	490	478	283	364	309
V/C Ratio(X)	0.88	0.54	0.61	0.68	0.54	0.24	0.92	0.29	0.30	0.86	0.89	0.00
Avail Cap(c_a), veh/h	232	1134	507	133	806	361	455	490	478	376	382	325
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	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	37.4	24.5	25.2	41.7	29.8	27.7	32.5	25.0	25.0	35.9	34.4	0.0
Incr Delay (d2), s/veh	29.3	1.8	5.5	11.0	2.6	1.6	22.8	0.3	0.3	14.2	21.9	0.0
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	6.8	6.3	7.2	1.3	4.9	1.9	12.0	2.7	2.8	6.9	9.9	0.0
LnGrp Delay(d),s/veh	66.7	26.3	30.7	52.7	32.4	29.3	55.3	25.3	25.4	50.2	56.3	0.0
LnGrp LOS	E	C	C	D	C	C	E	C	C	D	E	
Approach Vol, veh/h		1127			568			677			568	
Approach Delay, s/veh		34.9			33.6			42.7			53.7	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.9	32.6	25.6	21.6	16.0	24.5	18.5	28.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.6	24.9	22.5	18.0	11.5	20.0	18.6	21.9
Max Q Clear Time (g_c+I1), s	4.2	16.6	20.9	16.9	11.9	11.5	13.7	7.7
Green Ext Time (p_c), s	0.0	3.4	0.2	0.2	0.0	2.0	0.3	1.3

Intersection Summary	
HCM 2010 Ctrl Delay	40.0
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	21	103	0	554	746	0
Future Vol, veh/h	21	103	0	554	746	0
Conflicting Peds, #/hr	0	0	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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	112	0	602	811	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1413	811	-	0	-	0
Stage 1	811	-	-	-	-	-
Stage 2	602	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	-	-
Pot Cap-1 Maneuver	152	379	0	-	-	0
Stage 1	437	-	0	-	-	0
Stage 2	547	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	152	379	-	-	-	-
Mov Cap-2 Maneuver	152	-	-	-	-	-
Stage 1	437	-	-	-	-	-
Stage 2	547	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	26.2	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT
Capacity (veh/h)	-	302	-
HCM Lane V/C Ratio	-	0.446	-
HCM Control Delay (s)	-	26.2	-
HCM Lane LOS	-	D	-
HCM 95th %tile Q(veh)	-	2.2	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	493	212	546	58
Future Volume (Veh/h)	0	0	493	212	546	58
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	0	560	241	620	66
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				861		
pX, platoon unblocked						
vC, conflicting volume	2014	653	686			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2014	653	686			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	38			
cM capacity (veh/h)	25	467	908			

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	560	241	686
Volume Left	560	0	0
Volume Right	0	0	66
cSH	908	1700	1700
Volume to Capacity	0.62	0.14	0.40
Queue Length 95th (ft)	110	0	0
Control Delay (s)	15.1	0.0	0.0
Lane LOS	C		
Approach Delay (s)	10.6		0.0
Approach LOS			

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	344	4	0	0	138	12	0	0	48	0
Future Volume (Veh/h)	0	0	344	4	0	0	138	12	0	0	48	0
Sign Control		Free			Free			Yield			Yield	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	405	5	0	0	162	14	0	0	56	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			405			38	10	0	220	415	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			405			38	10	0	220	415	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			82	98	100	100	89	100
cM capacity (veh/h)	1623			1154			885	881	1085	725	526	1085

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	405	5	176	56
Volume Left	0	5	162	0
Volume Right	405	0	0	0
cSH	1700	1154	885	526
Volume to Capacity	0.24	0.00	0.20	0.11
Queue Length 95th (ft)	0	0	18	9
Control Delay (s)	0.0	8.1	10.1	12.7
Lane LOS		A	B	B
Approach Delay (s)	0.0	8.1	10.1	12.7
Approach LOS			B	B

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	38.0%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	156	64	63	167	3
Future Vol, veh/h	2	156	64	63	167	3
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	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	184	75	74	196	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	149	0	-	0	300	112
Stage 1	-	-	-	-	112	-
Stage 2	-	-	-	-	188	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1432	-	-	-	691	941
Stage 1	-	-	-	-	913	-
Stage 2	-	-	-	-	844	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1432	-	-	-	690	941
Mov Cap-2 Maneuver	-	-	-	-	690	-
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	844	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	12.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1432	-	-	-	693
HCM Lane V/C Ratio	0.002	-	-	-	0.289
HCM Control Delay (s)	7.5	0	-	-	12.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	1.2

2040 BASE + PROJECT PM PEAK HOUR

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	440	584	635	60	490	150	383	674	50	113	262	225
Future Volume (veh/h)	440	584	635	60	490	150	383	674	50	113	262	225
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	478	635	690	65	533	163	416	733	54	123	285	0
Adj No. of Lanes	1	2	1	1	2	1	1	2	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	426	1328	594	83	643	288	398	1038	76	151	320	272
Arrive On Green	0.24	0.38	0.38	0.05	0.18	0.18	0.22	0.31	0.31	0.09	0.17	0.00
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	3343	246	1774	1863	1583
Grp Volume(v), veh/h	478	635	690	65	533	163	416	388	399	123	285	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1819	1774	1863	1583
Q Serve(g_s), s	23.8	13.5	37.1	3.6	14.4	9.3	22.2	19.2	19.2	6.7	14.8	0.0
Cycle Q Clear(g_c), s	23.8	13.5	37.1	3.6	14.4	9.3	22.2	19.2	19.2	6.7	14.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.14	1.00		1.00
Lane Grp Cap(c), veh/h	426	1328	594	83	643	288	398	550	565	151	320	272
V/C Ratio(X)	1.12	0.48	1.16	0.78	0.83	0.57	1.05	0.71	0.71	0.81	0.89	0.00
Avail Cap(c_a), veh/h	426	1328	594	115	643	288	398	565	581	154	339	288
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	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	37.6	23.6	30.9	46.7	39.0	36.9	38.4	30.1	30.1	44.5	40.1	0.0
Incr Delay (d2), s/veh	80.7	1.2	90.3	20.2	11.7	7.8	57.6	3.9	3.8	26.7	23.4	0.0
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	21.2	6.8	31.0	2.2	8.1	4.7	17.2	10.0	10.2	4.4	9.7	0.0
LnGrp Delay(d),s/veh	118.3	24.8	121.2	66.9	50.7	44.8	96.0	34.0	33.9	71.2	63.5	0.0
LnGrp LOS	F	C	F	E	D	D	F	C	C	E	E	
Approach Vol, veh/h		1803			761			1203			408	
Approach Delay, s/veh		86.5			50.8			55.4			65.8	
Approach LOS		F			D			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.2	41.6	26.7	21.5	28.3	22.5	12.9	35.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.4	35.4	22.2	18.0	23.8	18.0	8.6	31.6
Max Q Clear Time (g_c+I1), s	5.6	39.1	24.2	16.8	25.8	16.4	8.7	21.2
Green Ext Time (p_c), s	0.0	0.0	0.0	0.2	0.0	0.7	0.0	3.6

Intersection Summary	
HCM 2010 Ctrl Delay	69.0
HCM 2010 LOS	E

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	170	0	1185	308	0
Future Vol, veh/h	30	170	0	1185	308	0
Conflicting Peds, #/hr	0	0	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	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	183	0	1274	331	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1605	331	-	0	-	0
Stage 1	331	-	-	-	-	-
Stage 2	1274	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	-	-
Pot Cap-1 Maneuver	116	711	0	-	-	0
Stage 1	728	-	0	-	-	0
Stage 2	263	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	116	711	-	-	-	-
Mov Cap-2 Maneuver	116	-	-	-	-	-
Stage 1	728	-	-	-	-	-
Stage 2	263	-	-	-	-	-

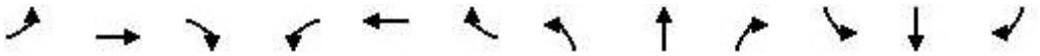
Approach	EB	NB	SB
HCM Control Delay, s	23.8	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT
Capacity (veh/h)	-	402	-
HCM Lane V/C Ratio	-	0.535	-
HCM Control Delay (s)	-	23.8	-
HCM Lane LOS	-	C	-
HCM 95th %tile Q(veh)	-	3.1	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	970	325	303	45
Future Volume (Veh/h)	0	0	970	325	303	45
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	1021	342	319	47
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				861		
pX, platoon unblocked						
vC, conflicting volume	2726	342	366			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2726	342	366			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	14			
cM capacity (veh/h)	3	700	1193			

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	1021	342	366
Volume Left	1021	0	0
Volume Right	0	0	47
cSH	1193	1700	1700
Volume to Capacity	0.86	0.20	0.22
Queue Length 95th (ft)	290	0	0
Control Delay (s)	22.7	0.0	0.0
Lane LOS	C		
Approach Delay (s)	17.0		0.0
Approach LOS			

Intersection Summary			
Average Delay	13.4		
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	184	1	0	0	273	52	0	0	30	1
Future Volume (Veh/h)	0	0	184	1	0	0	273	52	0	0	30	1
Sign Control		Yield			Yield			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	216	1	0	0	321	61	0	0	35	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	738	738	36	954	739	61	36			61		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	738	738	36	954	739	61	36			61		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	79	99	100	100	80			100		
cM capacity (veh/h)	281	275	1037	159	275	1004	1575			1542		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	216	1	382	36
Volume Left	0	1	321	0
Volume Right	216	0	0	1
cSH	1037	159	1575	1700
Volume to Capacity	0.21	0.01	0.20	0.02
Queue Length 95th (ft)	20	0	19	0
Control Delay (s)	9.4	27.8	6.9	0.0
Lane LOS	A	D	A	
Approach Delay (s)	9.4	27.8	6.9	0.0
Approach LOS	A	D		

Intersection Summary				
Average Delay	7.4			
Intersection Capacity Utilization	34.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	2.5

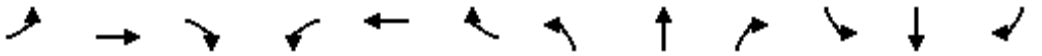
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	95	95	153	94	3
Future Vol, veh/h	3	95	95	153	94	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	108	108	174	107	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	282	0	-	0	309	195
Stage 1	-	-	-	-	195	-
Stage 2	-	-	-	-	114	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1280	-	-	-	683	846
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	911	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1280	-	-	-	682	846
Mov Cap-2 Maneuver	-	-	-	-	682	-
Stage 1	-	-	-	-	836	-
Stage 2	-	-	-	-	911	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	11.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1280	-	-	-	686
HCM Lane V/C Ratio	0.003	-	-	-	0.161
HCM Control Delay (s)	7.8	0	-	-	11.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.6

Appendix B – Current Study LOS Calculation Worksheets



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	570	110	20	490	60	160	70	30	190	180	260
Future Volume (veh/h)	110	570	110	20	490	60	160	70	30	190	180	260
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.95	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	113	588	39	21	505	16	165	72	16	196	186	0
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, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	159	1108	474	35	860	366	336	278	62	290	305	
Arrive On Green	0.09	0.31	0.31	0.02	0.24	0.24	0.19	0.19	0.19	0.16	0.16	0.00
Sat Flow, veh/h	1767	3526	1509	1767	3526	1500	1767	1460	324	1767	1856	1572
Grp Volume(v), veh/h	113	588	39	21	505	16	165	0	88	196	186	0
Grp Sat Flow(s),veh/h/ln	1767	1763	1509	1767	1763	1500	1767	0	1784	1767	1856	1572
Q Serve(g_s), s	3.4	7.5	1.0	0.6	6.9	0.4	4.6	0.0	2.3	5.7	5.1	0.0
Cycle Q Clear(g_c), s	3.4	7.5	1.0	0.6	6.9	0.4	4.6	0.0	2.3	5.7	5.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.18	1.00		1.00
Lane Grp Cap(c), veh/h	159	1108	474	35	860	366	336	0	339	290	305	
V/C Ratio(X)	0.71	0.53	0.08	0.59	0.59	0.04	0.49	0.00	0.26	0.67	0.61	
Avail Cap(c_a), veh/h	647	1614	691	388	1614	687	971	0	980	647	680	
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	1.00	0.00
Uniform Delay (d), s/veh	24.1	15.4	13.2	26.5	18.2	15.8	19.7	0.0	18.8	21.4	21.2	0.0
Incr Delay (d2), s/veh	2.2	0.4	0.1	5.8	0.6	0.0	0.4	0.0	0.1	1.0	0.7	0.0
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	1.4	2.6	0.3	0.3	2.5	0.1	1.7	0.0	0.9	2.3	2.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.3	15.8	13.3	32.4	18.8	15.8	20.2	0.0	19.0	22.5	21.9	0.0
LnGrp LOS	C	B	B	C	B	B	C	A	B	C	C	
Approach Vol, veh/h		740			542			253			382	A
Approach Delay, s/veh		17.3			19.3			19.8			22.2	
Approach LOS		B			B			B			C	

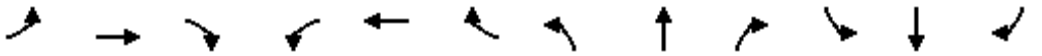
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.1	22.2		13.0	8.9	18.3		14.4				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	12.0	25.0		20.0	20.0	25.0		30.0				
Max Q Clear Time (g_c+I1), s	2.6	9.5		7.7	5.4	8.9		6.6				
Green Ext Time (p_c), s	0.0	3.5		0.8	0.1	3.0		0.5				

Intersection Summary		
HCM 6th Ctrl Delay		19.2
HCM 6th LOS		B

Notes

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

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	690	310	50	580	160	190	340	30	110	160	160
Future Volume (veh/h)	250	690	310	50	580	160	190	340	30	110	160	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.95	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	272	750	164	54	630	78	207	370	30	120	174	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	311	1312	563	69	828	352	462	442	36	216	227	
Arrive On Green	0.18	0.37	0.37	0.04	0.23	0.23	0.26	0.26	0.26	0.12	0.12	0.00
Sat Flow, veh/h	1767	3526	1514	1767	3526	1499	1767	1689	137	1767	1856	1572
Grp Volume(v), veh/h	272	750	164	54	630	78	207	0	400	120	174	0
Grp Sat Flow(s),veh/h/ln	1767	1763	1514	1767	1763	1499	1767	0	1826	1767	1856	1572
Q Serve(g_s), s	12.4	14.0	6.3	2.5	13.8	3.5	8.1	0.0	17.1	5.3	7.5	0.0
Cycle Q Clear(g_c), s	12.4	14.0	6.3	2.5	13.8	3.5	8.1	0.0	17.1	5.3	7.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.08	1.00		1.00
Lane Grp Cap(c), veh/h	311	1312	563	69	828	352	462	0	477	216	227	
V/C Ratio(X)	0.87	0.57	0.29	0.79	0.76	0.22	0.45	0.00	0.84	0.56	0.77	
Avail Cap(c_a), veh/h	427	1312	563	256	1065	453	640	0	662	427	448	
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	1.00	0.00
Uniform Delay (d), s/veh	33.2	20.7	18.3	39.4	29.5	25.6	25.6	0.0	28.9	34.2	35.2	0.0
Incr Delay (d2), s/veh	11.1	0.6	0.3	7.1	2.4	0.3	0.3	0.0	5.0	0.8	2.1	0.0
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	6.0	5.5	2.1	1.2	5.8	1.2	3.3	0.0	7.8	2.3	3.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.3	21.3	18.6	46.6	31.9	25.9	25.8	0.0	33.9	35.0	37.2	0.0
LnGrp LOS	D	C	B	D	C	C	C	A	C	D	D	
Approach Vol, veh/h		1186			762			607			294	A
Approach Delay, s/veh		26.2			32.4			31.1			36.3	
Approach LOS		C			C			C			D	

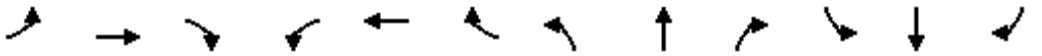
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.2	35.8		14.1	18.6	24.4		25.6				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	12.0	25.0		20.0	20.0	25.0		30.0				
Max Q Clear Time (g_c+I1), s	4.5	16.0		9.5	14.4	15.8		19.1				
Green Ext Time (p_c), s	0.0	3.7		0.6	0.2	3.0		1.4				

Intersection Summary			
HCM 6th Ctrl Delay		30.0	
HCM 6th LOS		C	

Notes

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

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	119	570	110	20	490	65	160	79	30	206	208	288
Future Volume (veh/h)	119	570	110	20	490	65	160	79	30	206	208	288
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.95	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	123	588	39	21	505	16	165	81	17	212	214	0
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, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	163	1112	476	35	857	365	335	280	59	294	309	
Arrive On Green	0.09	0.32	0.32	0.02	0.24	0.24	0.19	0.19	0.19	0.17	0.17	0.00
Sat Flow, veh/h	1767	3526	1509	1767	3526	1500	1767	1477	310	1767	1856	1572
Grp Volume(v), veh/h	123	588	39	21	505	16	165	0	98	212	214	0
Grp Sat Flow(s),veh/h/ln	1767	1763	1509	1767	1763	1500	1767	0	1788	1767	1856	1572
Q Serve(g_s), s	3.7	7.5	1.0	0.6	7.0	0.4	4.6	0.0	2.6	6.3	6.0	0.0
Cycle Q Clear(g_c), s	3.7	7.5	1.0	0.6	7.0	0.4	4.6	0.0	2.6	6.3	6.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.17	1.00		1.00
Lane Grp Cap(c), veh/h	163	1112	476	35	857	365	335	0	338	294	309	
V/C Ratio(X)	0.75	0.53	0.08	0.60	0.59	0.04	0.49	0.00	0.29	0.72	0.69	
Avail Cap(c_a), veh/h	642	1600	685	385	1600	681	962	0	974	642	674	
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	1.00	0.00
Uniform Delay (d), s/veh	24.4	15.5	13.2	26.8	18.4	15.9	20.0	0.0	19.2	21.7	21.6	0.0
Incr Delay (d2), s/veh	2.6	0.4	0.1	5.8	0.6	0.0	0.4	0.0	0.2	1.2	1.0	0.0
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	1.5	2.7	0.3	0.3	2.6	0.1	1.7	0.0	1.0	2.5	2.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.0	15.9	13.3	32.6	19.1	16.0	20.4	0.0	19.3	23.0	22.7	0.0
LnGrp LOS	C	B	B	C	B	B	C	A	B	C	C	
Approach Vol, veh/h		750			542			263			426	A
Approach Delay, s/veh		17.6			19.5			20.0			22.8	
Approach LOS		B			B			B			C	

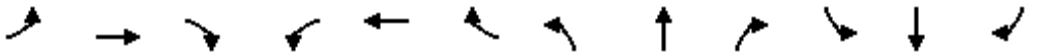
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.1	22.4		13.2	9.1	18.4		14.4				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	12.0	25.0		20.0	20.0	25.0		30.0				
Max Q Clear Time (g_c+I1), s	2.6	9.5		8.3	5.7	9.0		6.6				
Green Ext Time (p_c), s	0.0	3.5		0.9	0.1	3.0		0.5				

Intersection Summary		
HCM 6th Ctrl Delay	19.6	
HCM 6th LOS	B	

Notes

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

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	282	690	310	50	580	178	190	372	30	121	179	179
Future Volume (veh/h)	282	690	310	50	580	178	190	372	30	121	179	179
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.95	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	307	750	164	54	630	85	207	404	30	132	195	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	340	1328	570	69	786	334	477	460	34	231	242	
Arrive On Green	0.19	0.38	0.38	0.04	0.22	0.22	0.27	0.27	0.27	0.13	0.13	0.00
Sat Flow, veh/h	1767	3526	1514	1767	3526	1496	1767	1702	126	1767	1856	1572
Grp Volume(v), veh/h	307	750	164	54	630	85	207	0	434	132	195	0
Grp Sat Flow(s),veh/h/ln	1767	1763	1514	1767	1763	1496	1767	0	1829	1767	1856	1572
Q Serve(g_s), s	15.7	15.6	7.0	2.8	15.6	4.3	9.0	0.0	21.0	6.5	9.4	0.0
Cycle Q Clear(g_c), s	15.7	15.6	7.0	2.8	15.6	4.3	9.0	0.0	21.0	6.5	9.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	340	1328	570	69	786	334	477	0	494	231	242	
V/C Ratio(X)	0.90	0.56	0.29	0.78	0.80	0.25	0.43	0.00	0.88	0.57	0.81	
Avail Cap(c_a), veh/h	382	1328	570	229	953	404	573	0	593	382	401	
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	1.00	0.00
Uniform Delay (d), s/veh	36.5	22.8	20.2	44.1	34.0	29.6	27.9	0.0	32.3	37.8	39.1	0.0
Incr Delay (d2), s/veh	21.0	0.6	0.3	7.0	4.1	0.4	0.2	0.0	11.1	0.8	2.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.5	6.2	2.4	1.3	6.9	1.6	3.7	0.0	10.4	2.9	4.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.5	23.4	20.4	51.0	38.1	30.0	28.2	0.0	43.5	38.6	41.5	0.0
LnGrp LOS	E	C	C	D	D	C	C	A	D	D	D	
Approach Vol, veh/h		1221			769			641			327	A
Approach Delay, s/veh		31.6			38.1			38.5			40.3	
Approach LOS		C			D			D			D	

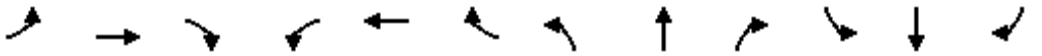
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.6	39.8		16.1	21.8	25.6		29.0				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	12.0	25.0		20.0	20.0	25.0		30.0				
Max Q Clear Time (g_c+I1), s	4.8	17.6		11.4	17.7	17.6		23.0				
Green Ext Time (p_c), s	0.0	3.2		0.6	0.1	2.6		1.3				

Intersection Summary			
HCM 6th Ctrl Delay		35.7	
HCM 6th LOS		D	

Notes

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

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	730	140	30	630	80	210	90	40	240	230	330
Future Volume (veh/h)	140	730	140	30	630	80	210	90	40	240	230	330
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	144	753	71	31	649	23	216	93	26	247	237	0
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, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	184	1215	521	47	941	401	322	252	71	318	334	
Arrive On Green	0.10	0.34	0.34	0.03	0.27	0.27	0.18	0.18	0.18	0.18	0.18	0.00
Sat Flow, veh/h	1767	3526	1512	1767	3526	1504	1767	1384	387	1767	1856	1572
Grp Volume(v), veh/h	144	753	71	31	649	23	216	0	119	247	237	0
Grp Sat Flow(s),veh/h/ln	1767	1763	1512	1767	1763	1504	1767	0	1770	1767	1856	1572
Q Serve(g_s), s	5.1	11.4	2.1	1.1	10.6	0.7	7.3	0.0	3.8	8.5	7.7	0.0
Cycle Q Clear(g_c), s	5.1	11.4	2.1	1.1	10.6	0.7	7.3	0.0	3.8	8.5	7.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.22	1.00		1.00
Lane Grp Cap(c), veh/h	184	1215	521	47	941	401	322	0	323	318	334	
V/C Ratio(X)	0.78	0.62	0.14	0.66	0.69	0.06	0.67	0.00	0.37	0.78	0.71	
Avail Cap(c_a), veh/h	554	1382	593	332	1382	589	831	0	833	554	582	
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	1.00	0.00
Uniform Delay (d), s/veh	27.9	17.4	14.4	30.8	21.0	17.4	24.3	0.0	22.9	24.9	24.6	0.0
Incr Delay (d2), s/veh	2.7	0.7	0.1	5.8	0.9	0.1	0.9	0.0	0.3	1.6	1.0	0.0
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	2.1	4.2	0.7	0.5	4.0	0.2	2.9	0.0	1.5	3.5	3.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.6	18.1	14.5	36.6	21.9	17.5	25.2	0.0	23.1	26.5	25.6	0.0
LnGrp LOS	C	B	B	D	C	B	C	A	C	C	C	
Approach Vol, veh/h		968			703			335			484	A
Approach Delay, s/veh		19.7			22.4			24.5			26.1	
Approach LOS		B			C			C			C	

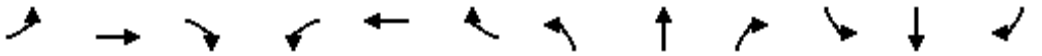
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	27.0		15.5	10.6	22.0		15.6				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	12.0	25.0		20.0	20.0	25.0		30.0				
Max Q Clear Time (g_c+I1), s	3.1	13.4		10.5	7.1	12.6		9.3				
Green Ext Time (p_c), s	0.0	4.1		1.0	0.1	3.5		0.7				

Intersection Summary			
HCM 6th Ctrl Delay		22.3	
HCM 6th LOS		C	

Notes

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

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	890	400	60	750	210	240	440	40	140	210	210
Future Volume (veh/h)	320	890	400	60	750	210	240	440	40	140	210	210
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.95	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	348	967	258	65	815	130	261	478	40	152	228	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	329	1310	563	84	820	349	493	470	39	254	267	
Arrive On Green	0.19	0.37	0.37	0.05	0.23	0.23	0.28	0.28	0.28	0.14	0.14	0.00
Sat Flow, veh/h	1767	3526	1514	1767	3526	1498	1767	1685	141	1767	1856	1572
Grp Volume(v), veh/h	348	967	258	65	815	130	261	0	518	152	228	0
Grp Sat Flow(s),veh/h/ln	1767	1763	1514	1767	1763	1498	1767	0	1826	1767	1856	1572
Q Serve(g_s), s	20.0	25.5	13.9	3.9	24.8	7.8	13.4	0.0	30.0	8.7	12.9	0.0
Cycle Q Clear(g_c), s	20.0	25.5	13.9	3.9	24.8	7.8	13.4	0.0	30.0	8.7	12.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.08	1.00		1.00
Lane Grp Cap(c), veh/h	329	1310	563	84	820	349	493	0	510	254	267	
V/C Ratio(X)	1.06	0.74	0.46	0.78	0.99	0.37	0.53	0.00	1.02	0.60	0.86	
Avail Cap(c_a), veh/h	329	1310	563	197	820	349	493	0	510	329	345	
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	1.00	0.00
Uniform Delay (d), s/veh	43.7	29.2	25.6	50.6	41.1	34.6	32.7	0.0	38.7	43.1	44.9	0.0
Incr Delay (d2), s/veh	65.7	2.2	0.6	5.7	29.7	0.7	0.5	0.0	44.0	0.8	12.5	0.0
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	14.6	10.8	5.0	1.8	13.9	2.9	5.7	0.0	19.2	3.9	6.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	109.4	31.5	26.2	56.3	70.9	35.3	33.3	0.0	82.7	43.9	57.4	0.0
LnGrp LOS	F	C	C	E	E	D	C	A	F	D	E	
Approach Vol, veh/h		1573			1010			779			380	A
Approach Delay, s/veh		47.8			65.4			66.1			52.0	
Approach LOS		D			E			E			D	

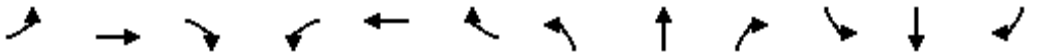
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.1	44.9		19.4	24.0	30.0		34.0				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	12.0	25.0		20.0	20.0	25.0		30.0				
Max Q Clear Time (g_c+I1), s	5.9	27.5		14.9	22.0	26.8		32.0				
Green Ext Time (p_c), s	0.0	0.0		0.6	0.0	0.0		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		56.8	
HCM 6th LOS		E	

Notes

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

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	149	730	140	30	630	85	210	99	40	256	258	358
Future Volume (veh/h)	149	730	140	30	630	85	210	99	40	256	258	358
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	154	753	71	31	649	24	216	102	26	264	266	0
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, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	195	1223	525	46	926	395	320	256	65	333	350	
Arrive On Green	0.11	0.35	0.35	0.03	0.26	0.26	0.18	0.18	0.18	0.19	0.19	0.00
Sat Flow, veh/h	1767	3526	1512	1767	3526	1503	1767	1415	361	1767	1856	1572
Grp Volume(v), veh/h	154	753	71	31	649	24	216	0	128	264	266	0
Grp Sat Flow(s),veh/h/ln	1767	1763	1512	1767	1763	1503	1767	0	1776	1767	1856	1572
Q Serve(g_s), s	5.6	11.7	2.1	1.2	11.0	0.8	7.5	0.0	4.2	9.4	9.0	0.0
Cycle Q Clear(g_c), s	5.6	11.7	2.1	1.2	11.0	0.8	7.5	0.0	4.2	9.4	9.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.20	1.00		1.00
Lane Grp Cap(c), veh/h	195	1223	525	46	926	395	320	0	322	333	350	
V/C Ratio(X)	0.79	0.62	0.14	0.67	0.70	0.06	0.67	0.00	0.40	0.79	0.76	
Avail Cap(c_a), veh/h	534	1332	571	321	1332	568	801	0	805	534	561	
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	1.00	0.00
Uniform Delay (d), s/veh	28.7	17.9	14.8	31.9	22.0	18.3	25.3	0.0	23.9	25.6	25.4	0.0
Incr Delay (d2), s/veh	2.7	0.7	0.1	6.0	1.0	0.1	0.9	0.0	0.3	1.6	1.3	0.0
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	2.4	4.4	0.7	0.5	4.3	0.3	3.0	0.0	1.7	3.9	3.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.4	18.7	14.9	37.9	23.0	18.3	26.2	0.0	24.2	27.2	26.7	0.0
LnGrp LOS	C	B	B	D	C	B	C	A	C	C	C	
Approach Vol, veh/h		978			704			344			530	A
Approach Delay, s/veh		20.4			23.5			25.5			27.0	
Approach LOS		C			C			C			C	

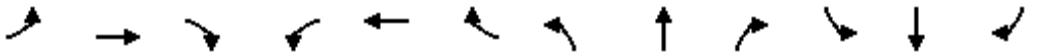
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	28.0		16.5	11.3	22.4		16.0				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	12.0	25.0		20.0	20.0	25.0		30.0				
Max Q Clear Time (g_c+I1), s	3.2	13.7		11.4	7.6	13.0		9.5				
Green Ext Time (p_c), s	0.0	4.0		1.1	0.2	3.4		0.7				

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

Notes

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

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	352	890	400	60	750	228	240	472	40	151	229	229
Future Volume (veh/h)	352	890	400	60	750	228	240	472	40	151	229	229
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.95	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	383	967	257	65	815	141	261	513	40	164	249	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	325	1325	569	84	843	358	488	468	36	272	286	
Arrive On Green	0.18	0.38	0.38	0.05	0.24	0.24	0.28	0.28	0.28	0.15	0.15	0.00
Sat Flow, veh/h	1767	3526	1514	1767	3526	1499	1767	1695	132	1767	1856	1572
Grp Volume(v), veh/h	383	967	257	65	815	141	261	0	553	164	249	0
Grp Sat Flow(s),veh/h/ln	1767	1763	1514	1767	1763	1499	1767	0	1828	1767	1856	1572
Q Serve(g_s), s	20.0	25.7	13.9	4.0	24.9	8.6	13.6	0.0	30.0	9.4	14.3	0.0
Cycle Q Clear(g_c), s	20.0	25.7	13.9	4.0	24.9	8.6	13.6	0.0	30.0	9.4	14.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	325	1325	569	84	843	358	488	0	504	272	286	
V/C Ratio(X)	1.18	0.73	0.45	0.78	0.97	0.39	0.54	0.00	1.10	0.60	0.87	
Avail Cap(c_a), veh/h	325	1325	569	195	843	358	488	0	504	325	341	
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	1.00	0.00
Uniform Delay (d), s/veh	44.4	29.2	25.5	51.2	40.9	34.8	33.5	0.0	39.4	42.9	44.9	0.0
Incr Delay (d2), s/veh	107.6	2.1	0.6	5.7	23.2	0.7	0.6	0.0	69.1	0.9	16.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.3	10.9	5.0	1.9	13.2	3.2	5.8	0.0	22.7	4.2	7.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	152.0	31.3	26.1	57.0	64.1	35.5	34.1	0.0	108.5	43.8	61.6	0.0
LnGrp LOS	F	C	C	E	E	D	C	A	F	D	E	
Approach Vol, veh/h		1607			1021			814			413	A
Approach Delay, s/veh		59.2			59.7			84.6			54.5	
Approach LOS		E			E			F			D	

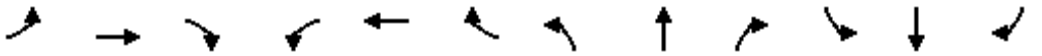
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.1	44.9		20.7	24.0	30.0		34.0				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	12.0	25.0		20.0	20.0	25.0		30.0				
Max Q Clear Time (g_c+I1), s	6.0	27.7		16.3	22.0	26.9		32.0				
Green Ext Time (p_c), s	0.0	0.0		0.5	0.0	0.0		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		64.2	
HCM 6th LOS		E	

Notes

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

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	352	890	400	60	750	228	240	472	40	151	229	229
Future Volume (veh/h)	352	890	400	60	750	228	240	472	40	151	229	229
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.95	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	383	967	298	65	815	156	261	513	41	164	249	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	402	1523	656	82	886	377	283	530	42	178	471	
Arrive On Green	0.23	0.43	0.43	0.05	0.25	0.25	0.16	0.31	0.31	0.10	0.25	0.00
Sat Flow, veh/h	1767	3526	1518	1767	3526	1501	1767	1692	135	1767	1856	1572
Grp Volume(v), veh/h	383	967	298	65	815	156	261	0	554	164	249	0
Grp Sat Flow(s),veh/h/ln	1767	1763	1518	1767	1763	1501	1767	0	1827	1767	1856	1572
Q Serve(g_s), s	31.8	32.0	20.7	5.4	33.5	12.9	21.7	0.0	44.5	13.7	17.2	0.0
Cycle Q Clear(g_c), s	31.8	32.0	20.7	5.4	33.5	12.9	21.7	0.0	44.5	13.7	17.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	402	1523	656	82	886	377	283	0	572	178	471	
V/C Ratio(X)	0.95	0.64	0.45	0.79	0.92	0.41	0.92	0.00	0.97	0.92	0.53	
Avail Cap(c_a), veh/h	404	1523	656	142	900	383	356	0	577	178	471	
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	1.00	0.00
Uniform Delay (d), s/veh	56.7	33.1	29.9	70.2	54.3	46.6	61.6	0.0	50.4	66.3	47.9	0.0
Incr Delay (d2), s/veh	32.5	0.9	0.5	6.2	14.3	0.7	22.9	0.0	29.1	44.7	0.6	0.0
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	17.7	13.8	7.6	2.6	16.5	4.9	11.5	0.0	24.7	8.4	8.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	89.3	34.0	30.4	76.4	68.6	47.3	84.5	0.0	79.5	111.0	48.5	0.0
LnGrp LOS	F	C	C	E	E	D	F	A	E	F	D	
Approach Vol, veh/h		1648			1036			815			413	A
Approach Delay, s/veh		46.2			65.9			81.1			73.3	
Approach LOS		D			E			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.9	68.3	27.9	41.8	37.8	41.4	19.0	50.6
Change Period (Y+Rc), s	4.0	5.0	4.0	4.0	4.0	5.0	4.0	4.0
Max Green Setting (Gmax), s	12.0	59.0	30.0	32.0	34.0	37.0	15.0	47.0
Max Q Clear Time (g_c+I1), s	7.4	34.0	23.7	19.2	33.8	35.5	15.7	46.5
Green Ext Time (p_c), s	0.0	8.7	0.2	0.8	0.0	0.9	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	61.5
HCM 6th LOS	E

Notes

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

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.