East Bay Municipal Utility District

Fontaine Pumping Plant Replacement Project

Final Transportation and Traffic Technical Report

September 2021

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East Bay Municipal Utility District

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1 Introduction

1.1 Project Overview

The East Bay Municipal Utility District (EBMUD) is proposing to replace its existing Fontaine Pumping Plant (PP) to address aging water distribution infrastructure and improve operational reliability and redundancy. Specifically, the Fontaine Pumping Plant Replacement Project (Project) includes the following three primary components:

- Demolition of the existing 20-million-gallon-per-day (mgd) Fontaine PP and construction of a new retaining wall (shown on Figure 1) at 8445 Ney Avenue in the City of Oakland (Alameda County) and abandonment of existing pipelines by cutting, capping, and filling the pipelines with cellular concrete at three existing pipeline abandonment disconnection sites (shown on Figure 2);
- Construction of a new 20-mgd PP and 24-inch rate control station (shown on Figure 3) at 9601 MacArthur Boulevard in the City of Oakland (Alameda County); and
- Installation of approximately 1,300 feet of new 30-inch-diameter suction pipeline and approximately 3,600 feet of new 30-inch-diameter discharge pipeline (using open trench construction methods) that would connect the new PP to the distribution system (shown on Figure 4).

The new PP would consist of three pumps, associated mechanical and electrical equipment, and a 24-inch-diameter rate control station located inside an approximately 45-feet wide, 50-feet long, and 23-feet tall building. The new PP site would include an approximate 25-foot-tall antenna, outdoor light fixtures, site accesses, a parking area, outdoor transformer and switchgear, and perimeter fencing. The Project would also include building architectural treatments and site landscaping as described in the *East Bay Municipal Utility District Fontaine Pumping Plant Replacement Project Aesthetics Conceptual Design Report* (Panorama Environmental, Inc., MWA Architects, and Dillingham Associates, 2021).

Figure 1 Existing Fontaine Pumping Plant (8445 Ney Avenue)

Figure 2 Existing Pipeline Abandonment Disconnection Sites

Figure 3 New Fontaine Pumping Plant (9601 MacArthur Boulevard)

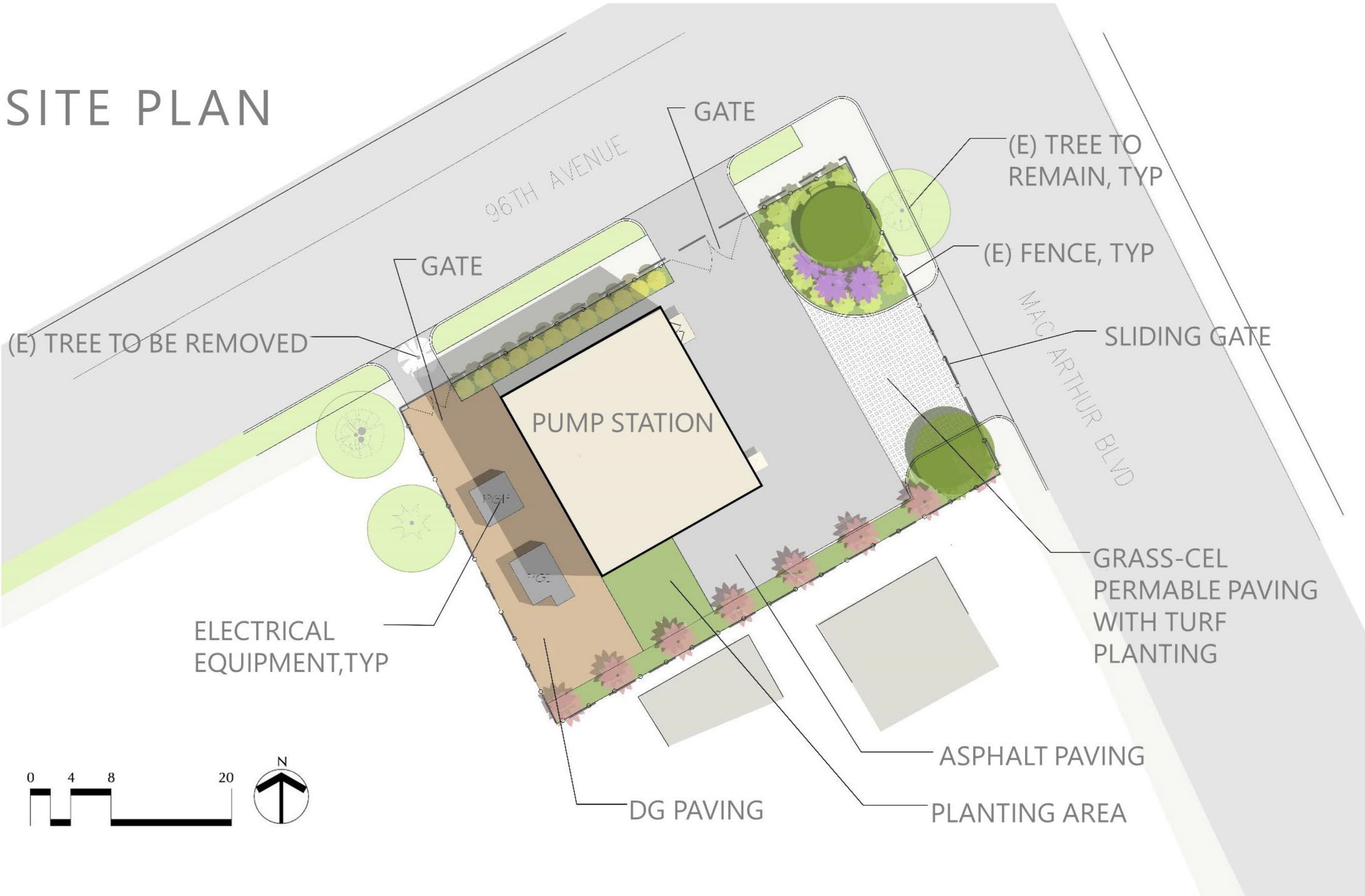


Figure 4 New Pumping Plant and New Pipeline Location

1.2 Definitions

1.2.1 Level of Service

Intersection Level of Service (LOS) is used to rank traffic operation on various types of facilities, based on traffic volumes and roadway capacity, using a series of letter designations ranging from A to F. LOS measures the operational effectiveness of a roadway or intersection. LOS A represents relatively free-flow conditions with little delay at intersections and LOS F represents a significantly congested condition where traffic flows can exceed design capacities resulting in long vehicle delays.

The Highway Capacity Manual (HCM) 2010 method used in this report to evaluate intersection operations calculates control delay at an intersection based on inputs including traffic volumes, lane geometry, intersection control, pedestrian crossing times, and peak-hour factors. Control delay is defined as the delay directly associated with the traffic control device and specifically includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

At signalized and all-way stopped controlled intersections, the LOS rating is the weighted average control delay of all movements measured in seconds per vehicle. At side-street stop-controlled intersections, LOS is calculated for each controlled movement, as well as for the whole intersection. Table 1 provides definitions of the LOS used in this analysis, as defined in the HCM.

1.2.2 Average Daily Traffic

Average daily traffic (ADT) is a term that describes the average number of vehicles or volume of traffic on a roadway segment over a weekday 24-hour period. ADT has been estimated for the Project area based on the standard capacity for each roadway type. ADT capacities have been determined from historical peak hour capacities of similar roadways in many different communities and are, therefore, generalizations ADT capacities are adjusted based on unique or non-standard road conditions. To adjust the capacities, a peak hour intersection analysis was performed to determine the peak hour volumes on the road. . Per the Federal Highway Administration’s (FHWA) Traffic Computation Method, peak hour traffic on a roadway typically represents 8 to 12 percent of daily traffic (FHWA, 2018). Using the middle of this range, the ADT was empirically estimated to be 10 times the peak hour traffic the following calculation:

Average daily traffic = (AM peak hour traffic + PM peak hour traffic)/2 x 10

1.2.3 Peak Hour Traffic

Peak hour traffic is the hour in which the four highest traffic volume 15-minute periods (consecutive) fall during the typical two-hour commute period. There is an AM and a PM peak hour traffic. The AM (7:00 a.m. to 9:00 a.m.) and PM (4:00 p.m. to 6:00 p.m.) commute periods are generally considered the peak flow of traffic during the weekday periods. Depending on the specific region, these periods can fluctuate by as much as an hour or more depending on a variety of factors, including commute distances, freeway operations, and local incidents.

The peak hour of traffic flow is determined from the AM and PM peak commute period counts. From these peak hour volumes, intersection LOS is calculated to understand each intersections operation. As previously indicated, operational conditions are assigned a letter grade from LOS A to LOS F.

1.2.4 Roadway Classifications

The local roadways described below include local residential streets, collector streets, and arterial streets. The Land Use and Transportation Element of the City of Oakland’s General Plan defines these street classifications as follows:

- **Local Streets** provide access to abutting property in residential neighborhoods and deliver traffic to and from the collector street system. Local streets have two travel lanes and generally discourage through traffic and high-speed travel.
- **Collector Streets** move traffic between local streets and the arterial street system and serve trips within and between neighborhoods. Residential collector streets typically have two lanes.
- **Arterial Streets** serve through-traffic between different sections of the City and define the form of residential, industrial, and commercial areas. Arterial streets have between two and six lanes and connect freeways with collector streets. Arterials are designed to carry heavy traffic volumes at speeds typically around 30-45 miles per hour (mph).

1.2.5 Bicycle Route Classes

Bicycle route classes are defined by the location of the bicycle route. The City of Oakland 2019 Oakland Bike Plan (Let’s Bike Oakland) identifies the following bicycle facility types.

Class 1 Shared Use Paths are located off-street and can serve both bicyclists and pedestrians. Recreational trails can be considered Class 1 facilities. Class 1 paths are typically 8 to 10 feet wide, excluding shoulders, and are generally paved.

Class 2 Bike Lanes provide a dedicated area for bicyclists within the paved street width using striping and appropriate signage. These facilities are typically 5 to 6 feet wide.

Class 2B Buffered Bike Lanes provide a dedicated area for bicyclists within the paved street separated from the motor vehicle travel lanes by a painted buffer.

Class 3 Bike Routes are located along streets that do not provide enough width for dedicated bicycle lanes. The street is then designated as a bicycle route using signage, informing drivers to expect bicyclists.

Class 3A Arterial Bike Routes are located along some arterial streets where bicycle lanes are not feasible and parallel streets do not provide adequate connectivity. Speed limits as low as 25 mph, and shared-lane bicycle stencils, wide curb lanes, and signage are used to encourage shared use. According to the 2019 Oakland Bike Plan, New Class 3A facilities will no longer be proposed.

Class 3B Neighborhood Bike Routes are located along residential streets with low traffic volumes. Assignment of right-of-way to the route, traffic calming measures, and bicycle traffic signal actuation are used to prioritize through-trips for bicycles.

Class 4 Protected Bike Lanes, also known as cycle tracks, provide space that is exclusively for bicyclists and separated from motor vehicle travel lanes, parking lanes, and sidewalks. Parked cars, curbs, bollards, or planter boxes provide physical separation between bicyclists and moving cars. Where on-street parking is allowed, it is placed between the bikeway and the travel lanes (rather than between the bikeway and the sidewalk, as is typical for Class 2 bike lanes).

Table 1 Level of Service

Level of Service	Type of Flow	Delay	Maneuverability	Intersection Control Delay (seconds/vehicle) Signalized	Un-signalized	All-Way Stop
A	Stable Flow	Very slight delay. Progression is very favorable, with most vehicles arriving during the green phase not stopping at all.	Turning movements are easily made, and nearly all drivers find freedom of operation.	< 10.0	< 10.0	< 10.0
B	Stable Flow	Good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles.	>10.0 and < 20.0	>10.0 and < 15.0	>10.0 and < 15.0
C	Stable Flow	Higher delays resulting from fair progression and longer cycles. Individual cycle failures begin to appear at level C. The number of vehicles stopping is significant, although many pass through the intersection without stopping.	Back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted.	>20.0 and < 35.0	>15.0 and < 25.0	>15.0 and < 25.0
D	Approaching Unstable Flow	Influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycles, or high volume-to-capacity ratios. Many vehicles stop, and proportion of vehicles not stopping declines. Cycle failures are noticeable.	Maneuverability is severely limited during short periods due to temporary back-ups.	>35.0 and < 55.0	>25.0 and < 35.0	>25.0 and < 35.0
E	Unstable Flow	Considered the limit of acceptable delay. Indicative of poor progression, long cycles, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences.	There are typically long queues of vehicles waiting upstream of the intersection.	>55.0 and < 80.0	>35.0 and < 50.0	>35.0 and < 50.0
F	Forced Flow	Considered unacceptable to most drivers. Often occurs with over saturation. May occur at high volume-to-capacity ratios. There are many individual cycle failures. Poor progression and long cycles are major contributing factors.	Jammed conditions. Back-ups from other locations restrict or prevent movement. Volumes vary widely, depending on downstream conditions.	> 80.0	> 50.0	> 50.0

2 Environmental Setting

2.1 Roadway Network

2.1.1 Regional Roadways

Interstate 880 (I-880) is a north-south freeway that runs through the City of Oakland. This portion of the freeway is a designated truck route and generally provides four travel lanes in each direction.

Interstate 580 (I-580) is an eight-lane, north-south freeway that parallels I-880 through the City of Oakland. Trucks over 4.5 tons, except passenger buses and paratransit vehicles, are prohibited on I-580 between Foothill Boulevard in San Leandro and Grand Avenue in Oakland (California Vehicle Code Section 35655.5), and thus would not provide direct access to the existing and new PP sites for large construction vehicles. Because trucks over 4.5 tons are prohibited on I-580 near the existing and new PP sites, large construction trucks going to and coming from the existing and new PP construction sites would use I-880.

2.1.2 Local Roadways

Existing Pumping Plant and Existing Pipeline Abandonment

82nd Avenue is an east-west, two-lane collector street serving single-family and low-rise multi-family homes. 82nd Avenue connects to Aster Avenue, Ney Avenue, and Golf Links Road, extending to the western edge of East Oakland. On-street parking is allowed on both sides of the street. There are no speed limit signs present; therefore, the prima facie speed limit is 25 mph based on the land uses. As detailed below in Section 2.3, three transit lines serve 82nd Avenue and there is not a bike route.

Aster Avenue is a north-south, two-lane local street serving largely single-family homes. Aster Avenue connects to 82nd Avenue to the north and Ney Avenue to the south. On-street parking is allowed on both sides of the street. There are no speed limit signs present; therefore, the prima facie speed limit is 25 mph based on the land uses. Aster Avenue does not provide a transit or bike route.

Fontaine Street is a north-south, four-lane collector street. Within the vicinity of the Project, Fontaine Street connects residential uses to local schools, including Howard Elementary School, Bay Area Technology School, and Rudsdale Continuation School. Fontaine Street runs parallel to I-580 to the west for most of the corridor and merges into Golf Links Road at its southwestern terminus. On-street parking is allowed on both sides of the street for much of the corridor, with time limitations in effect in front of schools. Speed limits range between 25 and 30 mph. As detailed below in Section 2.3, three transit lines serve Fontaine Street and there is not a bike route.

Golf Links Road is a north-south, two-lane collector street serving largely single-family homes. Golf Links Road terminates at 82nd Avenue to the north and continues south past I-580. On-street parking is allowed on the south side of the street. There are no speed limit signs present, therefore, the prima facie speed limit is 25 mph based on the land uses. As detailed below in Section 2.3, three transit lines serve Golf Links Road. Golf Links Road does not provide a bike route.

Ney Avenue is a north-south, two-lane local street serving largely single-family homes. Ney Avenue connects to 82nd Avenue to the north and Aster Avenue to the south. On-street parking is allowed on both sides of the street. There are no speed limit signs present, therefore, the prima facie speed limit is 25 mph based on the land uses. Ney Avenue does not provide a transit or bike route.

New Pumping Plant and New Pipelines

96th Avenue is an east-west, two-lane local street serving a mix of single-family homes and low-rise multifamily homes. 96th Avenue passes through Bancroft Avenue and terminates at MacArthur Boulevard. On-street parking is allowed on both sides of the street. There are no speed limit signs present; therefore, the prima facie speed limit is 25 mph based on the land uses. 96th Avenue does not provide a transit or bike route.

98th Avenue is an east-west, three- to four-lane, arterial street connecting I-580 and Oakland International Airport with residential and retail land use in Oakland. Between Bancroft Avenue and MacArthur Boulevard, 98th Avenue is a four-lane road with a center median and left-turn pockets approaching intersections. Most of 98th Avenue in the vicinity of the Project site provides on-street parking, and the posted speed limit varies between 25 and 35 mph depending on location. Transit lines serve 98th Avenue and are described below in Section 2.3. As detailed below in Section 2.4, a Class 2 Bicycle Lane is provided on 98th Avenue west of Bancroft Avenue.

99th Avenue is an east-west, two-lane local street serving a mix of single-family homes and low-rise multifamily homes. 99th Avenue passes through MacArthur Boulevard and terminates at Stanley Avenue. On-street parking is allowed on both sides of the street. There are no speed limit signs present; therefore, the prima facie speed limit is 25 mph. 99th Avenue does not provide a transit or bike route.

Bancroft Avenue is a north-south two-lane arterial street with left-turn pockets approaching intersections and a large center median. Most of Bancroft Avenue provides on-street parking and the posted speed limit varies between 25 and 30 mph depending on location. Transit lines serve Bancroft Avenue corridor and are described below in Section 2.3. A Class 2 Bike Lane is provided along Bancroft Avenue near the Project site, as discussed in Section 2.4.

MacArthur Boulevard is a north-south, two- to four-lane, arterial street connecting I-580 with residential and retail land use in Oakland. Between 99th Avenue and 96th Avenue, MacArthur Boulevard is a three- to four-lane road. Most of MacArthur Boulevard provides on-street parking and the posted speed limit varies between 25 and 30 mph depending on location. Transit lines serve MacArthur Boulevard and are described below in Section 2.3. MacArthur Boulevard does not currently provide a bike route. However, as detailed below in Section 2.4, a Class 2 Bicycle Lane is proposed on MacArthur Boulevard along the Project's frontage.

Stanley Avenue is a north-south, two-lane collector street running adjacent to I-580 and terminates at 98th Avenue. Stanley Avenue is lined by residential uses to the west and a freeway barrier to the east. On-street parking is allowed on both sides of the street and the posted speed limit is 30 mph. Transit does not serve this corridor. Stanley Avenue is categorized as a Class 3 Bike Route.

2.1.3 Traffic Operations

Study Intersection Selection

Anticipated construction volumes for all Project components, including demolishing the existing PP, activities at existing pipeline abandonment disconnection sites, construction of the new PP, and installation of the new pipeline, were provided by EBMUD. These volumes were reviewed to identify the construction phases that would result in the maximum construction impacts to traffic which include demolishing the existing PP on Ney Avenue, construction of the new PP on MacArthur Boulevard, and concurrent installation of new pipelines on 96th Avenue, MacArthur Boulevard, and 99th Avenue with the new PP. The traffic operations analysis for the Project conservatively focuses on maximum construction impacts to traffic at these locations because the period of maximum construction related traffic is most likely to trigger significant impacts and the need for mitigation. Other construction activities with less traffic would be expected to have less impact compared to the maximum construction traffic condition.

Study Intersections

Seven study intersections were identified for this analysis, including two at the existing PP and five at the new PP and pipeline alignments. These intersections are presented below.

Existing Pumping Plant

At the existing PP, two intersections were identified for analysis to address maximum construction related impacts associated with demolishing the existing PP. The following two study intersections were identified for analysis:

1. Ney Avenue / El Monte Avenue
2. El Monte Avenue / Golf Links Road

New Pumping Plant and New Pipelines

At the new PP, maximum construction related impacts to traffic would occur during concurrent pipeline and new PP construction work along 96th Avenue and MacArthur Boulevard. Because the pipeline construction continues onto 99th Avenue and terminates at Stanley Avenue, traffic operations on 99th Avenue are also assessed. The following five study intersections were identified for analysis:

3. Bancroft Avenue / 96th Avenue
4. MacArthur Boulevard / 96th Avenue
5. MacArthur Boulevard / 98th Avenue
6. MacArthur Boulevard / 99th Avenue
7. Stanley Avenue / 99th Avenue

2.1.4 Existing (Current) Conditions

Due to the COVID-19 pandemic, traffic volumes have decreased, resulting in atypical and non-representative traffic levels in the area. As a result, alternative methods to estimate current traffic volumes were used. Traffic volumes were estimated for each study intersection through a combination of geographic information system (GIS) analysis and traffic counts collected in 2015 by Fehr & Peers for the Oak Knoll Mixed Use Community Project Environmental Impact Report (EIR) in East Oakland (City of Oakland, 2016). To estimate traffic generation on Ney Avenue, El Monte Avenue, 96th Avenue, and 99th Avenue, it was assumed that these streets only serve as local residential streets and are not used for through traffic. Alameda County parcel data was analyzed in GIS to estimate the number of residential units using the study intersections during the peak hours. Near the existing PP site and existing pipeline abandonment disconnection sites, approximately 58 dwelling units are served by the Ney Avenue and El Monte intersections and approximately 64 dwelling units are served by the Golf Links Road and El Monte Avenue intersection. Near the new PP site and new pipelines, approximately 172 dwelling units are served by 96th Avenue and approximately 100 dwelling units are served by 99th Avenue. The dwelling units were distributed between the Bancroft Avenue intersection and the MacArthur Boulevard intersection on 96th Avenue and between the MacArthur Boulevard intersections and Stanley Avenue intersection on 99th Avenue.

Dwelling units were multiplied by the trip generation rate provided in the Institute of Transportation Engineers Trip Generation Manual, 10th Edition for Single-Family or Low-Rise Multifamily land use codes depending on the housing type coded to each parcel. For intersections allowing left, right, and through movements, traffic assignment was based on area land use patterns and thus 45 percent turn right, 45 percent turn left, and 10 percent proceed straight. If a straight movement is not allowed, the traffic was distributed equally to the right- and left-turn movements. The outputs of this analysis provided 2020 traffic volume estimates for coming from and going to Ney Avenue, El Monte Avenue, 96th Avenue, and 99th Avenue.

The outputs of this analysis were combined with northbound and southbound traffic movements derived from counts collected in 2015 at the Golf Links Road intersection with

Fontaine Street and the 98th Avenue intersections with Bancroft Avenue, MacArthur Boulevard, and Stanley Avenue. Using traffic data from these intersections, the northbound and southbound traffic on Golf Links Road, Bancroft Avenue, MacArthur Boulevard, and Stanley Avenue was calculated. The northbound and southbound traffic was multiplied by one percent per year for five years to establish 2020 traffic. The one percent growth factor is consistent with the upper bounds of growth used by the California Department of Transportation (Caltrans) when forecasting traffic in Alameda County.[1] This guidance has been applied to multiple highway improvement projects on I-880, I-580, and I-680 over the past 20 years.

Table 2 summarizes the existing (year 2020) weekday daily, AM peak hour, and PM peak hour road segment traffic volumes. Figure 5 shows the AM and PM peak hour intersection turning movements used in the intersection operations analysis. These volumes were input into Synchro software along with other intersection features such as geometry and traffic control and the intersection delay and LOS was calculated using the HCM 2010 methods (Transportation Research Board, 2010). This method is documented in Chapter 16 (Signalized Intersections) and Chapter 17 (Unsignalized Intersections) of the HCM. For description of delay and LOS, see Section 1.2.1. Table 3 presents the intersection analysis results for the study intersections listed above. The detailed intersection analysis worksheets are provided in Appendix A.

[1] For comparison, the 2015 Oak Knoll Mixed Use Community Project EIR included the MacArthur Boulevard/98th Avenue intersection as a study intersection and used a growth rate of 0.9 percent for future conditions analysis.

Table 2 Existing (2020) Daily and Peak Hour Traffic Volumes

Roadway	Location	Average Daily Traffic[a]	AM Peak Hour[b]	PM Peak Hour[c]
Existing Pumping Plant and Existing Pipeline Abandonment				
1. Golf Links Road	Between 82nd Avenue and El Monte Avenue	6,960	792	600
New Pumping Plant and New Pipelines				
2. Bancroft Avenue	Between 96th Avenue and 98th Avenue	11,765	1,146	1,207
3. MacArthur Boulevard	Between 96th Avenue and 99th Avenue	7,388	720	758
4. 96th Avenue	Between Bancroft Avenue and MacArthur Boulevard	425	38	48
5. 98th Avenue	Between Bancroft Avenue and MacArthur Boulevard	15,655	1,526	1,605
6. 99th Avenue	Between MacArthur Boulevard and Stanley Avenue	420	36	48

a Average Daily Traffic over a 24 hour period is empirically estimated to be 10 times the Peak Hour Traffic. Therefore, Average Daily Traffic = (AM Peak Hour Traffic + PM Peak Hour Traffic)/2 x 10

b Maximum hourly volume between the hours of 7:00 and 9:00 AM.

c Maximum hourly volume between the hours of 4:00 and 6:00 PM.

Source: Fehr & Peers, 2020

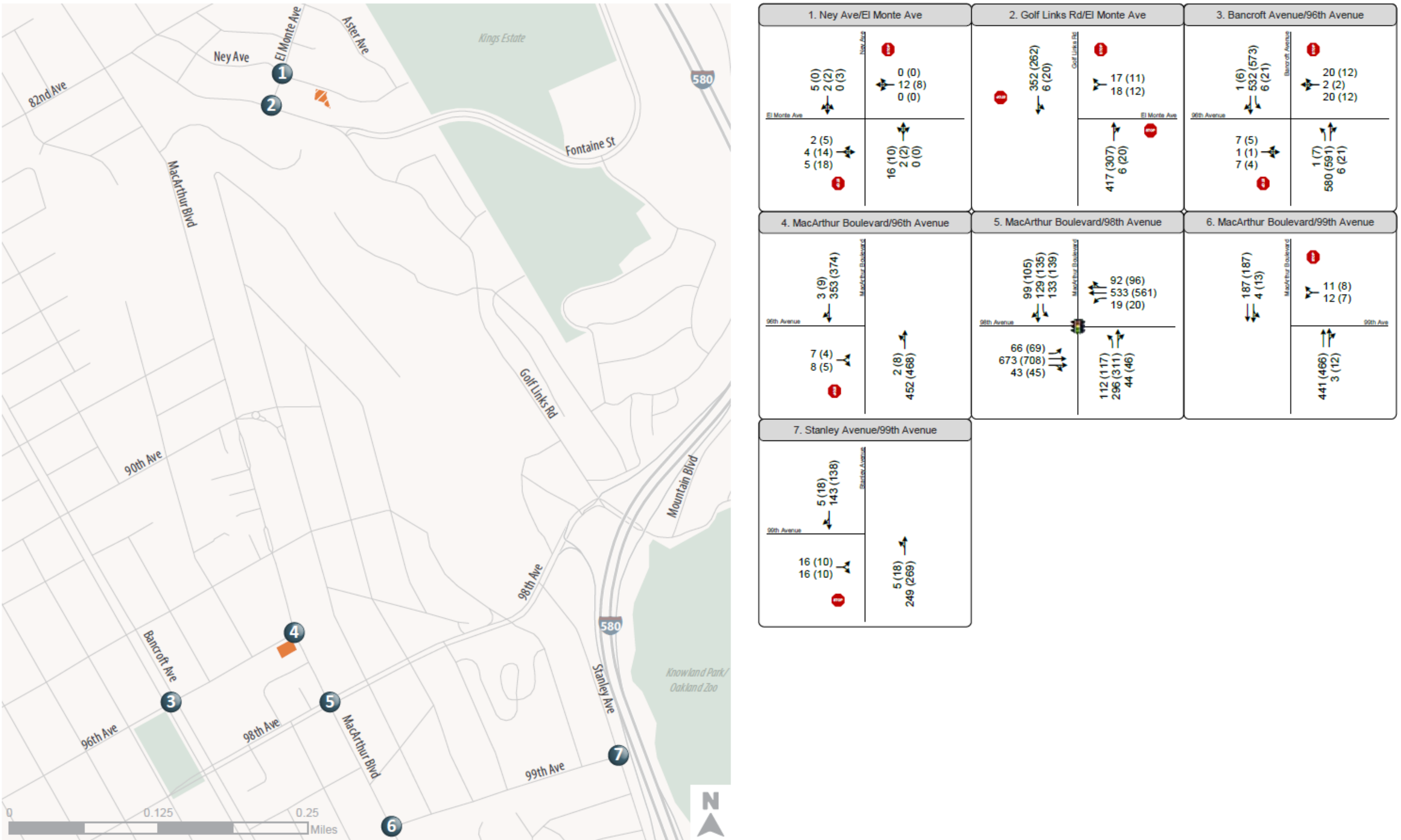
Table 3 Existing (2020) Peak Hour Intersection Levels of Service

Intersection	Control	Peak Hour	Existing	
			Delay[a]	LOS
Existing Pumping Plant and Existing Pipeline Abandonment				
1. Ney Avenue/El Monte Avenue	Side-Street Stop	AM	6.7 (9.3)	A (A)
		PM	8.0 (9.2)	A (A)
2. Golf Links Road/El Monte Avenue	All-Way Stop	AM	12.4	B
		PM	10.1	B
New Pumping Plant and New Pipelines				
3. Bancroft Avenue/96th Avenue	Side-Street Stop	AM	1.1 (21.6)	A (C)
		PM	0.9 (24.4)	A (C)
4. MacArthur Boulevard/96th Avenue	Side-Street Stop	AM	0.2 (12.9)	A (B)
		PM	0.2 (13.1)	A (B)
5. MacArthur Boulevard/98th Avenue	Signal	AM	30.2	C
		PM	30.3	C
6. MacArthur Boulevard/99th Avenue	Side-Street Stop	AM	0.5 (11.5)	A (B)
		PM	0.4 (11.7)	A (B)
7. Stanley Avenue/99th Avenue	Side-Street Stop	AM	0.8 (10.4)	A (B)
		PM	0.8 (10.6)	A (B)

[a] Average vehicle delay in seconds. For side-street stop control intersections, average delay is listed first followed by (delay for the worst approach)

Source: Fehr & Peers, 2020

Figure 5 Existing (2020) Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls



XX (YY) AM (PM) Peak Hour Traffic Volumes | Signalized Intersection | Stop Sign

New Project Site | Existing Project Site | Study Intersection

2.1.5 Construction-Year (2025) Conditions

Because construction is expected to begin in 2025, construction-year baseline traffic projections account for a one percent per year growth compounded over five years and added to year 2020 traffic volumes for all road segments and study intersections presented above. Table 4 shows construction-year traffic projections for each study segment. Corresponding intersection levels of service for construction-year baseline conditions are summarized in Table 5. Construction-year baseline peak hour intersection volumes are shown on Figure 6. Detailed intersection LOS analysis worksheets are provided in Appendix A.

Table 4 Construction-Year (2025) Baseline Daily and Peak Hour Traffic Volumes

Roadway	Location Between	Average Daily Traffic[a]	AM Peak Hour[b]	PM Peak Hour[b]
Existing Pumping Plant and Existing Pipeline Abandonment				
1. Golf Links Road	Between 82nd Avenue and El Monte Avenue	7,300	830	630
New Pumping Plant and New Pipelines				
2. Bancroft Avenue	96th Avenue and 98th Avenue	12,350	1,200	1,270
3. MacArthur Boulevard	96th Avenue and 99th Avenue	7,800	760	800
4. 96th Avenue	Bancroft Avenue and MacArthur Boulevard	450	40	50
5. 98th Avenue	Between Bancroft Avenue and MacArthur Boulevard	16,450	1,600	1,690
6. 99th Avenue	MacArthur Boulevard and Stanley Avenue	450	40	50

[a] Average Daily Traffic over a 24 hour period is empirically estimated to be 10 times the Peak Hour Traffic. Therefore, Average Daily Traffic = (AM Peak Hour Traffic + PM Peak Hour Traffic)/2 x 10

[b] Maximum hourly volume between the hours of 7:00 and 9:00 AM and the hours between 4:00 and 6:00 PM.

Table Note:

Although the analysis applies year 2025 as the construction-year, traffic volumes generally do not significantly increase year over year and these projected traffic volumes would remain valid for a period of two to three years after the currently projected construction-year.

Source: Fehr & Peers, 2020

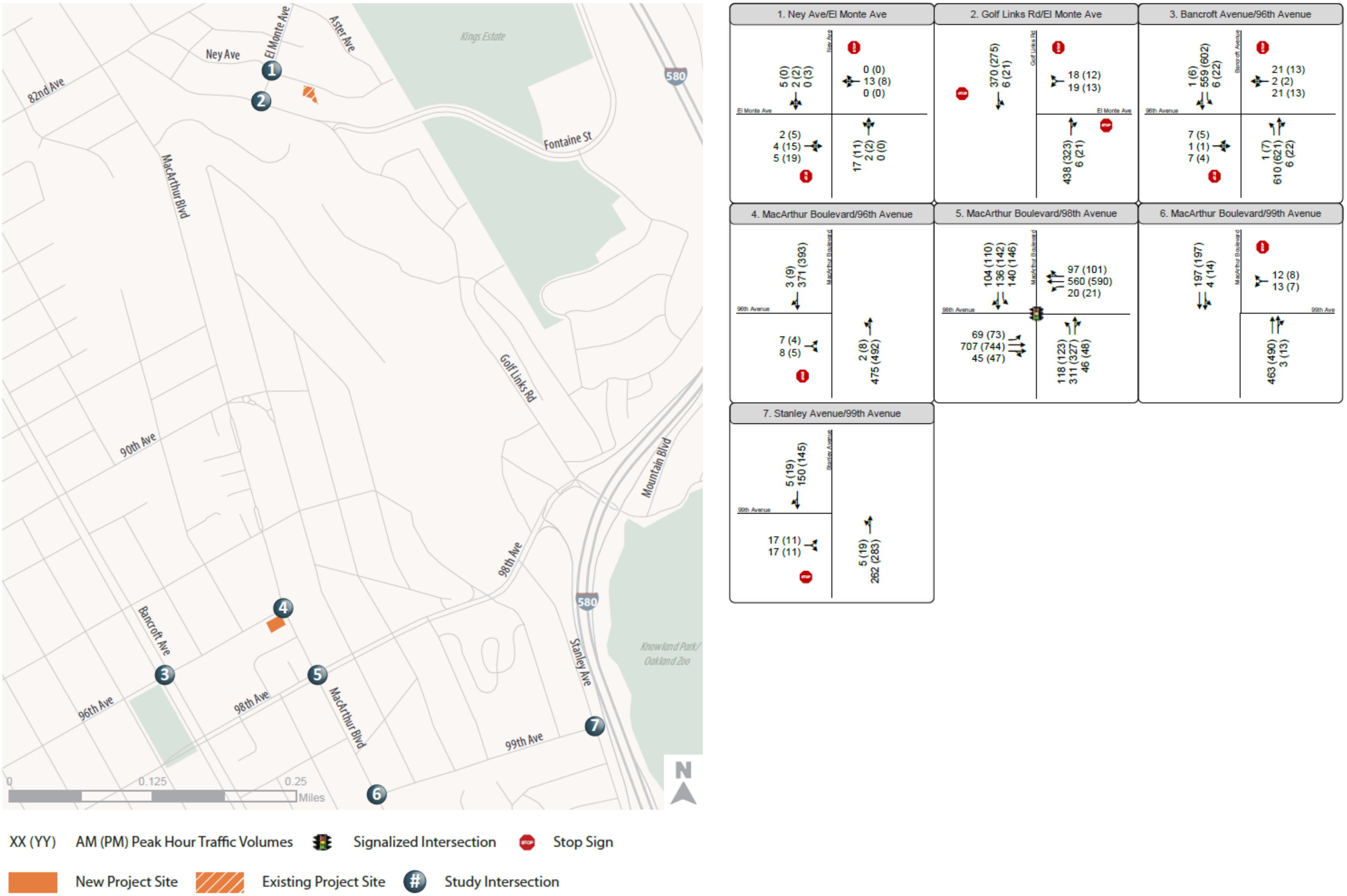
Table 5 Construction-Year (2025) Baseline Peak Hour Intersection Levels of Service

Intersection	Control	Peak Hour	2025 Baseline	
			Delay[a]	LOS
Existing Pumping Plant and Existing Pipeline Abandonment				
1. Ney Avenue/El Monte Avenue	Side-Street Stop	AM	6.9 (9.4)	A (A)
		PM	8.0 (9.3)	A (A)
2. Golf Links Road/El Monte Avenue	All-Way Stop	AM	13.0	B
		PM	10.4	B
New Pumping Plant and New Pipelines				
3. Bancroft Avenue/96th Avenue	Side-Street Stop	AM	1.1 (23.5)	A (C)
		PM	1.0 (26.5)	A (D)
4. MacArthur Boulevard/96th Avenue	Side-Street Stop	AM	0.2 (13.2)	A (B)
		PM	0.2 (13.5)	A (B)
5. MacArthur Boulevard/98th Avenue	Signal	AM	31.2	C
		PM	32.3	C
6. MacArthur Boulevard/99th Avenue	Side-Street Stop	AM	0.5 (11.7)	A (B)
		PM	0.4 (12.0)	A (B)
7. Stanley Avenue/99th Avenue	Side-Street Stop	AM	0.8 (10.6)	A (B)
		PM	0.8 (10.8)	A (B)

[c] Average vehicle delay in seconds. For side-street stop control intersections, average delay is listed first followed by (delay for the worst approach)

Source: Fehr & Peers, 2020

Figure 6 Construction-Year (2025) Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls



2.2 Transit Service

The Project area is served by multiple Alameda-Contra Costa (AC) Transit bus routes. While many transit lines have been impacted by the COVID-19 pandemic, several transit lines served the Project area regularly before the pandemic. It is unclear how or if existing transit lines near the Project site will change by the start of Project construction. Assuming limited changes, AC Transit bus lines 46, 46L, and 646 stop near the existing PP and existing pipeline abandonment disconnection sites at the Golf Links Road/Fontaine Street intersection. All three lines connect riders to the Coliseum BART station to the west, with bus line 646 specifically servicing schools along the route.

Bus lines 57, 90, NX3, and NXC travel along construction areas at the new PP site on MacArthur Boulevard between 96th Avenue and 99th Avenue on weekdays and weekends at all hours of the day. Bus line 40 travels along Bancroft Avenue between the City of San Leandro and Downtown Oakland. In the east-west direction, bus line 98 travels along 98th Avenue and takes riders to the Coliseum Bay Area Rapid Transit Station. Two Alameda-Contra Costa Transit District (AC Transit) bus lines, 680 and 652, service as school lines with stops near the study area along MacArthur Boulevard. Bus stops are provided at all study intersections associated with the new PP construction, except at Stanley Avenue and 99th Avenue. Figure 7 shows the existing transit routes near the existing and new PP.

2.3 Pedestrian/Bicycle Circulation

2.3.1 Pedestrian Facilities

Pedestrian facilities, which include sidewalks, crosswalks, and pedestrian signals, are described by Project area below. Figure 8 shows the existing pedestrian facilities near the existing PP, existing pipeline abandonment disconnection sites, new PP, and new pipeline alignments.

Existing Pumping Plant and Existing Pipeline Abandonment

Sidewalks exist for the most part on both sides of the road within the neighborhood surrounding the existing PP site and existing pipeline abandonment disconnection sites, including on Ney Avenue and most of El Monte Avenue and Golf Links Road. The exceptions include a 100-foot segment of El Monte Avenue between Ney Avenue and Aster Avenue and the east side of Golf Links Road between El Monte Avenue and Fontaine Avenue, which do not have a sidewalk. Pedestrian crossings are allowed at each of the two study intersections near the existing PP, but no marked crosswalks are provided.

New Pumping Plant and New Pipelines

Sidewalks exist for the most part on both sides of the road within the neighborhood surrounding the new PP site and new pipeline alignments, including on Bancroft Avenue, MacArthur Boulevard, 96th Avenue, and most of 99th Avenue. The one exception, a 250-foot segment of 99th Avenue approaching Stanley Avenue, does not have a sidewalk. Pedestrian crossings are allowed at each intersection, and both the MacArthur Boulevard intersections at 96th Avenue and 99th Avenue provide a marked crosswalk across MacArthur Boulevard. Within the Project vicinity, Bancroft Avenue and 98th Avenue are considered High Injury Corridors, or corridors with the highest share of traffic-related injury collisions citywide, based on the 2017 Oakland Pedestrian Plan.

2.3.2 Bicycle Facilities

Bicycle facilities, which include the bicycle routes described in Section 1.2.5, are described by Project area below. Figure 8 shows the existing bicycle facilities near the existing PP, existing pipeline abandonment disconnection sites, new PP, and new pipeline alignments.

Existing Pumping Plant and Existing Pipeline Abandonment

There are no existing bicycle facilities directly adjacent to or near the existing PP or existing pipeline abandonment disconnection sites on El Monte Avenue or Ney Avenue. A Class 3 Bike Route is proposed along Golf Links Road between 82nd Avenue and 98th Avenue near the southernmost existing pipeline abandonment disconnection site; however, it is unclear when this facility will be constructed.

New Pumping Plant and New Pipelines

There are no existing bicycle facilities directly adjacent to or near the new PP or pipeline alignments on MacArthur Boulevard, 96th Avenue, or 99th Avenue. Bancroft Avenue is a designated Class 2 Bike Lane with striped lanes in both the north and south direction. Stanley Avenue is categorized as a Class 3 Bike Route. There is also a Class 2 Bike Lane on 98th Avenue west of Bancroft Avenue. The 2019 "Let's Bike Oakland" Bike Plan proposes a Class 1 Shared Use Path within the Bancroft Avenue median and a Class 2 Bike Lane along MacArthur Boulevard; however, it is unclear when these facilities will be constructed.

Figure 7 Existing Transit Routes

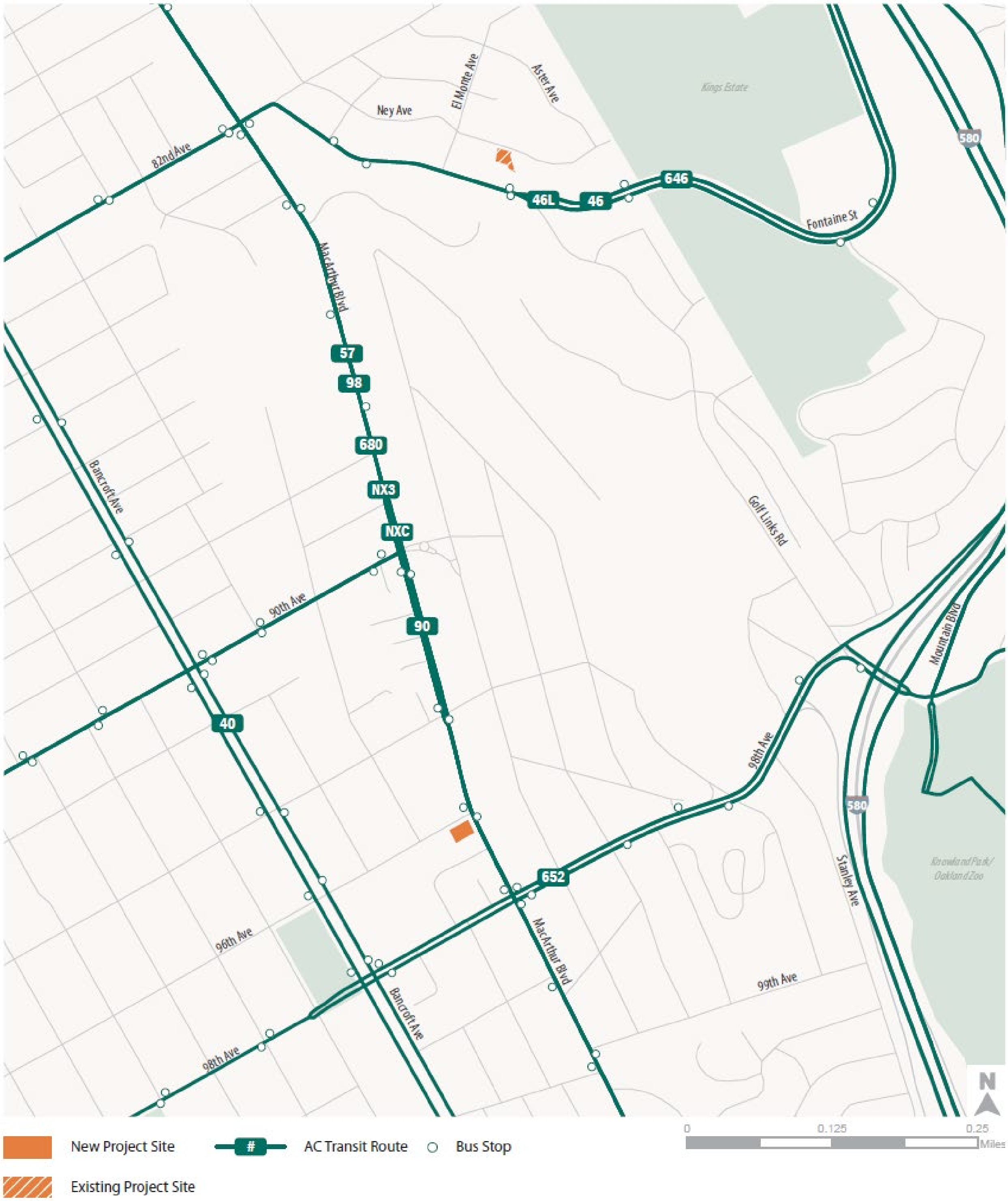
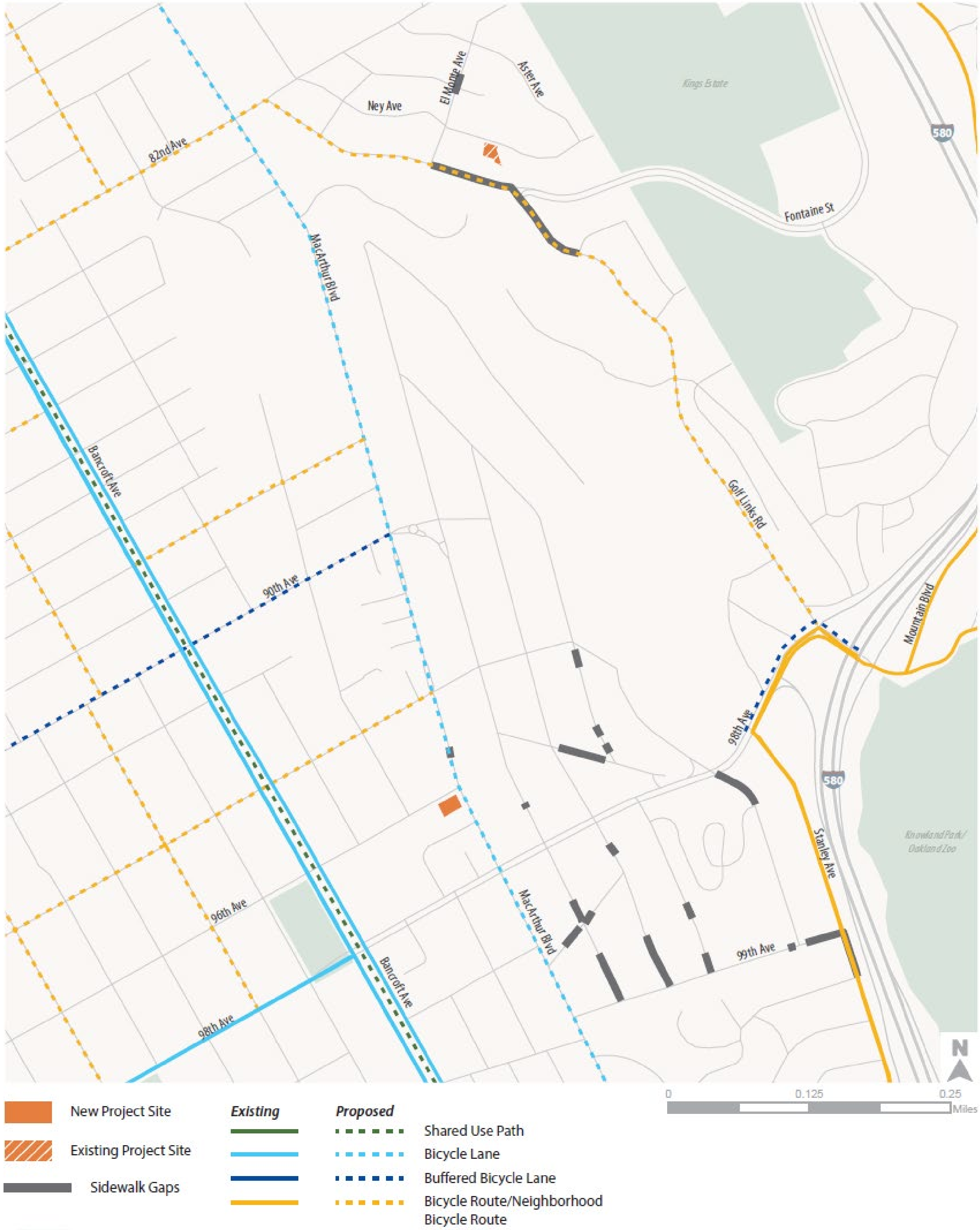


Figure 8 Existing Bicycle and Pedestrian Facilities



3 Regulatory Setting

3.1 Federal Regulations

The Code of Federal Regulations (CFR) includes the general and permanent rules published in the Federal Register by the executive departments and agencies of the federal government. The rules under Title 49 of the CFR address safety considerations for the transport of goods, materials, and substances and govern the transportation of hazardous materials, including types of materials and marking of the transportation vehicles.

3.2 State Regulations

Caltrans manages interregional transportation, including management and construction of the California highway system. Caltrans is also responsible for permitting and regulation of the use of State roadways. Caltrans requires that permits be obtained for transportation of oversized loads and transportation of certain materials, and for construction-related rail-traffic disturbance.

3.2.1 Senate Bill 743

On September 27, 2013, Senate Bill (SB) 743 was signed into law, building on legislative changes from SB 375 and Assembly Bill (AB) 32. SB 743 began the process to modify how impacts to the transportation system are assessed for purposes of California Environmental Quality Act (CEQA) compliance. SB 743 created a shift in transportation impact analysis under CEQA from a focus on automobile delay, as measured by LOS and similar metrics, toward a focus on reducing vehicle miles traveled (VMT).

SB 743 also includes amendments that revise the definition of "infill opportunity zones" to allow cities and counties to opt out of traditional LOS standards established by Congestion Management Programs, and requires the Governor's Office of Planning and Research to update the CEQA Guidelines and establish criteria for determining the significance of transportation impacts. The statute states that upon certification of the new criteria, automobile delay, as described solely by LOS or similar measures of vehicular capacity or traffic congestion, would not be considered a significant impact on the environment under CEQA, except in certain locations specifically identified in the new criteria.

The new criteria, contained in CEQA Guidelines Section 15064.3, were certified and adopted in December 2018. Section 15064.3 states that VMT is the most appropriate metric to assess transportation impacts and that, with limited exceptions, a Project's effect on automobile delay does not constitute a significant environmental impact.

CEQA Guidelines Section 15064.3 provides that a lead agency may elect to be governed by the new provisions immediately, and that the provisions will apply statewide beginning on July 1, 2020. On September 21, 2016, the City of Oakland Planning Commission updated Oakland's CEQA Thresholds of Significance Guidelines aligning with SB 743 described below.

3.3 Local Regulations

Pursuant to California Government Code Section 53091, EBMUD, as a local agency and utility district, is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities for the production, generation, storage, treatment, or transmission of water. However, EBMUD's practice is to work with local jurisdictions and neighboring communities during project planning and to consider local environmental protected policies for guidance.

3.3.1 Alameda County Transportation Commission Congestion Management Program

The Alameda County Transportation Commission (Alameda CTC) plans, funds, and delivers transportation programs and projects that expand access to and improve mobility for Alameda County (Alameda CTC, 2017). Alameda CTC combines the functions of two formerly separate agencies: the Alameda County Congestion Management Agency and the Alameda County Transportation Improvement Authority. Alameda CTC delivers the Expenditure Plan for Measure BB, the one-cent Alameda County sales tax dedicated to funding transportation projects. The Expenditure Plan contains a number of capital projects (e.g., freeway widening, interchange improvements, high-occupancy vehicle lanes, BART extensions, and transit station development), as well as programs for local street and road improvements (e.g., fixing potholes), special transportation services for seniors and disabled individuals, bicycle and pedestrian safety, and transit operations. As the congestion management agency, the Alameda CTC is also responsible for managing the Congestion Management Program (CMP). The CMP for Alameda County incorporates various strategies and practices to improve congestion management on the Alameda County multi-modal transportation system, including LOS monitoring of a designated CMP roadway network (Alameda CTC, 2017). The CMP indicates a standard of LOS E for the freeway segments along I-580 and I-880 in the vicinity of the Project sites.

3.3.2 City of Oakland Plans and Policies

The City of Oakland's adopted plans and policies shape the transportation analysis framework. The overall goals of these policies are to achieve an effective, sustainable, multi-modal transportation system for the City, including the City's Complete Streets Policy, General Plan Land Use and Transportation Element (1998), Bicycle Master Plan (2007b), and Pedestrian Master Plan (2017a), which affirm that the City will provide transportation facilities that are safe and convenient for all users of the roadway, including pedestrians, bicyclists, motorists, persons with disabilities, users and operators of public transit, seniors, children, and movers of commercial goods. Applicable plans and policies are described in further detail below.

City of Oakland Transportation Impact Review Guidelines

The City of Oakland Transportation Impact Review Guidelines include the City's significance criteria, thresholds of significance, and screening criteria related to VMT for analysis in CEQA document/transportation studies (City of Oakland, 2017b). At the City's discretion, intersection operations analysis may be recommended if the development project would generate more than 800 peak-hour vehicle trips or 400 peak hour transit trips. According to the City of Oakland Transportation Impact Review Guidelines, a project would have a significant effect on the environment if it would:

- "Conflict with a plan, ordinance, or policy addressing the safety or performance of the circulation system, including transit, roadways, bicycle lanes, and pedestrian paths (except for automobile level of service or other measures of vehicle delay); or
- Cause substantial additional VMT per capita, per service population, or other appropriate efficiency measure; or
- Substantially induce additional automobile travel by increasing physical roadway capacity in congested areas (i.e., by adding new mixed-flow lanes) or by adding new roadways to the network."

Public services (e.g., police, fire stations, public utilities) do not generally generate VMT. Instead, these land uses are often built in response to development from other land uses (e.g., office and residential). Therefore, public services land uses can be presumed to have impacts that are less than significant on VMT. However, the less-than-significant impacts on VMT would not apply if a project is in a location that would require employees or visitors to travel substantial distances, and is not within 0.5-mile of a major transit stop or does not meet the small project screening criterion.

City of Oakland Public Transit and Alternative Modes Policy

The City of Oakland adopted the Public Transit and Alternative Modes Policy, also known as the "Transit-First Policy," in October 2006 (City Council Resolution 73036 C.M.S.). This resolution supports public transit and other alternatives to single-occupant vehicles and directs the Land Use and Transportation Element of the City's General Plan to incorporate "various methods of expediting transit services on designated streets and encouraging greater transit use." The resolution also directs the City, in constructing and maintaining its transportation infrastructure, to resolve any conflicts between public transit and single-occupant vehicles on City streets in favor of the transportation mode that provides the greatest mobility for people rather than vehicles giving due consideration to the environment, public safety, economic development, health, and social equity impacts.

City of Oakland Complete Streets Policy

The City of Oakland adopted the Complete Streets Policy to Further Ensure that Oakland Streets Provide Safe and Convenient Travel Options for all Users in January 2013 (City Council Resolution 84204 C.M.S.). This resolution, consistent with the California Complete Streets Act of 2008, directs the City of Oakland to plan, design, construct, operate, and maintain the street network in the City to accommodate safe, convenient, comfortable travel for all modes, including pedestrians, bicyclists, transit users, motorists, trucks, and emergency vehicles (City of Oakland, 2013).

Construction Requirements

Specific traffic control requirements are provided in the 2017 City of Oakland's *Supplemental design guidance: Accommodating pedestrians, bicyclists, and bus facilities in construction zones*. Specific procedures related to transportation and traffic that are required by the City of Oakland for construction are summarized below:

- Pedestrian Accommodation
  - Any blockage of sidewalk must be mitigated through a sidewalk diversion or detour following the requirements:

Reasonable Accommodation for Pedestrians By Location

Treatment[a]	Downtown & within 0.25 miles of a BART Station	Neighborhood commercial areas and major transit corridors[b]	All other areas
Sidewalk diversion[c]	Acceptable [a]	Acceptable	Acceptable
Sidewalk detour[d]	Not Acceptable	Not Acceptable	Acceptable
Max duration of temporary sidewalk detour	4 hours Flagger required throughout duration of closure	24 hours Flagger required throughout duration of closure	One week Flagger required during peak traffic

a. For all: Acceptable only if Traffic Control Plan is deemed sufficient and approved.

b. A map of neighborhood commercial areas and major transit corridors can be found in the *Supplemental Design Guidance memorandum*.

c. A sidewalk diversion is a temporary path created with traffic barriers for pedestrians to circumvent a construction-related obstacle.

d. A sidewalk detour is a sidewalk closure with signage directing pedestrians to use an alternative path.

  - Pedestrian diversions must always be clearly identified, wheelchair usable, shielded from motor vehicle traffic, and free of pedestrian hazards such as holes, debris, gravel, mud, etc.
- Bicyclist Accommodation
  - Existing bike lanes must remain clear (minimum 5 feet) unless bike lane closure is specifically approved as part of a Traffic Control Plan (TCP) and a reasonable accommodation for an alternate bicycle path of travel is implemented.
- Bus Stop Relocation or Closure
  - Temporary relocation of a bus stop for construction activity requires written approval from AC Transit, submitted at the time of a TCP submission.

Temporary bus stops must also be approved by the Oakland Department of Transportation (OakDOT).
  - Any parking obstruction, sidewalk obstruction, travel lane obstruction, or other accommodation required for the temporary bus stop shall be proposed through an obstruction permit application at the sponsors' expense.
- Lane Closures
  - No more than one lane fewer than the total lanes per direction may be closed.
  - The minimum width of a temporarily narrowed traffic lane is 10 feet, clear of any obstructions, including traffic cones or delineators.

EBMUD and its contractors would be required to obtain encroachment and obstruction permits from the City of Oakland for the pipeline work within the public right of way and comply with all requirements to prevent or reduce disruption of traffic flow and bicycle/pedestrian/transit operations in public rights-of-way.

3.3.3 EBMUD Standard Construction Specifications

EBMUD Standard Construction Specifications set forth the contract requirements for environmental compliance to which construction workers must adhere and stipulate that the construction contractor is responsible for maintaining compliance with applicable federal, State, and local requirements. These specifications are implemented on all EBMUD projects as part of standard construction procedures. EBMUD reviews contractor submittals for conformance with contract document requirements and specified laws and regulations.

Standard Construction Specification 01 55 26, Traffic Regulation, is applicable to transportation and traffic. Specific planning documents and procedures related to transportation and traffic required by EBMUD and its contractors are described below.

- **Traffic Control Plan.** The project contractor must prepare a TCP that conforms to the most current version of the Caltrans Manual of Traffic Controls for Construction and Maintenance Work Zones and the Manual on Uniform Traffic Control Devices. The Traffic Control Plan must be prepared by a California-licensed Traffic Engineer and include:
  - circulation and detour plans to minimize impacts to local street circulation (haul routes should minimize truck traffic on local roadways to the extent possible);
  - a description of emergency response vehicle access (a contingency plan must be included if the road or area is completely blocked, preventing access by an emergency responder);
  - procedures, to the extent feasible, to schedule construction of project elements to minimize overlapping construction phases that require truck hauling;
  - designated contractor staging areas for storage of all equipment and materials in such a manner to minimize obstruction to traffic;
  - locations for parking by construction workers;

- temporary signs, flashing lights, barricades, and other traffic safety devices where required to direct the flow of traffic;
- temporary traffic marking installation requirements where required to direct the flow of traffic (traffic markings must be maintained for the duration of need and removed by abrasive blasting when no longer required);
- flagger requirements to control traffic where required;
- procedures, to the extent safe, to keep sidewalks open for pedestrians or provide alternative routes and signing if sidewalks are to be closed;
- procedures to maintain driveway access unless other arrangements are made; and
- a minimum of 12-foot-wide travel lanes must be maintained unless otherwise approved by EBMUD.

4 Impact Analysis

4.1 Methodology for Analysis

The transportation and circulation analysis evaluated transportation impacts for the following three traffic scenarios:

- **Existing (2020) Plus Project Construction** – Existing conditions with added maximum anticipated construction traffic.
- **Construction-Year (2025) Plus Project Construction** – Anticipated 2025 baseline traffic conditions with added maximum anticipated construction traffic.
- **Project Operation** – Post-construction when the Project would be expected to generate two vehicle trips per month for routine maintenance.

The City of Oakland, at their discretion, does not require an analysis of intersection operations unless a project would generate more than 800 peak-hour vehicle trips on a long-term basis. However, an intersection operational analysis was performed for locations where maximum construction impacts to traffic would occur at both the existing and new PPs to provide information on projected intersection operating conditions with the addition of Project traffic and to identify any deficiencies (such as highly congested conditions that could lead to hazardous conditions for vehicles, bicycles, and pedestrians).

4.2 Short-Term Construction Traffic

EBMUD identified a preliminary construction schedule and the number of worker vehicles and construction trucks anticipated for each phase. Worker vehicles are vehicles used by workers to commute to and from the Project work sites. Construction trucks consist of material delivery or off-haul trucks entering and exiting the Project work sites. The estimates were based on the number of worker vehicles and construction trucks needed during each phase. The number of Project-generated trips would vary on a daily basis, depending on the construction phase, planned activity, and material delivery needs. Table 6 provides a summary of the number of worker vehicles and construction truck trips.

Table 6 Construction Vehicle and Truck Trips

Construction Phase	Approx. Duration (weeks)	Major Equipment	Haul/ Material Trucks (Roundtrips per day)	Max Hourly One-Way Trips	
				Worker Vehicles	Trucks
Pipeline Installation					
Mobilization	1	Haul Trucks, Backhoe	2	3	1
Pipeline Connections	4	Excavator, Generator Sets, Front-End Loader, Backhoe, Dewatering Pumps	1	11	1
Suction Pipeline	3	Excavator, Front-End Loader, Backhoe, Crane, Haul/Material Trucks, Soil Compactor	15	16	4
Discharge Pipeline	9	Excavator, Front-End Loader, Backhoe, Crane, Haul/Material trucks, Soil Compactor	15	16	4
Flushing, pressure testing and chlorination	4	N/A	0	6	0
Paving	3	Compactor, Asphalt Paver, Roller, Paving Saw	1	6	1
Demobilization	1	Street Sweeper	0	3	0
New Fontaine Pumping Plant Construction					
Mobilization	2	Haul Trucks, Backhoe	2	3	1
Site Prep & New Driveways	1	Excavator, Loader, Backhoe, Hoe Ram, Concrete Saw	1	5	1
Excavation/Site Work/Retaining Wall	4	Chain Saw, Excavator, Loader, Backhoe, Haul Trucks	32	5	8
PP Construction	22	Crane, Excavator, Backhoe, Loader, Forklift, Material Trucks, Concrete Delivery Trucks, Concrete Pumper Truck	7	10	2
PP Equipment Installation	16	Crane, Excavator, Backhoe, Forklift, Boom Truck, Material Trucks	2	8	1
PP Equipment Testing	2	N/A	0	6	0
Backfill	1	Excavator, Backhoe, Loader, Compactor, Haul Trucks, Scraper	12	5	3
Landscaping/Civil Site Work	2	Haul/Material Trucks, Backhoe, Soil Compactor, Pavers, Rollers	2	4	1
Demobilization	1	Street Sweeper	0	3	0

Construction Phase	Approx. Duration (weeks)	Major Equipment	Haul/ Material Trucks (Roundtrips per day)	Max Hourly One-Way Trips	
				Worker Vehicles	Trucks
Existing Fontaine Pumping Plant Demolition & Pipeline Abandonment					
Mobilization	1	Haul Trucks, Backhoe	2	3	1
Remove/Demo Equipment	1	Crane, Excavator, Haul Trucks	3	8	1
Demo Building/Foundation	2	Excavator, Loader, Backhoe, Hoe Ram, Concrete Saw	10	7	3
Cut/Fill/Cap Underground Piping	1	Excavator, Loader, Backhoe, Crane, Haul/Material Trucks, Soil Compactor, Concrete Pump, Concrete Delivery Trucks	2	8	1
Construct Retaining Wall	2	Crane, Excavator, Backhoe, Loader, Forklift, Material Trucks, Concrete Delivery Trucks, Concrete Pumper Truck	3	10	1
Backfill	1	Excavator, Loader, Compactor, Haul Trucks	13	5	4
Site Restoration	1	Compactor, Roller	0	6	0
Demobilization	1	Street Sweeper	0	3	0
Total Duration - Pipeline Work Completed Prior to starting PP construction	**86**				
Total Duration - Pipeline Work concurrent with PP construction	**61**				
MAXIMUM ONE-WAY TRIPS PER HOUR (Pipeline Work Completed Prior) =				**16**	**8**
MAXIMUM ONE-WAY TRIPS PER HOUR (Concurrent Pipeline Work) =				**26**	**12**

Table Notes:

[a] Maximum hourly worker trips are estimated by assuming all workers arrive separately at the job site in a one-hour period in the a.m. peak period and leave the job site in a one-hour period during the p.m. peak period.

[b] Maximum hourly truck trips are estimated by averaging the number of trucks trips going to and truck trips leaving the job site daily over an eight-hour period and rounded up to the nearest whole number.

General Notes:

[c] Work schedule: eight-hour workday within construction hours, Monday-Friday between 7:00 a.m. and 7:00 p.m.

[d] Conservatively assumes pipeline is installed at rate of 80 linear feet/day, but actual rate could be up to 200 feet/day.

[e] Active construction time does not include down-time, submittal review, material procurement, or fabrication inspection and approval.

[f] Haul trucks average twenty cubic yards (CY) per load at the new PP site and nine CY per load at the existing PP; concrete trucks average nine CY per load regardless of location.

[g] Assume that all excess soil excavation will be off-hauled.

Source: EBMUD, 2020

For the purposes of this analysis, the following information, which was provided by EBMUD, regarding construction schedule, staging areas, and pipeline construction work zones was used.

- **Construction Schedule.** Typical construction hours would occur between 7:00 a.m. and 7:00 p.m., Monday through Friday, with an exception for emergencies. A typical eight-hour workday between Monday and Friday serves as the basis of estimated construction durations for this Project. Construction is estimated to take approximately 86 weeks total beginning in 2025. If construction of the new pipeline occurs concurrently with construction of the new PP, construction is estimated to take approximately 61 weeks total. Demolition of the existing PP and pipeline abandonment is expected to occur over an approximately 10-week period.
- **Staging Areas and Work Zones.** During demolition of the existing PP, equipment and materials would be staged both onsite at the EBMUD-owned parcel at 8445 Ney Avenue and on the adjacent street. Existing pipeline abandonment activities will require a minimum construction work zone width of approximately four feet. During construction of the new PP, equipment and materials would be staged both onsite at the EBMUD-owned parcel at 9601 MacArthur Boulevard and at a nearby offsite location chosen by the contractor.

  A minimum construction work zone width of 25 feet would be needed on roadways adjacent to the new pipeline alignment to accommodate pipeline storage and to allow trucks and equipment access along the trench. The construction work zone would be established in phases as the pipeline work progresses along 96th Avenue between Bancroft Avenue and MacArthur Boulevard, MacArthur Boulevard between 96th Avenue and 99th Avenue, and 99th Avenue between MacArthur Boulevard and Stanley Avenue. In some areas where the pipeline would need to be installed at greater depth to avoid other utilities, a wider trench and construction work zone may be required. The work zone would be open to traffic outside the construction work hours, but on-street parking would be prohibited to accommodate overnight pipeline storage. During pipeline construction, equipment and materials would be staged on the streets.

4.2.1 Project Trip Generation

Project trips were generated by using the largest number of hourly one-way worker and truck trips of overlapping phases at one time over the Project duration. Project trip generation at the existing site reflects the period of maximum construction impacts to traffic during retaining wall construction and backfill, while Project trip generation at the new site reflects the period of maximum construction impacts to traffic during concurrent pipeline and plant construction. The maximum hourly one-way worker trips are 26 trips at the new site and 10 trips at the existing site. All workers are assumed to arrive during the AM peak hour and to depart during PM peak hour.

The number of truck trips account for the maximum number of trucks going to and leaving the Project sites in one hour. Therefore, the maximum hourly one-way truck trips are 12 trips at the new site and 4 trips at the existing site in the AM and PM peak hours. The Project trip generation estimate is summarized in Table 7.

Table 7 Project Trip Generation Estimates

Trip Type	Average Daily Trips [a]	Maximum Daily Trips [a]	Average Hourly Trips [a]	Maximum Hourly Trips [a]
Existing Pumping Plant Demolition and Existing Pipeline Abandonment (Concurrent)				
Workers [b]	14	20	7	10
Trucks [c]	10	26	2	4
Total Trips	**24**	**46**	**9**	**14**
New Pumping Plant Construction and New Pipeline Installation (Concurrent)[d]				
Workers [b]	28	52	14	26
Trucks [c]	20	94	3	12
Total Trips	**48**	**146**	**17**	**38**

[a] Trips refer to the number of inbound and/or outbound trips expected to occur. All trip calculations assume that existing PP demolition and existing pipeline abandonment would occur concurrently and new PP construction and pipeline installation would also occur concurrently. This assumption was incorporated to conservatively account for the maximum number of trips that could occur as a result from Project construction activities.

[b] Average and maximum hourly worker trips from Table 7 are conservatively assumed to occur only during the AM and PM peak hour. Each worker would arrive during the AM peak hour and leave during the PM peak hour.

[c] Hourly truck trips are daily trips over eight hours, rounded up to the nearest whole number.

[d] Calculation of average daily trips and average hourly trips conservatively assumes that new PP construction and pipeline installation occur concurrently and begin at the same time. Average daily trips reflect the number of trips with both activities combined and averaged over a 51-week period, which is the duration of the new PP construction phase, the longer of the two phases.

Source: EBMUD and Fehr & Peers, 2020

4.2.2 Project Trip Distribution

This section describes the distribution patterns of vehicle trips during construction. The distribution of worker and truck trips to the new PP is presented on Figure 9 and the distribution of worker and truck trips to the existing PP is presented on Figure 10. Routes to/from the Project sites and the regional roadway network were reviewed in the development of preliminary truck routing plans.

Construction Worker Trip Distribution

Construction workers are assumed to be non-local residents. As such, it is estimated that approximately 25 percent of workers would access the new Project site via I-880 to 98th Avenue to MacArthur Boulevard, 25 percent would access the new site via I-880 to 98th Avenue to Bancroft Avenue to 96th Avenue, and 50 percent would access the new site via I-580 to 98th Avenue to MacArthur Boulevard. Of the workers traveling to the new site via I-580 to 98th Avenue to MacArthur Boulevard, it is estimated that roughly 50 percent would proceed northbound through the 96th Avenue/MacArthur Boulevard intersection to park on MacArthur

Boulevard, and 50 percent would turn left at the 96th Avenue/MacArthur Boulevard intersection to park on 96th Avenue. Once pipeline installation reaches 99th Avenue, maximum construction related impacts to traffic would occur during pipeline work near the MacArthur intersection. Both trucks and workers would access the pipeline on 99th Avenue via southbound MacArthur Boulevard and exit onto Stanley Avenue and proceed northbound to 98th Avenue. Workers would follow the same distribution pattern in earlier phases where 50 percent of workers would exit eastbound on 98th Avenue and 50 percent of workers would exist westbound on 98th Avenue.

For worker trips to the existing PP site during PP demolition and existing pipeline abandonment, it is estimated that approximately 50 percent of workers would access the existing Project site via 82nd Avenue to Golf Links Road to El Monte Avenue to Ney Avenue, and exit via Aster Avenue to 82nd Avenue. The remaining 50 percent of workers would access the existing PP via Fontaine Street to Golf Links Road to El Monte Avenue to Ney Avenue and exit via the same route.

Truck Trip Distribution

Project-related truck traffic for off-hauling, large equipment deliveries, and material deliveries would access the Project sites via the City of Oakland designated truck routes on I-880 and Hegenberger Road/73rd Avenue. Although 98th Avenue is the most direct route to the new PP site, 98th Avenue is not a City-designated truck route and is a comparatively lower volume arterial street. Trucks are also not recommended on International Boulevard because the corridor has recently been redesigned to a single vehicle lane in each direction to accommodate dedicated bus-only lanes.

To reduce impacts to surrounding the neighborhood and ease truck turning movements, all trucks would travel to the new PP site via I-880 to Hegenberger Road/73rd Avenue to southbound MacArthur Boulevard, accessing the new PP site on the MacArthur Boulevard side. Trucks exiting the new PP would exit onto MacArthur Boulevard, proceed south to westbound 98th Avenue, and back to I-880. The assumed truck route plan is shown on Figure 9. The counterclockwise truck route shown on Figure 11 minimizes the number of truck turns to access the site and allows the trucks to pull along the new PP site's MacArthur Boulevard frontage without using 96th Avenue which is a local residential street. Once pipeline installation reaches the 99th Avenue phase, maximum construction related impacts to traffic would occur during pipeline work near the MacArthur Boulevard intersection. Both trucks and workers would access the pipeline on 99th Avenue via southbound MacArthur Boulevard and exit onto Stanley Avenue and proceed northbound to 98th Avenue. Trucks would follow the same routing in earlier phases accessing 99th Avenue via MacArthur Boulevard and then proceeding to northbound Stanley Avenue and then to westbound 98th Avenue to I-880.

Truck traffic would also access the existing PP site during demolition. The truck route is also shown on Figure 12. Trucks would use the City of Oakland designated truck routes on I-880 and Hegenberger Road/73rd Avenue and then use MacArthur Boulevard to 82nd Avenue. Once on 82nd Avenue, trucks would be directed to use Golf Links Road and El Monte Avenue to access Ney Avenue and the existing PP. Because of the steepness of El Monte Avenue, some trucks may be required to use 82nd Avenue to access Ney Avenue. Leaving the site, trucks would be directed to Aster Avenue and back to 82nd Avenue. This clockwise truck route near the existing site allows the trucks to pull along the existing PP site's frontage. Due to the narrow roads and significant grade changes along the recommended truck route serving the existing PP site, haul trucks will be limited to 9-cubic-yard capacity. These types of trucks are typically approximately 25 feet in length.

4.3 Long-Term Operational Traffic

4.3.1 Existing Pumping Plant and Abandoned Pipeline

The existing PP would be demolished, and the existing pipeline would be abandoned. As a result, no traffic would be generated following the demolition phase.

4.3.2 New Pumping Plant and New Pipelines

The new PP and new pipelines would operate in a similar manner as the existing PP and new pipelines, which are currently operated and monitored remotely. Worker vehicle trips for operation and maintenance would be similar to existing conditions, with approximately two trips per month.

Figure 9 Worker and Truck Trip Distribution for New Pumping Plant Construction and New Pipeline Alignment

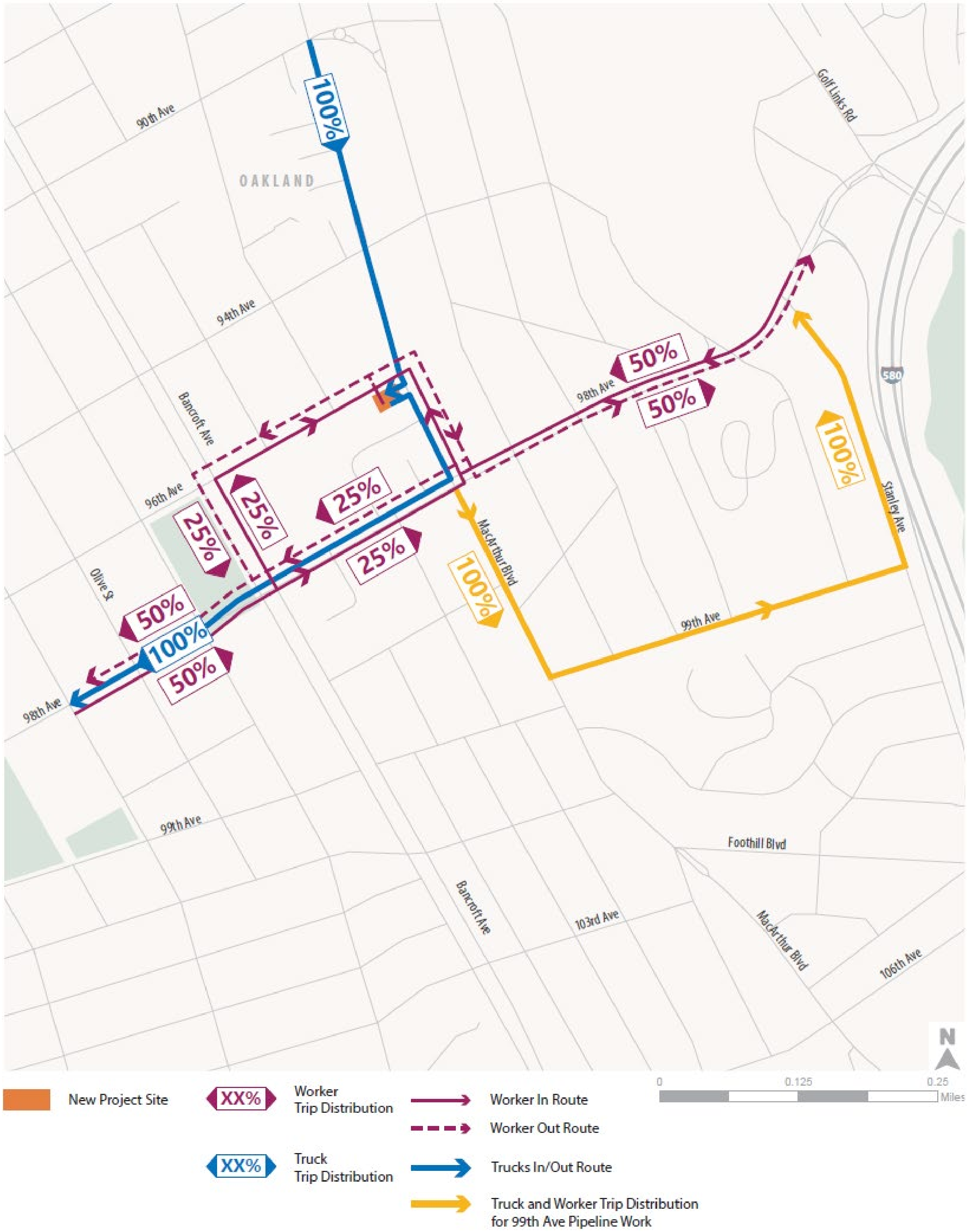


Figure 10 Worker and Truck Trip Distribution for Existing Pumping Plant Demolition and Existing Pipeline Abandonment

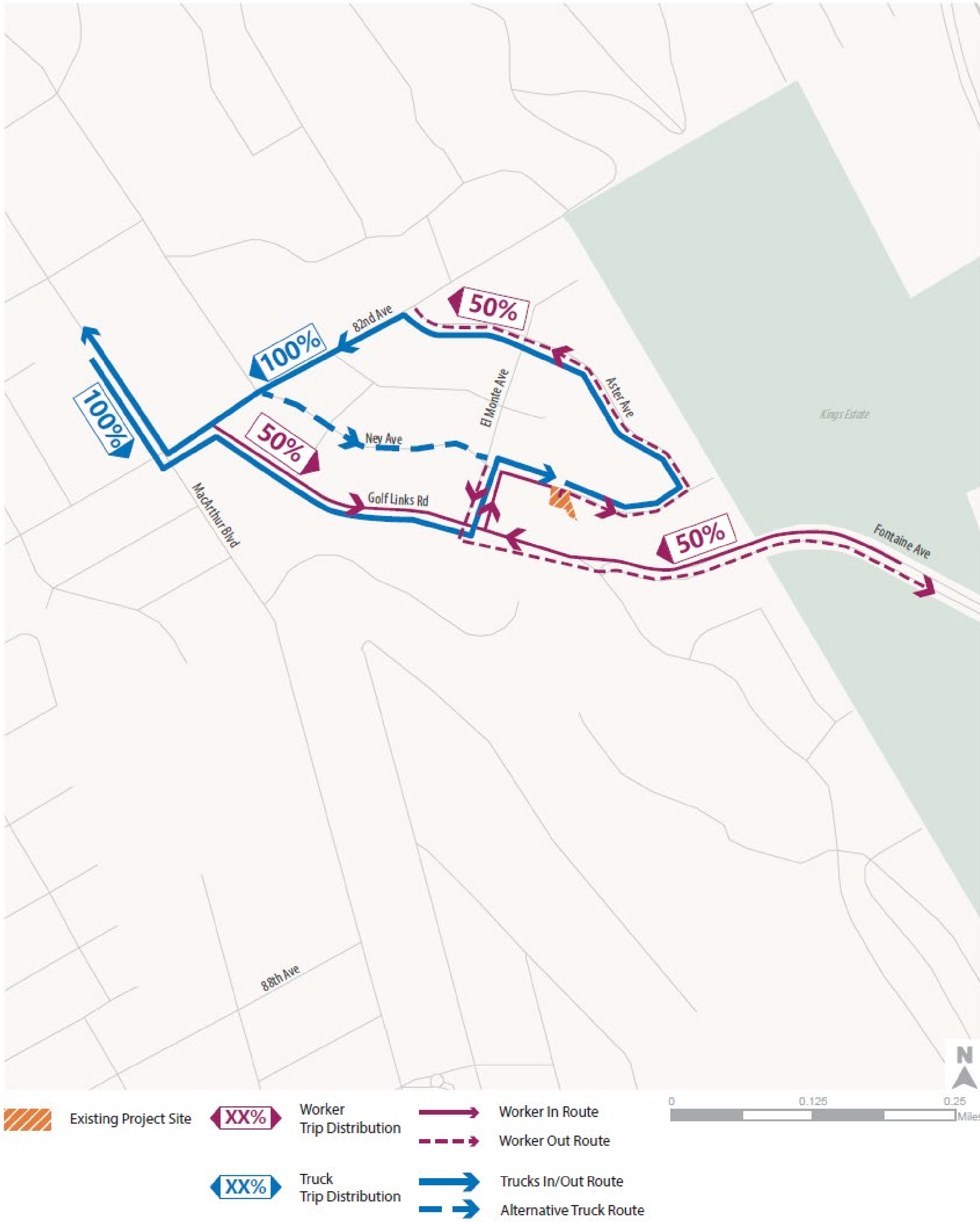


Figure 11 Truck Routing Plan for New Pumping Plant Construction and New Pipeline Alignment

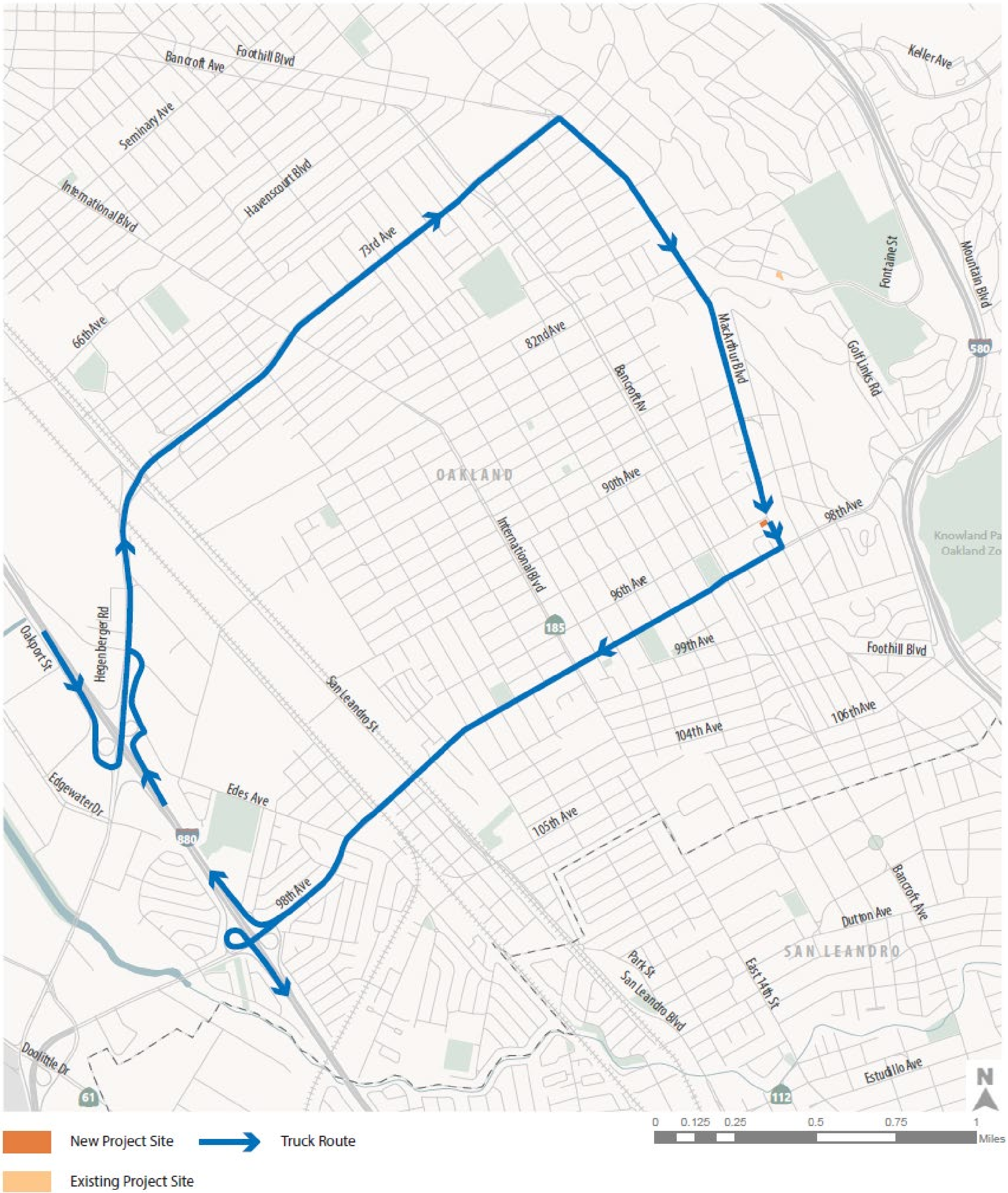
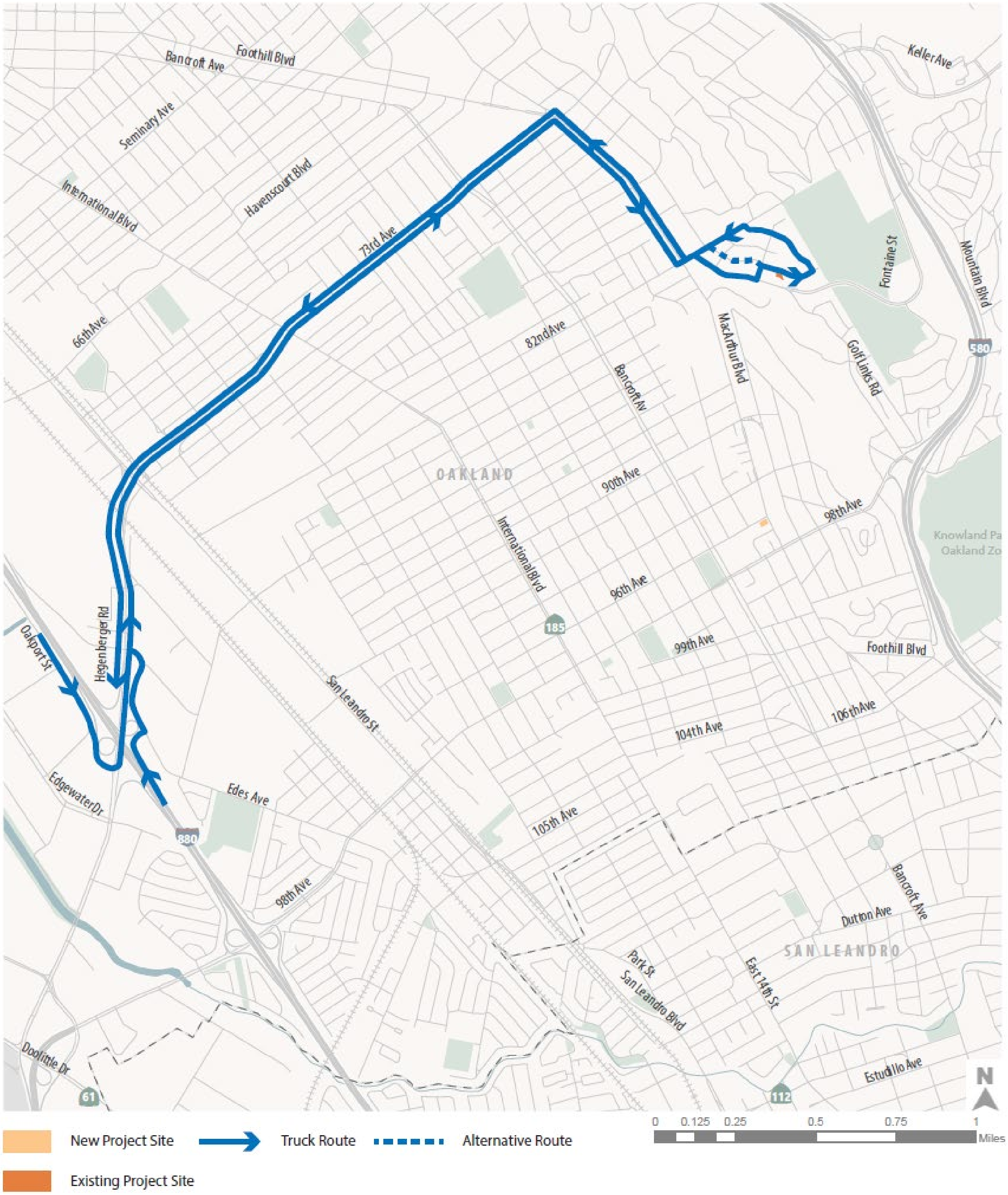


Figure 12 Truck Routing Plan for Existing Pumping Plant Demolition and Existing Pipeline Abandonment



5 Project Impacts

5.1 Significance Criteria

Consistent with Appendix G of the CEQA Guidelines, a project is considered to have a significant impact related to transportation and traffic if it would:

1. Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.
2. Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision(b)[2]
3. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)
4. Result in inadequate emergency access

5.2 Impact Discussion

Impact Traffic-1: Potential to conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities. (*Less than Significant with Mitigation*)

Construction

The section describes the Project's potential to impact the circulation system during the construction of the Project.

Vehicle Traffic Operations

As discussed in Section 2.1.3, traffic operations analysis for the Project conservatively focuses on the period of maximum construction-related traffic at both the existing PP on Ney Avenue and the new PP on MacArthur Boulevard. Maximum construction-related impacts to traffic would occur during concurrent new pipeline and new PP construction work along 96th Avenue and MacArthur Boulevard. Because the pipeline construction continues onto 99th Avenue, traffic operations on 99th Avenue are assessed, as well. At the existing site, maximum construction-related impacts to traffic would occur during retaining wall construction and backfill.

[2] CEQA Guidelines section 15064.3, subdivision(b) refers to vehicle miles traveled criteria for analyzing transportation impacts.

Existing (2020) Plus Project Construction

As shown in Table 7, the Project would generate a maximum total of 146 daily vehicle trips, including 52 worker vehicle trips and 94 truck trips, during the peak construction period at the new PP site, while the Project would generate a maximum total of 46 daily vehicle trips, including 20 worker vehicle trips and 26 truck trips, during the peak construction period at the existing PP site.

Using the hourly trip generation estimates and the trip distribution described above, Existing (2020) Plus Project segment traffic volumes were determined for the Project's construction phase. These segment volumes are shown in Table 8. For a conservative analysis, it was assumed that all worker vehicle trips would travel to the Project sites during the AM peak hour and leave during the PM peak hour. It was also assumed that the hourly truck trips would arrive at the sites and leave the sites during each peak hour.

Table 8 Existing (2020) Plus Project Daily and Peak Hour Traffic Volumes

Roadway	Location	Average Daily Traffic[a]	AM Peak Hour[b]	PM Peak Hour[c]
Existing Pumping Plant and Existing Pipeline Abandonment				
1. Golf Links Road	Between 82nd Avenue and El Monte Avenue	7,025	801	604
New Pumping Plant and New Pipelines				
2. Bancroft Avenue	Between 96th Avenue and 99th Avenue	11,825	1,152	1,213
3. MacArthur Boulevard	Between 96th Avenue and 99th Avenue	7,708	752	790
4. 96th Avenue	Between Bancroft Avenue and MacArthur Boulevard	485	44	54
5. 98th Avenue	Between Bancroft Avenue and MacArthur Boulevard	15,845	1,545	1,624
6. 99th Avenue	Between MacArthur Boulevard and Stanley Avenue	620	56	68

[a] Average Daily Traffic over a 24 hour period is empirically estimated to be 10 times the Peak Hour Traffic. Therefore, Average Daily Traffic = (AM Peak Hour Traffic + PM Peak Hour Traffic)/2 x 10

[b] Maximum hourly volume between the hours of 7:00 and 9:00 AM.

[c] Maximum hourly volume between the hours of 4:00 and 6:00 PM.

Source: Fehr & Peers, 2020

Peak hour volumes for the Existing (2020) Plus Project scenario, which are shown on Figure 13, were used to evaluate intersection operations. Peak hour intersection operations with maximum construction traffic volumes assigned to the roadway network are summarized in Table 9. Trucks behave differently than passenger vehicles as they take longer to accelerate, decelerate, and negotiate turns. As such, they affect intersection and roadway operations differently. For the purposes of intersection operations analysis, truck trips are analyzed as passenger car equivalent (PCE), using a ratio of 1:2 (one truck is equivalent to two cars). Detailed intersection LOS analysis worksheets are provided in Appendix A.

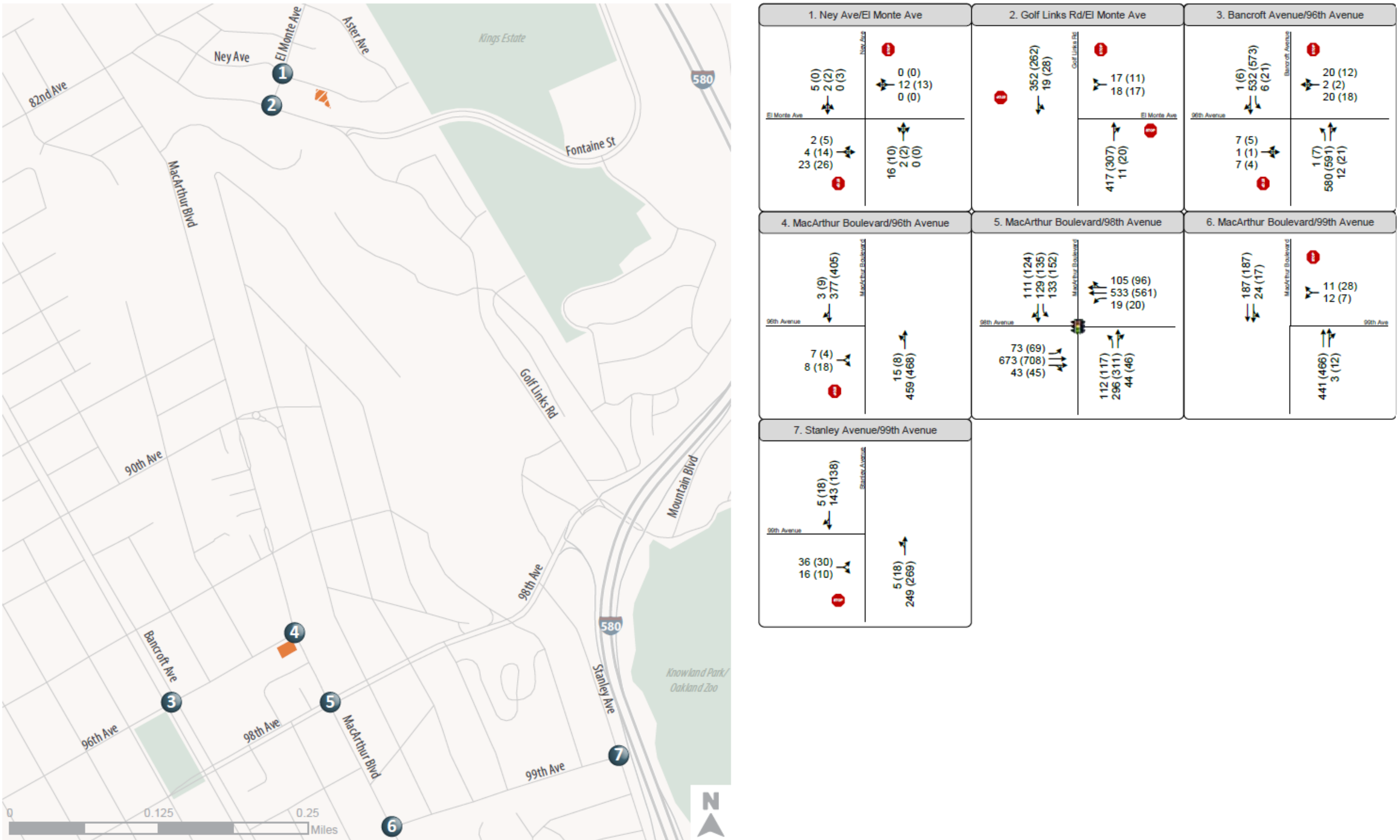
Table 9 Existing (2020) Plus Project Intersection Operations

Intersection	Control	Peak Hour	Existing		Existing (2020) Plus Project	
			Delay[a]	LOS	Delay[a]	LOS
Existing Pumping Plant and Existing Pipeline Abandonment						
1. Ney Avenue/El Monte Avenue	Side-Street Stop	AM	6.7 (9.3)	A (A)	7.2 (9.3)	A (A)
		PM	8.0 (9.2)	A (A)	8.1 (9.3)	A (A)
2. Golf Links Road/El Monte Avenue	All-Way Stop	AM	12.4	B	12.6	B
		PM	10.1	B	10.2	B
New Pumping Plant and New Pipelines						
3. Bancroft Avenue/96th Avenue	Side-Street Stop	AM	1.1 (21.6)	A (C)	1.1 (21.7)	A (C)
		PM	0.9 (24.4)	A (C)	1.1 (27.3)	A (D)
4. MacArthur Boulevard/96th Avenue	Side-Street Stop	AM	0.2 (12.9)	A (B)	0.4 (13.5)	A (B)
		PM	0.2 (13.1)	A (B)	0.3 (12.0)	A (B)
5. MacArthur Boulevard/98th Avenue	Signal	AM	30.2	C	30.4	C
		PM	30.3	C	30.8	C
6. MacArthur Boulevard/99th Avenue	Side-Street Stop	AM	0.5 (11.5)	A (B)	0.7 (11.8)	A (B)
		PM	0.4 (11.7)	A (B)	0.8 (11.9)	A (B)
7. Stanley Avenue/99th Avenue	Side-Street Stop	AM	0.8 (10.4)	A (B)	1.3 (11.1)	A (B)
		PM	0.8 (10.6)	A (B)	1.3 (11.6)	A (B)

[a] Average vehicle delay in seconds. For side-street stop control intersections, average delay is listed first followed by (delay for the worst approach)

Source: Fehr & Peers, 2020

Figure 13 Existing (2020) Plus Project Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls



XX (YY) AM (PM) Peak Hour Traffic Volumes
Signalized Intersection
Stop Sign
New Project Site
Existing Project Site
Study Intersection

Project construction traffic is not expected to increase the average LOS for any study intersection. The LOS for the worst approach at the Bancroft Avenue/96th Avenue intersection is expected to degrade from C to D in the PM peak hour with the addition of Project construction traffic.

Since 2017, the City of Oakland has not had a policy on intersection LOS; therefore, this change in LOS would be considered less than significant based on the City's current policies. Prior to 2017, the City did have intersection LOS policies. Under these previous policies, side-street stop-controlled intersection would have a significant impact if a project would add 10 or more vehicles to the critical movement and, after project completion, satisfy the California Manual on Uniform Traffic Control Devices (MUTCD) peak-hour volume traffic signal warrant. During maximum Project construction traffic, over 10 vehicles would be added to the following intersections:

- Study Intersection #1: Ney Avenue/El Monte Avenue
- Study Intersection #4: MacArthur Boulevard/96th Avenue
- Study Intersection #5: MacArthur Boulevard/98th Avenue
- Study Intersection #6: MacArthur Boulevard/99th Avenue

However, no additional trips would be generated after Project completion. Additionally, the MUTCD peak-hour volume traffic signal warrant threshold would not be satisfied. For these reasons, the Project would have a less-than-significant impact on vehicle circulation.

Construction-Year (2025) Plus Project Construction

The Construction-Year (2025) Plus Project Construction scenario represents construction-year (2025) baseline traffic conditions with the addition of the proposed maximum construction activity Project traffic volumes. The maximum proposed Project traffic volumes, using the Project trip generation and trip distribution to assign the trips to the network, were added to the construction-year baseline traffic projections to develop the traffic forecasts. Construction-Year Plus Project Construction peak hour segment volumes are shown on Table 10.

Intersection LOS for Construction-Year (2025) Plus Project Construction conditions are summarized in Table 11 and peak hour volumes are shown on Figure 12. For the purposes of intersection operations analysis, truck trips are analyzed as PCE. Detailed intersection LOS analysis worksheets are provided in Appendix A.

The addition of Project construction traffic in the construction-year is not expected to degrade the average LOS or worst-approach LOS of any study intersection, as compared to construction-year baseline conditions. Because the City no longer has a policy on intersection LOS and the City criteria would not be met prior to 2017 (maximum Project construction traffic would not trigger the peak-hour volume traffic signal warrant), impacts related to vehicle traffic operations would be less than significant.

Table 10 Construction-Year (2025) Plus Project Daily and Peak Hour Traffic Volumes

Roadway	Location	Average Daily Traffic[a]	AM Peak Hour[b]	PM Peak Hour[b]
Existing Pumping Plant and Existing Pipeline Abandonment				
1. Golf Links Road	Between 82nd Avenue and El Monte Avenue	7,400	840	640
New Pumping Plant and New Pipelines				
2. Bancroft Avenue	Between 96th Avenue and 98th Avenue	12,450	1,210	1,280
3. MacArthur Boulevard	Between 96th Avenue and 99th Avenue	8,300	800	840
4. 96th Avenue	Between Bancroft Avenue and MacArthur Boulevard	550	50	60
5. 98th Avenue	Between Bancroft Avenue and MacArthur Boulevard	16,650	1,620	1,710
6. 99th Avenue	Between MacArthur Boulevard and Stanley Avenue	650	60	70

[a] Average Daily Traffic over a 24 hour period is empirically estimated to be 10 times the Peak Hour Traffic. Therefore, Average Daily Traffic = (AM Peak Hour Traffic + PM Peak Hour Traffic)/2 x 10

[b] Maximum hourly volume between the hours of 7:00 and 9:00 AM and the hours of 4:00 and 6:00 PM.

Source: Fehr & Peers, 2020

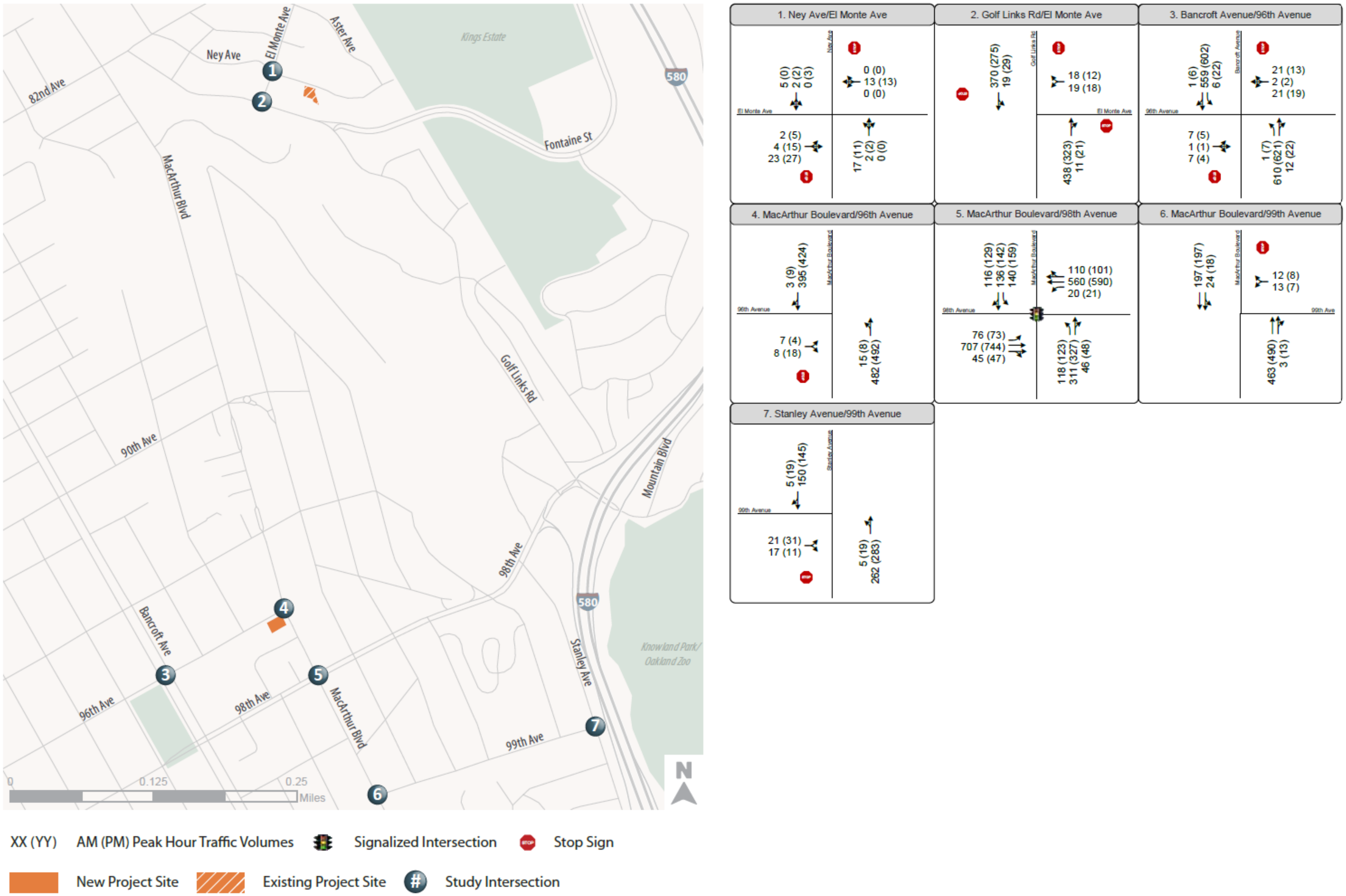
Table 11 Construction-Year (2025) Plus Project Peak Hour Intersection Levels of Service

Intersection	Control	Peak Hour	2025 Baseline		2025 Plus Project	
			Delay[a]	LOS	Delay[a]	LOS
Existing Pumping Plant and Existing Pipeline Abandonment						
1. Ney Avenue/El Monte Avenue	Side-Street Stop	AM	6.9 (9.4)	A (A)	7.3 (9.4)	A (A)
		PM	8.0 (9.3)	A (A)	8.1 (9.3)	A (A)
2. Golf Links Road/El Monte Avenue	All-Way Stop	AM	13.0	B	13.3	B
		PM	10.4	B	10.5	B
New Pumping Plant and New Pipelines						
3. Bancroft Avenue/96th Avenue	Side-Street Stop	AM	1.1 (23.5)	A (C)	1.1 (23.6)	A (C)
		PM	1.0 (26.5)	A (D)	1.2 (29.9)	A (D)
4. MacArthur Boulevard/96th Avenue	Side-Street Stop	AM	0.2 (13.2)	A (B)	0.3 (13.9)	A (B)
		PM	0.2 (13.5)	A (B)	0.3 (12.3)	A (B)
5. MacArthur Boulevard/98th Avenue	Signal	AM	31.2	C	31.4	C
		PM	32.3	C	33.0	C
6. MacArthur Boulevard/99th Avenue	Side-Street Stop	AM	0.5 (11.7)	A (B)	0.7 (12.1)	A (B)
		PM	0.4 (12.0)	A (B)	0.5 (12.0)	A (B)
7. Stanley Avenue/99th Avenue	Side-Street Stop	AM	0.8 (10.6)	A (B)	1.0 (10.8)	A (B)
		PM	0.8 (10.8)	A (B)	1.3 (11.9)	A (B)

[a] Average vehicle delay in seconds. For side-street stop control intersections, average delay is listed first followed by (delay for the worst approach)

Source: Fehr & Peers, 2020

Figure 14 Construction-Year (2025) Plus Project Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls



Pedestrian Facilities
There may be temporary impacts to sidewalk access at the Project sites during construction activities associated with pipeline trenching, equipment and material delivery, driveway installations, and utility relocations. During existing pipeline abandonment and existing PP demolition pedestrian facilities along Ney Avenue, 82nd Avenue, Aster Avenue, and Golf Links Road may be impacted. Pedestrian facilities on 96th Avenue, MacArthur Boulevard, and 99th Avenue may be impacted during new pipeline and PP construction. Otherwise, sidewalks are anticipated to be open to the public at all times.

As discussed in Section 3.3.2, specific traffic control requirements are provided in the 2017 City of Oakland's *Supplemental design guidance: Accommodating pedestrians, bicyclists, and bus facilities in construction zones*. This guidance specifies that any blockage of a sidewalk along major transit corridors must be mitigated through a sidewalk diversion and does not allow for pedestrian detours. As detailed in Section 3.3.3, several EBMUD standard practices and procedures, applicable to all EBMUD projects, would be incorporated as part of the Project, including EBMUD Standard Construction Specification 01 55 26, Traffic Regulation, which requires that sidewalks be kept open if safe for pedestrians and, if alternative pedestrian routes are required, signage would be installed to direct pedestrians to detour routes. Use of a sidewalk detour (and not diversion) along MacArthur Boulevard, which is considered a major transit corridor according to the City of Oakland's *Supplemental design guidance: Accommodating pedestrians, bicyclists, and bus facilities in construction zones*, would conflict with the City of Oakland Complete Streets Policy and the City of Oakland's *Supplemental design guidance: Accommodating pedestrians, bicyclists, and bus facilities in construction zones*. To mitigate potential conflicts with City of Oakland policies and guidance, EBMUD will implement the following:

- **Mitigation Measure Transportation-1: MacArthur Boulevard Pedestrian Diversion.** A temporary pedestrian diversion shall be provided around any sidewalk obstruction to maintain the pedestrian path of travel along the sidewalk corridor on MacArthur Boulevard at the Project site. The temporary pedestrian diversion, if provided, shall be clearly identified, wheelchair usable, shielded from motor vehicle traffic, and free of pedestrian hazards such as holes, debris, gravel, mud, etc. All temporary pedestrian diversion routes must keep and maintain a minimum 5.5-foot clear width for pedestrian access. Pedestrian access plans shall be reviewed and approved by OakDOT prior to construction and included in the Project's Traffic Control Plan.

With implementation of Mitigation Measure Transportation-1, the Project would not conflict with any programs, plans, or policies related to pedestrian facilities, and impacts would be less than significant.

Bicycle Facilities
As described under Section 2.4, the existing bicycle facilities near the Project sites include a designated Class 2 Bike Lane on Bancroft Avenue with striped lanes in both the north and south direction, a Class 2 Bike Lane on 98th Avenue extending west from the Bancroft Avenue

intersection, and a Class 3 Bike Route on Stanley Avenue. The increased construction traffic on public roadways would potentially decrease the safety of bicyclists because local users may not be accustomed to the presence of large construction vehicles.

As detailed in Section 3.3.3, a number of EBMUD standard practices and procedures, applicable to all EBMUD projects, would be incorporated as part of the Project, including EBMUD Standard Construction Specification 01 55 26, Traffic Regulation, which would require the contractor to prepare a Traffic Control Plan to minimize impacts on bicycle circulation on local streets. To maintain safe bicycle circulation, the Traffic Control Plan would identify specific practices around the Project sites during periods of construction with heavy truck traffic (such as during concrete pours). The Traffic Control Plan may include requirements such as signs, flashing lights, barricades, and other traffic safety devices to minimize impacts on circulation on the streets surrounding the Project sites.

Because EBMUD's Standard Construction Specification 01 55 26, Traffic Regulation, would be incorporated into the Project and requires implementation of a Traffic Control Plan that includes, but is not limited to, the use of temporary traffic signs, flashing lights, barricades, markings and flaggers, the Project would not conflict with any programs, plans, or policies related to bicycle facilities, and impacts would be less than significant.

Transit Facilities

Transit impacts during construction have the potential to conflict with the City of Oakland Public Transit and Alternative Modes Policy. The abandonment of the existing pipeline would include at most one lane closure on Golf Links Road, potentially requiring the short-term closure or relocation of the AC Transit bus stop serving lines 46, 46L, and 646 at the Golf Links Road/Fontaine Street intersection. The construction of the new PP and pipeline would require haul trucks and delivery trucks that arrive from southbound MacArthur Boulevard and some of these trucks may temporarily stage during work hours along the southbound curb both north and south of 96th Avenue because of the relatively small size of the new PP site. Truck staging that extends north of 96th Avenue would conflict with the existing AC Transit bus stop at MacArthur Boulevard and 96th Avenue serving bus lines 57, 90, and 98 shown on Figure 7. The nearest alternative bus stops are located approximately 600 feet north and 600 feet south of 96th Avenue. The Project would, therefore, require the temporary closure or relocation of the bus stop located at McArthur Boulevard and 96th Avenue. Pipeline construction on MacArthur Boulevard between 96th and 99th Avenues may also conflict with other bus stops on MacArthur Boulevard requiring temporary closure or relocation. Temporary closure or relocation of bus stops would require prior approval by AC Transit and OakDOT.[3] Closure of a

[3] These procedures are described in the City of Oakland's construction requirements including the 2017 City of Oakland's *Supplemental design guidance: Accommodating pedestrians, bicyclists, and bus facilities in construction zones*.

transit stop would conflict with the City of Oakland Complete Streets Policy and the City of Oakland's *Supplemental design guidance: Accommodating pedestrians, bicyclists, and bus facilities in construction zones*. To mitigate potential conflicts with City of Oakland policies and guidance, EBMUD will implement the following:

- **Mitigation Measure Transportation-2: Golf Links Road and MacArthur Boulevard Bus Stop Relocation/ Short-Term Closure.** EBMUD shall coordinate with and obtain written approval from AC transit and OakDOT for the temporary relocation or closure of any bus stops along Golf Links Road and MacArthur Boulevard required to accommodate Project construction. Any parking obstruction, sidewalk obstruction, travel lane obstruction, or other accommodation required for the closed or temporary bus stop shall be proposed through an obstruction permit application and documented in the Project's Traffic Control Plan.

With implementation of Mitigation Measure Transportation-2, the Project would not conflict with any programs, plans, or policies related to transit facilities, and impacts would be less than significant.

Parking

Although no CEQA significance criterion addresses parking, the temporary loss of on-street vehicle parking along construction routes was considered in this analysis. On-street parking is available along 96th Avenue, MacArthur Boulevard, and 99th Avenue in the vicinity of the new PP site and new pipelines and along Ney Avenue, El Monte Avenue, Aster Avenue, 82nd Avenue, and southbound Golf Links Road near the existing PP and existing pipeline abandonment disconnection sites. It is expected that construction workers would find an available on-street parking space and walk to the work site. Through observations of aerial imagery, it is concluded that there is adequate on-street parking within one to two blocks of the work site to accommodate construction worker parking throughout the construction period.

The pipeline construction requires a work zone with a minimum 25-foot-wide easement that would temporarily restrict on-street parking within the work zone. As the work zone moves with the pipeline construction on-street parking restrictions would also shift. In addition, construction of the PP may require temporary truck staging on southbound MacArthur Boulevard approaching 96th Avenue. There is adequate on-street parking during the construction work hours to accommodate these temporary parking restrictions. Because on-street parking is typically underutilized, the loss of parking would not inconvenience local residents.

Operation

All roadways and sidewalks would be restored after construction is complete and operation of the Project would generate approximately two trips per month for routine maintenance and inspection of the facility. Operation of the Project would have a negligible effect on traffic circulation and not conflict with any program plans, ordinances, or policies addressing the circulation system. No impact would occur during operation.

Impact Traffic-2: Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision(b)[4] (*Less than Significant*)

Consistent with the City of Oakland's guidelines, VMT impacts would be less than significant for the Project if any of the identified screening criteria outlined below are met:

1. **Small Projects**: The Project generates fewer than 100 vehicle trips per day.
2. **Low-VMT Areas**: The Project meets map-based screening criteria by being in an area that exhibits below-threshold VMT, or 15 percent or more below the regional average.
3. **Near Transit Stations**: The Project is in a Transit Priority Area or within one-half mile of a Major Transit Corridor or Stop[5] and satisfies the following:
   a. Has a Floor Area Ratio (FAR) of more than 0.75,
   b. Does not include more parking for use by residents, customers, or employees of the Project than other typical nearby uses, or more than required by the City (if parking minimums pertain to the site) or allowed without a conditional use permit (if minimums and/or maximums pertain to the site),
   c. Is consistent with the applicable Sustainable Communities Strategy (as determined by the lead agency, with input from the Metropolitan Transportation Commission).

Construction and Operation

As summarized in Table 7, the construction of the Project would on average generate 46 daily worker and truck trips at the new site and on average 24 daily worker and truck trips at the existing site. The construction phase of this Project satisfies the "Small Projects" screening criteria as construction would generate fewer than 100 vehicle trips per day. Furthermore, once constructed, the Project would generate approximately two trips per month, similar to existing conditions and operation of the existing PP. Because the Project would generate trips that are substantially less than those identified in the VMT screening criteria, the Project would not conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b), and impacts related to VMT would be less than significant.

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[4] CEQA Guidelines section 15064.3, subdivision(b) refers to vehicle miles traveled criteria for analyzing transportation impacts.

[5] "Major transit stop" is defined in CEQA Section 21064.3 as a rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.

Impact Traffic-3: Potential to substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) (*Less than Significant*)

Construction

Construction of the Project would not modify the geometric design features of any publicly accessible roadway. An increase in hazards due to construction equipment present within roadways could occur during construction of the new pipelines. As detailed in Section 3.3.3, several EBMUD standard practices and procedures, applicable to all EBMUD projects, would be incorporated as part of the Project, including EBMUD's Standard Construction Specification 01 55 26, Traffic Regulation, which requires EBMUD's contractor to incorporate various traffic control practices that reduce potential for traffic hazards. Specifically, Section 1.2, Submittals, requires preparation of a Traffic Control Plan that conforms to the most current version of the Caltrans Manual of Traffic Controls for Construction and Maintenance Work Zones and the Manual on Uniform Traffic Control Devices.

Because EBMUD's Standard Construction Specification 01 55 26, Traffic Regulation, would be incorporated into the Project and requires implementation of a Traffic Control Plan that includes, but is not limited to, the use of temporary traffic signs, flashing lights, barricades, markings and flaggers, Project impacts related to short-term construction traffic hazards from the Project would be less than significant.

Operation

All roadways and sidewalks would be restored after construction is complete. No impact would occur during operation.

Impact Traffic-4: Potential to result in inadequate emergency access. (*Less than Significant*)

Construction

Ney Avenue

One existing pipeline abandonment disconnection site is located at the existing PP site on Ney Avenue, as shown in Figure 2. Pipeline abandonment at this location may require full road closure, resulting in potentially inadequate emergency access. As detailed in Section 3.3.3, several EBMUD standard practices and procedures, applicable to all EBMUD projects, would be incorporated as part of the Project, including EBMUD's Standard Construction Specification 01 55 26, Traffic Regulation. Section 1.2, Submittals, of Standard Construction Specification 01 55 26, Traffic Regulation, requires preparation of a Traffic Control Plan that conforms to the most current version of the Caltrans Manual of Traffic Controls for Construction and Maintenance Work Zones and the Manual on Uniform Traffic Control Devices, including a description of emergency response vehicle access. Specifically, Section 1.2, Submittals, includes the following provision:

- A description of emergency response vehicle access. If the road or area is completely blocked, preventing access by an emergency responder, a contingency plan must be included.

Furthermore, Section 3.1, General (Execution), of Standard Construction Specification 01 55 26, Traffic Regulation, includes the following provision:

- For complete road closures, immediate emergency access to be provided if needed to emergency response vehicles.

Because EBMUD's Standard Construction Specification 01 55 26, Traffic Regulation, would be incorporated into the Project and requires implementation of a Traffic Control Plan that includes the development of an emergency vehicle access plan, Project impacts related to emergency vehicle access on Ney Avenue would be less than significant.

82nd Avenue, Aster Avenue, and Golf Links Road
Existing pipeline abandonment disconnection sites are located at the intersection of 82nd Avenue and Aster Avenue and at the intersection of Golf Links Road and Fontaine Street, as shown in Figure 2. Construction at these two existing pipeline abandonment disconnection sites would potentially require one-lane closures on 82nd Avenue, Aster Avenue, and Golf Links Road. Closure of one lane would still accommodate adequate emergency response vehicle access. However, in the event that any full road closures are required to accommodate existing pipeline abandonment activities, potential impacts to emergency vehicle access could occur. As detailed in Section 3.3.3, several EBMUD standard practices and procedures, applicable to all EBMUD projects, would be incorporated as part of the Project, including EBMUD's Standard Construction Specification 01 55 26, Traffic Regulation. Section 1.2, Submittals, of Standard Construction Specification 01 55 26, Traffic Regulation, requires preparation of a Traffic Control Plan that conforms to the most current version of the Caltrans Manual of Traffic Controls for Construction and Maintenance Work Zones and the Manual on Uniform Traffic Control Devices, including a description of emergency response vehicle access. Specifically, Section 1.2, Submittals, includes the following provision:

- A description of emergency response vehicle access. If the road or area is completely blocked, preventing access by an emergency responder, a contingency plan must be included.

Furthermore, Section 3.1, General (Execution), of Standard Construction Specification 01 55 26, Traffic Regulation, includes the following provision:

- For complete road closures, immediate emergency access to be provided if needed to emergency response vehicles.

Because EBMUD's Standard Construction Specification 01 55 26, Traffic Regulation, would be incorporated into the Project and requires implementation of a Traffic Control Plan that includes the development of an emergency vehicle access plan, Project impacts related to emergency vehicle access on 82nd Avenue, Aster Avenue, and Golf Links Road would be less than significant.

96th and 99th Avenues
Because 96th and 99th Avenues are approximately 30 feet wide, the 25-foot-wide easement needed for pipeline trenching, truck staging, and vehicle parking would require closure of the segment of 96th Avenue between Bancroft Avenue and MacArthur Boulevard as well as closure of the segment of 99th Avenue between MacArthur Boulevard and Stanley Avenue.

Closure of 96th and 99th Avenues may result in inadequate emergency and property access. As detailed in Section 3.3.3, several EBMUD standard practices and procedures, applicable to all EBMUD projects, would be incorporated as part of the Project, including EBMUD's Standard Construction Specification 01 55 26, Traffic Regulation. Section 1.2, Submittals, of Standard Construction Specification 01 55 26, Traffic Regulation, requires preparation of a Traffic Control Plan that conforms to the most current version of the Caltrans Manual of Traffic Controls for Construction and Maintenance Work Zones and the Manual on Uniform Traffic Control Devices, including a description of emergency response vehicle access. Specifically, Section 1.2, Submittals, includes the following provision:

- A description of emergency response vehicle access. If the road or area is completely blocked, preventing access by an emergency responder, a contingency plan must be included.

Furthermore, Section 3.1, General (Execution), of Standard Construction Specification 01 55 26, Traffic Regulation, includes the following provision:

- For complete road closures, immediate emergency access to be provided if needed to emergency response vehicles.

Because EBMUD's Standard Construction Specification 01 55 26, Traffic Regulation, would be incorporated into the Project and requires implementation of a Traffic Control Plan that includes the development of an emergency vehicle access plan, Project impacts related to emergency vehicle access on 96th and 99th Avenues would be less than significant.

MacArthur Boulevard
MacArthur Boulevard is approximately 50 feet wide, and EBMUD would require an approximately 25-foot-wide easement to accommodate pipeline trenching, truck staging, and vehicle parking for Project construction. As a result, the Project would require closure of approximately half of MacArthur Boulevard within the work zone; however, EBMUD would maintain adequate street width to maintain two-way traffic flow. Vehicles would be rerouted around the work zone in accordance with EBMUD's Standard Construction Specification 01 55 26, Traffic Regulation, which requires preparation of a Traffic Control Plan that conforms to the most current version of the Caltrans Manual of Traffic Controls for Construction and Maintenance Work Zones and the Manual on Uniform Traffic Control Devices including a description of emergency response vehicle access. Specifically, Section 1.2, Submittals, includes the following provision:

- A description of emergency response vehicle access. If the road or area is completely blocked, preventing access by an emergency responder, a contingency plan must be included.

Furthermore, Section 3.1, General (Execution), of Standard Construction Specification 01 55 26, Traffic Regulation, includes the following provision:

- For complete road closures, immediate emergency access to be provided if needed to emergency response vehicles.

Because EBMUD's Standard Construction Specification 01 55 26, Traffic Regulation, would be incorporated into the Project and requires implementation of a Traffic Control Plan that includes the development of an emergency vehicle access plan, and two-way access along MacArthur Boulevard would be maintained during construction, Project impacts related to emergency vehicle access on MacArthur Boulevard would be less than significant.

Operation

All roadways and sidewalks would be restored to pre-Project conditions after construction is complete. No impact would occur during operation.

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Appendix A Intersection LOS Analysis Worksheets

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	4	5	0	12	0	16	2	0	0	2	5
Future Vol, veh/h	2	4	5	0	12	0	16	2	0	0	2	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	4	5	0	12	0	16	2	0	0	2	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	45	39	5	43	41	2	7	0	0	2	0	0
Stage 1	5	5	-	34	34	-	-	-	-	-	-	-
Stage 2	40	34	-	9	7	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	957	853	1078	960	851	1082	1614	-	-	1620	-	-
Stage 1	1017	892	-	982	867	-	-	-	-	-	-	-
Stage 2	975	867	-	1012	890	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	940	844	1078	945	842	1082	1614	-	-	1620	-	-
Mov Cap-2 Maneuver	940	844	-	945	842	-	-	-	-	-	-	-
Stage 1	1007	892	-	972	858	-	-	-	-	-	-	-
Stage 2	952	858	-	1003	890	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.8	9.3	6.4	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1614	-	-	956	842	1620	-	-
HCM Lane V/C Ratio	0.01	-	-	0.012	0.014	-	-	-
HCM Control Delay (s)	7.3	0	-	8.8	9.3	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Intersection	
Intersection Delay, s/veh	12.4
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	18	17	417	6	6	352
Future Vol, veh/h	18	17	417	6	6	352
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	18	453	7	7	383
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	9	13.1	11.8
HCM LOS	A	B	B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	51%	2%
Vol Thru, %	99%	0%	98%
Vol Right, %	1%	49%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	423	35	358
LT Vol	0	18	6
Through Vol	417	0	352
RT Vol	6	17	0
Lane Flow Rate	460	38	389
Geometry Grp	1	1	1
Degree of Util (X)	0.566	0.059	0.488
Departure Headway (Hd)	4.434	5.554	4.512
Convergence, Y/N	Yes	Yes	Yes
Cap	814	642	798
Service Time	2.46	3.613	2.539
HCM Lane V/C Ratio	0.565	0.059	0.487
HCM Control Delay	13.1	9	11.8
HCM Lane LOS	B	A	B
HCM 95th-tile Q	3.6	0.2	2.7

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	1	7	20	2	20	1	580	6	6	532	1
Future Vol, veh/h	7	1	7	20	2	20	1	580	6	6	532	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	80	-	-	80	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	1	7	20	2	20	1	580	6	6	532	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1141	1133	533	1134	1130	583	533	0	0	586	0	0
Stage 1	545	545	-	585	585	-	-	-	-	-	-	-
Stage 2	596	588	-	549	545	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	178	203	547	180	204	512	1035	-	-	989	-	-
Stage 1	523	519	-	497	498	-	-	-	-	-	-	-
Stage 2	490	496	-	520	519	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	169	202	547	176	203	512	1035	-	-	989	-	-
Mov Cap-2 Maneuver	169	202	-	176	203	-	-	-	-	-	-	-
Stage 1	522	516	-	497	498	-	-	-	-	-	-	-
Stage 2	469	496	-	509	516	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.1	21.6	0	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1035	-	-	254	258	989	-	-
HCM Lane V/C Ratio	0.001	-	-	0.059	0.163	0.006	-	-
HCM Control Delay (s)	8.5	-	-	20.1	21.6	8.7	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.6	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	8	2	452	353	3
Future Vol, veh/h	7	8	2	452	353	3
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	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	8	2	452	353	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	811	355	356	0	-	0
Stage 1	355	-	-	-	-	-
Stage 2	456	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	349	689	1203	-	-	-
Stage 1	710	-	-	-	-	-
Stage 2	638	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	348	689	1203	-	-	-
Mov Cap-2 Maneuver	348	-	-	-	-	-
Stage 1	709	-	-	-	-	-
Stage 2	638	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1203	-	473	-	-
HCM Lane V/C Ratio	0.002	-	0.032	-	-
HCM Control Delay (s)	8	0	12.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	673	43	19	533	92	112	296	44	133	129	99
Future Volume (veh/h)	66	673	43	19	533	92	112	296	44	133	129	99
Number	1	6	16	5	2	12	7	4	14	3	8	18
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		0.99	1.00		0.99	1.00		0.99
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	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	66	673	40	19	533	81	112	296	39	133	129	72
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	315	1604	95	50	994	150	139	336	44	162	248	138
Arrive On Green	0.36	0.94	0.94	0.03	0.32	0.32	0.08	0.21	0.21	0.09	0.22	0.22
Sat Flow, veh/h	1774	3395	202	1774	3079	466	1774	1610	212	1774	1120	625
Grp Volume(v), veh/h	66	351	362	19	305	309	112	0	335	133	0	201
Grp Sat Flow(s),veh/h/ln	1774	1770	1827	1774	1770	1776	1774	0	1822	1774	0	1744
Q Serve(g_s), s	2.9	2.0	2.0	1.2	15.5	15.7	6.8	0.0	19.6	8.1	0.0	11.2
Cycle Q Clear(g_c), s	2.9	2.0	2.0	1.2	15.5	15.7	6.8	0.0	19.6	8.1	0.0	11.2
Prop In Lane	1.00		0.11	1.00		0.26	1.00		0.12	1.00		0.36
Lane Grp Cap(c), veh/h	315	836	863	50	571	573	139	0	380	162	0	386
V/C Ratio(X)	0.21	0.42	0.42	0.38	0.53	0.54	0.80	0.00	0.88	0.82	0.00	0.52
Avail Cap(c_a), veh/h	315	836	863	153	571	573	234	0	472	234	0	452
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.86	0.86	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.1	1.7	1.7	52.5	30.5	30.5	49.9	0.0	42.2	49.1	0.0	37.7
Incr Delay (d2), s/veh	0.1	1.3	1.3	1.8	3.6	3.6	4.1	0.0	13.2	9.6	0.0	0.4
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	1.1	1.1	0.6	8.1	8.2	3.5	0.0	11.3	4.4	0.0	5.4
LnGrp Delay(d),s/veh	30.2	3.0	2.9	54.3	34.1	34.1	54.0	0.0	55.4	58.7	0.0	38.1
LnGrp LOS	C	A	A	D	C	C	D		E	E		D
Approach Vol, veh/h		779			633			447			334	
Approach Delay, s/veh		5.3			34.7			55.0			46.3	
Approach LOS		A			C			E			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	25.0	41.0	15.5	28.4	8.6	57.5	14.1	29.8
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	9.5	35.5	14.5	28.5	9.5	35.5	14.5	28.5
Max Q Clear Time (g_c+I1), s	4.9	17.7	10.1	21.6	3.2	4.0	8.8	13.2
Green Ext Time (p_c), s	0.0	1.3	0.1	0.5	0.0	1.6	0.1	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	30.2
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	11	441	3	4	187
Future Vol, veh/h	12	11	441	3	4	187
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	11	441	3	4	187

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	545	222	0	0	444	0
Stage 1	443	-	-	-	-	-
Stage 2	102	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	468	782	-	-	1112	-
Stage 1	614	-	-	-	-	-
Stage 2	911	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	466	782	-	-	1112	-
Mov Cap-2 Maneuver	466	-	-	-	-	-
Stage 1	614	-	-	-	-	-
Stage 2	907	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.5	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	578	1112	-
HCM Lane V/C Ratio	-	-	0.04	0.004	-
HCM Control Delay (s)	-	-	11.5	8.2	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection						
Int Delay, s/veh	0.8					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	16	16	5	249	143	5
Future Vol, veh/h	16	16	5	249	143	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
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	17	17	5	271	155	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	439	158	160	0	-	0
Stage 1	158	-	-	-	-	-
Stage 2	281	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	575	887	1419	-	-	-
Stage 1	871	-	-	-	-	-
Stage 2	767	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	573	887	1419	-	-	-
Mov Cap-2 Maneuver	573	-	-	-	-	-
Stage 1	868	-	-	-	-	-
Stage 2	767	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.4	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1419	-	696	-	-
HCM Lane V/C Ratio	0.004	-	0.05	-	-
HCM Control Delay (s)	7.5	0	10.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	14	18	0	8	0	10	2	0	3	2	0
Future Vol, veh/h	5	14	18	0	8	0	10	2	0	3	2	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	14	18	0	8	0	10	2	0	3	2	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	34	30	2	46	30	2	2	0	0	2	0	0
Stage 1	8	8	-	22	22	-	-	-	-	-	-	-
Stage 2	26	22	-	24	8	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	973	863	1082	955	863	1082	1620	-	-	1620	-	-
Stage 1	1013	889	-	996	877	-	-	-	-	-	-	-
Stage 2	992	877	-	994	889	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	960	856	1082	922	856	1082	1620	-	-	1620	-	-
Mov Cap-2 Maneuver	960	856	-	922	856	-	-	-	-	-	-	-
Stage 1	1007	887	-	990	872	-	-	-	-	-	-	-
Stage 2	977	872	-	960	887	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.9	9.2	6	4.3
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1620	-	-	969	856	1620	-	-
HCM Lane V/C Ratio	0.006	-	-	0.038	0.009	0.002	-	-
HCM Control Delay (s)	7.2	0	-	8.9	9.2	7.2	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-

Intersection	
Intersection Delay, s/veh	10.1
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	11	307	20	20	262
Future Vol, veh/h	12	11	307	20	20	262
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	12	334	22	22	285
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	8.4	10.4	9.9
HCM LOS	A	B	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	52%	7%
Vol Thru, %	94%	0%	93%
Vol Right, %	6%	48%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	327	23	282
LT Vol	0	12	20
Through Vol	307	0	262
RT Vol	20	11	0
Lane Flow Rate	355	25	307
Geometry Grp	1	1	1
Degree of Util (X)	0.422	0.036	0.372
Departure Headway (Hd)	4.272	5.161	4.364
Convergence, Y/N	Yes	Yes	Yes
Cap	846	694	828
Service Time	2.284	3.193	2.377
HCM Lane V/C Ratio	0.42	0.036	0.371
HCM Control Delay	10.4	8.4	9.9
HCM Lane LOS	B	A	A
HCM 95th-tile Q	2.1	0.1	1.7

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1	4	12	2	12	7	591	21	21	573	6
Future Vol, veh/h	5	1	4	12	2	12	7	591	21	21	573	6
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	80	-	-	80	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1	4	12	2	12	7	591	21	21	573	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1261	1264	596	1257	1257	622	589	0	0	622	0	0
Stage 1	628	628	-	626	626	-	-	-	-	-	-	-
Stage 2	633	636	-	631	631	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	147	169	504	148	171	487	986	-	-	959	-	-
Stage 1	471	476	-	472	477	-	-	-	-	-	-	-
Stage 2	468	472	-	469	474	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	137	162	496	140	163	479	978	-	-	951	-	-
Mov Cap-2 Maneuver	137	162	-	140	163	-	-	-	-	-	-	-
Stage 1	464	462	-	465	470	-	-	-	-	-	-	-
Stage 2	447	465	-	450	460	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.2	24.4	0.1	0.3
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	978	-	-	197	211	951	-	-
HCM Lane V/C Ratio	0.007	-	-	0.051	0.123	0.022	-	-
HCM Control Delay (s)	8.7	-	-	24.2	24.4	8.9	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.4	0.1	-	-

Intersection						
Int Delay, s/veh	0.2					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	5	8	468	374	9
Future Vol, veh/h	4	5	8	468	374	9
Conflicting Peds, #/hr	2	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	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	5	8	468	374	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	865	379	383	0	-	0
Stage 1	379	-	-	-	-	-
Stage 2	486	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	324	668	1175	-	-	-
Stage 1	692	-	-	-	-	-
Stage 2	618	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	321	668	1175	-	-	-
Mov Cap-2 Maneuver	321	-	-	-	-	-
Stage 1	686	-	-	-	-	-
Stage 2	618	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.1	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1175	-	451	-	-
HCM Lane V/C Ratio	0.007	-	0.02	-	-
HCM Control Delay (s)	8.1	0	13.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	708	45	20	561	96	117	311	46	139	135	105
Future Volume (veh/h)	69	708	45	20	561	96	117	311	46	139	135	105
Number	1	6	16	5	2	12	7	4	14	3	8	18
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		0.99	1.00		0.99	1.00		0.99
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	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	69	708	42	20	561	85	117	311	41	139	135	78
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	322	1567	93	76	994	150	167	347	46	190	253	146
Arrive On Green	0.36	0.92	0.92	0.04	0.32	0.32	0.09	0.22	0.22	0.11	0.23	0.23
Sat Flow, veh/h	1774	3395	201	1774	3081	465	1774	1610	212	1774	1104	638
Grp Volume(v), veh/h	69	369	381	20	322	324	117	0	352	139	0	213
Grp Sat Flow(s),veh/h/ln	1774	1770	1827	1774	1770	1776	1774	0	1822	1774	0	1742
Q Serve(g_s), s	3.0	3.0	3.0	1.2	16.5	16.6	7.0	0.0	20.6	8.3	0.0	11.8
Cycle Q Clear(g_c), s	3.0	3.0	3.0	1.2	16.5	16.6	7.0	0.0	20.6	8.3	0.0	11.8
Prop In Lane	1.00		0.11	1.00		0.26	1.00		0.12	1.00		0.37
Lane Grp Cap(c), veh/h	322	817	843	76	571	573	167	0	393	190	0	398
V/C Ratio(X)	0.21	0.45	0.45	0.26	0.56	0.57	0.70	0.00	0.90	0.73	0.00	0.53
Avail Cap(c_a), veh/h	322	817	843	177	571	573	258	0	472	258	0	451
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.84	0.84	0.84	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.6	2.4	2.4	51.0	30.8	30.9	48.3	0.0	41.9	47.6	0.0	37.3
Incr Delay (d2), s/veh	0.1	1.5	1.5	0.7	4.0	4.0	2.0	0.0	15.6	3.8	0.0	0.4
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	1.6	1.6	0.6	8.7	8.8	3.5	0.0	12.1	4.3	0.0	5.7
LnGrp Delay(d),s/veh	29.7	3.9	3.9	51.7	34.8	34.9	50.3	0.0	57.5	51.3	0.0	37.7
LnGrp LOS	C	A	A	D	C	C	D		E	D		D
Approach Vol, veh/h		819			666			469			352	
Approach Delay, s/veh		6.1			35.3			55.7			43.1	
Approach LOS		A			D			E			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	24.0	41.0	15.8	29.2	8.7	56.3	14.4	30.7
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	9.5	35.5	14.5	28.5	9.5	35.5	14.5	28.5
Max Q Clear Time (g_c+I1), s	5.0	18.6	10.3	22.6	3.2	5.0	9.0	13.8
Green Ext Time (p_c), s	0.0	1.4	0.1	0.4	0.0	1.7	0.1	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	30.3
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	8	466	12	13	187
Future Vol, veh/h	7	8	466	12	13	187
Conflicting Peds, #/hr	4	0	0	4	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	8	466	12	13	187

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	600	243	0	0	482	0
Stage 1	476	-	-	-	-	-
Stage 2	124	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	432	758	-	-	1077	-
Stage 1	591	-	-	-	-	-
Stage 2	888	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	423	755	-	-	1073	-
Mov Cap-2 Maneuver	423	-	-	-	-	-
Stage 1	589	-	-	-	-	-
Stage 2	873	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.7	0	0.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	553	1073	-
HCM Lane V/C Ratio	-	-	0.027	0.012	-
HCM Control Delay (s)	-	-	11.7	8.4	0.1
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	10	18	269	138	18
Future Vol, veh/h	10	10	18	269	138	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
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	11	11	20	292	150	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	492	160	170	0	-	0
Stage 1	160	-	-	-	-	-
Stage 2	332	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	536	885	1407	-	-	-
Stage 1	869	-	-	-	-	-
Stage 2	727	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	527	885	1407	-	-	-
Mov Cap-2 Maneuver	527	-	-	-	-	-
Stage 1	854	-	-	-	-	-
Stage 2	727	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1407	-	661	-	-
HCM Lane V/C Ratio	0.014	-	0.033	-	-
HCM Control Delay (s)	7.6	0	10.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	6.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	4	5	0	13	0	17	2	0	0	2	5
Future Vol, veh/h	2	4	5	0	13	0	17	2	0	0	2	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	4	5	0	13	0	17	2	0	0	2	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	48	41	5	45	43	2	7	0	0	2	0	0
Stage 1	5	5	-	36	36	-	-	-	-	-	-	-
Stage 2	43	36	-	9	7	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	953	851	1078	957	849	1082	1614	-	-	1620	-	-
Stage 1	1017	892	-	980	865	-	-	-	-	-	-	-
Stage 2	971	865	-	1012	890	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	934	842	1078	941	840	1082	1614	-	-	1620	-	-
Mov Cap-2 Maneuver	934	842	-	941	840	-	-	-	-	-	-	-
Stage 1	1006	892	-	969	855	-	-	-	-	-	-	-
Stage 2	946	855	-	1003	890	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.8	9.4	6.5	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1614	-	-	954	840	1620	-	-
HCM Lane V/C Ratio	0.011	-	-	0.012	0.015	-	-	-
HCM Control Delay (s)	7.3	0	-	8.8	9.4	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Intersection	
Intersection Delay, s/veh	13
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	19	18	438	6	6	370
Future Vol, veh/h	19	18	438	6	6	370
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	20	476	7	7	402
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	9.1	14	12.3
HCM LOS	A	B	B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	51%	2%
Vol Thru, %	99%	0%	98%
Vol Right, %	1%	49%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	444	37	376
LT Vol	0	19	6
Through Vol	438	0	370
RT Vol	6	18	0
Lane Flow Rate	483	40	409
Geometry Grp	1	1	1
Degree of Util (X)	0.599	0.063	0.516
Departure Headway (Hd)	4.466	5.642	4.546
Convergence, Y/N	Yes	Yes	Yes
Cap	806	631	793
Service Time	2.494	3.708	2.576
HCM Lane V/C Ratio	0.599	0.063	0.516
HCM Control Delay	14	9.1	12.3
HCM Lane LOS	B	A	B
HCM 95th-tile Q	4.1	0.2	3

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	1	7	21	2	21	1	610	6	6	559	1
Future Vol, veh/h	7	1	7	21	2	21	1	610	6	6	559	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	80	-	-	80	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	1	7	21	2	21	1	610	6	6	559	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1199	1190	560	1191	1187	613	560	0	0	616	0	0
Stage 1	572	572	-	615	615	-	-	-	-	-	-	-
Stage 2	627	618	-	576	572	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	162	188	528	164	188	492	1011	-	-	964	-	-
Stage 1	505	504	-	479	482	-	-	-	-	-	-	-
Stage 2	471	481	-	503	504	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	153	187	528	160	187	492	1011	-	-	964	-	-
Mov Cap-2 Maneuver	153	187	-	160	187	-	-	-	-	-	-	-
Stage 1	504	501	-	479	482	-	-	-	-	-	-	-
Stage 2	449	481	-	492	501	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.5	23.5	0	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1011	-	-	233	238	964	-	-
HCM Lane V/C Ratio	0.001	-	-	0.064	0.185	0.006	-	-
HCM Control Delay (s)	8.6	-	-	21.5	23.5	8.8	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.7	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	8	2	475	371	3
Future Vol, veh/h	7	8	2	475	371	3
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	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	8	2	475	371	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	852	373	374	0	-	0
Stage 1	373	-	-	-	-	-
Stage 2	479	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	330	673	1184	-	-	-
Stage 1	696	-	-	-	-	-
Stage 2	623	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	329	673	1184	-	-	-
Mov Cap-2 Maneuver	329	-	-	-	-	-
Stage 1	695	-	-	-	-	-
Stage 2	623	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1184	-	452	-	-
HCM Lane V/C Ratio	0.002	-	0.033	-	-
HCM Control Delay (s)	8	0	13.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	707	45	20	560	97	118	311	46	140	136	104
Future Volume (veh/h)	69	707	45	20	560	97	118	311	46	140	136	104
Number	1	6	16	5	2	12	7	4	14	3	8	18
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		0.99	1.00		0.99	1.00		0.99
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	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	69	707	42	20	560	86	118	311	41	140	136	77
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	295	1561	93	52	992	152	146	347	46	169	255	144
Arrive On Green	0.33	0.92	0.92	0.03	0.32	0.32	0.08	0.22	0.22	0.10	0.23	0.23
Sat Flow, veh/h	1774	3395	202	1774	3074	471	1774	1610	212	1774	1113	630
Grp Volume(v), veh/h	69	368	381	20	322	324	118	0	352	140	0	213
Grp Sat Flow(s),veh/h/ln	1774	1770	1827	1774	1770	1775	1774	0	1822	1774	0	1744
Q Serve(g_s), s	3.1	3.1	3.2	1.2	16.5	16.7	7.2	0.0	20.6	8.5	0.0	11.8
Cycle Q Clear(g_c), s	3.1	3.1	3.2	1.2	16.5	16.7	7.2	0.0	20.6	8.5	0.0	11.8
Prop In Lane	1.00		0.11	1.00		0.27	1.00		0.12	1.00		0.36
Lane Grp Cap(c), veh/h	295	814	840	52	571	573	146	0	393	169	0	399
V/C Ratio(X)	0.23	0.45	0.45	0.39	0.56	0.57	0.81	0.00	0.90	0.83	0.00	0.53
Avail Cap(c_a), veh/h	295	814	840	153	571	573	234	0	472	234	0	452
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.86	0.86	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.6	2.5	2.5	52.4	30.8	30.9	49.6	0.0	41.9	48.9	0.0	37.3
Incr Delay (d2), s/veh	0.1	1.6	1.5	1.8	4.0	4.0	4.4	0.0	15.6	11.7	0.0	0.4
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	1.6	1.6	0.6	8.7	8.7	3.7	0.0	12.1	4.8	0.0	5.7
LnGrp Delay(d),s/veh	31.8	4.1	4.0	54.2	34.8	34.9	54.1	0.0	57.5	60.6	0.0	37.7
LnGrp LOS	C	A	A	D	C	C	D		E	E		D
Approach Vol, veh/h		818			666			470			353	
Approach Delay, s/veh		6.4			35.4			56.7			46.8	
Approach LOS		A			D			E			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	23.8	41.0	16.0	29.2	8.7	56.1	14.5	30.7
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	9.5	35.5	14.5	28.5	9.5	35.5	14.5	28.5
Max Q Clear Time (g_c+I1), s	5.1	18.7	10.5	22.6	3.2	5.2	9.2	13.8
Green Ext Time (p_c), s	0.0	1.4	0.1	0.4	0.0	1.7	0.1	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	31.2
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	12	463	3	4	197
Future Vol, veh/h	13	12	463	3	4	197
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	12	463	3	4	197

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	572	233	0	0	466	0
Stage 1	465	-	-	-	-	-
Stage 2	107	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	450	769	-	-	1092	-
Stage 1	599	-	-	-	-	-
Stage 2	906	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	448	769	-	-	1092	-
Mov Cap-2 Maneuver	448	-	-	-	-	-
Stage 1	599	-	-	-	-	-
Stage 2	902	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.7	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	560	1092	-
HCM Lane V/C Ratio	-	-	0.045	0.004	-
HCM Control Delay (s)	-	-	11.7	8.3	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection						
Int Delay, s/veh	0.8					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	17	17	5	262	150	5
Future Vol, veh/h	17	17	5	262	150	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
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	18	18	5	285	163	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	461	166	168	0	-	0
Stage 1	166	-	-	-	-	-
Stage 2	295	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	559	878	1410	-	-	-
Stage 1	863	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	557	878	1410	-	-	-
Mov Cap-2 Maneuver	557	-	-	-	-	-
Stage 1	860	-	-	-	-	-
Stage 2	755	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1410	-	682	-	-
HCM Lane V/C Ratio	0.004	-	0.054	-	-
HCM Control Delay (s)	7.6	0	10.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	15	19	0	8	0	11	2	0	3	2	0
Future Vol, veh/h	5	15	19	0	8	0	11	2	0	3	2	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	15	19	0	8	0	11	2	0	3	2	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	36	32	2	49	32	2	2	0	0	2	0	0
Stage 1	8	8	-	24	24	-	-	-	-	-	-	-
Stage 2	28	24	-	25	8	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	970	861	1082	951	861	1082	1620	-	-	1620	-	-
Stage 1	1013	889	-	994	875	-	-	-	-	-	-	-
Stage 2	989	875	-	993	889	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	956	853	1082	916	853	1082	1620	-	-	1620	-	-
Mov Cap-2 Maneuver	956	853	-	916	853	-	-	-	-	-	-	-
Stage 1	1006	887	-	987	869	-	-	-	-	-	-	-
Stage 2	973	869	-	957	887	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.9	9.3	6.1	4.3
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1620	-	-	966	853	1620	-	-
HCM Lane V/C Ratio	0.007	-	-	0.04	0.009	0.002	-	-
HCM Control Delay (s)	7.2	0	-	8.9	9.3	7.2	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-

Intersection	
Intersection Delay, s/veh	10.4
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	12	323	21	21	275
Future Vol, veh/h	13	12	323	21	21	275
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	13	351	23	23	299
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	8.5	10.7	10.2
HCM LOS	A	B	B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	52%	7%
Vol Thru, %	94%	0%	93%
Vol Right, %	6%	48%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	344	25	296
LT Vol	0	13	21
Through Vol	323	0	275
RT Vol	21	12	0
Lane Flow Rate	374	27	322
Geometry Grp	1	1	1
Degree of Util (X)	0.446	0.039	0.392
Departure Headway (Hd)	4.294	5.23	4.39
Convergence, Y/N	Yes	Yes	Yes
Cap	841	684	824
Service Time	2.307	3.265	2.404
HCM Lane V/C Ratio	0.445	0.039	0.391
HCM Control Delay	10.7	8.5	10.2
HCM Lane LOS	B	A	B
HCM 95th-tile Q	2.3	0.1	1.9

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1	4	13	2	13	7	621	22	22	602	6
Future Vol, veh/h	5	1	4	13	2	13	7	621	22	22	602	6
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	80	-	-	80	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1	4	13	2	13	7	621	22	22	602	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1323	1326	625	1318	1318	652	618	0	0	653	0	0
Stage 1	659	659	-	656	656	-	-	-	-	-	-	-
Stage 2	664	667	-	662	662	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	133	156	485	134	157	468	962	-	-	934	-	-
Stage 1	453	461	-	454	462	-	-	-	-	-	-	-
Stage 2	450	457	-	451	459	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	123	149	477	127	150	460	954	-	-	926	-	-
Mov Cap-2 Maneuver	123	149	-	127	150	-	-	-	-	-	-	-
Stage 1	446	446	-	447	455	-	-	-	-	-	-	-
Stage 2	429	450	-	432	444	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26.3	26.5	0.1	0.3
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	954	-	-	179	195	926	-	-
HCM Lane V/C Ratio	0.007	-	-	0.056	0.144	0.024	-	-
HCM Control Delay (s)	8.8	-	-	26.3	26.5	9	-	-
HCM Lane LOS	A	-	-	D	D	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.5	0.1	-	-

Intersection						
Int Delay, s/veh	0.2					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	5	8	492	393	9
Future Vol, veh/h	4	5	8	492	393	9
Conflicting Peds, #/hr	2	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	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	5	8	492	393	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	908	398	402	0	-	0
Stage 1	398	-	-	-	-	-
Stage 2	510	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	306	652	1157	-	-	-
Stage 1	678	-	-	-	-	-
Stage 2	603	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	303	652	1157	-	-	-
Mov Cap-2 Maneuver	303	-	-	-	-	-
Stage 1	671	-	-	-	-	-
Stage 2	603	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.5	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1157	-	431	-	-
HCM Lane V/C Ratio	0.007	-	0.021	-	-
HCM Control Delay (s)	8.1	0	13.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	744	47	21	590	101	123	327	48	146	142	110
Future Volume (veh/h)	73	744	47	21	590	101	123	327	48	146	142	110
Number	1	6	16	5	2	12	7	4	14	3	8	18
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		0.99	1.00		0.99	1.00		0.99
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	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	73	744	44	21	590	90	123	327	43	146	142	83
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	275	1521	90	53	993	151	151	360	47	175	260	152
Arrive On Green	0.31	0.90	0.90	0.03	0.32	0.32	0.09	0.22	0.22	0.10	0.24	0.24
Sat Flow, veh/h	1774	3396	201	1774	3077	468	1774	1611	212	1774	1099	642
Grp Volume(v), veh/h	73	388	400	21	339	341	123	0	370	146	0	225
Grp Sat Flow(s),veh/h/ln	1774	1770	1827	1774	1770	1776	1774	0	1823	1774	0	1742
Q Serve(g_s), s	3.4	4.5	4.5	1.3	17.6	17.7	7.5	0.0	21.8	8.9	0.0	12.5
Cycle Q Clear(g_c), s	3.4	4.5	4.5	1.3	17.6	17.7	7.5	0.0	21.8	8.9	0.0	12.5
Prop In Lane	1.00		0.11	1.00		0.26	1.00		0.12	1.00		0.37
Lane Grp Cap(c), veh/h	275	792	818	53	571	573	151	0	407	175	0	413
V/C Ratio(X)	0.27	0.49	0.49	0.39	0.59	0.60	0.81	0.00	0.91	0.83	0.00	0.55
Avail Cap(c_a), veh/h	275	792	818	153	571	573	234	0	472	234	0	451
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.83	0.83	0.83	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.2	3.4	3.4	52.4	31.2	31.2	49.5	0.0	41.6	48.7	0.0	36.8
Incr Delay (d2), s/veh	0.2	1.8	1.7	1.7	4.5	4.5	6.2	0.0	18.3	13.5	0.0	0.4
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	1.7	2.3	2.4	0.6	9.3	9.3	4.0	0.0	13.1	5.0	0.0	6.0
LnGrp Delay(d),s/veh	33.4	5.2	5.1	54.1	35.7	35.7	55.7	0.0	59.9	62.2	0.0	37.2
LnGrp LOS	C	A	A	D	D	D	E		E	E		D
Approach Vol, veh/h		861			701			493			371	
Approach Delay, s/veh		7.6			36.3			58.9			47.0	
Approach LOS		A			D			E			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	22.6	41.0	16.4	30.1	8.8	54.8	14.9	31.6
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	9.5	35.5	14.5	28.5	9.5	35.5	14.5	28.5
Max Q Clear Time (g_c+I1), s	5.4	19.7	10.9	23.8	3.3	6.5	9.5	14.5
Green Ext Time (p_c), s	0.0	1.5	0.1	0.4	0.0	1.8	0.1	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	32.3
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	8	490	13	14	197
Future Vol, veh/h	7	8	490	13	14	197
Conflicting Peds, #/hr	4	0	0	4	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	8	490	13	14	197

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	632	256	0	0	507	0
Stage 1	501	-	-	-	-	-
Stage 2	131	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	413	743	-	-	1054	-
Stage 1	574	-	-	-	-	-
Stage 2	881	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	404	741	-	-	1050	-
Mov Cap-2 Maneuver	404	-	-	-	-	-
Stage 1	572	-	-	-	-	-
Stage 2	865	-	-	-	-	-

Approach	WB		NB		SB	
HCM Control Delay, s	12		0		0.7	
HCM LOS	B					

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	533	1050	-
HCM Lane V/C Ratio	-	-	0.028	0.013	-
HCM Control Delay (s)	-	-	12	8.5	0.1
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection						
Int Delay, s/veh	0.8					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	11	19	283	145	19
Future Vol, veh/h	11	11	19	283	145	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
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	12	12	21	308	158	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	519	169	179	0	-	0
Stage 1	169	-	-	-	-	-
Stage 2	350	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	517	875	1397	-	-	-
Stage 1	861	-	-	-	-	-
Stage 2	713	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	508	875	1397	-	-	-
Mov Cap-2 Maneuver	508	-	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	713	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.8	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1397	-	643	-	-
HCM Lane V/C Ratio	0.015	-	0.037	-	-
HCM Control Delay (s)	7.6	0	10.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection												
Int Delay, s/veh	7.2											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	4	23	0	12	0	16	2	0	0	2	5
Future Vol, veh/h	2	4	23	0	12	0	16	2	0	0	2	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	4	23	0	12	0	16	2	0	0	2	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	45	39	5	52	41	2	7	0	0	2	0	0
Stage 1	5	5	-	34	34	-	-	-	-	-	-	-
Stage 2	40	34	-	18	7	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	957	853	1078	947	851	1082	1614	-	-	1620	-	-
Stage 1	1017	892	-	982	867	-	-	-	-	-	-	-
Stage 2	975	867	-	1001	890	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	940	844	1078	917	842	1082	1614	-	-	1620	-	-
Mov Cap-2 Maneuver	940	844	-	917	842	-	-	-	-	-	-	-
Stage 1	1007	892	-	972	858	-	-	-	-	-	-	-
Stage 2	952	858	-	975	890	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.6	9.3	6.4	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1614	-	-	1028	842	1620	-	-
HCM Lane V/C Ratio	0.01	-	-	0.028	0.014	-	-	-
HCM Control Delay (s)	7.3	0	-	8.6	9.3	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-

Intersection	
Intersection Delay, s/veh	12.6
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	18	17	417	11	19	352
Future Vol, veh/h	18	17	417	11	19	352
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	18	453	12	21	383
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	9	13.3	12.1
HCM LOS	A	B	B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	51%	5%
Vol Thru, %	97%	0%	95%
Vol Right, %	3%	49%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	428	35	371
LT Vol	0	18	19
Through Vol	417	0	352
RT Vol	11	17	0
Lane Flow Rate	465	38	403
Geometry Grp	1	1	1
Degree of Util (X)	0.574	0.059	0.507
Departure Headway (Hd)	4.443	5.595	4.525
Convergence, Y/N	Yes	Yes	Yes
Cap	814	637	798
Service Time	2.47	3.655	2.553
HCM Lane V/C Ratio	0.571	0.06	0.505
HCM Control Delay	13.3	9	12.1
HCM Lane LOS	B	A	B
HCM 95th-tile Q	3.7	0.2	2.9

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	1	7	20	2	20	1	580	12	6	532	1
Future Vol, veh/h	7	1	7	20	2	20	1	580	12	6	532	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	80	-	-	80	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	1	7	20	2	20	1	580	12	6	532	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1144	1139	533	1137	1133	586	533	0	0	592	0	0
Stage 1	545	545	-	588	588	-	-	-	-	-	-	-
Stage 2	599	594	-	549	545	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	177	201	547	179	203	510	1035	-	-	984	-	-
Stage 1	523	519	-	495	496	-	-	-	-	-	-	-
Stage 2	488	493	-	520	519	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	168	200	547	175	202	510	1035	-	-	984	-	-
Mov Cap-2 Maneuver	168	200	-	175	202	-	-	-	-	-	-	-
Stage 1	522	516	-	495	496	-	-	-	-	-	-	-
Stage 2	467	493	-	509	516	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.2	21.7	0	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1035	-	-	252	257	984	-	-
HCM Lane V/C Ratio	0.001	-	-	0.06	0.163	0.006	-	-
HCM Control Delay (s)	8.5	-	-	20.2	21.7	8.7	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.6	0	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	8	15	459	377	3
Future Vol, veh/h	7	8	15	459	377	3
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	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	8	15	459	377	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	868	379	380	0	-	0
Stage 1	379	-	-	-	-	-
Stage 2	489	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	323	668	1178	-	-	-
Stage 1	692	-	-	-	-	-
Stage 2	616	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	318	668	1178	-	-	-
Mov Cap-2 Maneuver	318	-	-	-	-	-
Stage 1	680	-	-	-	-	-
Stage 2	616	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.5	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1178	-	441	-	-
HCM Lane V/C Ratio	0.013	-	0.034	-	-
HCM Control Delay (s)	8.1	0	13.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	673	43	19	533	105	112	296	44	133	129	111
Future Volume (veh/h)	73	673	43	19	533	105	112	296	44	133	129	111
Number	1	6	16	5	2	12	7	4	14	3	8	18
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		0.99	1.00		0.99	1.00		0.99
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	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	73	673	40	19	533	94	112	296	39	133	129	84
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	315	1604	95	50	970	170	139	336	44	162	232	151
Arrive On Green	0.36	0.94	0.94	0.03	0.32	0.32	0.08	0.21	0.21	0.09	0.22	0.22
Sat Flow, veh/h	1774	3395	202	1774	3006	528	1774	1610	212	1774	1050	684
Grp Volume(v), veh/h	73	351	362	19	313	314	112	0	335	133	0	213
Grp Sat Flow(s),veh/h/ln	1774	1770	1827	1774	1770	1765	1774	0	1822	1774	0	1733
Q Serve(g_s), s	3.2	2.0	2.0	1.2	16.0	16.1	6.8	0.0	19.6	8.1	0.0	12.0
Cycle Q Clear(g_c), s	3.2	2.0	2.0	1.2	16.0	16.1	6.8	0.0	19.6	8.1	0.0	12.0
Prop In Lane	1.00		0.11	1.00		0.30	1.00		0.12	1.00		0.39
Lane Grp Cap(c), veh/h	315	836	863	50	571	570	139	0	380	162	0	383
V/C Ratio(X)	0.23	0.42	0.42	0.38	0.55	0.55	0.80	0.00	0.88	0.82	0.00	0.56
Avail Cap(c_a), veh/h	315	836	863	153	571	570	234	0	472	234	0	449
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.86	0.86	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.2	1.7	1.7	52.5	30.6	30.7	49.9	0.0	42.2	49.1	0.0	38.0
Incr Delay (d2), s/veh	0.1	1.3	1.3	1.8	3.8	3.8	4.1	0.0	13.2	9.6	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	1.1	1.1	0.6	8.4	8.5	3.5	0.0	11.3	4.4	0.0	5.8
LnGrp Delay(d),s/veh	30.3	3.0	2.9	54.3	34.4	34.5	54.0	0.0	55.4	58.7	0.0	38.5
LnGrp LOS	C	A	A	D	C	C	D		E	E		D
Approach Vol, veh/h		786			646			447			346	
Approach Delay, s/veh		5.5			35.0			55.0			46.3	
Approach LOS		A			D			E			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	25.0	41.0	15.5	28.4	8.6	57.5	14.1	29.8
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	9.5	35.5	14.5	28.5	9.5	35.5	14.5	28.5
Max Q Clear Time (g_c+I1), s	5.2	18.1	10.1	21.6	3.2	4.0	8.8	14.0
Green Ext Time (p_c), s	0.0	1.4	0.1	0.5	0.0	1.6	0.1	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	30.4
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	11	441	3	24	187
Future Vol, veh/h	12	11	441	3	24	187
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	11	441	3	24	187

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	585	222	0	0	444	0
Stage 1	443	-	-	-	-	-
Stage 2	142	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	442	782	-	-	1112	-
Stage 1	614	-	-	-	-	-
Stage 2	870	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	431	782	-	-	1112	-
Mov Cap-2 Maneuver	431	-	-	-	-	-
Stage 1	614	-	-	-	-	-
Stage 2	849	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.8	0	1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	549	1112	-
HCM Lane V/C Ratio	-	-	0.042	0.022	-
HCM Control Delay (s)	-	-	11.8	8.3	0.1
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

Intersection						
Int Delay, s/veh	1.3					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	36	16	5	249	143	5
Future Vol, veh/h	36	16	5	249	143	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
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	39	17	5	271	155	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	439	158	160	0	-	0
Stage 1	158	-	-	-	-	-
Stage 2	281	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	575	887	1419	-	-	-
Stage 1	871	-	-	-	-	-
Stage 2	767	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	573	887	1419	-	-	-
Mov Cap-2 Maneuver	573	-	-	-	-	-
Stage 1	868	-	-	-	-	-
Stage 2	767	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1419	-	643	-	-
HCM Lane V/C Ratio	0.004	-	0.088	-	-
HCM Control Delay (s)	7.5	0	11.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	8.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	14	26	0	13	0	10	2	0	3	2	0
Future Vol, veh/h	5	14	26	0	13	0	10	2	0	3	2	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	14	26	0	13	0	10	2	0	3	2	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	37	30	2	50	30	2	2	0	0	2	0	0
Stage 1	8	8	-	22	22	-	-	-	-	-	-	-
Stage 2	29	22	-	28	8	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	968	863	1082	950	863	1082	1620	-	-	1620	-	-
Stage 1	1013	889	-	996	877	-	-	-	-	-	-	-
Stage 2	988	877	-	989	889	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	951	856	1082	910	856	1082	1620	-	-	1620	-	-
Mov Cap-2 Maneuver	951	856	-	910	856	-	-	-	-	-	-	-
Stage 1	1007	887	-	990	872	-	-	-	-	-	-	-
Stage 2	967	872	-	948	887	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.8	9.3	6	4.3
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1620	-	-	986	856	1620	-	-
HCM Lane V/C Ratio	0.006	-	-	0.046	0.015	0.002	-	-
HCM Control Delay (s)	7.2	0	-	8.8	9.3	7.2	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-

Intersection	
Intersection Delay, s/veh	10.2
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	17	11	307	20	28	262
Future Vol, veh/h	17	11	307	20	28	262
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	18	12	334	22	30	285
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	8.5	10.4	10.1
HCM LOS	A	B	B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	61%	10%
Vol Thru, %	94%	0%	90%
Vol Right, %	6%	39%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	327	28	290
LT Vol	0	17	28
Through Vol	307	0	262
RT Vol	20	11	0
Lane Flow Rate	355	30	315
Geometry Grp	1	1	1
Degree of Util (X)	0.424	0.044	0.384
Departure Headway (Hd)	4.298	5.25	4.388
Convergence, Y/N	Yes	Yes	Yes
Cap	839	682	823
Service Time	2.311	3.285	2.401
HCM Lane V/C Ratio	0.423	0.044	0.383
HCM Control Delay	10.4	8.5	10.1
HCM Lane LOS	B	A	B
HCM 95th-tile Q	2.1	0.1	1.8

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1	4	18	2	12	7	591	21	21	573	6
Future Vol, veh/h	5	1	4	18	2	12	7	591	21	21	573	6
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	80	-	-	80	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1	4	18	2	12	7	591	21	21	573	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1261	1264	596	1257	1257	622	589	0	0	622	0	0
Stage 1	628	628	-	626	626	-	-	-	-	-	-	-
Stage 2	633	636	-	631	631	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	147	169	504	148	171	487	986	-	-	959	-	-
Stage 1	471	476	-	472	477	-	-	-	-	-	-	-
Stage 2	468	472	-	469	474	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	137	162	496	140	163	479	978	-	-	951	-	-
Mov Cap-2 Maneuver	137	162	-	140	163	-	-	-	-	-	-	-
Stage 1	464	462	-	465	470	-	-	-	-	-	-	-
Stage 2	447	465	-	450	460	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.2	27.3	0.1	0.3
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	978	-	-	197	193	951	-	-
HCM Lane V/C Ratio	0.007	-	-	0.051	0.166	0.022	-	-
HCM Control Delay (s)	8.7	-	-	24.2	27.3	8.9	-	-
HCM Lane LOS	A	-	-	C	D	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.6	0.1	-	-

Intersection						
Int Delay, s/veh	0.3					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	18	8	468	405	9
Future Vol, veh/h	4	18	8	468	405	9
Conflicting Peds, #/hr	2	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	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	18	8	468	405	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	896	410	414	0	-	0
Stage 1	410	-	-	-	-	-
Stage 2	486	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	311	642	1145	-	-	-
Stage 1	670	-	-	-	-	-
Stage 2	618	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	308	642	1145	-	-	-
Mov Cap-2 Maneuver	308	-	-	-	-	-
Stage 1	664	-	-	-	-	-
Stage 2	618	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1145	-	536	-	-
HCM Lane V/C Ratio	0.007	-	0.041	-	-
HCM Control Delay (s)	8.2	0	12	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	708	45	20	561	96	117	311	46	152	135	124
Future Volume (veh/h)	69	708	45	20	561	96	117	311	46	152	135	124
Number	1	6	16	5	2	12	7	4	14	3	8	18
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		0.99	1.00		0.99	1.00		0.99
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	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	69	708	42	20	561	85	117	311	41	152	135	97
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	309	1542	91	76	994	150	167	347	46	203	237	170
Arrive On Green	0.35	0.91	0.91	0.04	0.32	0.32	0.09	0.22	0.22	0.11	0.24	0.24
Sat Flow, veh/h	1774	3395	201	1774	3081	465	1774	1610	212	1774	1005	722
Grp Volume(v), veh/h	69	369	381	20	322	324	117	0	352	152	0	232
Grp Sat Flow(s),veh/h/ln	1774	1770	1827	1774	1770	1776	1774	0	1822	1774	0	1727
Q Serve(g_s), s	3.0	3.6	3.6	1.2	16.5	16.6	7.0	0.0	20.6	9.1	0.0	13.0
Cycle Q Clear(g_c), s	3.0	3.6	3.6	1.2	16.5	16.6	7.0	0.0	20.6	9.1	0.0	13.0
Prop In Lane	1.00		0.11	1.00		0.26	1.00		0.12	1.00		0.42
Lane Grp Cap(c), veh/h	309	804	830	76	571	573	167	0	393	203	0	408
V/C Ratio(X)	0.22	0.46	0.46	0.26	0.56	0.57	0.70	0.00	0.90	0.75	0.00	0.57
Avail Cap(c_a), veh/h	309	804	830	177	571	573	258	0	472	258	0	447
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.84	0.84	0.84	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.6	2.9	2.9	51.0	30.8	30.9	48.3	0.0	41.9	47.2	0.0	37.1
Incr Delay (d2), s/veh	0.1	1.6	1.5	0.7	4.0	4.0	2.0	0.0	15.6	6.1	0.0	0.7
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	1.8	2.0	0.6	8.7	8.8	3.5	0.0	12.1	4.8	0.0	6.3
LnGrp Delay(d),s/veh	30.7	4.5	4.5	51.7	34.8	34.9	50.3	0.0	57.5	53.2	0.0	37.7
LnGrp LOS	C	A	A	D	C	C	D		E	D		D
Approach Vol, veh/h		819			666			469			384	
Approach Delay, s/veh		6.7			35.3			55.7			43.9	
Approach LOS		A			D			E			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	23.2	41.0	16.6	29.2	8.7	55.5	14.4	31.5
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	9.5	35.5	14.5	28.5	9.5	35.5	14.5	28.5
Max Q Clear Time (g_c+I1), s	5.0	18.6	11.1	22.6	3.2	5.6	9.0	15.0
Green Ext Time (p_c), s	0.0	1.4	0.1	0.4	0.0	1.7	0.1	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	30.8
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	28	466	12	17	187
Future Vol, veh/h	7	28	466	12	17	187
Conflicting Peds, #/hr	4	0	0	4	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	28	466	12	17	187

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	608	243	0	0	482	0
Stage 1	476	-	-	-	-	-
Stage 2	132	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	427	758	-	-	1077	-
Stage 1	591	-	-	-	-	-
Stage 2	880	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	417	755	-	-	1073	-
Mov Cap-2 Maneuver	417	-	-	-	-	-
Stage 1	589	-	-	-	-	-
Stage 2	862	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.9	0	0.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	650	1073	-
HCM Lane V/C Ratio	-	-	0.054	0.016	-
HCM Control Delay (s)	-	-	10.9	8.4	0.1
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	10	18	269	138	18
Future Vol, veh/h	30	10	18	269	138	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
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	33	11	20	292	150	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	492	160	170	0	-	0
Stage 1	160	-	-	-	-	-
Stage 2	332	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	536	885	1407	-	-	-
Stage 1	869	-	-	-	-	-
Stage 2	727	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	527	885	1407	-	-	-
Mov Cap-2 Maneuver	527	-	-	-	-	-
Stage 1	854	-	-	-	-	-
Stage 2	727	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.6	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1407	-	586	-	-
HCM Lane V/C Ratio	0.014	-	0.074	-	-
HCM Control Delay (s)	7.6	0	11.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	4	23	0	13	0	17	2	0	0	2	5
Future Vol, veh/h	2	4	23	0	13	0	17	2	0	0	2	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	4	23	0	13	0	17	2	0	0	2	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	48	41	5	54	43	2	7	0	0	2	0	0
Stage 1	5	5	-	36	36	-	-	-	-	-	-	-
Stage 2	43	36	-	18	7	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	953	851	1078	944	849	1082	1614	-	-	1620	-	-
Stage 1	1017	892	-	980	865	-	-	-	-	-	-	-
Stage 2	971	865	-	1001	890	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	934	842	1078	913	840	1082	1614	-	-	1620	-	-
Mov Cap-2 Maneuver	934	842	-	913	840	-	-	-	-	-	-	-
Stage 1	1006	892	-	969	855	-	-	-	-	-	-	-
Stage 2	946	855	-	975	890	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.6	9.4	6.5	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1614	-	-	1027	840	1620	-	-
HCM Lane V/C Ratio	0.011	-	-	0.028	0.015	-	-	-
HCM Control Delay (s)	7.3	0	-	8.6	9.4	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-

Intersection	
Intersection Delay, s/veh	13.3
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	19	18	438	11	19	370
Future Vol, veh/h	19	18	438	11	19	370
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	20	476	12	21	402
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	9.1	14.2	12.7
HCM LOS	A	B	B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	51%	5%
Vol Thru, %	98%	0%	95%
Vol Right, %	2%	49%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	449	37	389
LT Vol	0	19	19
Through Vol	438	0	370
RT Vol	11	18	0
Lane Flow Rate	488	40	423
Geometry Grp	1	1	1
Degree of Util (X)	0.607	0.063	0.535
Departure Headway (Hd)	4.475	5.683	4.559
Convergence, Y/N	Yes	Yes	Yes
Cap	805	627	791
Service Time	2.503	3.75	2.59
HCM Lane V/C Ratio	0.606	0.064	0.535
HCM Control Delay	14.2	9.1	12.7
HCM Lane LOS	B	A	B
HCM 95th-tile Q	4.2	0.2	3.2

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	1	7	21	2	21	1	610	12	6	559	1
Future Vol, veh/h	7	1	7	21	2	21	1	610	12	6	559	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	80	-	-	80	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	1	7	21	2	21	1	610	12	6	559	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1202	1196	560	1194	1190	616	560	0	0	622	0	0
Stage 1	572	572	-	618	618	-	-	-	-	-	-	-
Stage 2	630	624	-	576	572	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	161	186	528	163	188	491	1011	-	-	959	-	-
Stage 1	505	504	-	477	481	-	-	-	-	-	-	-
Stage 2	470	478	-	503	504	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	152	185	528	159	187	491	1011	-	-	959	-	-
Mov Cap-2 Maneuver	152	185	-	159	187	-	-	-	-	-	-	-
Stage 1	504	501	-	477	481	-	-	-	-	-	-	-
Stage 2	448	478	-	492	501	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.6	23.6	0	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1011	-	-	232	237	959	-	-
HCM Lane V/C Ratio	0.001	-	-	0.065	0.186	0.006	-	-
HCM Control Delay (s)	8.6	-	-	21.6	23.6	8.8	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.7	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	8	15	482	395	3
Future Vol, veh/h	7	8	15	482	395	3
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	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	8	15	482	395	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	909	397	398	0	-	0
Stage 1	397	-	-	-	-	-
Stage 2	512	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	305	652	1161	-	-	-
Stage 1	679	-	-	-	-	-
Stage 2	602	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	300	652	1161	-	-	-
Mov Cap-2 Maneuver	300	-	-	-	-	-
Stage 1	667	-	-	-	-	-
Stage 2	602	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.9	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1161	-	421	-	-
HCM Lane V/C Ratio	0.013	-	0.036	-	-
HCM Control Delay (s)	8.1	0	13.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	76	707	45	20	560	110	118	311	46	140	136	116
Future Volume (veh/h)	76	707	45	20	560	110	118	311	46	140	136	116
Number	1	6	16	5	2	12	7	4	14	3	8	18
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		0.99	1.00		0.99	1.00		0.99
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	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	76	707	42	20	560	99	118	311	41	140	136	89
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	295	1561	93	52	970	171	146	347	46	169	240	157
Arrive On Green	0.33	0.92	0.92	0.03	0.32	0.32	0.08	0.22	0.22	0.10	0.23	0.23
Sat Flow, veh/h	1774	3395	202	1774	3005	529	1774	1610	212	1774	1048	686
Grp Volume(v), veh/h	76	368	381	20	329	330	118	0	352	140	0	225
Grp Sat Flow(s),veh/h/ln	1774	1770	1827	1774	1770	1764	1774	0	1822	1774	0	1733
Q Serve(g_s), s	3.4	3.1	3.2	1.2	17.0	17.1	7.2	0.0	20.6	8.5	0.0	12.7
Cycle Q Clear(g_c), s	3.4	3.1	3.2	1.2	17.0	17.1	7.2	0.0	20.6	8.5	0.0	12.7
Prop In Lane	1.00		0.11	1.00		0.30	1.00		0.12	1.00		0.40
Lane Grp Cap(c), veh/h	295	814	840	52	571	569	146	0	393	169	0	397
V/C Ratio(X)	0.26	0.45	0.45	0.39	0.58	0.58	0.81	0.00	0.90	0.83	0.00	0.57
Avail Cap(c_a), veh/h	295	814	840	153	571	569	234	0	472	234	0	449
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.86	0.86	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.8	2.5	2.5	52.4	31.0	31.0	49.6	0.0	41.9	48.9	0.0	37.6
Incr Delay (d2), s/veh	0.1	1.6	1.5	1.8	4.2	4.3	4.4	0.0	15.6	11.7	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	1.6	1.6	0.6	9.0	9.0	3.7	0.0	12.1	4.8	0.0	6.1
LnGrp Delay(d),s/veh	31.9	4.1	4.0	54.2	35.2	35.3	54.1	0.0	57.5	60.6	0.0	38.1
LnGrp LOS	C	A	A	D	D	D	D		E	E		D
Approach Vol, veh/h		825			679			470			365	
Approach Delay, s/veh		6.6			35.8			56.7			46.7	
Approach LOS		A			D			E			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	23.8	41.0	16.0	29.2	8.7	56.1	14.5	30.7
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	9.5	35.5	14.5	28.5	9.5	35.5	14.5	28.5
Max Q Clear Time (g_c+I1), s	5.4	19.1	10.5	22.6	3.2	5.2	9.2	14.7
Green Ext Time (p_c), s	0.0	1.4	0.1	0.4	0.0	1.7	0.1	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	31.4
HCM 2010 LOS	C

Intersection						
Int Delay, s/veh	0.7					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	12	463	3	24	197
Future Vol, veh/h	13	12	463	3	24	197
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	12	463	3	24	197

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	612	233	0	0	466	0
Stage 1	465	-	-	-	-	-
Stage 2	147	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	425	769	-	-	1092	-
Stage 1	599	-	-	-	-	-
Stage 2	865	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	414	769	-	-	1092	-
Mov Cap-2 Maneuver	414	-	-	-	-	-
Stage 1	599	-	-	-	-	-
Stage 2	843	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.1	0	1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	532	1092	-
HCM Lane V/C Ratio	-	-	0.047	0.022	-
HCM Control Delay (s)	-	-	12.1	8.4	0.1
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	21	17	5	262	150	5
Future Vol, veh/h	21	17	5	262	150	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
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	18	5	285	163	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	461	166	168	0	-	0
Stage 1	166	-	-	-	-	-
Stage 2	295	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	559	878	1410	-	-	-
Stage 1	863	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	557	878	1410	-	-	-
Mov Cap-2 Maneuver	557	-	-	-	-	-
Stage 1	860	-	-	-	-	-
Stage 2	755	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.8	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1410	-	666	-	-
HCM Lane V/C Ratio	0.004	-	0.062	-	-
HCM Control Delay (s)	7.6	0	10.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	8.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	15	27	0	13	0	11	2	0	3	2	0
Future Vol, veh/h	5	15	27	0	13	0	11	2	0	3	2	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	15	27	0	13	0	11	2	0	3	2	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	39	32	2	53	32	2	2	0	0	2	0	0
Stage 1	8	8	-	24	24	-	-	-	-	-	-	-
Stage 2	31	24	-	29	8	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	966	861	1082	946	861	1082	1620	-	-	1620	-	-
Stage 1	1013	889	-	994	875	-	-	-	-	-	-	-
Stage 2	986	875	-	988	889	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	949	853	1082	903	853	1082	1620	-	-	1620	-	-
Mov Cap-2 Maneuver	949	853	-	903	853	-	-	-	-	-	-	-
Stage 1	1006	887	-	987	869	-	-	-	-	-	-	-
Stage 2	964	869	-	945	887	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.8	9.3	6.1	4.3
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1620	-	-	983	853	1620	-	-
HCM Lane V/C Ratio	0.007	-	-	0.048	0.015	0.002	-	-
HCM Control Delay (s)	7.2	0	-	8.8	9.3	7.2	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-

Intersection	
Intersection Delay, s/veh	10.5
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	18	12	323	21	29	275
Future Vol, veh/h	18	12	323	21	29	275
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	13	351	23	32	299
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	8.6	10.8	10.4
HCM LOS	A	B	B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	60%	10%
Vol Thru, %	94%	0%	90%
Vol Right, %	6%	40%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	344	30	304
LT Vol	0	18	29
Through Vol	323	0	275
RT Vol	21	12	0
Lane Flow Rate	374	33	330
Geometry Grp	1	1	1
Degree of Util (X)	0.449	0.048	0.405
Departure Headway (Hd)	4.322	5.318	4.414
Convergence, Y/N	Yes	Yes	Yes
Cap	834	673	816
Service Time	2.337	3.356	2.431
HCM Lane V/C Ratio	0.448	0.049	0.404
HCM Control Delay	10.8	8.6	10.4
HCM Lane LOS	B	A	B
HCM 95th-tile Q	2.3	0.2	2

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1	4	19	2	13	7	621	22	22	602	6
Future Vol, veh/h	5	1	4	19	2	13	7	621	22	22	602	6
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	80	-	-	80	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1	4	19	2	13	7	621	22	22	602	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1323	1326	625	1318	1318	652	618	0	0	653	0	0
Stage 1	659	659	-	656	656	-	-	-	-	-	-	-
Stage 2	664	667	-	662	662	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	133	156	485	134	157	468	962	-	-	934	-	-
Stage 1	453	461	-	454	462	-	-	-	-	-	-	-
Stage 2	450	457	-	451	459	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	123	149	477	127	150	460	954	-	-	926	-	-
Mov Cap-2 Maneuver	123	149	-	127	150	-	-	-	-	-	-	-
Stage 1	446	446	-	447	455	-	-	-	-	-	-	-
Stage 2	429	450	-	432	444	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	26.3			29.9			0.1			0.3		
HCM LOS	D			D								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	954	-	-	179	178	926	-	-
HCM Lane V/C Ratio	0.007	-	-	0.056	0.191	0.024	-	-
HCM Control Delay (s)	8.8	-	-	26.3	29.9	9	-	-
HCM Lane LOS	A	-	-	D	D	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.7	0.1	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	18	8	492	424	9
Future Vol, veh/h	4	18	8	492	424	9
Conflicting Peds, #/hr	2	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	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	18	8	492	424	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	939	429	433	0	-	0
Stage 1	429	-	-	-	-	-
Stage 2	510	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	293	626	1127	-	-	-
Stage 1	657	-	-	-	-	-
Stage 2	603	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	290	626	1127	-	-	-
Mov Cap-2 Maneuver	290	-	-	-	-	-
Stage 1	650	-	-	-	-	-
Stage 2	603	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1127	-	517	-	-
HCM Lane V/C Ratio	0.007	-	0.043	-	-
HCM Control Delay (s)	8.2	0	12.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	744	47	21	590	101	123	327	48	159	142	129
Future Volume (veh/h)	73	744	47	21	590	101	123	327	48	159	142	129
Number	1	6	16	5	2	12	7	4	14	3	8	18
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		0.99	1.00		0.99	1.00		0.99
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	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	73	744	44	21	590	90	123	327	43	159	142	102
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	262	1495	88	53	993	151	151	360	47	188	246	176
Arrive On Green	0.30	0.88	0.88	0.03	0.32	0.32	0.09	0.22	0.22	0.11	0.24	0.24
Sat Flow, veh/h	1774	3396	201	1774	3077	468	1774	1611	212	1774	1005	722
Grp Volume(v), veh/h	73	388	400	21	339	341	123	0	370	159	0	244
Grp Sat Flow(s),veh/h/ln	1774	1770	1827	1774	1770	1776	1774	0	1823	1774	0	1727
Q Serve(g_s), s	3.5	5.1	5.1	1.3	17.6	17.7	7.5	0.0	21.8	9.7	0.0	13.7
Cycle Q Clear(g_c), s	3.5	5.1	5.1	1.3	17.6	17.7	7.5	0.0	21.8	9.7	0.0	13.7
Prop In Lane	1.00		0.11	1.00		0.26	1.00		0.12	1.00		0.42
Lane Grp Cap(c), veh/h	262	779	804	53	571	573	151	0	407	188	0	422
V/C Ratio(X)	0.28	0.50	0.50	0.39	0.59	0.60	0.81	0.00	0.91	0.84	0.00	0.58
Avail Cap(c_a), veh/h	262	779	804	153	571	573	234	0	472	234	0	447
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.83	0.83	0.83	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	34.2	4.0	4.0	52.4	31.2	31.2	49.5	0.0	41.6	48.3	0.0	36.6
Incr Delay (d2), s/veh	0.2	1.9	1.8	1.7	4.5	4.5	6.2	0.0	18.3	17.2	0.0	1.0
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	1.7	2.6	2.6	0.6	9.3	9.3	4.0	0.0	13.1	5.6	0.0	6.6
LnGrp Delay(d),s/veh	34.4	5.9	5.8	54.1	35.7	35.7	55.7	0.0	59.9	65.4	0.0	37.5
LnGrp LOS	C	A	A	D	D	D	E		E	E		D
Approach Vol, veh/h		861			701			493			403	
Approach Delay, s/veh		8.3			36.3			58.9			48.5	
Approach LOS		A			D			E			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	21.8	41.0	17.2	30.1	8.8	53.9	14.9	32.4				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	9.5	35.5	14.5	28.5	9.5	35.5	14.5	28.5				
Max Q Clear Time (g_c+I1), s	5.5	19.7	11.7	23.8	3.3	7.1	9.5	15.7				
Green Ext Time (p_c), s	0.0	1.5	0.1	0.4	0.0	1.8	0.1	0.5				
Intersection Summary												
HCM 2010 Ctrl Delay			33.0									
HCM 2010 LOS			C									

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	8	490	13	18	197
Future Vol, veh/h	7	8	490	13	18	197
Conflicting Peds, #/hr	4	0	0	4	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	8	490	13	18	197

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	640	256	0	0	507	0
Stage 1	501	-	-	-	-	-
Stage 2	139	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	408	743	-	-	1054	-
Stage 1	574	-	-	-	-	-
Stage 2	873	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	398	741	-	-	1050	-
Mov Cap-2 Maneuver	398	-	-	-	-	-
Stage 1	572	-	-	-	-	-
Stage 2	854	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12	0	0.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	528	1050	-
HCM Lane V/C Ratio	-	-	0.028	0.017	-
HCM Control Delay (s)	-	-	12	8.5	0.1
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	31	11	19	283	145	19
Future Vol, veh/h	31	11	19	283	145	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
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	34	12	21	308	158	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	519	169	179	0	-	0
Stage 1	169	-	-	-	-	-
Stage 2	350	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	517	875	1397	-	-	-
Stage 1	861	-	-	-	-	-
Stage 2	713	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	508	875	1397	-	-	-
Mov Cap-2 Maneuver	508	-	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	713	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.9	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1397	-	571	-	-
HCM Lane V/C Ratio	0.015	-	0.08	-	-
HCM Control Delay (s)	7.6	0	11.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-