APPENDIX A

Notice of Preparation (NOP) and Initial Study

Notice of Preparation (NOP) of an Environmental Impact Report and Public Scoping Meeting for the Encinal Terminals Master Plan

Notice is hereby given that the City of Alameda, Lead Agency, will prepare an Environmental Impact Report (EIR) for the Encinal Terminals Project ("Project") and will hold a public scoping meeting to receive comments on the scope of the EIR, as detailed below. This NOP/Notice of Public Scoping Meeting (Notice) is also available online at www.ci.alameda.ca.us.

The City has determined that a Supplemental Focused EIR must be prepared for the project prior to making any final decision regarding whether to approve the project, in accordance with the California Environmental Quality Act (CEQA). The EIR will focus on the potential environmental impacts of the Project on Transportation and Traffic, Air Quality; Greenhouse Gas Emissions; Noise; and Biological Resources. The purpose of the EIR will be to supplement the 2008 Northern Waterfront EIR and provide updated information and analysis about potential physical environmental effects of the Project, to identify ways to minimize significant effects, and to describe and analyze alternatives to the Project. The City has issued this Notice to Responsible Agencies, Trustee Agencies, federal agencies, transportation planning agencies and agencies with transportation facilities that may be affected and other interested parties. Responsible Agencies are those public agencies, other than the City, that have a role in approving or carrying out the Project.

PROJECT TITLE: Encinal Terminals Project	**PROJECT LOCATION:** Approximately 22 acres of land and 10 acres of submerged lands (total of 32 acres) in the north central portion of Alameda, California
LEAD AGENCY: City of Alameda Community Development Department 2263 Santa Clara Avenue, Room 190 Alameda, CA 94501	**LEAD AGENCY CONTACT:** Andrew Thomas, Planning Services Manager City of Alameda Community Development Department 2263 Santa Clara Avenue, Room 190 Alameda, CA 94501 Telephone: (510) 747-6881 Fax: (510) 747-6853 athomas@ci.alameda.ca.us
PROJECT APPLICANT/DEVELOPER: North Waterfront Cove LLC c/o Tim Lewis Communities 12667 Alcosta Blvd., Suite 170 San Ramon, CA 94583	**DATE OF THIS NOTICE:** April 27, 2016

PUBLIC REVIEW AND SCOPING:

The City of Alameda Planning Board will hold a Public Scoping Meeting to receive comments to help the City refine the scope and content of the EIR on **May 23, 2016, at Alameda City Hall, 2263 Santa Clara Avenue, Alameda, CA 94501, City Council Chambers, 3rd Floor, and beginning at 7:00 PM**. No action will be taken at the meeting. All comments must be received in writing at the City of Alameda Community Development Department by **5:00 p.m. on Monday, May 30, 2016.**

Comments on the proposed scope and content of the EIR may be submitted in writing to the attention of Andrew Thomas, City of Alameda, at the address indicated above for Lead Agency Contact. Comments may also be emailed to Andrew Thomas at the email address shown above. If you are an authorized representative of a Responsible Agency, or a Trustee Agency, or a transportation planning agency or agency with transportation facilities that may be affected, the City needs to know the views of your agency as to the scope and content of the environmental information that is relevant to your agency's statutory responsibilities in connection with the Project. Your agency will need to use the EIR when considering your permit or other approval for the Project. We will also need the name, address, telephone number and email address of the contact person for your agency.

PROJECT SITE AND SURROUNDINGS:

The project is located at 1521 Buena Vista Avenue in the north-central portion of the City of Alameda, as illustrated in **Figure 1**. The site is approximately two miles south and west of Oakland and approximately 12 miles from San Francisco (10 miles by ferry). Regional vehicular access to the project area is provided by Interstate 880 (I-880) from Oakland through the Webster Street (State Route [SR] 260) Tunnel to Alameda Island. Access to the project site is provided by Buena Vista Avenue (running east-west). Sherman Street and Entrance Road connect to Buena Vista Avenue from the west and east of the project site, respectively.

The project site encompasses 32 acres of land and water. Water surrounds the property on three sides with Alaska Basin (called Encinal Basin on some maps) to the west, the Oakland Estuary to the north, and the Fortman Marina to the east. The net usable land area is approximately 22 acres and includes four parcels, one of which (approximately six acres) is leased to North Waterfront Cove LLC (NWC) by the City of Alameda under a long-term ground lease. The leased parcel consists of State tidelands that are held in trust by the City of Alameda. The other ten acres are submerged lands, which are part of the project site due to its proximity to the adjacent estuary. The submerged lands that fall within the Fortman Marina are held in Public Trust, as illustrated in **Figure 2**. The proposed project could include a land exchange involving the approximately six-acre State tidelands leased parcel for waterfront areas of the property, including the proposed publicly accessible promenade on the Alaska Basin and northern sides of the site. In the event that the land exchange is not approved, an alternate land use plan would be adopted.

The project site is generally flat with elevations ranging from 4 to 8 feet above mean sea level. The site consists primarily of asphalt and concrete paving, with both concrete and wooden wharves and a wooden pier along the northwestern edge. Two vacant warehouse buildings are located in the center of the site flanking a large metal shed. There are two additional buildings located in the southeastern portion of the site and a third building in the southwestern portion of the site, all of which are also vacant.

Surrounding land uses in the vicinity include the Wind River office/research park located across Alaska Basin to the west, the Oakland Estuary to the north, the Fortman Marina to the east, and the Del Monte property to the south. Beyond the Del Monte building to the south are primarily single family residential neighborhoods and Littlejohn Park. The project site vicinity is shown in **Figure 2**.

PROJECT DESCRIPTION:

The Encinal Terminals project as currently proposed would involve the demolition of the existing structures on the site, followed by the development of a new residential mixed use waterfront community supported by transportation and infrastructure improvements. Initial discretionary approvals for Encinal Terminals include a Master Plan and subdivision approvals, a Development Agreement, a Development Plan and Design Review approvals for individual buildings, and approval of an Affordable Housing Plan and Density Bonus Application. Other approvals that may be required include: a land exchange agreement with the State Lands Commission, a National Pollutant Discharge Elimination System (NPDES) General Construction Permit and Storm Water Pollution Prevention Plan, San Francisco Bay Area Regional Water Quality Control Board (RWQCB) permits, Bay Area Air Quality Management District (BAAQMD) permits, Bay Conservation Development Commission (BCDC) approvals, Alameda Municipal Power approvals, and U.S. Army Corps of Engineers permits.

The project site would be developed in accordance with the proposed Master Plan, which provides a land use plan that divides the site into development subareas, describes the mix of uses that are permitted in each subarea, provides general design guidelines, and describes the placement and capacity of utilities and circulation infrastructure. The Master Plan calls for the construction of the following components:

- Approximately three acres of waterfront-related public open space and parks, including public access around the entire perimeter of the property.
- A new marina with up to 160 private berths and a harbormaster's office with facilities for boat sales and rentals including small crafts such as kayaks, row boats and board sailing equipment.
- A mixed-density residential neighborhood, with up to 589 residential dwelling units in a variety of configurations, including townhomes, stacked flats, live/work, lofts, and high-rise view residences.
- Between 30,000 and 50,000 square feet of retail, restaurant, and office uses along Clement Avenue and along the waterfront.
- A new internal grid of public streets and public infrastructure.
- Accessible public waterfront parking strategically located at various points to allow access to the waterfront perimeter.
- Locations for direct public access to the water, including kayak/small craft launches, waterfront steps and ramps.
- Provisions for future public water shuttle, water taxi or ferry terminal facilities.
- Development of a segment of Clement Avenue fronting the property.
- Rehabilitation of wharf surfaces or supporting pilings.

The Master Plan is designed to ensure that the redevelopment of the site achieves the General Plan objectives for the Northern Waterfront GPA planning area by providing access to the shoreline and estuary, which has been closed off to all but the former industrial users and still remains restricted from public access. The Master Plan contains the following goals:

- Repurpose the site with a mix of residential, commercial, and water-related uses that will create and support a lively waterfront and a pedestrian-friendly environment.
- Provide water and maritime-related job and business opportunities consistent with the site's waterfront location and maritime history.
- Create a continuous public waterfront promenade and sequence of public waterfront open spaces that provide opportunities for walking, biking, kayaking, and other waterfront activities.
- Reduce truck traffic in the adjacent neighborhoods by replacing warehouse and trucking uses with employment and residential uses.
- Provide a mix of uses and activities that will support a variety of lifestyles and employment opportunities.
- Assure a significant portion of new residential development is affordable to households at all income levels.
- Establish linkages to the surrounding city and neighborhoods for all modes of travel.
- Provide clear, safe access and linkages for pedestrians and bicyclists, where none have existed in the past.
- Strengthen references to the historic background of the site and environs through design.

The project would be constructed in multiple phases, with individual phases lasting up to 12 months, the order of which would be determined based on the economic conditions at the time, necessity for public infrastructure improvements, and the timing of land acquisitions. The Master Plan contains a set of requirements that would guide the timing of each subsequent phase to ensure the project is built out in a logical and orderly manner.

PROBABLE ENVIRONMENTAL EFFECTS OF THE PROJECT:

An Initial Study (IS) has been prepared to evaluate the proposed changes to the Encinal Terminals project originally presented in the Northern Waterfront General Plan Amendment (GPA) EIR. The Alameda City Council adopted the Northern Waterfront GPA and certified the Final EIR in July 2008. The City adopted the Northern Waterfront GPA to provide a planning framework for future growth and redevelopment of a collection of primarily industrial parcels located along the City's north-central shoreline. The purpose of the Northern Waterfront GPA was to establish General Plan and Zoning Ordinance policies, design standards, and requirements for future development while encouraging economically viable redevelopment of the area with a mix of uses that would be sensitive to existing residential neighborhoods and the historic character of the area. The Northern Waterfront GPA planning area is generally bounded by Sherman Street on the west, Buena Vista Avenue on the south, Grand Street on the east, and the Oakland/Alameda Estuary on the north. Encinal Terminals is a sub-area within the Northern Waterfront GPA planning area. The Northern Waterfront GPA evaluated the proposed buildout of the Encinal Terminals site to include 165 residential units and 200,000 square feet of commercial development.

An Initial Study (IS) has been prepared for the project, which determined that implementation, construction, and operation of the Project could result in one or more potentially significant environmental effects. These effects will be further analyzed in a project-level EIR that will examine the environmental impacts of the Project, identify mitigation measures, and analyze whether proposed mitigation measures would reduce any significant environmental impacts to a less-than-significant level as defined by CEQA. The EIR will evaluate the environmental impacts of the Project on each of the following environmental topics: Air Quality; Biological Resources; Greenhouse Gases; Noise; and Transportation and Traffic.

Air Quality Analysis: The EIR will include an analysis of the effects of project construction and operation on air quality. It is anticipated that the Project will be implemented consistent with all local, state, and federal requirements and that these impacts will be minimized or avoided.

Biological Analysis: The EIR will include an analysis of the Project on biological resources. It is anticipated that the Project will be implemented consistent with all federal and state requirements. Therefore, it is anticipated that impacts to biological resources will be minimized or avoided.

Greenhouse Gas Analysis: The EIR will include an analysis of the project's estimated construction and operational greenhouse gas emissions, and it's consistency with applicable greenhouse gas reduction plans. The project would be designed as a mixed use development, served by transit, with reduced parking and a Transportation Demand Management plan to reduce operational effects; therefore it is anticipated that these impacts will be minimized or avoided. In addition, grading activities are expected to be minimal; therefore, impacts from construction emissions are also expected to be minimized or avoided.

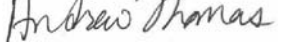
Noise Analysis: The EIR will include an analysis of the noise-related effects of construction and operation activities as well as transportation related noise from automobile traffic. It is anticipated that the Project will be implemented consistent with all federal, state, and local requirements. Therefore, it is anticipated that impacts to surrounding land uses due to noise generated by the proposed project would be minimized or avoided.

Transportation Analysis: The EIR will include a detailed analysis of the potential transportation impacts and feasible mitigations to minimize impacts to automobile, transit, bicycle, and pedestrian travel. Based upon prior environmental documentation, it is anticipated that the Project will result in significant transportation impacts given the limited automobile access between the Project and the regional transportation system.

The IS determined that the project would have no impacts, less than significant impacts, or less than significant impacts with mitigation incorporated, for the following topics: Aesthetics; Agricultural and Forestry Resources; Cultural Resources (including historical resources); Geology, Soils and Seismicity; Hazards and Hazardous Materials; Hydrology and Water Quality; Land Use and Planning; Mineral Resources; Population and Housing; Public Services; Recreation; and Utilities and Services Systems. These topics will not be further analyzed in the EIR.

INFORMATION:

Documents relating to the Project are available for review at the Alameda Community Development Department and at www.ci.alameda.ca.us.



Andrew Thomas, Planning Services Manager
City of Alameda Community Development Department

Date: April 26, 2016

Attachments: Figure 1, Site Location Map
Figure 2, Project Site Vicinity Map and Conceptual Master Plan

ENCINAL TERMINALS

Initial Study

Prepared for
City of Alameda

April 2016

ENCINAL TERMINALS

Initial Study

Prepared for
City of Alameda

April 2016

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CITY OF ALAMEDA

California Environmental Quality Act (CEQA) Initial Study

1. Introduction

This Initial Study (IS) has been prepared pursuant to the California Environmental Quality Act (CEQA) to evaluate the potential environmental effects of the proposed development at Encinal Terminals. The proposed project, as part of a master development plan, would demolish existing structures on the site and develop a new residential mixed use waterfront community on the 32-acre site with uses on both land and water. A detailed description of the proposed project is provided in Section 2, *Project Description,* below.

1.1 Standard for Determining if Further Environmental Review is Required

The Encinal Terminals project area was included as part of a Program Environmental Impact Report (EIR) for the Northern Waterfront General Plan Amendment (GPA EIR), which the City of Alameda certified in 2007 (SCH 2002102118). As provided in Section 15162 of the CEQA *Guidelines*, a Lead Agency may prepare a Supplemental EIR, a Subsequent EIR, or a Mitigated Negative Declaration (MND) when a previous EIR has been certified by the Lead Agency, and substantial changes are proposed to the project that would require major revisions of the previous EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects. The purpose of this IS is to analyze the changes to the project and to determine which environmental topic areas may warrant further environmental review.

Changes to the Proposed Project

Table 1-1 outlines the proposed changes to the Encinal Terminals project since the GPA EIR was certified in 2007. The table shows the changes to both the project description and the identified changes in the project area since the original EIR was certified. Based on the changes to the project and the changes that have occurred in the project area, together with the analysis contained in this IS, the City has determined that a Supplemental Focused EIR (SFEIR) should be prepared for the project.

TABLE 1-1
SCOPE OF CEQA REVIEW OF THE PROPOSED PROJECT

CEQA *Guidelines*	**Proposed Project Compared to the GPA EIR**
Substantial Changes to the Project (Sec.15162(a)(1))	
	Residential Use: Modify GPA EIR assumption of 165 residential units to up to 589 residential units.
	Commercial Use: Modify GPA EIR assumption of 200,000 sq. ft. of commercial use to between 30,000 and 50,000 sq. ft. of commercial use.
	Development Program and Site Area: Modify GPA EIR assumption to include the development of a marina with up to 160 berths.
Substantial Changes to Circumstances (Sec.15162(a)(2)) *and/or* New Information of Substantial Importance (Sec.15162(a)(3))[a] – *Since the GPA EIR*	
	***Transportation and Circulation*:** Updates to environmental setting, traffic model, and thresholds of significance since the GPA EIR.
	Land Use: With the adoption of the City's recent Housing Element, the City zoned the property to Mixed Use (M-X) with a Multi-Family Overlay (MF), which allows for a wide variety of residential, retail, marine and commercial uses.
	***Biological Resources*:** The Townsend's big-eared bat was identified in June 2013 by the California Fish and Wildlife Commission as a candidate for protection as an endangered species under the state's Endangered Species Act.

[a] Air quality and global climate change are not considered "changed circumstances" or "new information" since information regarding these topics was known, or could have been known, in 2007.

SOURCE: CEQA *Guidelines* Section 15162; ESA

1.2 Comparison of Environmental Impacts

This IS provides a comparison of the potential environmental effects that may result with the proposed project to the effects that were previously identified for the Encinal Terminals site as evaluated in the GPA EIR, and is intended to determine if circumstances exist that could result in the proposed project having a new significant environmental impact not previously identified in the GPA EIR, or if the proposed project would result in a substantial increase in the severity of the impacts previously evaluated. For each topic addressed in the Environmental Checklist (Section 4 in this document), the IS concludes one of the following comparative determinations for the proposed project:

- **Substantially Mitigated by Uniformly Applicable Development Policies** – The proposed project would result in impacts that would be fully mitigated by existing State, regional, and local regulatory requirements, and no further mitigation is necessary.

- **Analyzed in the Prior EIR** – The proposed project would result in substantially the same impact (significant or otherwise) as the impact identified for the Encinal Terminals site in the GPA EIR.

- **No Impact** – The topic was not previously required to be analyzed in the GPA EIR, and the impact is less than significant or has no impact.

- **Less than Significant or Less than Significant with New or Revised Mitigation Incorporated -** The proposed project would result in substantially the same impact (significant or otherwise) as identified for Encinal Terminals site in the GPA EIR, but new mitigation measures are added or GPA EIR mitigation measures are revised due to changes proposed by the City (e.g., methodologies and standard practices) or to update performance or regulatory standards.

- **Potentially Significant Impact** – The proposed project would result in a new or substantially more severe significant impact than identified for the Encinal Terminals site in the GPA EIR; no feasible mitigation measure would reduce the impact to less than significant and the impact will be further studied in the SFEIR.

1.3 Organization and Format of this Document

The organization and format of this document is stipulated by the CEQA *Guidelines*. Following this Section 1, *Introduction and CEQA Overview*, Section 2 provides a detailed description of the proposed project; Section 3 presents the City's Mitigation Determination; and Section 4, *Environmental Checklist*, presents the comparative impact determinations (discussed under 1.2, above), discussion, and mitigation measures that address the 18 environmental topics (e.g., Air Quality, Cultural Resources, Transportation and Traffic, etc.). Appendices including the Encinal Terminals Draft Master Plan and Subarea Development Standards as well as technical background reports are attached to this document.

1.4 Project Specifics

A. Project Address and Title:

Address: 1521 Buena Vista Avenue, Alameda, CA
APNs: 72-382-1, 72-382-2, 72-383-3, 72-382-9 and a portion of 72-382-10.
Title: Encinal Terminals

B. Lead Agency Name and Address:

City of Alameda
2263 Santa Clara Street
Alameda, CA 94501

C. Contact Person and Phone Number:

Andrew Thomas
Assistant Community Development Director
2263 Santa Clara Street
Alameda, CA 94501
510.747.6881

D. Project Sponsor's Names and Addresses:

North Waterfront Cove LLC
c/o Tim Lewis Communities
12667 Alcosta Blvd., Suite 170
San Ramon, CA 94583

E. Existing General Plan Designation and Zoning:

General Plan: Mixed Use
Zoning: Mixed Use Plan Development (M-X); Multi-Family Overlay Zoning (MF) applies to 13 acres of the project site

F. Project Description:

See Section 2, *Project Description*, below.

G. Location of Project:

See Section 2, *Project Description*, below.

2. Project Description

The project sponsor, North Waterfront Cove LLC, is proposing a Master Plan and Density Bonus Application for Encinal Terminals, a new residential mixed use waterfront community on both land and water. Overall, the proposed project would demolish existing structures on the project site and construct up to 589 new housing units, a marina with up to 160 boat slips and a harbormaster's office, between 30,000 and 50,000 square feet of commercial/office and restaurant uses, and over three acres of waterfront-related public open space and parks. Three existing wooden wharves and two concrete wharves on the site would be improved as part of development of the proposed waterfront open space uses, through a combination of demolition, rehabilitation, modification, and/or retrofit activities. The residential unit types proposed include condominiums, townhomes, lofts, stacked flats, live-work units, and high-rise view residences. Other proposed improvements include establishing locations for launching kayaks and other small watercraft launches, provisions for future public water taxi/water shuttle or ferry terminal facilities, a new internal roadway system and utility infrastructure, and parking throughout the site. Characteristics of the proposed project are detailed in Section 2.3, *Project Characteristics,* below.

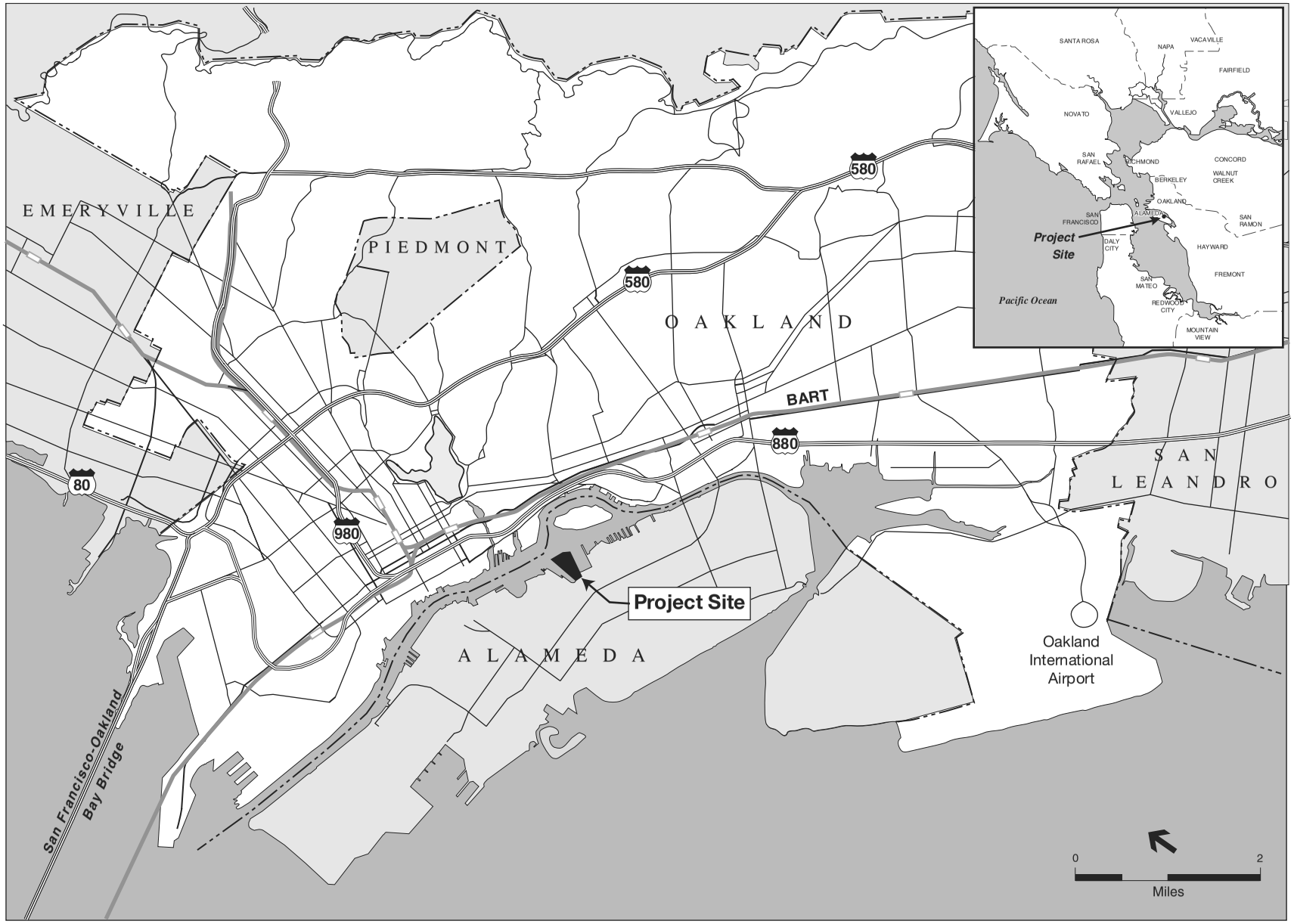
2.1 Project and Site Vicinity

The project is located at 1521 Buena Vista Avenue in the north-central portion of the City of Alameda, as illustrated in **Figure 1**. The site is approximately two miles south and west of Oakland and approximately 12 miles from San Francisco (10 miles by ferry). Regional vehicular access to the project area is provided by Interstate 880 (I-880) from Oakland through the Webster Street (State Route [SR] 260) Tunnel to Alameda Island. Access to the project site is provided by Buena Vista Avenue (running east-west). Sherman Street and Entrance Road connect to Buena Vista Avenue from the west and east of the project site, respectively.

The project site encompasses 32 acres of land and water. Water surrounds the property on three sides with Alaska Basin (called Encinal Basin on some maps) to the west, the Oakland Estuary to the north, and the Fortman Marina to the east. The net usable land area is approximately 22 acres and includes four parcels, one of which (approximately six acres) is leased to North Waterfront Cove LLC (NWC) by the City of Alameda under a long-term ground lease. The leased parcel consists of State tidelands that are held in trust by the City of Alameda. The other ten acres are submerged lands, which are part of the project site due to its proximity to the adjacent estuary. The submerged lands that fall within the Fortman Marina are held in Public Trust, as illustrated in **Figure 2**. The proposed project could include a land exchange involving the approximately six-acre tidelands parcel that is currently leased from the California State Lands Commission (CSLC) and the waterfront areas of the property, including the proposed publicly accessible promenade on the Alaska Basin and northern sides of the site. In the event that the land exchange is not approved, an alternate land use plan would be adopted.

Site Background and Current Conditions

The project site and the surrounding area were once a vital component of the fish canning industry. Fishing boats delivered their salmon catch to Alaska Basin, where they would be



SOURCE: ESA, 2013

Encinal Terminals . 130007

Figure 1
Regional Location

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SOURCE: ESA

Encinal Terminals . 130007

Figure 2
Public Trust

unloaded and then processed on the Del Monte property to the southwest of the project site. Most recently, the project site served as a shipping container dock; however, that use ended in the early 2000's and the property is now vacant.

The project site is generally flat with elevations ranging from 4 to 8 feet above mean sea level. The site consists primarily of asphalt and concrete paving, with both concrete and wooden wharves and a wooden pier along the northwestern edge. Two vacant warehouse buildings are located in the center of the site flanking a large metal shed. There are two additional buildings located in the southeastern portion of the site and a third building in the southwestern portion of the site, all of which are also vacant.

Surrounding Land Uses

Surrounding land uses in the vicinity include the Wind River office/research park located across Alaska Basin to the west, the Oakland Estuary to the north, the Fortman Marina to the east, and the Del Monte property to the south. Beyond the Del Monte building to the south are primarily single family residential neighborhoods and Littlejohn Park. The project site vicinity is shown in **Figure 3**.

2.2 Northern Waterfront GPA

This IS has been prepared to evaluate the proposed changes to the Encinal Terminals project originally presented in the Northern Waterfront GPA EIR. The Alameda City Council adopted the Northern Waterfront GPA and certified the Final EIR in July 2007.

The City adopted the Northern Waterfront GPA to provide a planning framework for future growth and redevelopment of a collection of primarily industrial parcels located along the City's north-central shoreline. The purpose of the Northern Waterfront GPA was to establish General Plan and Zoning Ordinance policies, design standards, and requirements for future development while encouraging economically viable redevelopment of the area with a mix of uses that would be sensitive to existing residential neighborhoods and the historic character of the area.

The Northern Waterfront GPA planning area is generally bounded by Sherman Street on the west, Buena Vista Avenue on the south, Grand Street on the east, and the Oakland/Alameda Estuary on the north. Encinal Terminals is a sub-area within the Northern Waterfront GPA planning area that includes the approximately 26 acres located between Alaska Basin and Fortman Basin. The Planning Area is presented in **Figure 4**.

The Northern Waterfront GPA evaluated the proposed buildout of the Encinal Terminals site to include 165 residential units and 200,000 square feet of commercial development. As described in the GPA:

> *The Northern Waterfront GPA would require a mix of land uses on the [project] site, including residential development, commercial, (retail, restaurant and/or office), and parks and open space. Since the optimum combination of future uses has not been determined at this time, the Northern Waterfront GPA proposes flexibility, within limits, for future development of this site.*

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Feet

SOURCE: ESA

Encinal Terminals . 130007

Figure

Pr ect Site icinit

General Plan Amendment Area

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SOURCE: ESA

Encinal Terminals . 130007

Figure

rt ern ater r nt PA Plannin Area

Since adoption of the GPA in 2007, Marina Cove I, Parrot Village, and Grand Marina Village have been developed and are currently occupied with uses described in Section 4, below. Residential properties on the Chipman Site are currently under construction, and construction at the Del Monte Warehouse Site is planned to begin in 2016.

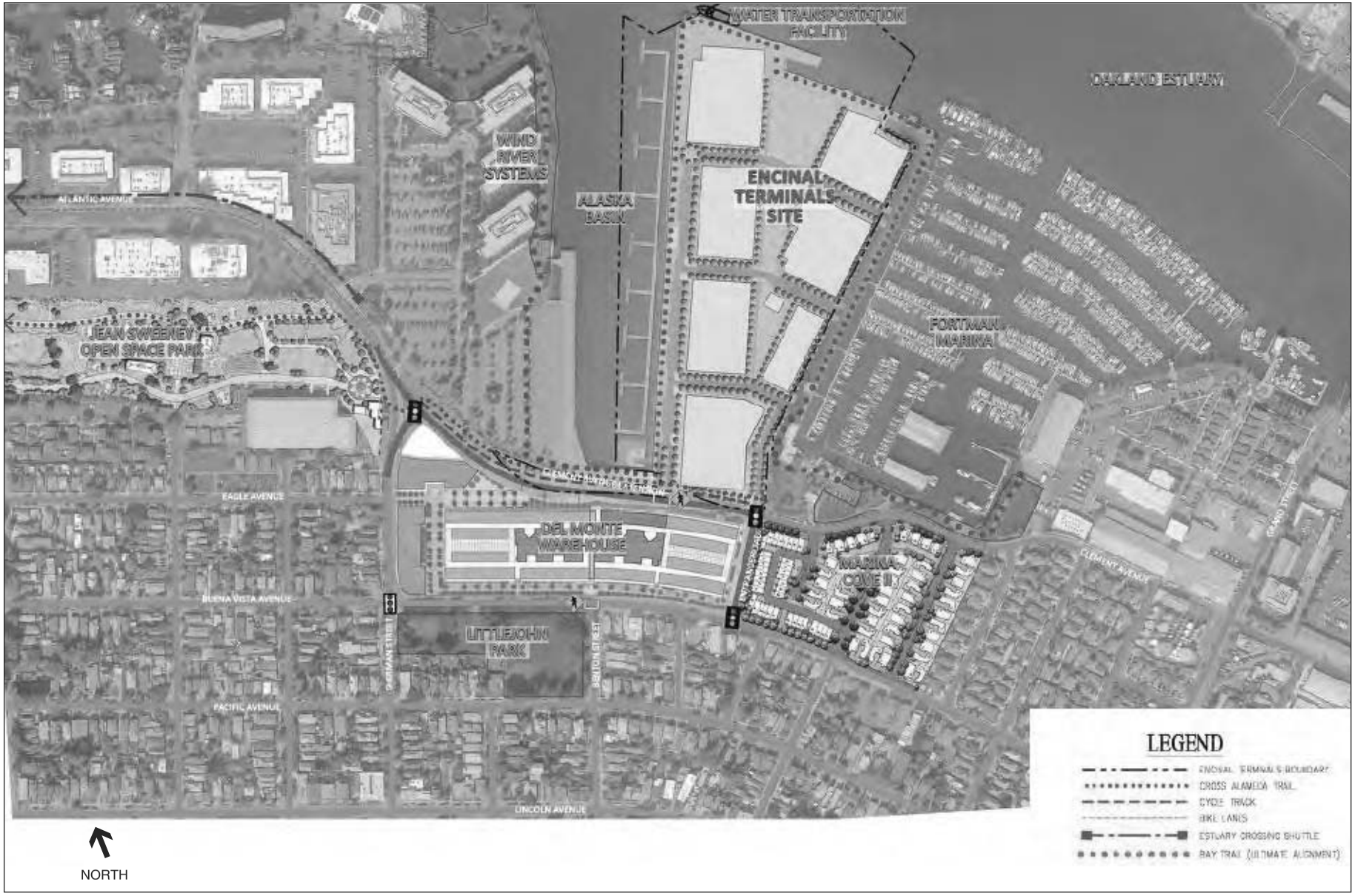
2.3 Project Characteristics

Master Plan

The proposed Encinal Terminals project, as part of a Master Plan, includes demolition of existing structures on the site and development of a new residential mixed use waterfront community. Initial discretionary approvals for Encinal Terminals include a Master Plan (**Figure 5**) and Large Lot Tentative Map. Overall, the proposed Master Plan describes the characteristics of future development on the project site and the placement and capacity of utilities and circulation infrastructure. The proposed project would be a residential community with a mix of restaurants and entertainment uses, which could include artist studios and galleries, maritime and craftsman work spaces, a marina, work/live studios, retail establishments, kayak and bicycle rental shops, and multiple public gathering spaces. All of these proposed uses would be encircled by a shoreline public promenade, offering views of the Oakland skyline and hills, the Oakland Estuary and Coast Guard Island.

The project could include construction of the following components:

- Approximately three acres of waterfront-related public open space and parks, including public access around the entire perimeter of the property.
- A new marina with up to 160 private berths and a harbormaster's office with facilities for boat sales and rentals including small crafts such as kayaks, row boats and board sailing equipment.
- A mixed-density residential neighborhood, with up to 589 residential dwelling units in a variety of configurations, including townhomes, stacked flats, live/work, lofts, and high-rise view residences.
- Between 30,000 and 50,000 square feet of retail, restaurant, and office uses along Clement Avenue and along the waterfront.
- A new internal grid of public streets and public infrastructure.
- Accessible public waterfront parking strategically located at various points to allow access to the waterfront perimeter.
- Locations for direct public access to the water, including kayak/small craft launches, waterfront steps and ramps.
- Provisions for future public water shuttle, water taxi or ferry terminal facilities.
- Development of a segment of Clement Avenue fronting the property.
- Rehabilitation of wharf surfaces or supporting pilings.



SOURCE: Carlson, Barbee & Gibson, Inc.

Encinal Terminals . 130007

Figure 5
Master Plan

The proposed project could include a land exchange involving the tidelands parcel that is leased from CSLC and the waterfront areas of the property, including the proposed publicly accessible boardwalk on the Alaska Basin and northern sides of the site. In the event that a land exchange is not approved an alternate land use plan would be adopted for the site that would be consistent with the uses allowed in the Master Plan for the tidelands and non-tidelands areas.

The Master Plan is designed to ensure that the redevelopment of the site achieves the General Plan objectives for the Northern Waterfront GPA planning area by providing access to the shoreline and estuary, which has been closed off to all but the former industrial users and still remains restricted from public access.

The Master Plan goals for the project site are to:

- Repurpose the site with a mix of residential, commercial, and water-related uses that will create and support a lively waterfront and a pedestrian-friendly environment.
- Provide water and maritime-related job and business opportunities consistent with the site's waterfront location and maritime history.
- Create a continuous public waterfront promenade and sequence of public waterfront open spaces that provide opportunities for walking, biking, kayaking, and other waterfront activities.
- Reduce truck traffic in the adjacent neighborhoods by replacing warehouse and trucking uses with employment and residential uses.
- Provide a mix of uses and activities that will support a variety of lifestyles and employment opportunities.
- Assure a significant portion of new residential development is affordable to households at all income levels.
- Establish linkages to the surrounding city and neighborhoods for all modes of travel.
- Provide clear, safe access and linkages for pedestrians and bicyclists, where none have existed in the past.
- Strengthen references to the historic background of the site and environs through design.

Land Use

The Master Plan identifies the following permitted land uses based on whether the proposed land use would be located within the Tidelands Area or the Non-Tidelands Area of the project site.

Tidelands Area:

- Public recreation facilities, hotels, restaurants, commercial recreation centers, entertainment facilities and attractions
- Public waterfront promenades, pedestrian trails, sidewalks, landscaped areas
- Public Parks and open space

- Public buildings, convention centers, museums, assembly areas and meeting places
- Streets, parking, landscaped areas
- Maritime related industry (excluding boat repair and storage), boat sales with limited outside display, rentals, leasing, marina berths

Non-Tidelands Area:

- Commercial retail, but not including "super store" type retail commercial uses or drive-through commercial facilities
- Hotels, restaurants, taverns and associated parking and landscape areas
- Office or medical facilities
- Commercial Recreational uses
- Multi-Family Residential Units
- Roadways, Private and Public Parks and Open Space and Playgrounds
- Home Occupations consistent with AMC Section 30-2
- Artist Studios and Galleries and Museums
- Performance, Entertainment, Amphitheater, Amusement Parks but not multiplexes
- Maritime – boat sales, rentals, leasing, marina berths
- Light warehousing, light manufacturing conditionally permitted with Planning Board approved Use Permit and finding that the use will not generate significant truck traffic
- Farmers Markets and Community Gardens
- Other uses determined by the Planning Board to be similar to the above and consistent with the plan objectives

For a full review of permitted land uses by subarea within the Master Plan, see **Appendix A**. Appendix A breaks the property down into subareas for the purpose of adding specificity to the development standards in those areas. The Master Plan would maintain flexibility for uses within the subarea. Many subareas would ultimately contain both Tidelands and Non-Tidelands, within the same subarea. Until the Tidelands and Non-Tidelands are defined by the future State Lands Commission action, the exact line of demarcation between Tidelands and Non-Tidelands is not known. Once it is known, the Tidelands/Non-Tidelands allowable uses would take precedence over the subarea allowable uses. For example, even if the subarea allows residential uses, those portions of the subarea that are within the Tidelands area would not permit residential uses, and would only allow the Tidelands uses.

Circulation, Public Access and Parking

Off-site Roadways

Clement Avenue would be extended along the frontage of the Encinal Terminals project area from the intersection of Entrance Road to a point approximately 400 feet to the west, as shown in

Figure 5. The roadway would be designed and constructed for a maximum operating speed of 25 miles per hour to reduce noise and calm traffic flow past residential areas. The road frontage along Clement Avenue from the intersection with Entrance Road and along the Encinal Terminals project frontage would be constructed by the project's developer. The Del Monte project would be responsible for constructing frontage improvements behind the southern curb along this segment. The segment from Entrance Road to Sherman Street would be completed along with future projects, and costs for the curb-to-curb improvements would be shared among project developers, including Encinal Terminals.

Internal Street System

The primary vehicular access into the project site would occur along a new street (Primary Entrance Street) that would originate at a new three-way intersection at Clement Avenue approximately 320 feet west of the centerline of the Clement Avenue/Entrance Road intersection. The Primary Entrance Street would extend northward into the property along the west shoreline but would be set back from the Alaska Basin. Over most of its length, it would be a two lane roadway constructed with a minimum curb-to-curb dimension of 26 feet, excluding intermittent locations for parking. Parallel and perpendicular parking would be allowed along the Primary Entrance Street.

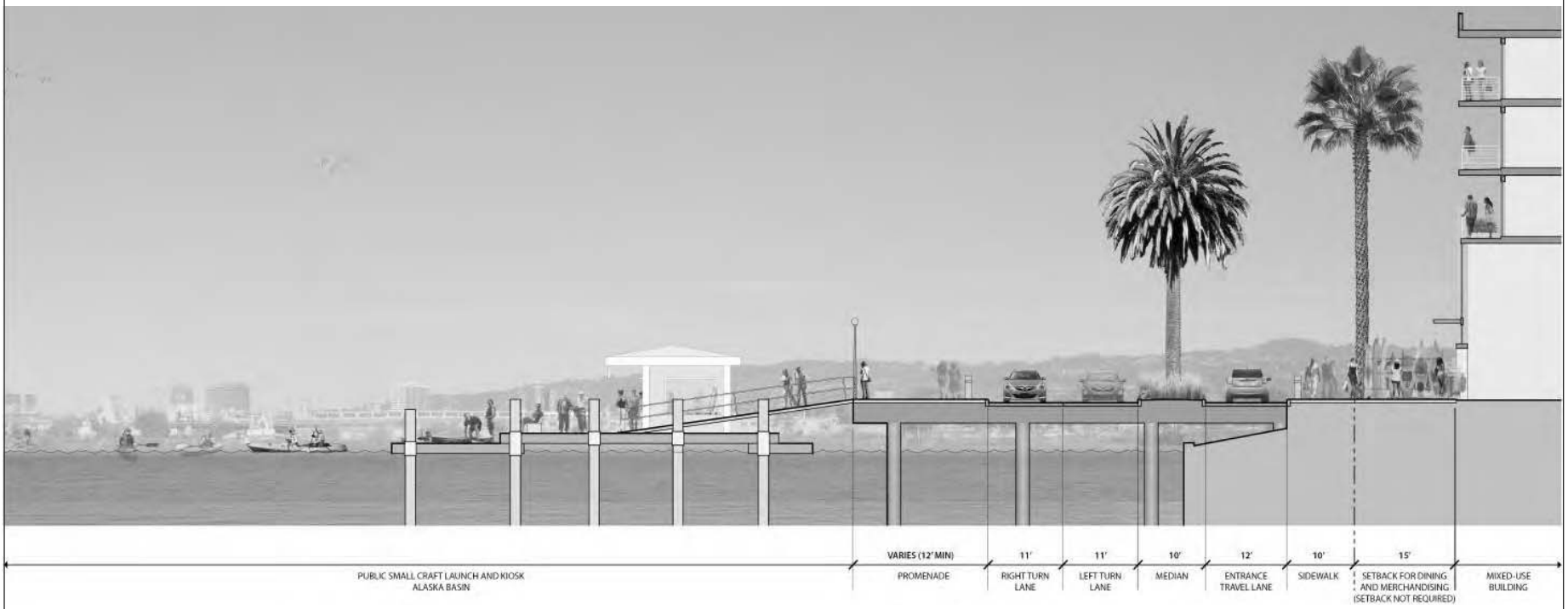
An additional secondary project site entrance would be provided at the Clement Avenue/Entrance Road intersection extending northward into the project site adjacent to Fortman Marina. Both of these points of access from Clement Avenue would provide means of access for emergency vehicles.

Internal east-west streets (potentially located in Subareas D, G and J) would cross the site generally perpendicular to the Primary Entrance Street and would serve the interior development subareas. These east-west streets would be two lane roadways constructed with a minimum curb-to-curb dimension of 26 feet, excluding intermittent locations for parking. Parallel and perpendicular parking would be allowed along the internal East-West Streets. All of the internal streets would be open and accessible to the public 24 hours per day.

Opportunities for water transit facilities are expected to be provided along the northern edge of the site. If bus transit service is provided along Clement Avenue by a public transit agency in the future, a bus shelter with seating would be provided on the Clement Avenue frontage of the project site at a location agreed upon with the City of Alameda and relevant transit agencies.

Waterfront Access

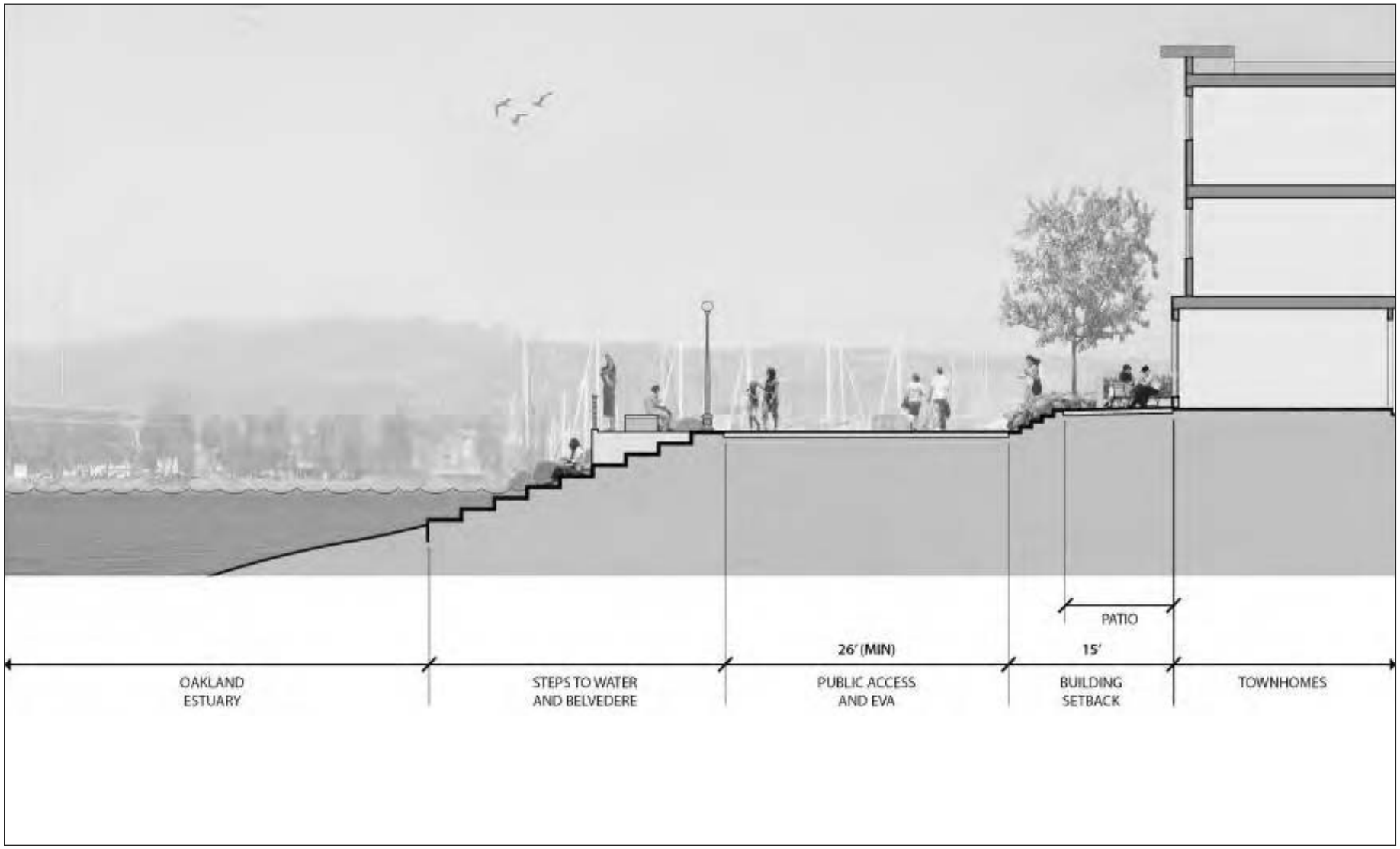
A continuous public shoreline promenade area would be provided around the waterfront perimeter of the site. **Figure 6 and Figure 7** provide a cross-section view of the promenade. The promenade would include a sequence of open spaces and recreational opportunities including walking, running, bicycling, rollerblading, fishing, watercraft launch, and vista points, and would include the necessary structural and safety improvements, allowing convenient pedestrian access to the Alaska Basin and Encinal Terminals site.



SOURCE: GLS Landscape/Architecture

Encinal Terminals . 130007

Figure 6
Western Entry Road and Waterfront Promenade
at Clement Avenue (View North)



SOURCE: Carlson, Barbee & Gibson, Inc.

Encinal Terminals . 130007

Figure 7
Public Waterfront Promenade along Northern Edge of the Site (View East)

The shoreline public promenade would be limited to use by pedestrians and bicyclists and not available to general vehicular traffic, but would be designed to be available for use by emergency, service and maintenance vehicles. The shoreline public promenade would have a minimum paved width of 12 feet adjacent to the Alaska Basin and around the perimeter of Encinal Terminals development from the Wind River Systems property to the Fortman Marina property. The promenade would include public viewing and gathering areas at the northwest and northeast corners of the project site.

Opportunities for water transit facilities would be provided along the northern edge of the project site. Opportunities for a public non-motorized boat launch facility, as well as pedestrian steps down to the water in the Alaska Basin and along the northern shoreline, would also be provided.

The shoreline public promenade would be designed to avoid flood inundation with considerations for climate change and sea level rise.

Public use areas would be clearly delineated with "Public Shore" signs, planting and/or special features. Public amenities including, bike racks, benches, trash containers, restrooms, and drinking fountains would be provided for public use within the public realm area. Public art and public view areas would be provided within the public areas.

Central Open Space

In addition to the public access and open space provided in the continuous public promenade that extends around the waterfront perimeter of the project site, the proposed project would provide a central open space of approximately one acre with at least one side open to views of the Estuary.

Additional open space areas would be provided within each of the subareas. In addition, both public common and non-common private open space would be established in the form of mini parks and open space patios for the ground floor units and balconies/decks for elevated units, or possibly in the form of rooftop gardens.

Pedestrian Access

All new streets would include sidewalks on both sides of the street and pedestrian crossings at all intersections. Sidewalks would be a minimum of five feet wide. Pedestrian access ways would be well lit and have clear sightlines in order to provide pedestrians with a sense of safety and comfort.

A traffic signal with pedestrian countdowns is planned for the intersection of Sherman Street and Clement Avenue. If warranted, traffic signals may be added at a future date at the intersections of Entrance Road and Clement Avenue, and Entrance Road and Buena Vista Avenue. Mid-block pedestrian crossings would be avoided. If mid-block crossings are found to be necessary on the north side of the Del Monte Building at Clement Avenue, pedestrian signals could be required at those locations.

Bicycle Access and Facilities

Bicycle lanes would be provided on the Clement Avenue Extension in conformance with the standards established by the Alameda Bicycle Plan. Bicycle racks would be provided at strategic spots throughout the project area and located in convenient, well-lit areas, clearly visible from a building's primary entrance. Racks would be placed at sufficiently short intervals so that bicyclists can easily find a place to park their bicycles.

Parking

Provisions would be made to ensure that all onsite, surface parking spaces are shared and available for public use. However, parking areas, garages, and driveways on private residential parcels would be exempted from the shared parking requirement.

The Master Plan would establish specific parking supply rates and the project would be exempt from Alameda Municipal Code standard parking rates in recognition that all the spaces would be shared and that the development would include a site specific Transportation Demand Management program, described below. Parking lots would not be located or designed in a manner that would deter access to the waterfront or reduce the quality of the waterfront experience.

Public Transit

The project site would be served by AC Transit Line 19, a new bus line that is planned to begin operation in December 2016 that will connect new development in the Northern Waterfront area to the nearby Downtown Oakland and Fruitvale Bay Area Rapid Transit (BART) stations via Buena Vista Avenue. The project site is located approximately 2.6 miles west of the Alameda Ferry Terminal at 2660 Main Street, which provides service to San Francisco.

Transportation Demand Management Plan

The Transportation Demand Management (TDM) plan would include: 1) an annual fee per residential unit and a per square foot fee for commercial space, which would be applied to transit services; 2) creation of a Transportation Management Authority (TMA) with representation from each phase of the development that would be established to manage the Transit Fund and plan appropriate transportation programs (or membership in other existing TMA's); 3) provision of shuttle services (bus and/or water shuttle) to BART beginning on the first day of occupancy; and 4) an annual report to the City evaluating the effectiveness of the TDM measures.

The TDM measures may be combined with other developments to more effectively manage the program and may include shuttle services, AC Transit EasyPasses, car share programs and parking programs provided with funds from annual fees and any onsite parking revenues.

Infrastructure

The project site is currently served by existing private utilities that are deteriorated and at the end of their service life. Many of these existing utilities do not meet current codes or standards.

The proposed project would replace the existing infrastructure with updated utility systems that would include stormwater, wastewater, potable water, electrical, natural gas and telecommunications. All systems would be designed in accordance with applicable standards. A flood protection system would also be constructed for the project site that would provide protection from the anticipated impacts of climate change and sea level rise. Based on the results of site-specific geotechnical and engineering studies, additional improvements would be implemented to improve the seismic and soil stability of the project site.

Flood and Sea Level Rise Protection

The existing topography of the project site is generally flat with elevations ranging from 4 to 8 feet above the mean high tide level (six to eight feet above mean sea level). The project site is not located in a 100-year floodplain as defined by the Federal Emergency Management Agency (FEMA) and the majority of the site sits above the 100-year tidal elevation for this area of the City, which is estimated at 3.9 feet[1] (Northern Waterfront Cove, LLC, 2016). To address anticipated sea level rise of two feet (24 inches) by 2050 the project would be required to provide protection from flooding to a level two feet above the 100-year tidal elevation, or 5.9 feet. As described in the Master Plan, the project would establish a minimum first habitable floor elevation of 6.5 feet within the project site, which would exceed the flood protection requirements for 2050 by over half-a-foot.

By 2100 the project would be required to provide protection from the 100-year tidal elevation, plus up to 4.5 feet of sea level rise for a combined elevation of 8.4 feet. As such, the Master Plan instructs that the perimeter of the site be reserved for the construction of future flood control measures, such as a sea wall or levee, that would provide protection against an additional 2.4 feet of sea level rise (1.9 feet beyond the first habitable floor level) that could occur by the end of the century.

The Master Plan instructs that all future flood control measures are constructed in a way that would avoid introducing additional fill materials into the estuary.

Stormwater System

The majority of the storm run-off from the project site is collected by onsite inlets and conveyed to various private onsite outfalls that discharge directly to the Oakland Estuary. The southernmost portion of the site is collected and conveyed to the City of Alameda's storm drain system, eventually discharging to the Arbor Street Pump Station.

The proposed storm drain system improvements would maintain the existing patterns of the project site. The proposed system would include the installation of new inlets and pipelines appropriately sized to convey the site run-off. The proposed collection pipelines would range in size from 12 to 24 inches in diameter. The portions of the system that directly discharge to the Oakland Estuary would likely require improved outfall structures that the project would

[1] City of Alameda Datum.

implement. This would require permits from the various regulatory and environmental agencies. The remainder of the project site would be collected and conveyed by a new system of inlets and pipelines to connect to the City's 54-inch pipeline, which eventually discharges to the Arbor Street Pump Station. In accordance with Alameda County Clean Water Program guidelines, bio-treatment areas would be established throughout the project site to treat runoff from impervious areas. Proposed bio-treatment areas would be integrated with landscaping areas adjacent to street and parking areas or buildings to the extent feasible.

Wastewater System

The City of Alameda owns and maintains local sanitary sewer pipelines within the public streets, which collect and convey wastewater to East Bay Municipal Utility District (EBMUD) conveyance and treatment facilities. Currently, the wastewater generated from the project site is collected and conveyed by an existing 10-inch pipeline that falls east to west towards Sherman Street. This pipeline is privately owned and maintained. It is aligned along the north side of the Del Monte Warehouse. The 10-inch pipeline extends to Sherman Street and connects into the City of Alameda collection system near the intersection with Eagle Avenue. The City's pipelines within Sherman Street range in size from eight to 12 inches and flow from north to south. The 12-inch pipeline in Sherman Street connects to the EBMUD 60-inch interceptor pipeline at the intersection with Buena Vista Avenue.

The proposed project would abandon or remove the existing private wastewater collection facilities and install new sewer pipelines throughout the project site. These new pipelines would connect to the EBMUD interceptor in Buena Vista Avenue from a City-owned manhole. The onsite sewer collection system would include new pipelines ranging in size from 6 to 8 inches. A pump/lift station would be constructed to minimize the depth of the proposed system. The proposed wastewater facilities extending off-site would be installed in Entrance Road and along the eastern side of the Del Monte Warehouse, conveying the project site wastewater from the site and potentially other surrounding properties southerly to Buena Vista Avenue. In Buena Vista Avenue, a short segment of pipeline would be constructed flowing westerly to connect to an existing manhole on the EBMUD interceptor.

Potable Water

EBMUD also provides potable water service to the City of Alameda and the project site. EBMUD owns and maintains the existing pipelines within Buena Vista Avenue, Sherman Street and Clement Avenue. There is a 12-inch pipeline in Buena Vista Avenue, an 8-inch pipeline in Sherman Street and an 8-inch pipeline in Clement Avenue to the east. Existing private water pipelines extend from the EBMUD distribution system to the existing structures within the project site. The project site is currently served by existing pipelines ranging in size from 6 inches to 15 inches that are located in Entrance Road and along the northern side of the Del Monte Warehouse.

The proposed project would construct new potable water pipelines within Clement Avenue and Entrance Way to serve the project site. These facilities would be owned and maintained by EBMUD and would range in size from 8 inches to 12 inches. Within the project site, potable and

fire water pipelines would extend from the pipelines in Clement Avenue and Entrance Road. These pipelines would range in size from 6 inches to 8 inches in diameter.

Dry Utilities

Electric

Alameda Municipal Power provides electric service to the project site. Existing transmission lines extend along Buena Vista Avenue, and would be the electrical source for the project. A new joint trench would be constructed from the source to and throughout the project site. A joint trench would be constructed in Entrance Road and Clement Avenue. The joint trench would connect to the facilities in either Clement Avenue or Entrance Road, and would include new facilities for all dry utility systems.

Natural Gas

Pacific Gas & Electric (PG&E) provides natural gas service to the project site. As described above, a new joint trench would be constructed in Entrance Road and Clement Avenue. The new joint trench could connect the proposed facilities in either Clement Avenue or Entrance Road.

Telecommunications

AT&T would provide telecommunication service to the project site. A new joint trench would be constructed from the source to and throughout the project site. The joint trench would include new facilities for all dry utility systems.

Affordable Housing

The project developer would enter into an Affordable Housing Agreement with the City of Alameda for the provision of onsite housing affordable to moderate-, low-, and very low-income households consistent with Alameda Municipal Code (AMC) Section 30-16. Consistent with AMC Section 30-16, a minimum of four percent of all units would be affordable to very-low income households, four percent would be affordable to low income households, and seven percent would be affordable to moderate-income households.

In addition, this project requires approval of a Density Bonus Application pursuant to State of California Section 65915 and AMC Section 30-17 Affordable Housing Density Bonus. Proposals that qualify under AMC Section 30-17 may be granted additional residential density and waivers from local development standards, subject to and consistent with AMC Section 30-17.

Phasing Requirements

The project may be constructed and occupied in phases; the phasing may need to be adjusted from time to time due to economic conditions, public infrastructure improvements, or land acquisition timing. Phasing could occur in any logical pattern so long as:

- Each phase would be consistent with the site-wide infrastructure and open space plan, Transportation Demand Management Plan, Affordable Housing Plan, and the requirements

of the Master Plan. All required public access and site wide infrastructure improvements would be fully constructed upon completion of each phase, consistent with the Site Wide infrastructure and open space plans.

- Two completed means of access would be available to/from Clement Avenue and/or Buena Vista Avenue upon initial occupancy.
- Open space parcels or public open space or waterfront public access would be offered for dedication and improved concurrently with completion of the residential or commercial areas immediately inland of them.
- Each phase of the development would be responsible for ensuring compliance with Federal, State and Regional standards and permits. Future specific development projects would not exceed the maximum densities specified in the Master Plan. All phase submittals would be required to include:
  - Reconciliation of maximum unit densities for the Residential component as it relates to the entirety of the site at full build out.
  - Reconciliation of maximum square footage for the Non-Residential component as it relates to the entirety of the site at full build out.
  - Consistency with the on-site parking plan, site wide infrastructure plan, and site wide public access plan.
  - All required public access, and site wide infrastructure improvements would be fully constructed upon completion of the final residential phase.

Construction

Project demolition and construction activities would occur Monday through Friday between the hours of 7:00 a.m. and 7:00 p.m. If weekend work is necessary, construction would occur on Saturdays from 8:00 a.m. to 5:00 p.m., pursuant to required approvals by the City. If construction work occurs over a single-phase construction period, construction may occur within 12 months (worst-case scenario), but could occur over a longer timeframe. Construction circulation could require temporary lane closures and sidewalk closures along adjacent streets. Heavy equipment would access the project site; equipment and materials would be staged for construction within established work areas onsite. In addition to on-haul and off-haul trips, project construction would generate an estimated maximum of ten to 20 trucks and automobiles per day. Up to 220 vehicle parking spaces would be provided during the peak construction period for deliveries, visitors, and construction employees.

Approvals Required

The project would require the following approvals and discretionary actions from the City of Alameda:

- Approval of the Master Plan and Subdivision Approvals (e.g., large lot tentative tract map)
- Development Agreement

- Development Plan and Design Review approvals for individual buildings
- Affordable Housing Plan approval
- Approval of a Density Bonus Application pursuant to State of California Section 65915 and AMC Section 30-17 Affordable Housing Density Bonus and a Waiver for Height pursuant to AMC Section 30-17
- Ministerial Permits (including demolition, construction, building or grading permits)

Other approvals may be required from the following agencies:

- State Lands Commission – agreement on the proposed land exchange involving the parcel leased from CSLC and the proposed publicly accessible promenade on the Alaska Basin and northern sides of the project site
- State Water Resources Control Board – National Pollutant Discharge Elimination System (NPDES) NPDES General Construction Permit and Storm Water Pollution Prevention Plan
- San Francisco Bay Area Regional Water Quality Control Board (RWQCB) permits
- Bay Area Air Quality Management District (BAAQMD) permits
- Bay Conservation Development Commission (BCDC) approvals
- Alameda Municipal Power
- U.S. Army Corps of Engineers permits

References

City of Alameda, 2006. *Alameda Northern Waterfront General Plan Amendment Draft EIR*, prepared by Lamphier-Gregory, DKS Associates, Charles M. Salter Associates, and Questa Engineering, January.

North Waterfront Cove, LLC. *Encinal Terminals Master Plan*. May, 2016.

3. Environmental Factors Potentially Affected and City's Mitigation Determination

The proposed project could potentially affect the environmental factor(s) checked below. The following pages present a more detailed checklist and discussion of each environmental factor.

☐ Aesthetics	☐ Agriculture and Forestry Resources	☒ Air Quality
☒ Biological Resources	☒ Cultural Resources	☒ Geology, Soils and Seismicity
☒ Greenhouse Gas Emissions	☒ Hazards and Hazardous Materials	☒ Hydrology and Water Quality
☐ Land Use and Land Use Planning	☐ Mineral Resources	☒ Noise
☐ Population and Housing	☐ Public Services	☐ Recreation
☒ Transportation and Traffic	☒ Utilities and Service Systems	☒ Mandatory Findings of Significance

DETERMINATION:

On the basis of this initial study:

☐ The City finds that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ The City finds that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A NEGATIVE DECLARATION will be prepared.

☐ The City finds the proposed project may have a significant effect(s) on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. If the effect is a potentially significant impact or potentially significant unless mitigated an ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to addressed.

☐ The City finds that changes to the project or the circumstances under which the project would be undertaken require major revisions to the previous EIR to make the previous EIR adequately apply to the proposed project in accordance with Public Resources Code §21166 and CEQA *Guidelines* §15163. Thus, a SUBSEQUENT EIR shall be prepared, focused on those factors identified above as provided in CEQA *Guidelines* §15063(c)(3).

☒ The City finds that changes to the project or the circumstances under which the project would be undertaken require only minor revision to the previous EIR to make the previous EIR adequately apply to the proposed project in accordance with Public Resources Code §21166 and CEQA *Guidelines* §15163. Thus, a SUPPLEMENTAL EIR shall be prepared focused on those factors identified above as provided in CEQA *Guidelines* §15063(c)(3).

☐ The City finds that the significant effects that would result from the proposed project have been addressed in the Northern Waterfront General Plan Amendment EIR, and that none of the determinations set forth in Public Resources Code §21166 and CEQA *Guidelines* §15162 can be established. Thus, a SUBSEQUENT MITIGATED NEGATIVE DECLARATION to the Northern Waterfront General Plan Amendment EIR shall be prepared.

Andrew Thomas

Signature

4/26/16

Date

Andrew Thomas

Printed Name

City of Alameda

For

4. Environmental Checklist, Discussion, and Mitigation Measures

4.1 Organization and Format

This Section presents the Environmental Checklist for each CEQA environmental factor, the discussion of the anticipated impacts to each of the environmental factors, the identification of any new or modified mitigation measures, and the reference citations of all technical studies, agencies, and other resources consulted in the evaluation.

Environmental Checklist

For each of CEQA's 18 specific environmental factors (e.g., Air Quality, Cultural Resources, Transportation and Traffic, etc.) to be addressed, the Checklist is marked with findings as to the impact determinations of the proposed project, and whether that finding was identified and fully analyzed in the GPA EIR for the Encinal Terminals site or fully mitigated by existing regulations. A checked box (☒) in the first column of the Checklist requires additional environmental analysis in the form of a supplemental or subsequent EIR. A checked box in the second through fifth column of the Checklist requires preparation of a subsequent mitigated negative declaration. (See Section 1.2 of this document for a detailed description of the Checklist determination categories in the Environmental Checklist.)

A discussion of the anticipated impacts to each of the environmental factors follows the Checklist and starts with a summary of the GPA EIR findings. If a potentially significant impact is identified, mitigation is presented to reduce the impact to less than significant.

Impacts, Mitigation Measures and Nomenclature

Because this IS has been prepared as a subsequent document to the certified GPA EIR, several mitigation measures from the GPA EIR are incorporated into this IS - sometimes in modified form (shown in underlined and/or ~~strike-out~~ text format to show revisions) to adequately address the proposed project changes when compared to the original Northern Waterfront GPA project evaluation in the GPA EIR.

For clarity, new mitigation measures introduced in the IS are labeled with new numeric designators corresponding to sequence of the environmental factor (e.g., **NEW Mitigation Measures 8-1a through 8-1e** to address "Hazards and Hazardous Materials, the eighth environmental factor under CEQA). Mitigation measures added or updated from the GPA EIR maintain the alphabetical designators used in the GPA EIR (e.g., **Mitigation Measures HAZ-1 through HAZ-1b**).

Lastly, each Checklist section includes reference citations of all technical studies, agencies, and other resources consulted in this evaluation.

Aesthetics

Environmental Factors for Determining Environmental Effect	Proposed Project Compared to the GPA EIR Project				
	Potentially Significant Impact – Further Study Required	*Less than Significant Impact with New or Revised Mitigation Incorporated*	*Not Analyzed in the Prior EIR – No Impact or Less Than Significant Impact*	*Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required*	*Substantially Mitigated by Uniformly Applicable Development Policies*
1. AESTHETICS — Would the project:					
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☐	☒
d) Create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area?	☐	☐	☐	☐	☒

The GPA EIR concluded that the Northern Waterfront GPA would result in less-than-significant visual resources impacts. In particular, the Northern Waterfront GPA includes policies that would support and supplement the City of Alameda's existing General Plan policies related to visual resources, and would generally have a beneficial effect on scenic vistas and visual quality by preserving view corridors, renovating important architectural landmarks, creating continuity between surrounding neighborhoods and the waterfront, and eliminating underutilized or deteriorating structures.

There are no substantial changes in the proposed project or new information of substantial importance since the GPA EIR that would result in any new significant environmental effects or substantial increase in the severity of previously identified significant effects related to aesthetics. As described below, the proposed project would have less than significant impacts to aesthetics, which is consistent with the GPA EIR. Therefore, the proposed project would not result in any new potentially significant aesthetic effects that were not identified in the GPA EIR or a substantial increase in the severity of any previously identified significant aesthetic effects. This topic will not be discussed further in the SFEIR.

Discussion

a, b) **Substantially Mitigated by Uniformly Applicable Development Policies.** As described in Section 2, *Project Description,* the project site consists of two vacant warehouses with a large metal shed in the central portion of the site and two vacant buildings on the southern side of the site. The remaining portion of the paved site is vacant. The project site is not immediately visible from any designated scenic vistas, scenic resources or state

scenic highways. Underutilized and under-maintained industrial warehouses on the project site and in the project vicinity have substantially degraded the existing visual character and quality at the property. Currently, the entire project site is fenced, and no public access is provided along the estuary or to any other portion of the site.

The scale and uses located in the project area vary substantially from the residential neighborhoods to the west and south, industrial uses to the south, and waterfront uses to the east of the project site. Buildings such as the adjacent Del Monte Warehouse are large and comprise highly visible landmarks within the generally flat landscape.

The eastern portion of the Northern Waterfront GPA area is comprised of waterfront uses located between Fortman Marina and Alameda Marina, including the Grand Harbor Marina, and the Grand Street boat launch. The City properties located along Fortman Way include a service yard and animal shelter; industrial and office uses located along Grand Street north of Buena Vista; and small pockets of single-family residential. The Marina Cove subdivision comprises the area north of Buena Vista Avenue and south of the planned extension of Clement Avenue between Paru Street and the recently demolished Chipman warehouse. Building composition and style is diverse in this area – buildings vary from one and two to sometimes three stories.

Scenic resources in the project vicinity include long-range views of the developed Oakland hills to the north. Distant views of the Oakland hills from the project site are available above intervening development. Views across the estuary include Coast Guard Island and industrial and commercial sites on the Oakland side.

The project site is visible from several nearby public vantage points. As shown in **Figure 8 Photo 1**, the project site can be seen across Alaska Basin from the path along the eastern edge of the Wind River Campus and from the future Clement Avenue extension immediately south of Alaska Basin (Figure 8, Photo 2). Estuary views to the north and east are also available from this vantage point. Foreground views of the project site are available from the Del Monte Warehouse to the south. Wood slat fencing along the eastern boundary of the project site generally obscures views from the Fortman Marina; however, the upper portions of the vacant warehouses are visible from some viewpoints.

Development of the proposed project would change the visual character of the site by removing the vacant warehouses and constructing a mix of residential, commercial, open space, and public uses on the site. The proposed Master Plan would ensure consistency with the Northern Waterfront GPA goals, requiring that new uses are consistent with existing development in the vicinity with respect to scale, design, and use. In addition, the proposed project would be consistent with BCDC Bay Plan policies that promote visually appropriate shoreline uses, the development of vista points, and the protection of significant views.

View #1 Looking South from Bay Trail Near Wind River Campus

View #2 Looking East from Future Clement Avenue Extension

SOURCE: ESA 2016

Encinal Terminals . 130007

Figure 8
Existing Views of the Site

Consistent with Bay Plan policies, the project would establish a boardwalk/promenade along the western side of the site, waterfront dependent uses adjacent to the Estuary, and the preservation of key vistas. Development of the proposed project would also connect to existing waterfront access points by providing an attractive, pedestrian friendly urban waterfront environment on the project site, which is currently not available at the project site.

The proposed project is subject to the City of Alameda Municipal Code requirements for Design Review[2] and City of Alameda standard conditions and requirements regarding lighting placement and design. This process is intended to ensure compatibility between the proposed project and "… adjacent or neighboring buildings or surroundings and promote harmonious transitions in scale and character in areas between different designated land uses" (City of Alameda, 2013).

Because there are no designated scenic vista points in proximity to the project site, the project would not displace or obstruct views from a scenic vista point. Therefore, the proposed project would not result in a substantial adverse effect or increase in the severity of the effect on a scenic vista or scenic resources, and the impact would be less than significant. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

c) **Substantially Mitigated by Uniformly Applicable Development Policies.** The project site is located within the Northern Waterfront GPA planning area of Alameda, an urban environment composed of a mix of industrial, water-oriented, and residential land uses. The site's immediate neighbors are the Del Monte Warehouse to the south, the Oakland Estuary to the north, Fortman Marina to the east, and Alaska Basin to the west. The project site is occupied by two warehouses flanking a large metal shed in the central portion and two warehouse buildings at the southern end of the site, all of which are vacant. As described above for criteria "a" and "b," underutilized and under-maintained industrial facilities have substantially degraded the existing visual character and quality of the site and its surroundings.

The proposed project would alter the visual character of the project site as it would allow for construction of a mix of residential, commercial, open space, and public uses to enhance the subject property and complement neighboring uses. Proposed development on the site would be designed consistent with the Northern Waterfront GPA goals, City of Alameda Municipal Code requirements for Design Review, as well as the project's Subarea Development Standards (Appendix A). As described in Section 2*, Project Description,* once the demarcation between Tidelands/Non-Tidelands is established, the Tidelands/Non-Tidelands allowable uses would, however, take precedence over the

2 Alameda Municipal Code Section 30-37, Design Review Regulations.

subarea allowable uses. The project includes construction of a boardwalk/promenade, which would provide public access along the waterfront. Landscaping and street trees would also be planted throughout the project site and along pedestrian access ways, which would substantially improve the visual character and quality of the property since there is currently no landscaping or vegetation on the site.

The project would develop mixed use buildings within each subarea, which would range from a maximum height of 55 feet on the southern end of the site, to 90 feet within the center of the site, and up to 250 feet on the northwestern end of the site near the Oakland Estuary. Buildings within the waterfront pedestrian promenade and public open spaces would not exceed 40 feet in height.

Impacts related to substantial degradation of the existing visual character or quality of the site and its surroundings would be less than significant. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not significantly increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

d) **Substantially Mitigated by Uniformly Applicable Development Policies.**
Development of the proposed project would result in an intensification of light and glare on the project site associated with the potential use of reflective building materials, street light fixtures, nighttime lighting of commercial identification signs and logos, and increased vehicle and transit use. Street lighting would be included on the Clement Avenue Extension as well as on internal local streets, and installed along all pedestrian and bike through-ways. However, the consistent use of a standard design review process for all proposed developments within the Northern Waterfront GPA area and the enforcement of Implementing Policy 10.8.f , Urban Design and Aesthetics,[3] of the Northern Waterfront General Plan policies, would ensure that new development does not create unnecessary glare or lighting impacts on adjacent land uses through design standards such as downcasting lighting, limited night lighting, and the imposition of limits on the use of reflective building materials. Therefore, impacts resulting from new sources of substantial light or glare that could adversely affect daytime or nighttime views in the area would be less than significant. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

[3] Policy 10.8.f states: Ensure that new development does not create unnecessary glare or lighting impacts on adjacent land uses.

References

City of Alameda, 2006. Alameda Northern Waterfront General Plan Amendment Draft EIR, prepared by Lamphier-Gregory, DKS Associates, Charles M. Salter Associates, and Questa Engineering, January.

City of Alameda, 2013. Citywide Design Review Manual. Available at: http://alamedaca.gov/sites/default/files/department-files/2014-01-13/citywide_design_review_manual_1-2014_part1.pdf. December 2013.

Agricultural and Forest Resources

Environmental Factors for Determining Environmental Effect	Proposed Project Compared to the GPA EIR Project: Potentially Significant Impact – Further Study Required	Less than Significant Impact with New or Revised Mitigation Incorporated	Not Analyzed in the Prior EIR – No Impact or Less Than Significant Impact	Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required	Substantially Mitigated by Uniformly Applicable Development Policies
2. AGRICULTURAL AND FOREST RESOURCES — In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. **Would the project:**					
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☒	☐	☐
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☒	☐	☐
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☒	☐	☐
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☒	☐	☐
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☒	☐	☐

The GPA EIR found that no agricultural lands would be converted with implementation of the Northern Waterfront GPA, since these resources are not present in the Northern Waterfront GPA area. There are no changes to the physical environment since the adoption of the Northern Waterfront GPA. As described below, the proposed project would have no impacts to agricultural resources, which is consistent with the GPA EIR.

Forest resources were not analyzed in the GPA EIR and were not commonly analyzed in CEQA documents at the time the GPA EIR was prepared and adopted. However, similar to agricultural

lands, forest resources are not present in the Northern Waterfront GPA area. The proposed project would not result in any significant effects related to forestry resources. The site is developed with industrial uses. Therefore, the new information related to forest resources would not result in a new potentially significant environmental effect that was not identified in the GPA EIR. This topic will not be discussed further in the SFEIR.

Discussion

a-e) **Not Analyzed in the Prior EIR – No Impact or Less Than Significant Impact.** There are no designated Prime Farmlands, Unique Farmlands, or Farmlands of Statewide Importance on the project site (CDC, 2011). There are no Williamson Act contracts in effect on any portion of the project site. The project site is not designated by either the General Plan or the Zoning Ordinance as agricultural or forestry land, and no agricultural or forestry operations are present or have been known to occur on the site or in the project vicinity (City of Alameda, 2013). Thus, no agricultural or forestry resources or operations would be affected as a result of the proposed project. There would be no impact.

References

City of Alameda, 1991. City of Alameda General Plan.

City of Alameda, 2013. Zoning Map.

California Department of Conservation (CDC), 2011. Alameda County Important Farmland 2010 (map). Division of Land Resource Protection. Accessed March 11, 2014.

Air Quality

Environmental Factors for Determining Environmental Effect	Proposed Project Compared to the GPA EIR Project				
	Potentially Significant Impact – Further Study Required	***Less than Significant Impact with New or Revised Mitigation Incorporated***	***Not Analyzed in the Prior EIR – No Impact or Less Than Significant Impact***	***Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required***	***Substantially Mitigated by Uniformly Applicable Development Policies***
3. AIR QUALITY — Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. **Would the project:**					
a) Conflict with or obstruct implementation of the applicable air quality plan?	☒	☐	☐	☐	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☒	☐	☐	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☒	☐	☐	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☒	☐	☐	☐	☐
e) Create objectionable odors affecting a substantial number of people?	☒	☐	☐	☒	☐

The proposed project would result in a greater level of development than the project that was analyzed in the Northern Waterfront GPA EIR; therefore, the project as proposed could result in new or substantially greater air quality impacts than those identified in the GPA EIR. For purposes of this IS, air quality impacts are identified as ***potentially significant***. Project effects related to air quality, including conflicts with applicable air quality plans, violation of applicable air quality standards, cumulatively considerable net increases in criteria pollutants, exposure of sensitive receptors to substantial pollutant concentrations, and the creation of objectionable odors will be analyzed in the SFEIR, and the analysis therein will be used to determine the significance of the project's impacts. Appropriate mitigation measures will be developed, if needed and as feasible, to reduce those impacts found to be substantially greater than the prior EIR impacts.

Biological Resources

Environmental Factors for Determining Environmental Effect	Proposed Project Compared to the GPA EIR Project				
	Potentially Significant Impact – Further Study Required	*Less than Significant Impact with New or Revised Mitigation Incorporated*	*Not Analyzed in the Prior EIR – No Impact or Less Than Significant Impact*	*Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required*	*Substantially Mitigated by Uniformly Applicable Development Policies*
4. BIOLOGICAL RESOURCES — Would the project:					
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☒	☐	☐	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☒	☐	☐	☐	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☒	☐	☐	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☒	☐	☐	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☒	☐	☐	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☒	☐	☐	☐	☐

The proposed project would result in the construction of a new marina with 160 boat slips in the Alaska Basin, which was not previously analyzed in the GPA EIR. Therefore, the project as proposed could result in new or substantially greater biological resources impacts than those identified in the GPA EIR. For purposes of this IS, biological resources impacts are identified as ***potentially significant***. Project effects related to biological resources will be analyzed in the SFEIR, and the analysis therein will be used to determine the significance of the project's impacts and if they are substantially greater than previously identified. Appropriate mitigation measures will be developed, if needed and as feasible, to reduce those impacts found to be significant.

Cultural Resources

Environmental Factors for Determining Environmental Effect	Proposed Project Compared to the GPA EIR Project				
	Potentially Significant Impact – Further Study Required	Less than Significant Impact with New or Revised Mitigation Incorporated	Not Analyzed in the Prior EIR – No Impact or Less Than Significant Impact	Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required	Substantially Mitigated by Uniformly Applicable Development Policies
5. CULTURAL RESOURCES — Would the project:					
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☒	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☐	☐	☒	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	☒	☐

The GPA EIR concluded that the Northern Waterfront GPA could result in potentially significant impacts to unidentified archaeological resources, unknown human remains, and unidentified paleontological resources. Since the GPA EIR was a programmatic analysis, projects proposed within the Northern Waterfront GPA are subject to a project-level review for cultural resource impacts, which is included below.

GPA EIR **Mitigation Measure CULT-1** relating to the discovery of previously identified archaeological resources, GPA EIR **Mitigation Measure CULT-2** relating to the encounter of human remains, and GPA EIR **Mitigation Measure CULT-3** relating to the discovery of paleontological resources would all apply to the project.

There are no substantial changes to the proposed project footprint or new information of substantial importance since the GPA EIR that would result in any new significant environmental effects or substantial increase in the severity of previously identified significant effects related to cultural resources. As described below, the proposed project would have less than significant impacts to the City's cultural resources with implementation of Mitigation Measures CULT-1, CULT-2, and CULT-3, as identified in the GPA EIR. This is consistent with the GPA EIR. Therefore, the proposed project would not result in any new potentially significant cultural resources effects that were not identified in the GPA EIR or a substantial increase in the severity of any previously identified significant cultural resources effects. This topic will not be discussed further in the SFEIR.

Discussion

a) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** The City of Alameda was once part of a Spanish land grant given to Luis Peralta in 1818 by the Governor of California. The land grant extended from Berkeley to San Leandro. The first settlers were William Worthington Chipman and Gideon Aughinbaugh, who established a peach orchard on the land. Around 1851, they purchased "the Encinal" area, a 160-acre parcel west of Oakland, from Peralta for $14,000. While Alameda was established at the east end of the peninsula, other communities grew up in the area, including Woodstock in the west, with its commercial district, and Encinal in the center. As San Francisco's demand for agricultural products increased, the township of Alameda grew. As early as 1856, strawberries, blackberries, and loganberries were grown on the Encinal peninsula. Between 1860 and 1870, Alameda's population grew 238 percent (from 460 to 1,557 people) and estate values rose significantly (City of Alameda, 2006).

Between 1927 and 1956 there was a great deal of industrial plant construction along Buena Vista Avenue. The Encinal Terminals, a large industrial shipping terminal on the north side of Atlantic Avenue near the Oakland Estuary, was opened in 1925. Its construction came about after an agreement between the owners, the Alaska Packer's Association, and their parent company, the California Packing Corporation. The terminal was created as a general cargo facility for agricultural products, and before World War II, Encinal Terminals was one of the largest cargo facilities in the Bay Area and one of the largest employers in Alameda. During World War II, it served as the General Navy Supply Depot for the South Pacific. In 1927, Del Monte built its warehouse and distribution center, constructed by the Alaska Packer's Association for the California Packing Corporation. The warehouse was sited between two spurs of the Alameda Beltline Railyard to serve as a distribution center and shipping port for the California Packing Corporation's Del Monte canned food brand. The California Packing Corporation was formed in 1916 by a merger with four major fruit and vegetable canners and a stock purchase from the Alaska Packer's Association. The new company was formed to market the state's food products nationally as well as overseas. After World War II, other well-known companies moved to the Central Northern Waterfront, including Pennzoil, Weyerhaeuser and Listo Pencil Company (City of Alameda, 2006).

In the 1950's, in an effort to make cargo handling and storage more efficient, the container shipping system was developed and implemented, by Sea-land in New Jersey in 1956 and by Matson Lines together with Encinal Terminals in Alameda in 1958. This system has subsequently transformed shipping throughout the world, rendering old ports and port facilities, such as the previously existing Encinal Terminals, obsolete. This system involves the use of sealed containers that can be carried unopened from manufacturer to seller by rail, truck, or cargo ship. This system was first fully in operation with the development and installation of the first high speed, dockside container handling crane, called the Paceco Container Crane, at Encinal Terminals in 1959. With the crane the unloading of a ship was reduced from up to three weeks to less than one day (Corbett & Hardy, 1988).

To accommodate the new system, large portions of the 1920s-era transit sheds that had been built parallel to Alaska Basin were demolished to provide a larger yard for the new weather proof containers. In 1983 the American Society of Mechanical Engineers declared the Paceco Container Crane to be an "International Historic Mechanical Engineering Landmark." In 1987 this first crane and a second one were dismantled and shipped to China (Corbett & Hardy, 1988).

A review of historic aerial photos of the project site indicates that the majority of the former transit sheds had been demolished by 1987, and were completely eliminated by 2000 (www.historicaerials.com). Of the approximately 20 structures that existed on the project site historically, there are currently six structures remaining on the site, only two of which date from the original period of use. Located toward the southern end of the site is a two-story, flat roofed, wood framed, former administration building built circa 1950, and a single-story, gable-roofed, wood-framed former office building built circa 1930. The latter building has the outward appearance of a residential bungalow but likely functioned as an office building (Corbett & Hardy, 1988). In addition, there are two corrugated metal warehouses at the center of the site that were built in 1960 and a large covered metal shed built circa 2000. Finally, a corrugated metal gable-roofed office building was constructed circa 2000 adjacent to the circa 1930 office building (Historical Aerials, 2016).

As stated in the GPA EIR the Northern Waterfront (inclusive of the Encinal Terminals site) does not have the potential for a historic district designation at the local, State or federal levels due to loss of historic fabric as the result of demolition activities. The Northern Waterfront General Plan Area does not contain a unique or exemplary collection of architectural resources with a unifying historic context, and is not an architecturally defined area marked by a cohesive grouping of buildings or neighborhoods. For similar reasons, the Encinal Terminals site is also not eligible for historic district designation (City of Alameda, 2006).

A records search at the Northwest Information Center indicates that all six structures on the project site are listed in the Historic Property Data File for Alameda County with an NRHP code of “7N” which means “needs to be reevaluated” (NWIC, 2012).

A reconnaissance-level site survey by an ESA architectural historian on May 3, 2013 (ESA, 2013), confirmed the existence of these six structures on the project site. The former office building located at the far southern end of the site was in dilapidated condition, with evidence of cladding and window removal and/or advanced deterioration. The other buildings on the project site generally appear as described above. The site is fenced and unoccupied.

Although two former office buildings remain on the project site and were once associated with the Encinal Terminals during its use as one of the largest cargo facilities in the Bay Area from approximately 1927 to 1956, the removal of all other buildings and structures on the site has reduced their integrity of setting to such an extent that they would not be

considered eligible for federal, state, or local listing either individually or as a group, and therefore would not qualify as historic resources for CEQA purposes (ESA, 2013).

As no historic resources are located on the project site, implementation of the proposed project, including demolition of all remaining buildings on the site, would not cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5. No mitigation is required, and this topic will not be discussed further in the SFEIR.

b) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** The project area is underlain by estuarine mud and overlying artificial fills. Based on the geologic context and previous extensive disturbance there is a low potential to uncover archaeological resources. This topic will not be discussed further in the EIR. In the unlikely event that archaeological resources are uncovered during project construction, implementation **Mitigation Measure CULT-1** from the GPA EIR would reduce the potential impact to unidentified archaeological resources to a less-than-significant level. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

> **Mitigation Measure CULT-1:** In the event that previously unidentified cultural resources are discovered during site preparation or construction, work shall cease in the immediate area until such time as a qualified archaeologist and City of Alameda personnel can assess the significance of the find. The following measures shall be implemented at the time of the find:
>
> - Activity in the vicinity of the suspected resources shall be immediately suspended and City of Alameda personnel and a qualified archaeologist shall evaluate the find. Project personnel shall not alter any of the uncovered materials or their context.
> - If archeological resources are discovered, the City and the cultural resource consultant shall determine whether the resource is unique based on the criteria provided in the CEQA Guidelines and the criteria listed above. The City and developer, in consultation with a cultural resource expert, shall seek to avoid damaging effects on the resource wherever feasible.
> - If the City determines that avoidance is not feasible, a qualified cultural resource consultant shall prepare an excavation plan for mitigating the impact on the qualities that make the resource unique. The mitigation plan shall be prepared in accordance with CEQA Guidelines and shall be submitted to the City for review and approval.

c) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** The project area is underlain by estuarine mud and overlying artificial fills, topped by structural wharf elements. Based on the geologic context and previous extensive disturbance there is a low potential to uncover paleontological

resources. This topic will not be discussed further in the SFEIR. While unlikely, in the event that paleontological resources are uncovered during project construction, implementation of **Mitigation Measure CULT-2** from the GPA EIR would reduce this potential impact to a less-than-significant level. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

> **Mitigation Measure CULT-3:** If paleontological resources are encountered during site preparation or construction activities, the following mitigation measures shall be implemented:
>
> Activity in the vicinity of the suspected resource(s) shall be immediately suspended, and City of Alameda personnel and a qualified paleontological resource consultant shall be contacted to evaluate the find. Project personnel shall not alter any of the uncovered materials or their context.
>
> If paleontological resources are discovered and the City and the paleontological resource consultant found that the resource is significant based on the criteria provided in the CEQA *Guidelines* and criteria listed above, the City and project developer, in consultation with a paleontological resource expert, shall seek to avoid damaging effects on the resource wherever feasible.
>
> If the City determines that avoidance is not feasible, a qualified paleontological resource consultant shall prepare a salvage plan for mitigating the effect of the project on the qualities which make the resource unique. The project developer, in consultation with a qualified paleontologist, shall complete a paleontological resource inventory, declaration, and mitigation plan in accordance with the CEQA *Guidelines* and submit it to the City for review and approval.

d) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** Based on the site's context and previous extensive disturbance, there is a low potential to uncover human remains in the project area. This topic will not be discussed further in the SFEIR. While unlikely, in the event that human remains are uncovered during project construction, implementation of **Mitigation Measure CULT-3** from the GPA EIR would reduce this potential impact to a less-than-significant level. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

> **Mitigation Measure CULT-2:** If human remains are encountered, work shall halt within 50 feet of the find and the County Coroner shall be notified immediately. A qualified archaeologist shall also be contacted to evaluate the situation. If the human remains are of Native American origin, the Coroner must notify the Native American Heritage Commission within 24 hours of this identification. Pursuant to Section 5097.98 of the Public Resources Code, the Native American Heritage Commission will identify a Native American Most Likely Descendent to inspect

the site and provide recommendations for the proper treatment of the remains and associated grave goods. Section 7050.5 of the California Health and Safety Code states that in the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined whether or not the remains are subject to the coroner's authority.

References

City of Alameda, *Northern Waterfront General Plan Amendment Draft EIR*, Prepared by Lamphier and Gregory for the City of Alameda, 2006.

Corbett, Michael, and Hardy, Mary, *Historic Resources Inventory of Encinal Terminals*, Prepared for the City of Alameda, 1988.

ESA, *Memorandum: Encinal Terminals Reconnaissance-level Historic Resources Survey*, Prepared by Brad Brewster, ESA Architectural Historian, May 6, 2013.

Northwest Information Center (NWIC), California Historical Resources Information System, *Historic Property Data File for Alameda County, 1521 Buena Vista Avenue,* Updated April 5, 2012.

Historic Aerials, 2016. Historic Aerials website. Available at: www.historicaerials.com. Accessed April 13, 2016.

Geology, Soils, and Seismicity

Environmental Factors for Determining Environmental Effect	Proposed Project Compared to the GPA EIR Project				
	Potentially Significant Impact – Further Study Required	*Less than Significant Impact with New or Revised Mitigation Incorporated*	*Not Analyzed in the Prior EIR – No Impact or Less Than Significant Impact*	*Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required*	*Substantially Mitigated by Uniformly Applicable Development Policies*
6. GEOLOGY, SOILS, AND SEISMICITY — Would the project:					
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:					
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42.)	☐	☒	☐	☐	☐
ii) Strong seismic ground shaking?	☐	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒	☐
iv) Landslides?	☐	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☐	☒
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒	☐

The GPA EIR concluded that the Northern Waterfront GPA could result in potentially significant impacts to occupants of future development within the Northern Waterfront GPA area, which would be subject to seismic-induced ground shaking. Potentially significant impacts could result from the possible occurrence of seismic-induced ground failure, including liquefaction, lurch-cracking, and lateral spreading. Potentially significant impacts could occur as a result of expected continuing consolidation and land subsidence, causing damage to structures, utilities and pavements. Potentially significant impacts could also occur as a result of shrink-swell potential of

Northern Waterfront GPA area soils, causing damage to structures or property. Since the GPA EIR was a programmatic analysis, projects proposed within the Northern Waterfront GPA are subject to a project-level review for impacts relating to geology, soils and seismicity, which is included below.

GPA EIR **Mitigation Measure GEO-1** which reduces impacts from strong ground shaking, **Mitigation Measure GEO-2** which reduces impacts of seismic-induced ground failure, **Mitigation Measure GEO-3** limiting soil consolidation, and **Mitigation Measure GEO-4** reducing impacts from soil shrink-swell conditions, would all apply to the project.

Mitigation Measure GEO-2 is revised as part of this project analysis to address project specific impacts.

There are no substantial changes in the proposed project or new information of substantial importance since the GPA EIR that would result in any new significant environmental effects or substantial increase in the severity of previously identified significant effects related to geology and soils. As described below, the proposed project would have less than significant impacts to geology and soils, which is consistent with the GPA EIR. Therefore, the proposed project would not result in any new potentially significant geology and soils effects that were not identified in the GPA EIR or a substantial increase in the severity of any previously identified significant geology and soils effects. This topic will not be discussed further in the SFEIR.

Discussion

a) **Less than Significant Impact with New or Revised Mitigation Incorporated.** *Fault Rupture.* The project site is not located within an Alquist-Priolo Fault Rupture Hazard Zone, as designated through the Alquist-Priolo Earthquake Fault Zoning Act.[4] No active faults are known to pass through the immediate project region (California Division of Mines and Geology, 1982).[5] The nearest active faults to the project site are the Hayward Fault (approximately five miles northeast), the San Andreas Fault (approximately 14 miles southwest), the Calaveras Fault (approximately 17 miles east), and the Concord-Green Valley Fault (approximately 19 miles northeast). Although fault rupture is not necessarily bound by the limits of a fault rupture hazard zone, ground displacement is most commonly seen along traces of active faults during major earthquakes that result in observable offsets. Because the site is not located on or relatively close to an active or potentially active fault, the potential for surface fault rupture is low and the impact is considered less than significant. This topic will not be discussed further in the SFEIR.

[4] Alquist-Priolo Zones designate areas most likely to experience fault rupture, although surface fault rupture is not necessarily restricted to those specifically zoned areas.

[5] Active faults are defined as those faults which show evidence of movement within the last 11,000 years (Holocene); potentially active faults are defined as those that have shown evidence of surface displacement over the last 1.6 million years (Quaternary).

Groundshaking. The project site is located in a seismically active region of California with numerous active faults. Seismic activity in the region is dominated by the San Andreas Fault system, which includes the San Andreas, Hayward, and Calaveras faults. According to a 2007 study by the U.S. Geological Survey (USGS) Working Group on Earthquake Probabilities (2003), the probability of one or more earthquakes of Richter magnitude 6.7 or higher occurring in the San Francisco Bay Area for the following 30-years is 63 percent. The Hayward and San Andreas faults are the most likely of the known Bay Area faults to experience a major earthquake. The probability of a large earthquake anywhere along the Hayward Fault during this period was determined to be 27 percent, and 21 percent for the San Andreas Fault. In the event of an earthquake on one of these faults, the project site is expected to experience very strong to very violent ground shaking.

The proposed project would be required to comply with the geotechnical and seismic design requirements of the most recent version of the California Building Code (Title 24). Furthermore, the project sponsor would be required to submit a geotechnical engineering analysis accompanied by detailed engineering drawings to the City of Alameda prior to excavation, grading, or construction activities on the site. This is consistent with standard City of Alameda practices to ensure that all buildings are designed and built in conformance with the seismic requirements of the City of Alameda Building Code. A geotechnical engineering analysis report that includes drawings and details of relevant grading and/or construction requirements on the project site would be required to address constraints and to ensure the recommendations identified in the geotechnical investigation are implemented. These required submittals ensure that buildings are designed and constructed in conformance with the requirements of all applicable building code regulations, pursuant to standard City procedures.

Mandatory compliance with all applicable building code regulations, and implementation of all geotechnical recommendations contained in the required geotechnical engineering investigation as described in **Mitigation Measure GEO-1** from the Northern Waterfront GPA, would reduce potential project impacts associated with strong seismic ground shaking and seismically-induced ground failure to less-than-significant levels. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

> **Mitigation Measure GEO-1:** While the potential impacts of strong seismic ground shaking cannot be eliminated in the Northern Waterfront GPA area, the following steps shall be implemented to reduce the impacts related to expected strong ground shaking:
>
> - Grading, foundation, and structural design should be based on the anticipated strong seismic shaking associated with a future major earthquake on the Hayward fault. The Hayward fault is considered to be a Type A seismic source (with active slip and capable of a magnitude 7.0 or greater

earthquake). All structures shall be designed in accordance with the most recent edition of the California Building Code.

- The applicant shall prepare an earthquake preparedness and emergency response plan for all public use facilities. The plan should be submitted for review and approval by the Community Development and/or Public Works Department, prior to occupancy of the structures.

- Prior to marketing residential or commercial units for sale, the developer shall prepare an earthquake hazards information document. This document should be made available to any potential occupant prior to purchase or rental of the housing units or commercial spaces. The document should describe the potential for strong ground shaking at the site, potential effects of such shaking, and earthquake preparedness procedures.

Liquefaction. Seismic shaking can also trigger ground-failures caused by liquefaction. Liquefaction is the process by which granular soils, such as sands or loamy sands, behave like a dense fluid when subjected to prolonged shaking during an earthquake. Seismic hazard mapping prepared by the California Department of Conservation, Geological Survey (2003), indicates that the project site is located within a designated Seismic Hazard Zone for liquefaction. As a result, pursuant to the Seismic Hazards Mapping Act of 1990, a geotechnical report must be prepared that evaluates and provides mitigation for potential liquefaction hazards in accordance with the most recent California Building Code and the California Geological Survey, Special Publication 117A, Guidelines for Evaluating and Mitigating Seismic Hazards. A preliminary geotechnical report for the project site also identified potentially liquefiable soils and recommended design measures to address this hazard. The required final geotechnical investigation and mitigation recommendations must be made in accordance with Special Publication 117A to ensure that the potential for damage as a result of liquefaction is minimized. Recommendations such as foundation design approach and site soil treatments like addition of lime or replacement with engineered fills can effectively reduce the potential for liquefaction to adversely affect proposed improvements. Incorporation of such methods as also required by **Mitigation Measure GEO-2** (and modified as shown by <u>underline</u> below) that is taken from the Northern Waterfront GPA, would reduce the potential for seismically-related ground failure including liquefaction to less than significant levels. This topic will not be discussed further in the SFEIR.

Mitigation Measure GEO-2: The following mitigation measures shall be implemented to reduce the potential impact of seismic-induced ground failure.

- Earthworks and foundation design shall be conducted in accordance with all recommendations contained in the Weyerhaeuser/Chipman Parcels geotechnical report by Lowney Associates (December 1998) for that parcel. Additional liquefaction potential analyses shall be conducted and a liquefaction mitigation program developed for each development within the Northern Waterfront GPA area. All structures proposed for the project area shall be designed and constructed in accordance with the most recently adopted version of the City of Alameda Building Code, and the seismic design

considerations of the most recent California Building Code as adopted by the City of Alameda, and in accordance with CGS Special Publication 117A.

- Prior to the issuance of any grading or building permits, geotechnical investigations shall be conducted for the Del Monte Warehouse (URS Corporation report, 2002), Encinal Terminals, or Fortman Marina sub-areas of the Northern Waterfront GPA area. Reports for these studies shall evaluate the liquefaction potential for each site in accordance with the Standard of Practice for Geotechnical Engineering and shall provide recommendations for stabilization or resistance of structures from the potential effect of liquefaction of sediments. The potential for lurch cracking and lateral spreading shall also be evaluated. Stability of the bulkhead for projects adjacent to bulkheads shall also be evaluated. Reports shall be submitted to the City of Alameda Public Works Department for review and approval.

- Prior to commencement of construction of the project the existing wharfs/piers and the bank protection along the northern shoreline, including the shall be evaluated for suitability by a California licensed structural/geotechnical engineering firm. Any recommendations made shall be incorporated into the project design.

- Prior to commencement of construction on the Clement Avenue extension, a slope stability evaluation of the offshore areas of the project site and the Alaska Basin bulkhead shall be performed by a California licensed structural/geotechnical engineering firm. Any recommendations made in accordance with the most recent California Building Code requirements shall be incorporated into the project design plans for the Clement Avenue Extension. The project applicant shall pay a fair share contribution with the Del Monte project toward this study and the subsequent recommendations.

Landslides. The upland portion of the project site is located on a relatively level site that would not be susceptible to landslides. However, the site is adjacent to the Alaska Basin Bulkhead. According to the GPA EIR, deformation of parts of the Alaska Basin Bulkhead is currently visible. The bulkhead retains fill and native sediments and provides slope stability for the adjacent areas. Deformations of parts of the Alaska Basin Bulkhead are visible adjacent to the Del Monte site. Repairs to the damaged section of bulkhead and review of the overall stability of the bulkhead are needed. Further evaluation of the submerged sediments at the project site would be necessary to determine both seismic and static slope stability and how proposed improvements such as the proposed Clement Avenue extension would affect them. The GPA EIR also noted slopes adjacent to the Fortman Marina that were determined to be relatively stable under existing static (non-earthquake) conditions but marginally stable if liquefaction were to occur. Implementation of Mitigation Measure GEO-2**,** as amended, would reduce this potential slope stability hazard to a less-than-significant level. This topic will not be discussed further in the SFEIR.

b) **Substantially Mitigated by Uniformly Applicable Development Policies.** Project construction would include grading and earthmoving activities at the site that could expose site soils to erosion from heavy winds, rainfall, or runoff. Project construction

would be required to comply with the National Pollution Discharge Elimination System (NPDES) General Construction Activities Stormwater Permit which requires preparation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP would include a description of appropriate Best Management Practices (BMPs) that include erosion control measures. Construction contractor(s) are responsible for implementation of the SWPPP, which includes maintenance, inspection, and repair of erosion and sediment control measures and water quality BMPs throughout the construction period. Once constructed, disturbed areas would be protected by coverings such as structures, pavement, concrete, or vegetation such that the potential for erosion or loss of topsoil is very low. Therefore, with implementation of the required BMPs as part of a SWPPP, the potential for soil erosion or loss of topsoil is less than significant. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

c) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** Areas of the project site that are underlain by artificial fill and/or Bay Mud would be susceptible to settlement if proposed improvements are not designed appropriately. Younger Bay Mud is highly compressible and has low strength. The weight of the overlying materials (which could include existing fill, proposed new fill, and structures) causes consolidation of the sediments over time. As the sediments consolidate at depth, the ground surface settles and structural damage can occur. Subsidence related to consolidation of Bay Mud beneath fill and foundation settlement directly related to site-specific structural building loads could affect structures proposed as part of the project. Underground utilities could also experience differential settlement along their alignments, possibly resulting in rupture or leakage, which could cause disruption of service or safety hazards. Construction of new shallow foundations and/or placement of new fill at the site would begin a new cycle of consolidation settlement in the Bay Mud. The amount and rate of consolidation settlement would depend on:

- the weight of any new fill or structural loads (i.e., footings),
- the thickness and character of the existing fill,
- the thickness of the Bay Mud deposit beneath the existing fill and Merritt Sand,
- the potential presence of sand lenses within the Bay Mud deposit,
- the amount of consolidation/settlement that has already occurred due to previous site activities, and
- the presence of existing foundations or other obstructions, particularly pile foundations.

Buried foundations or foundation elements may also act as “hard points” beneath new roads or utilities, resulting in the potential for abrupt differential settlement. The final design level geotechnical report required for proposed improvements would determine

the susceptibility of subject parcels to settlement and prescribe appropriate engineering techniques for reducing its effects. Where settlement and/or differential settlement is predicted, engineering measures—such as use of lightweight fill, geofoam, surcharging, wick drains, deep foundations, structural slabs, hinged slabs, flexible utility connections, and utility hangers—could be used. These measures would be evaluated and the most effective, feasible, and economical measures recommended and incorporated into project design plans in accordance with California Building Code requirements. Implementation of geotechnical recommendations as required by **Mitigation Measure GEO-3** taken from the Northern Waterfront GPA EIR, would reduce the potential impact of unstable soils to less than significant levels. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

> **Mitigation Measure GEO-3:** Proponents for all projects within the Northern Waterfront GPA area shall be required to prepare a geotechnical report for review and approval by the City of Alameda that specifies all measures necessary to limit consolidation including minimization of structural fills and use (when necessary) of lightweight and low plasticity fill materials to reduce the potential for excessive loading caused by fill placement. The placement of artificial fill should be limited to reduce the potential for increased loading and associated settlement in areas underlain by thick younger Bay Mud. Increased area settlement could have implications for flooding potential as well as foundation design. Reconditioning (compaction) of existing subgrade materials would be preferable to placement of fill. The report shall present recommendations for specific foundation designs, which minimize the potential for damage related to settlement. The design of utilities shall consider differential settlements along utility alignments constructed in filled areas of the Northern Waterfront GPA area.

d) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** Expansive soils are generally clayey soils or soils that have sufficient clay content such that they swell when wetted and shrink when dried. Expansive soils located beneath structures can result in cracks in foundations, walls, and floors that develop over time from cyclical wetting and drying periods. According to the geotechnical report prepared for the project site, the shallow soils present at the site have a potential for expansion (Engeo, 2012). Typically, soil preparation and the use of imported engineered fill materials mitigate the effects of expansive soils. Implementation of all geotechnical recommendations contained in the required geotechnical investigation, as required by the City of Alameda, the California Building Code, and **Mitigation Measure GEO-4** from the GPA EIR would reduce potential impacts associated with expansive soils to less-than-significant levels. This topic will not be discussed further in the SFEIR.

> **Mitigation Measure GEO-4**: The required geotechnical report shall require that subgrade soils for pavements consist of moisture-conditioned, lime-treated, or non-expansive soil, and that surface (including roof drainage) and subsurface water be directed away from foundation elements and into storm drains to minimize variations in soil moisture.

e) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** Development under the proposed project would not include the installation of septic tanks or alternative wastewater disposal systems. The project site is located in an urban area and would be required to connect to the existing sewer system which provides wastewater collection service for the City of Alameda. Thus, no impact associated with alternative wastewater disposal systems would occur. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

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Greenhouse Gas Emissions

Environmental Factors for Determining Environmental Effect	Proposed Project Compared to the GPA EIR Project				
	Potentially Significant Impact – Further Study Required	***Less than Significant Impact with New or Revised Mitigation Incorporated***	***Not Analyzed in the Prior EIR – No Impact or Less Than Significant Impact***	***Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required***	***Substantially Mitigated by Uniformly Applicable Development Policies***
7. GREENHOUSE GAS EMISSIONS — Would the project:					
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☒	☐	☐	☐	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☒	☐	☐	☐	☐

GHGs were not analyzed in the GPA EIR and were not commonly analyzed in CEQA documents at the time the GPA EIR was prepared and adopted. For purposes of this IS, greenhouse gas related impacts are identified as ***potentially significant***. Project effects related to the generation of greenhouse gases and consistency with applicable plans and policies that have been adopted for the purpose of reducing greenhouse gas emissions will be analyzed in the SFEIR, which will determine the significance of the project's impacts and provide mitigation measures, as feasible, to reduce those impacts found to be significant.

Hazards and Hazardous Materials

Environmental Factors for Determining Environmental Effect	Proposed Project Compared to the GPA EIR Project				
	Potentially Significant Impact – Further Study Required	*Less than Significant Impact with New or Revised Mitigation Incorporated*	*Not Analyzed in the Prior EIR – No Impact or Less Than Significant Impact*	*Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required*	*Substantially Mitigated by Uniformly Applicable Development Policies*
8. HAZARDS AND HAZARDOUS MATERIALS — Would the project:					
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☒	☐	☐	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☐	☐	☒
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒	☐
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☒	☐	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒	☐
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☐	☒
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒	☐

The GPA EIR concluded that contaminated soils and groundwater have the potential to exist within the Northern Waterfront GPA area that would result in potentially significant impacts by exposing construction workers, future workers, or residents to health risks. Since the GPA EIR was a programmatic analysis, projects proposed within the Northern Waterfront GPA are subject to a project-level review for hazardous materials impacts, which is included below.

GPA EIR **Mitigation Measure HAZ-1** would apply to the project, which requires documentation of adequate soils, ground water investigations, and, where warranted, remediation. If soils and groundwater investigations indicate that hazardous materials are present, additional **Mitigation Measures HAZ-1a and HAZ-1b** would also apply.

This analysis further identifies **NEW Mitigation Measures 8-1a through 8-1e, and Mitigation Measure HAZ-1c** to reduce potential project specific impacts to the exposure of hazardous materials to a less-than-significant level.

There are no substantial changes in the proposed project or new information of substantial importance since the GPA EIR that would result in any new significant environmental effects or substantial increase in the severity of previously identified significant effects related to hazards and hazardous materials. As described below, none of the proposed project's construction activities or operating services would result in contact with hazards or hazardous materials. As identified in the GPA EIR, if during construction hazardous materials are discovered, Mitigation Measure HAZ-1 would be implemented, which is consistent with the GPA EIR. Therefore, the proposed project would not result in any new potentially significant hazardous effects that were not identified in the GPA EIR or a substantial increase in the severity of any previously identified significant hazardous effects. This topic will not be discussed further in the SFEIR.

Discussion

a) **Less than Significant Impact with New or Revised Mitigation Incorporated.**

Construction. Demolition of existing structures on the project site may expose construction workers, the public, or the environment to hazardous materials such as lead-based paint, asbestos, and PCBs. The level of potential impact is dependent upon the age, construction, and building materials of each building. Based on the age of the existing structures, any of these hazardous building materials could be present at the site which, if disturbed, could expose workers and the public during demolition. Any remaining asbestos containing materials (ACMs) would need appropriate abatement of identified asbestos prior to demolition. ACMs are regulated both as a hazardous air pollutant under the Clean Air Act and as a potential worker safety hazard under the authority of Cal-OSHA. Potential exposure to these hazardous building materials can be reduced through appropriate abatement measures.

Exposure to asbestos, and the resulting adverse health effects, is possible throughout the demolition and renovation phases if materials that contain asbestos are present. In structures slated for demolition under the project, any asbestos-containing materials would be abated in accordance with state and federal regulations including Section 19827.5 of the California Health and Safety Code, Bay Area Air Quality Management District Regulation 11, Rule 2, California Code of Regulations Title 8 Sections 1529 and 341.6, and OSHA worker safety requirements for all demolition or renovation activities.

Fluorescent lighting ballasts manufactured prior to 1978, and electrical transformers, capacitors, and generators manufactured prior to 1977, may contain PCBs. In accordance with the Toxic Substances Control Act and other federal and state regulations, the applicant would be required to properly handle and dispose of electrical equipment and lighting ballasts that contain PCBs, reducing potential impacts to a less-than-significant level. **NEW Mitigation Measures 8-1a through 8-1e** would reduce impacts that have been analyzed at a project specific level, as required by the GPA EIR, to a less-than-significant level. This topic will not be discussed further in the SFEIR.

NEW Mitigation Measure 8-1a: The project sponsor shall ensure that all proposed areas for demolition shall be assessed by qualified licensed contractors for the potential presence of lead-based paint or coatings, asbestos containing materials, and PCB-containing equipment prior to issuance of a demolition permit.

NEW Mitigation Measure 8-1b: If the assessment required by Mitigation Measure 8-1a finds presence of lead-based paint, asbestos, and/or PCBs, the project applicant shall create and implement a health and safety plan to protect workers from risks associated with hazardous materials during demolition or renovation of affected structures. The health and safety plan shall include emergency notification protocols, appropriate personal protective equipment for workers and visitors, material safety data sheets, and training requirements.

NEW Mitigation Measure 8-1c: If the assessment required by Mitigation Measure 8-1a finds presence of lead-based paint, the project applicant shall develop and implement a lead-based paint removal plan. The plan shall specify, but not be limited to, the following elements for implementation:

- Develop a removal specification approved by a Certified Lead Project Designer.
- Ensure that all removal workers are properly trained.
- Contain all work areas to prohibit off-site migration of paint chip debris.
- Remove all peeling and stratified lead-based paint on building and non-building surfaces to the degree necessary to safely and properly complete demolition activities according to recommendations of the survey. The demolition contractor shall be responsible for the proper containment and disposal of intact lead-based paint on all equipment to be cut and/or removed during the demolition.
- Provide on-site personnel and area air monitoring during all removal activities to ensure that workers and the environment are adequately protected by the control measures used.
- Clean up and/or vacuum paint chips with a high efficiency particulate air (HEPA) filter.
- Collect, segregate, and profile waste for disposal determination.
- Properly dispose of all waste.

NEW Mitigation Measure HAZ 8-1d: If the assessment required by Mitigation Measure 8-1a finds asbestos, the project applicant shall ensure that asbestos abatement shall be conducted by a licensed contractor prior to building demolition. Abatement of known or suspected ACMs shall occur prior to demolition or construction activities that would disturb those materials. Pursuant to an asbestos abatement plan developed by a state-certified asbestos consultant and approved by the City, all ACMs shall be removed and appropriately disposed of by a state certified asbestos contractor.

NEW Mitigation Measure HAZ 8-1e: If the assessment required by Mitigation Measure 8-1a finds PCBs, the project applicant shall ensure that PCB abatement shall be conducted prior to building demolition or renovation. PCBs shall be removed by a qualified contractor and transported in accordance with Caltrans requirements.

Also as part of construction, earthwork activities could disturb contaminated soil and groundwater from past releases that could expose workers, the public or the environment to adverse effects. According to the Phase I report prepared for the project site, the site was formerly used as a ship berthing and distribution center that once included the operation of underground fuel storage tanks (Engeo, 2012). In addition, a cleanup order was issued for the site related to unauthorized disposal of suspect fill materials onto the site. Review of available regulatory agency correspondence and previous consultant reports indicates that some residual contaminants, primarily petroleum hydrocarbons such as diesel and motor oil and metals, remain in the soil and groundwater at several locations within the proposed project site; however, the lead regulatory agency, Alameda County Environmental Health (ACEH), has issued certification for no further action for the property (Engeo, 2012). However, considering the known presence of petroleum hydrocarbons and metals in the subsurface, the Phase I report recommended preparation and implementation of a soil management plan to address any contaminated soils that might be encountered during construction activities. As such and in accordance with the mitigations required from the GPA EIR below, the site contractor would be required to conduct all earthwork activities in accordance with a Soil Management Plan that would reduce potential impacts related to residual contaminants in the subsurface to less than significant levels. **Mitigation Measures HAZ-1 through HAZ-1b,** identified in the GPA EIR would reduce this impact to a less-than-significant level. This topic will not be discussed further in the SFEIR.

Mitigation Measure HAZ-1: Prior to the approval of any specific development projects within the Northern Waterfront GPA area, documentation from a qualified professional shall be provided to the City of Alameda stating that adequate soils and ground water investigations and, where warranted, remediation, have been conducted to ensure that there would be no significant hazard related risks to future site users. If the soil and groundwater investigations indicate that hazardous materials are present and pose a risk to construction workers and future site users, the following additional mitigation measures shall be implemented, and the City of Alameda would refer the site to the appropriate State and County agencies (such as Alameda County Environmental Health, the State Department of Toxic Substances

Control and/or the San Francisco Bay Regional Water Quality Control Board) for oversight of the specific development project.

Mitigation Measure HAZ-1a: If required as a result of the information obtained from Mitigation Measure HAZ-1, the City shall condition the subject development project to record a restrictive covenant prohibiting the installation or use of water wells into the shallow groundwater at the site for drinking water prior to transfer of the property.

Mitigation Measure HAZ-1b: The City shall condition the subject Project to require preparation by a qualified registered professional of a Site Management Plan (SMP) for the subject Project site as a condition of its approval as a specific development project. The SMP would provide site specific information for contractors (and others) developing the Project site that would improve their management of environmental and health and safety contingencies. Topics covered by the SMP shall include, but not be limited to:

- Land use history, including known hazardous material use, storage, disposal, and spillage, for specific areas within the Project site.
- The nature and extent of previous environmental investigation and remediation at the Project site.
- The nature and extent of ongoing remedial activities and the nature and extent of unremediated areas of the Project site, including the nature and occurrence of marsh crust and hazardous materials associated with the dredge material used as fill at the Project site.
- A listing and description of institutional controls, such as the City's excavation ordinance and other local, State, and federal laws and regulations, that will apply to development of the Project site.
- Requirements for site specific Health and Safety Plans (HASPs) to be prepared by all contractors at the Project site. The HASPs should be prepared by a Certified Industrial Hygienist and would protect construction workers and interim site users adjacent to construction activities by including engineering controls, monitoring, and security measures to prevent unauthorized entry to the construction site and to reduce hazards outside the construction site. The HASPs would address the possibility of encountering subsurface hazards and include procedures to protect workers and the public. If prescribed exposure levels were exceeded, personal protective equipment would be required for workers in accordance with DOSH regulations.
- A description of protocols for the investigation and evaluation of previously unidentified hazardous materials that may potentially be encountered during Project development, including engineering controls that may be required to reduce exposure to construction workers and future users of the Project site.
- Requirements for site specific construction techniques at the site, based on proposed development, such as minimizing the transport of contaminated materials to the surface during construction activities by employing pile

driving techniques that consist of driving the piles directly without boring, where practical.

- The SMP shall be distributed to all contractors at the Project site; implementation of the SMP shall be a condition of approval for excavation, building, and grading permits at the Project site. The contractors will be required to hold a daily safety meeting with all construction workers and subcontractors on lands identified with Hazardous Material risks.

Operation. Once constructed, hazardous materials associated with residential and commercial land use generally include various products associated with building maintenance, landscape management (i.e. pesticides and herbicides, etc.), and products related to automobile cleaning and maintenance. These uses would likely involve a wide range of chemical compounds and products that are considered hazardous. Exposure to hazardous chemicals could cause acute or chronic health effects to residents and visitors if not handled appropriately.

Hazardous materials for building and landscaping maintenance would typically be stored in their original containers in a centralized location prior to use. However, the volume of hazardous materials that would be associated with the proposed project would likely be limited to relatively small quantities. In addition, required compliance with applicable regulatory requirements such as preparation and implementation of hazardous materials management plans would minimize hazards to residents, the public, and the environment from waste products. Therefore, the potential impacts related to the routine transport, use, or disposal of hazardous materials during operation of the project would be less than significant. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

b) **Substantially Mitigated by Uniformly Applicable Development Policies.** The proposed project would not handle, store, transport, or dispose of significant quantities of hazardous materials beyond what is typically used in residential/commercial land uses. The volumes of hazardous materials that would be associated with the proposed uses, though not quantifiable, would not be significant compared to industrial or manufacturing uses where emissions are of a greater concern. In addition, commercial uses are required to adhere to local, state, and federal regulatory requirements regarding the use, storage, and disposal of hazardous materials including the preparation and implementation of a Hazardous Materials Management Plan that minimize the potential for upset and accident conditions. Therefore, based on relatively small quantities of hazardous materials that might be stored at the site and existing regulatory requirements, the potential for upset and accident conditions would be considered to have no impact. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

c) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** There are no schools located within a quarter mile of the project site. Regardless, as stated above, the quantities of hazardous materials that would likely be stored, handled, and disposed of at the proposed site would be relatively limited and therefore would not represent a potential impact to any schools in the area. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

d) **Less than Significant Impact with New or Revised Mitigation Incorporated.** The project site is listed on the State Water Resources Control Board's environmental database known as Geotracker (Engeo, 2012). As discussed above, the listing of the site is related to the former underground fuel storage tanks that were subsequently removed from the site as well as the disposal of unauthorized fill materials at the site. Numerous sampling activities have occurred at the site to delineate the horizontal and vertical extent of contamination. After review of the sampling results, both the removal of the tanks and the fill material incident have received regulatory closure indicating that the remaining levels of contamination do not represent potential threats to the public or environment (SWRCB, 2014). According to the Phase I report for the site, however, a soil management plan was recommended to address the potential for encountering any residual contamination that might be encountered during construction activities. Therefore, with implementation of **Mitigation Measures HAZ-1, -1a, -1b, and -1c** (above), the potential for these residual contaminants to adversely affect construction workers or the public would be reduced to less than significant levels, which is the same conclusion as the GPA EIR. This topic will not be discussed further in the SFEIR.

Project construction activities would include excavation of subsurface soils and construction of the proposed building. Improper handling, storage, or disposal of potentially contaminated soil during construction could pose health hazards to construction workers, the public, and the environment. This could be a significant impact, which would be reduced to less-than-significant levels with implementation of **Mitigation Measure HAZ-1, -1a, -1b, and -1c**. This is the same finding as the proposed project in the GPA EIR, and includes project specific mitigation to ensure that the effects of the proposed project would remain less than significant with mitigation. This topic will not be discussed further in the SFEIR.

e, f) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** The project site is not located within two miles of any airport or airstrip nor is it included in an existing airport land use plan. The nearest airport is the Oakland International Airport which is over five miles from the project site. Therefore, there would be no impact related to proximity to airports or private airstrips. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or

introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

g) **Substantially Mitigated by Uniformly Applicable Development Policies.** The proposed project would result in an increased resident, employee and visitor population in the project area. However, the proposed project would not alter the existing street network and would comply with all emergency vehicle access requirements as stated in the California Fire Code. Overall, the proposed project would not impede an emergency access route or emergency response requirements and would not result in permanent road closures, and therefore, would not physically interfere with emergency response or evacuation plans. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

h) **Substantially Mitigated by Uniformly Applicable Development Policies.** The proposed project site is located within a developed urbanized area that is not susceptible to wildfires. The proposed project improvements would be required to adhere to current fire code requirements for construction which would minimize the threat of fire causing adverse effects. Therefore, the potential impact related to wildfires is less than significant. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

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Hydrology and Water Quality

Environmental Factors for Determining Environmental Effect	Proposed Project Compared to the GPA EIR Project				
	Potentially Significant Impact – Further Study Required	*Less than Significant Impact with New or Revised Mitigation Incorporated*	*Not Analyzed in the Prior EIR – No Impact or Less Than Significant Impact*	*Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required*	*Substantially Mitigated by Uniformly Applicable Development Policies*
9. HYDROLOGY AND WATER QUALITY — Would the project:					
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☐	☒	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of a site or area through the alteration of the course of a stream or river, or by other means, in a manner that would result in substantial erosion or siltation on- or off-site?	☐	☐	☐	☐	☒
d) Substantially alter the existing drainage pattern of a site or area through the alteration of the course of a stream or river, or by other means, substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?	☐	☐	☐	☒	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☒	☐
f) Otherwise substantially degrade water quality?	☐	☐	☐	☐	☒
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☒	☐	☐	☐
h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	☐	☒	☐	☐	☐
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☒	☐	☐	☐
j) Expose people or structures to a significant risk of loss, injury or death involving inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒	☐

The GPA EIR concluded that the Northern Waterfront GPA could result in potentially significant impacts to water quality in the Oakland Estuary and San Francisco Bay from construction activities and post-construction site uses potentially reducing the quality of storm water runoff. The GPA EIR concluded that dredging activities under the Northern Waterfront GPA could result in potentially significant impacts to water quality at dredging and disposal sites. Since the GPA EIR was a programmatic analysis, projects proposed within the Northern Waterfront GPA are subject to a project-level review for hydrological impacts, which is included below.

GPA EIR **Mitigation Measure HYD-1,** which requires the preparation of a Stormwater Pollution Prevention Plan (SWPP), and **Mitigation Measure HYD-2**, which requires compliance with the standards and procedures set forth in BCDC, RWQCB, U.S. EPA, and other agencies' Long Term Management Strategy would apply to the proposed project since dredging would occur under the proposed project.

This analysis further identifies **Mitigation Measure 9-1** to reduce potential impacts from flooding to a less-than-significant level.

There are no substantial changes in the proposed project or new information of substantial importance since the GPA EIR that would result in any new significant environmental effects or substantial increase in the severity of previously identified significant effects related to hydrology or water quality. As described below, the proposed project would have less than significant impacts on the hydrology and water quality, which is consistent with the GPA EIR. Therefore, the proposed project would not result in any new potentially significant hydrologic resources or water quality effects that were not identified in the GPA EIR or a substantial increase in the severity of any previously identified significant hydrologic resources or water quality effects. This topic will not be discussed further in the SFEIR.

Discussion

a) Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.

*Construction Impacts. C*onstruction activities that could potentially affect water quality are primarily the result of: erosion of sediment; leaks from construction equipment; accidental spills of fuel, oil, or hazardous liquids used for equipment maintenance; accidental spills of construction materials; and any dredging activities. Due to the project site's close proximity and direct outfall connections to the Oakland Inner Harbor, construction impacts on water quality could be particularly severe if not properly managed. As previously mentioned, the Oakland Inner Harbor is hydrologically connected to the San Francisco Bay, which is on the list of impaired water bodies compiled by the San Francisco Bay Regional Water Quality Control Board (RWQCB) pursuant to the federal Clean Water Act. If discharges from the project site exceeded the State mandated Total Maximum Daily Loads (TMDLs) for water quality within these water bodies, construction on the project site could result in an impact. Implementation of **Mitigation Measure HYD-1** from the GPA EIR, below, would ensure that construction

impacts on water quality remain less than significant. In addition, **Mitigation Measure HYD-2** from the GPA EIR, below, would ensure that any dredging activities associated with construction are conducted in a manner that is protective of the environment.

Operational Impacts. Generally, residential development projects may degrade surface water quality as a result of various daily operational impacts. Automobile use produces oil, grease, fuel residues, heavy metals and tire particles that can contaminate surface water runoff from parking areas and roadways. Other pollutants that contribute to surface water pollution and result from urban development, include: pesticides, herbicides, and fertilizers from landscaping; organic debris (e.g. grass, leaves); weathered paint; eroded metals from painted and unpainted surfaces; organic compounds (e.g., cleaners, solvents, adhesives, etc.); nutrients; bacteria and viruses; sediments; and rooftop runoff. Since the project site is located in close proximity to the Oakland Inner Harbor, the effects of pollutants from development in the project area could have a significant and adverse effect on water quality. Mitigation Measure HYD-1 from the GPA EIR provides a means of monitoring and verifying compliance with the stormwater treatment requirements, below, and would ensure that operational impacts are less than significant.

Operational stormwater discharges from new development at the project site would be regulated by the City's regional municipal stormwater permits, under the National Pollutant Discharge Elimination System (NPDES) permit. Development projects in the City of Alameda, must comply with the NPDES Permit No. CAS612008, which is issued to the Clean Water Program Alameda County (CWPAC) (formerly the Alameda Countywide Clean Water Program) and other Bay Area jurisdictions by the RWQCB (NPDES Order No. R2-2009-0074). The Municipal Regional Stormwater Permit (MRP) was issued on October 14, 2009 and revised November 28, 2011, replacing the previous permit originally issued in February 2003 with additional requirements for development and redevelopment projects.

In particular, Provision C.3 in the NPDES Permit governs storm drain systems and regulates post-construction stormwater runoff. The provision requires new development and redevelopment projects to incorporate treatment measures and other appropriate source control and site design features to reduce the pollutant load in stormwater discharges and to manage runoff flows. "Redevelopment" is defined as a project on a previously developed site that results in the addition or replacement of impervious surface. A redevelopment project that adds or replaces at least 10,000 square feet of impervious surface is required to adhere to the C.3 provisions by including low-impact development (LID) measures. The proposed project would replace more than 10,000 square feet of impervious surface; therefore would be required to incorporate treatment measures and appropriate source control and site design measures under the NPDES permit.

Currently, the majority of the storm run-off from the project site is collected by onsite inlets and conveyed to various private on-site outfalls that discharge directly to the Oakland Estuary. The southernmost portion of the site is collected and conveyed to the

City's storm drain system, eventually discharging to the Arbor Street Pump Station. The main collection facility is a 54-inch pipeline that flows from the west (Sherman Street) to the east along the north side of the Del Monte Warehouse, encompassing a large component of the Northside drainage area.

Under the proposed project all stormwater runoff from the project site would be connected to the City's 54-inch pipeline and conveyed to the Arbor Street Pump Station. The proposed system would also include the installation of new inlets and pipelines appropriately sized to convey the site run-off. Stormwater from the Arbor Street pump station would be pumped through an outfall that discharges into the Oakland Inner Harbor, which is hydrologically connected to the San Francisco Bay. As per Provision C.3 of the Clean Water Program Alameda County (CWPAC), the project would construct bio-treatment areas to treat runoff from impervious areas on the project site. Bio-treatment areas would be integrated to landscaping areas adjacent to parking areas or buildings. As stated in the GPA EIR and Alameda Storm Drain Master Plan, the proposed quantity of run-off conveyed to the City's system is anticipated to be less than the existing condition because of the reduced amount of impervious area included in the proposed redevelopment plan. Provision C.3 of the MRP also includes hydromodification management (HM) requirements for certain projects that create or replace one acre or more of impervious surfaces in "susceptible areas" as mapped by the CWPAC. The project site is not located within a susceptible area, and is therefore not subject to HM requirements. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

> **Mitigation Measure HYD-1:** All specific development projects approved pursuant to the Northern Waterfront GPA, that involve site clearing, grading or excavation as part of the proposed construction activity and that result in soil disturbances of one or more acres, (and for projects of less than one acre if the construction activity is part of a larger common plan of development), shall be required to prepare a Stormwater Pollution Prevention Plan (SWPPP). To avoid unnecessary duplication of effort, the SWPPP prepared for the first site or development project within the Northern Waterfront GPA area may be used as the basis for a SWPPP required for subsequent projects, provided that each version of the SWPPP is modified as necessary to maintain compliance with the qualitative standards set forth in this EIR and with applicable regulations and standards of the RWQCB.
>
> Each SWPPP shall be designed to reduce potential impacts to surface water quality through the construction and life of the Project for which it is prepared. The SWPPP shall conform to the requirements of the Alameda County Clean Water Program which set new standards effective February 2003, and to the standards set forth herein. The SWPPP would act as the overall program document designed to provide measures to mitigate potential water quality impacts associated with implementation of the proposed Project. Preparers of the SWPPP should review the Conditions of Approval (including General Conditions for Construction,

Residential Development/Construction Conditions, and Commercial/Industrial Conditions) established by the City.

The SWPPP shall include the following three elements to address construction, post-construction and pest management issues:

- *Specific and Detailed Best Management Practices (BMPs) Designed to Mitigate Construction-related Pollutants*. These controls shall include practices to minimize the contact of construction materials, equipment, and maintenance supplies (e.g., fuels, lubricants, paints, solvents, adhesives) with storm water. The SWPPP shall specify properly designed centralized storage areas that keep these materials out of the rain. The contractor(s) shall submit details, design and procedures for compliance with storage area requirements. An important component of the storm water quality protection effort is knowledge on the part of on-site construction and maintenance supervisors and workers. To educate on-site personnel and maintain awareness of the importance of storm water quality protection, site supervisors shall conduct regular meetings to discuss pollution prevention. The SWPPP shall establish a frequency for meetings and require all personnel to attend. The SWPPP shall specify a monitoring program to be implemented by the construction site supervisor, and must include both dry and wet weather inspections. City of Alameda personnel shall conduct regular inspections to ensure compliance with the SWPPP. BMPs designed to reduce erosion of exposed soil may include, but are not limited to: soil stabilization controls, watering for dust control, perimeter silt fences, placement of hay bales and sediment basins. If grading must be conducted during the rainy season, the primary BMPs selected shall focus on erosion control (i.e., keeping sediment on the site). End of pipe sediment control measures (e.g., basins and traps) shall be used only as secondary measures. If hydroseeding is selected as the primary soil stabilization method, these areas shall be seeded by September 1 and irrigated to ensure that adequate root development has occurred prior to October 1. Entry and egress from the construction site shall be carefully controlled to minimize off-site tracking of sediment. Vehicle and equipment wash-down facilities shall be designed to be accessible and functional both during dry and wet conditions.

- *Measures Designed to Mitigate Post-construction-Related Pollutants*. The SWPPP shall include measures designed to mitigate potential water quality degradation of runoff from all portions of the completed development. It is important that post construction storm water quality controls are required in the initial design phase of redevelopment projects and not simply added after the site layout and building footprints have been established. The specific BMPs that would be required of a project can be found in *SF Bay Regional Water Quality Control Board Staff Recommendations for New and Redevelopment Controls for Storm Water Programs*. In addition, the design team should include design principles contained in the Bay Area Stormwater Management Agencies Association's manual, *Start at the Source, Design Guidance Manual for Stormwater Quality Protection.* The selection of BMPs required for a specific project is based on the size of the development and the sensitivity of the area. The Estuary is considered a sensitive area by the RWQCB. In general, passive, low maintenance BMPs (e.g., grassy swales, porous pavements) are preferred. If the SWPPP includes higher maintenance

BMPs (e.g., sedimentation basins, fossil filters), then funding for long term maintenance needs must be specified in the SWPPP as a condition of approval of the grading, excavation, or building permits, as appropriate (the City would not assume maintenance responsibilities for these features).

- *Integrated Pest Management Plan*. An Integrated Pest Management Plan (IPM) shall be prepared and implemented by the Project for all common landscaped areas. Each IPM shall be prepared by a qualified professional. The IPMs shall address and recommend methods of pest prevention and turf grass management that use pesticides as a last resort in pest control. Types and rates of fertilizer and pesticide application shall be specified. Special attention in the IPMs shall be directed toward avoiding runoff of pesticides and nitrates into sensitive drainages or leaching into the shallow groundwater table. Pesticides shall be used only in response to a persistent pest problem. Preventative chemical use shall not be employed. Cultural and biological approaches to pest control shall be fully integrated into the IPMs, with an emphasis toward reducing pesticide application.

The City of Alameda Department of Public Works shall review and approve the SWPPP prior to the approval of the Development Plan for each Project phase to ensure that the selected BMPs would adequately protect water quality. The City and the RWQCB are empowered to levy considerable fines for non-compliance with the SWPPP. Compliance with the approved SWPPP would mitigate the impact to a less-than-significant level.

Any dredging activities would be required to adhere to local, state, and federal requirements as stated in **Mitigation Measure HYD-2**. Implementation of this mitigation would ensure that potential water quality impacts associated with dredging are minimized to less than significant levels. This topic will not be discussed further in the SFEIR.

Mitigation Measure HYD-2: All dredging and in-water construction activities shall be consistent with the standards and procedures set forth in the Long-Term Management Strategy, a program developed by the Bay Conservation and Development Commission (BCDC), the Regional Water Quality Control Board (RWQCB), the U.S. Environmental Protection Agency (EPA), and other agencies, to guide dredging and the disposal of dredge materials in an environmentally sound manner.

b, c) **Substantially Mitigated by Uniformly Applicable Development Policies.** The majority of the project site is paved, the amount of which would be reduced with implementation of the project resulting in a net reduction in impervious surfaces. The proposed project would also construct bio-treatment areas to treat runoff from impervious areas on the project site in accordance with the Alameda County Clean Water Program guidelines. Development of the site would not involve groundwater extraction, nor would the project result in the alteration of a stream or river. The proposed improvements at the project site would overall slightly decrease the amount of impervious surfaces, and thus no increased offsite runoff would occur. Therefore, the proposed project would not lower the groundwater table as a result of groundwater extraction or reduction in groundwater recharge and

would not otherwise cause offsite sedimentation or erosion to occur. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

d, e) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** As discussed above, the proposed project would not alter any stream or river. The decrease in impervious surfaces with the proposed improvements, albeit relatively minor, would nonetheless not increase flows to receiving waters. Therefore, the potential impact of altered drainage causing offsite or onsite flooding would be less than significant. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

f) **Substantially Mitigated by Uniformly Applicable Development Policies.** Operation of the proposed project would not result in any substantial changes to onsite water quality associated with stormwater runoff. As discussed under Comment a), above, implementation of BMP's under the SWPPP, design measures that adhere to C.3 NPDES requirements, and mitigation measures required by the GPA EIR, as stated above would reduce potential impacts to water quality to a less-than-significant level. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

g, h, i) **Less than Significant Impact with New or Revised Mitigation Incorporated.** The project site lies at the southern shore of Oakland Inner Harbor on the Island of Alameda, which is prone to sea level rise. According to maps compiled by the National Oceanic Atmospheric Administration (NOAA), many coastal areas of the Bay Area would be susceptible to future sea level rise (NOAA, 2016). The maps indicate that areas along the perimeter of the proposed project site would be located within the anticipated inundation area (NOAA, 2016), including areas primarily along the north east, eastern and encroaching into the southern boundaries. Site specific projections for potential sea level rise combined with a high tide event show inundation of areas on the northern and eastern perimeter of the project site (Carlson, Barbee & Gibson, 2012). With sea level rise projected to reach 4.5 feet by 2100, the project site would be exposed to storm event flooding necessitating adaptive measures to reduce the risk of flooding (BCDC, 2013).

The proposed project site is not currently located within a 100 year flood hazard zone according to the FEMA Flood Insurance Rate Map (FEMA, 2009). As noted in the project description, the proposed project would establish a minimum elevation grade

within the project site that is a minimum of two feet above the 100-year tidal elevation of the Estuary (3.9 feet) to account for future sea level rise.

Additionally, the proposed project would incorporate a flood protection system that would include an adaptive management strategy to allow for future adjustments to the perimeter of the project site to provide protection from the 100-year tidal elevation plus an additional 4.5 feet of sea level rise that is estimated to occur by the end of the century. This adaptive management strategy would include reservation of land along the perimeter shorelines of the project site. This reserved land would be wide enough to accommodate elevating shorelines and floodwalls in the future to adapt to sea level rise, if necessary. The perimeter improvements would be designed to allow for the future adaptive flood protection measures to be implemented without requiring fill to be placed within the Bay.

The project includes plans for a continuous public shoreline promenade along the entire perimeter of the site that would have a minimum paved width of 12 feet and allow access for emergency, service and maintenance vehicles but would not be open to vehicular traffic. The Shoreline public promenade would be designed to protect against the effects of flooding and inundation resulting from extreme storm events caused by climate change, and estimates of potential future sea level rise.

The proposed project, as discussed above, would incorporate structural design and adaptive measures for protection from flooding from sea level rise. Incorporation of these measures alongside implementation of **NEW Mitigation Measure 9-1** would ensure the project impacts are less than significant. The analysis of the proposed project addresses new information of substantial importance not discussed in the GPA EIR, but the identified mitigation measures would reduce potential impacts to a less than significant level. This topic will not be discussed further in the SFEIR.

> **NEW Mitigation Measure 9-1:** The City shall require that any new construction be constructed at a minimum elevation of 4.5 feet above the 100-year flood risk elevation. In addition, the City shall implement the following steps prior to project implementation:
>
> - Apply for membership in the National Flood Insurance Program (NFIP) Community Rating System (CRS), and as appropriate through revisions to the City Code, obtain reductions in flood insurance rates offered by the NFIP to community residents.
>
> - Cooperate with FEMA in its efforts to comply with recent congressional mandates to incorporate predictions of sea level rise into its Flood Insurance Studies and FIRM.
>
> - Implement climate adaptation strategies such as avoidance/planned retreat, enhance levees, setback levees to accommodate habitat transition zones, buffer zones and beaches, expanded tidal prisms for enhanced natural scouring of channel sediments, raising and flood-proofing structures, or provisions for additional floodwater pumping stations, and inland detention basins to reduce peak discharges.

j) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** Tsunamis are waves caused by an underwater earthquake, landslide, or volcanic eruption, and would generally affect low-lying areas along the Pacific coastline and San Francisco Bay. The U.S. Geologic Survey (USGS) evaluated the potential community exposure to tsunami hazards in a recent scientific report (Wood et.al. 2013) to support preparedness and education efforts. The report indicates that in the event of a tsunami, the maximum onshore runup elevation in Alameda would be 16.73 feet from a distant source and 4.26 feet from a local source (Wood et. al., 2013). Mapping compiled by the Association of Bay Area Governments (ABAG) indicate that the entire project site is located in a tsunami-inundation zone (ABAG, 2014). The tsunami-inundation zone identifies the maximum areas of inundation from various earthquake and landslide sources, and is not meant to imply that all delineated areas would be inundated by a single future tsunami. In addition, the tsunami-inundation zone does not provide any indicator of the probability of such an event occurring (Wood et al., 2013). The Alameda General Plan (1991) describes tsunamis and seiches as secondary seismic hazards associated with earthquakes and notes that the likelihood of these hazards occurring due to groundshaking is not as high as other hazards such as earthquakes and landslides of submerged sediments. The City of Alameda operates disaster preparedness and emergency services in the project area, in cooperation with preparedness efforts from the California Emergency Management Agency and the California Geological Survey. The National Oceanic Atmospheric Administration (NOAA) operates the Pacific Tsunami Warning System (PTWS), which monitors seismological and tidal stations throughout the Pacific Basin and provides tsunami warning information. If a warning was to be issued, residents of Alameda would be notified by the City's Alert and Warning Siren System, and the City's Comprehensive Emergency Management Plan (2008) would be implemented to insure the safety of the City's residents.

Seiches are large waves on an enclosed or semi-enclosed body of water that can be caused by seismic activity. San Francisco Bay is partially enclosed, with outlets to San Pablo Bay, as well as the Pacific Ocean via the Golden Gate, and is relatively shallow, with a mean depth of approximately 27.6 feet. Geologic-induced seiche events have not been documented in the San Francisco Bay. The proposed project site is relatively flat and not subject to mudflows. Therefore, the potential impact of seiche, tsunamis and mudflows is less than significant. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

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Land Use and Land Use Planning

Environmental Factors for Determining Environmental Effect	Proposed Project Compared to the GPA EIR Project				
	Potentially Significant Impact – Further Study Required	*Less than Significant Impact with New or Revised Mitigation Incorporated*	*Not Analyzed in the Prior EIR – No Impact or Less Than Significant Impact*	*Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required*	*Substantially Mitigated by Uniformly Applicable Development Policies*
10. LAND USE AND LAND USE PLANNING — Would the project:					
a) Physically divide an established community?	☐	☐	☐	☒	☐
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒	☐
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒	☐

The GPA EIR concluded that development of the Northern Waterfront area would result in less-than-significant impacts related to compatibility with surrounding land uses, physical division of the established community, and compatibility with plans and policies including the Alameda General Plan, BCDC's San Francisco Bay Plan, and the Tidelands Trust lands.

There are no substantial changes in the proposed project or new information of substantial importance since the GPA EIR that would result in any new significant environmental effects or substantial increase in the severity of previously identified significant effects related to the City's designated land uses. The proposed project as adopted in the GPA EIR would have less-than-significant impacts on land use and land use planning, which is consistent with the GPA EIR. Therefore, the proposed project would not result in any new potentially significant land use effects that were not identified in the GPA EIR, or a substantial increase in the severity of any previously identified significant land use effects. This topic will not be discussed further in the SFEIR.

Discussion

a) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** The project site is located within an urban area, adjacent to residential, commercial and industrial land uses. The project site is bordered by the Oakland Estuary to the north, Fortman Marina to the east, the Del Monte Warehouse to the south, and the Alaska Basin to the west. The project site is currently surrounded by fencing and is not accessible to the public, nor does the site provide access to any of the

surrounding land uses. The proposed project would develop the site with a mix of residential, commercial, and public uses and would provide vehicular and pedestrian circulation within the site. The proposed project would contribute financially to the cost of extending Clement Avenue, which would include the development of a new segment of the Cross Alameda Trail (CAT) to connect to the CAT trail segment that would transverse the planned 22-acre Jean Sweeney Open Space to the east of the site. The project would also develop a segment of the Bay Trail along the perimeter of the project site that would connect to other future segments bordering the Alaska Basin and Fortman Marina. In addition, the project may ultimately provide a transit connection to Oakland across the Oakland Estuary via a water shuttle or water taxi or ferry boat.

The proposed project would not divide an established community; rather, the proposed project would improve vehicular, bicycle, and pedestrian access in proximity to the site and provide new circulation routes within and potentially through the site to Oakland. Therefore, impacts related to physical division of an established community would be less than significant. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

b) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** The project site is zoned mixed use planned development (M-X) with approximately 13 acres of the site, outside the tidelands area, falling within the multi-family overlay (MF) in the Zoning Ordinance and is designated for mixed use in the General Plan. The proposed project would demolish two warehouses, a shed, and a small office building on the site, all of which are vacant, and construct up to 589 new housing units, up to 160 private boat slips, between 30,000 and 50,000 square feet of commercial/office, and boardwalk, open space, and public uses. The proposed boardwalk would be located on the western side of the property, which would provide public access to the waterfront.

The Northern Waterfront GPA states:

> *The intent of the site specific development policies for the Encinal Terminals Site is to facilitate redevelopment of the site with new land uses that will take advantage of the unique site configuration and waterfront location, increase opportunities for public access and enjoyment of the waterfront and eliminate the existing uses which contribute a large volume of truck traffic in the vicinity. The Mixed Use designation will allow for the development of a wide range of land uses to capitalize on the site's unique location adjacent to the Alaska Basin, Oakland/Alameda Estuary, Fortman Marina, and Del Monte Warehouse site. Anticipated land uses in this district include a range of housing types, including senior housing, commercial, office, and public parks and open space. Public waterfront access around the perimeter of the site is envisioned, as well as a new marina on the Alaska Basin.*

The proposed uses on the site would be consistent with nearby existing neighboring residential uses, as well as future mixed use developments that would be similar in character to the proposed project. Future residential, commercial, and recreational uses on the site would not change the character of the neighborhood in a negative way because these uses are intended to foster a pedestrian-friendly, transit-oriented environment envisioned in the Northern Waterfront GPA. The proposed project would provide additional commercial amenities and recreational opportunities for the adjacent community. The Northern Waterfront GPA represents a transition away from the area's historically industrial uses in favor of residential, commercial, open space and marina uses. The proposed project is, therefore, compatible with the transition of the waterfront area from industrial to mixed use.

Consistent with the GPA EIR, the proposed project would support the intent of the current City of Alameda General Plan. In particular, the project would be consistent with the General Plan's policies for waterfront sites, mixed use housing development, shoreline access, and policies regarding architectural resources and historic resources. The GPA EIR indicated that if the Encinal Terminals project required relocation of the tidelands to accommodate the site plan and non-tidelands compliant uses, then a tideland exchange would need to be accomplished through enactment of State legislation (City of Alameda, 2006). As described in Section 2, *Project Description*, and consistent with the GPA EIR, the City of Alameda would work with the State Lands Commission and North Waterfront Cove LLC to reach agreement on a land exchange that involves the parcel leased from CSLC for the proposed publicly accessible promenade along the western side of the property adjacent to the Alaska Basin and the northern edge along the Oakland/Alameda Estuary. If the land exchange is not approved, the project site would be developed with the same mix of uses as the proposed project, but in a different configuration that is consistent with the uses allowed in the tidelands, as specified by the Master Plan.

In 2007, the Northern Waterfront GPA changed the land use designation for the property from Industrial to Mixed Use. More recently, in July 2012 and with adoption of the City's new Housing Element, the City rezoned around 13 acres of the site to mixed use (M-X) with multi-family overlay (MF). The surrounding parcels include: one large parcel to the west zoned commercial manufacturing planned development (C-M-PD); one parcel to the southwest zoned intermediate industrial planned development (M-1-PD); an adjacent parcel to the south (Del Monte) zoned mixed use (M-X) that falls within the multi-family overlay (MF); a parcel to the southeast zoned neighborhood residential planned development (R-4-PD) with multi-family overlay (MF); and a couple parcels zoned for open space (O) to the southeast. The broader surrounding land uses include mixed use (M-X), two-family residential (R-2), garden residential (R-3), and neighborhood residential (R-4).

The project site is within the jurisdiction of the San Francisco Bay Conservation and Development (BCDC) San Francisco Bay Plan since the northern and western edges are

within the 100-foot shoreline band. As described in the GPA EIR, the proposed project would be expected to comply with all applicable BCDC permitting policies. Implementation of the proposed project would allow better and easier public access to the shoreline by establishing a boardwalk/promenade that facilitates and encourages public access to the shoreline. Therefore, implementation of the proposed project would be consistent with the BCDC San Francisco Bay Plan and policies. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

c) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** There are no habitat conservation plan or natural communities conservation plans that apply to the project. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

References

City of Alameda, 1991. City of Alameda General Plan.

City of Alameda, 2006. Northern Waterfront General Plan Amendment – Draft EIR, Section IV.A, Land Use and Public Policy, January 2006.

City of Alameda, March 17, 2007. Northern Waterfront General Plan Amendment.

City of Alameda, 2013. City of Alameda Municipal Zoning Code.

San Francisco Bay Conservation and Development Commission. Website. http://www.bcdc.ca.gov/, accessed December 23, 2013.

San Francisco Bay Conservation and Development Commission, March 2012. San Francisco Bay Plan, Amended September 2006.

Mineral Resources

Environmental Factors for Determining Environmental Effect	Proposed Project Compared to the GPA EIR Project				
	Potentially Significant Impact – Further Study Required	Less than Significant Impact with New or Revised Mitigation Incorporated	Not Analyzed in the Prior EIR – No Impact or Less Than Significant Impact	Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required	Substantially Mitigated by Uniformly Applicable Development Policies
11. MINERAL RESOURCES — Would the project:					
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒	☐
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒	☐

The GPA EIR found no impact to mineral resources with implementation of the Northern Waterfront GPA, since these resources are not present in the Northern Waterfront GPA area. There are no changes to the physical environment since the adoption of the Northern Waterfront GPA. As described below, the proposed project would have no impacts to mineral resources, which is consistent with the GPA EIR. This topic will not be discussed further in the SFEIR.

Discussion

a, b) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** There are no known mineral resources within the project site, and no operational mineral resource recovery sites at the project site or in the vicinity. The Alameda General Plan does not identify any areas of significant mineral deposits anywhere within the City. The project site is located in an area that has been fully developed with urban uses for many years and would not be a viable location for extraction of mineral resources. Therefore, the project would not result in any impacts to mineral resources since it would not result in the loss of availability of a known mineral resource that would be of value to the region or the state, or result in the loss of a locally-important mineral resource. Therefore, the project would not affect mineral resources. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

References

City of Alameda, 1991. City of Alameda General Plan.

California Department of Conservation, Division of Mines and Geology, Generalized Mineral Land Classification. Map of the South San Francisco Bay Production-Consumption Region (Plate 1 of 29), 1996.

Noise

Environmental Factors for Determining Environmental Effect	Proposed Project Compared to the GPA EIR Project				
	Potentially Significant Impact – Further Study Required	*Less than Significant Impact with New or Revised Mitigation Incorporated*	*Not Analyzed in the Prior EIR – No Impact or Less Than Significant Impact*	*Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required*	*Substantially Mitigated by Uniformly Applicable Development Policies*
12. NOISE — Would the project:					
a) Result in exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☒	☐	☐	☐	☐
b) Result in exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels?	☒	☐	☐	☐	☐
c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐	☐
d) Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐	☐
e) For a project located within an airport land use plan area, or, where such a plan has not been adopted, in an area within two miles of a public airport or public use airport, would the project expose people residing or working in the area to excessive noise levels?	☒	☐	☐	☐	☐
f) For a project located in the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☒	☐	☐

The proposed project would result in a greater level of development than the project that was analyzed in the Northern Waterfront GPA EIR; therefore, the project as proposed could result in new or greater noise impacts than those identified in the GPA EIR. For purposes of this IS, noise related impacts are identified as ***potentially significant***. Project effects related to the exceedance of noise standards, vibration, and increases in ambient noise levels will be analyzed in the SFEIR, which will determine the significance of the project's impacts and provide mitigation measures, as feasible, to reduce those impacts found to be significant.

The proposed project is not located within two miles of a private airstrip; therefore, criteria 12.f does not apply to the project. Criteria 12.f will not be discussed further in the SFEIR.

Population and Housing

Environmental Factors for Determining Environmental Effect	Proposed Project Compared to the GPA EIR Project				
	Potentially Significant Impact – Further Study Required	*Less than Significant Impact with New or Revised Mitigation Incorporated*	*Not Analyzed in the Prior EIR – No Impact or Less Than Significant Impact*	*Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required*	*Substantially Mitigated by Uniformly Applicable Development Policies*
13. POPULATION AND HOUSING — Would the project:					
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒	☐
b) Displace substantial numbers of existing housing units, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒	☐
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒	☐

The GPA EIR concluded that the GPA would result in less-than-significant effects related to population and housing. In particular, the GPA EIR concluded that projected population growth would be well within the growth rate established by the Association of Bay Area Governments for the City of Alameda, would not displace persons or displace or destroy housing located within the Northern Waterfront GPA area, would not contribute to the future projected jobs/housing imbalance, and would provide affordable residential development needed in the City.

There are no substantial changes in the proposed project or new information of substantial importance since the GPA EIR that would result in any new significant environmental effects or substantial increase in the severity of previously identified significant effects related to the City's population and housing. As described below, the proposed project would have less-than-significant impacts related to population and housing, which is consistent with the GPA EIR. Therefore, the proposed project would not result in any new potentially significant population and housing effects that were not identified in the GPA EIR or a substantial increase in the severity of any previously identified significant population and housing effects. This topic will not be discussed further in the SFEIR.

Discussion

a) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** The proposed project would result in a direct increase in population through the development of up to 589 new housing units, and a direct increase in jobs with the development of between 30,000 and 50,000 square feet of commercial

and office space. According to ABAG, the average per-household population within the City of Alameda is 2.48 (ABAG, 2014). Using this number, the project would cause an increase in residential population of up to 1,461 people.

The population growth resulting from the proposed project is generally consistent with the population growth projections in the City of Alameda General Plan, and Housing Element representing the Association of Bay Area Government (ABAG) Regional Housing Needs Allocation. The projections are also consistent with the Alameda County Transportation Commission's population growth projections for the City of Alameda. The growth in population that would occur with implementation of the proposed project was planned for in the General Plan, and the impacts of this growth were previously evaluated in the GPA EIR. The GPA EIR assumed that based on an average projected household size in 2025 of 2.40 persons per single-family household, the projected 389 single-family households that would be constructed as part of the Northern Waterfront GPA would increase the City of Alameda's population by approximately 933 persons (page IV.B-5 of GPA EIR). This estimated population increase did not take into account the projected 60 work/live studios.

The projected increase of 1,461 people that would result from implementation of the proposed project is greater than that which was assumed in the GPA EIR primarily because the average per-household factor of 2.48 was applied to all 589 new housing units. As described in the GPA EIR, infill development in the existing urban area has been demonstrated by regional planning and transportation professionals to be an environmentally sound means of accommodating regional economic development. The project would allow for efficient utilization of land and infrastructure, as opposed to the development of open space and agricultural land at the periphery of existing urban areas.

The proposed project includes affordable housing, which is an identified need in Alameda and the region. The proposed project site is located within a half-mile of an AC Transit bus stop (at the intersection of Santa Clara Avenue and Stanton Street), which is consistent with population, housing, transportation, and greenhouse gas reduction (global warming) policies established by the State of California (most recently by SB 375 and AB 32), the Metropolitan Transportation Commission, and ABAG. Furthermore, new bus AC Transit Bus Line 19 will commence operation in December of 2016 and will provide the Northern Waterfront area with a direct connection to the Downtown Oakland and Fruitvale BART stations. The project would constitute infill development within a developed urban area, and new roads and infrastructure would not be extended into an undeveloped area. For the above-described reasons, the project would not cause a new impact related to a substantial increase in population growth not already evaluated in the GPA EIR. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

b, c) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** The project site was formerly used as an unloading point for fishing boats, and most recently a shipping container dock. There are currently two vacant warehouse buildings near the center of the site, and one warehouse in the southeastern portion, all of which are currently vacant. The site currently contains no active uses and there are no residential units on the project site. Development on this site would not displace any existing residents, and would therefore not necessitate the construction of replacement housing elsewhere. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

References

Association of Bay Area Governments (ABAG), 2014. *ABAG Projections 2009 Housing Element Data Profiles*. January.

City of Alameda, 1991. General Plan.

City of Alameda, 2006. Alameda Northern Waterfront General Plan Amendment Draft EIR, prepared by Lamphier-Gregory, DKS Associates, Charles M. Salter Associates, and Questa Engineering, January. Association of Bay Area Governments, 2013. Regional Housing Needs Plan for the San Francisco Bay Area: 2014-2022.

U.S. Census Bureau, 2014. 2008-2012 American Community Survey 5-Year Estimates, Average Household Size of Occupied Housing Units by Tenure.

Public Services

Environmental Factors for Determining Environmental Effect	Proposed Project Compared to the GPA EIR Project				
	Potentially Significant Impact – Further Study Required	***Less than Significant Impact with New or Revised Mitigation Incorporated***	***Not Analyzed in the Prior EIR – No Impact or Less Than Significant Impact***	***Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required***	***Substantially Mitigated by Uniformly Applicable Development Policies***
14. PUBLIC SERVICES — Would the project:					
a) Result in substantial adverse physical impacts associated with the provision of, or the need for, new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:					
i) Fire protection?	☐	☐	☐	☐	☒
ii) Police protection?	☐	☐	☐	☐	☒
iii) Schools?	☐	☐	☐	☐	☒
iv) Parks?	☐	☐	☐	☒	☐
v) Other public facilities?	☐	☐	☐	☒	☐

The Northern Waterfront GPA concluded that the GPA would result in less-than-significant impacts related to fire and emergency services, and demand for school services. More specifically, the GPA EIR concluded that future buildout of the Northern Waterfront GPA would result in an increase in calls for police services but such growth would not require alterations to existing facilities. Similarly, the GPA EIR concluded that anticipated fire response times would be in conformance with response times to the rest of the City of Alameda and that future development would be subject to the City's Development Impact Fee, which would be the source of funding for improvements needed by the Fire Department. With respect to demands for school services, the Northern Waterfront GPA would generate new students for the schools serving the Northern Waterfront GPA area; assessment of the adopted School Facilities Mitigation Fee would ensure that the project would not result in a significant impact.

There are no substantial changes in the proposed project or new information of substantial importance since the GPA EIR that would result in any new significant environmental effects or substantial increase in the severity of previously identified significant effects related to public services. As described below, the proposed project would have less than significant impacts to public services, which is consistent with the GPA EIR. Therefore, the proposed project would not result in any new potentially significant public services effects that were not identified in the GPA EIR or a substantial increase in the severity of any previously identified significant public services effects. This topic will not be discussed further in the SFEIR.

Discussion

The project site is designated for residential redevelopment in the City of Alameda's General Plan and Housing Element. The General Plan and Housing Element ensure that land use policy is consistent with the City's ability to serve the land uses with transportation, utilities, and other services.

The proposed 589 dwelling units and 30,000 to 50,000 square feet of commercial space would result in an increase in calls for police and fire service, but the increase would not be sufficient to require construction of new fire and police stations in order to maintain adequate response times. Redevelopment of the site would result in increased tax revenues to pay for police and fire services, and the project would be required to pay police and fire impact fees to mitigate its impacts on police and fire services.

Pursuant to State of California government code, payment of school impact fees mitigates the impacts of new residential development on schools. The proposed project is subject to Alameda Unified School District (AUSD) impact fees.

a.i) **Substantially Mitigated by Uniformly Applicable Development Policies.** The Alameda Fire Department (AFD) delivers fire suppression services out of four stations throughout the city, with a total of 98 sworn firefighters and seven non-sworn personnel. The AFD is also equipped to provide emergency medical services with three full-time advanced life support (ALS) ambulances. A response for a first alarm assignment consists of three fire engines, two fire trucks, one ambulance and the Division Chief vehicle. The response team for a first alarm call includes, at minimum, eighteen fire personnel accompanied by at least one paramedic. The AFD also provides non-emergency ambulance transport for patients to or from medical facilities through the Basic Life Support (BLS) Transport Program, including inter-facility transportation, doctors' appointments, dialysis appointments, and medical event standbys.

The project site is 0.4 mile from Station Number 3 (Station No. 3), at 1709 Grand Street, would be the first to provide fire and emergency response services. Station No. 3 has one fire captain, one fire apparatus operator, one fire engine, one fire boat, and one water rescue boat. In 2015, Station No. 3 responded to 2,102 calls, 1,516 of which were emergency response calls, 83 of which were fire-related calls, and 503 of which were other calls (City of Alameda, 2016b). A new Station No.3 is currently being constructed at the corner of Buena Vista Avenue and Grand Street that would replace the existing station, and includes a new operations center for the City. Upon completion, the project site would be served by this new Station No.3. According to the GPA EIR, the AFD's goal is to respond to calls within 3.5 minutes 90 percent of the time (City of Alameda, 2006). The AFD does not have an official staffing ratio, but generally there are 24 firefighters and one fire chief on duty every day.

Development that occurs within the project site would comply with standard fire code requirements administered by the City of Alameda Community Development

Department's Permit Center and specified by the California Building Code and California Fire Code (CFC). Consistent with the GPA EIR, the project would place fire hydrants a maximum of 250 feet apart, and meet minimum flow requirements of 1,500 gallons per minute (gpm) with 20 pounds per square inch (PSI) residual pressure. The project would also be subject to fire flow requirements set forth in the California Fire Building Code, which specify a typical 3,000 gpm from two hydrants and 1,500 gpm from each hydrant with 20 PSI residual pressure. Additionally, all new buildings would be required to be equipped with complete sprinkler systems. These standard required design features would ensure that adequate infrastructure would be provided for firefighting services. The City of Alameda Municipal Code Chapter 27-26, Police and Fire Fee Requirements, states that new development must pay fees to assist in maintaining level of service standards to accommodate new growth.

The project would result in an increase in calls for fire services but until more project specific information has been developed, the extent of the impact on existing fire facilities is unknown (Raff, 2014). As noted in the GPA EIR, the increase in calls for fire services could result in a need for additional equipment and traffic light control devices but the acquisition of such equipment and installation of new light devices would not result in any significant environmental impacts since this type of activity would be relatively minor and would occur in an already developed area. As further described in the GPA EIR, development on the project site would result in increased tax revenues to pay for fire services, and the project would be required to pay the City's Development Impact Fee, which would be the source of funding for any improvements needed by the Fire Department and would substantially mitigate the project's impacts on fire service to a less than significant level. For the above-described reasons and because the project would not require development of new public fire facilities, the project would have a less-than-significant impact on fire protection services. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

a.ii) **Substantially Mitigated by Uniformly Applicable Development Policies.** Police protection would be provided to the project by the Alameda Police Department (APD). The Department operates out of one station located at 1555 Oak Street, which is approximately 1.3 miles from the project site. The APD currently has a total of 88 sworn officers and 33 non-sworn personnel (City of Alameda, 2016d).

The APD's patrol is based on a five-sector system. Seven days a week, 24 hours a day, officers are assigned to patrol the five sectors during which, there are typically one to four officers assigned to each sector. According to the GPA EIR, the GPA planning area is located in Police Sector 2. The APD has 30 patrol vehicles, but only eight are used during each shift. APD aims to respond to 85 percent of all calls for service within three minutes and generally responds to around 5,000 priority calls and 60,000 non-priority calls per year (City of Alameda, 2016e).Consistent with the findings described in the

GPA EIR, the project would result in an increase in calls for police services for a variety of property- and traffic-related incidents but the increase would not be sufficient to require construction of new police stations in order to maintain adequate response times. Development within the project site would result in increased tax revenues to pay for police services, and the project would be required to pay the City's Development Impact Fee. As such, the effects of the project would be substantially mitigated by existing uniformly applicable development policies and the project would have a less-than-significant impact on police services. This topic will not be discussed further in the SFEIR.

a.iii) **Substantially Mitigated by Uniformly Applicable Development Policies.** The project site is located within the service boundaries of the AUSD. AUSD operates a childhood development center, ten elementary schools, two middle schools, two comprehensive high schools, an Early College High School, and an adult continuation school. The nearest elementary schools are Franklin Elementary School, which is located at 1433 San Antonio Street, approximately 0.5 mile south of the project site, and Henry Haight School, which is located at 2025 Santa Clara Avenue, approximately 0.7 mile southeast of the site. The closest middle school is Wood Middle School, located at 420 Grand Street, about 1.1 miles south of the site. The closest high school is Alameda High School located at 2201 Encinal Avenue, approximately 1.5 miles from the project site.

The AUSD employs a student yield factor as a basis for the determination of students generated by a specific project. The GPA EIR relied on student yield factors provided by AUSD's demographic consultant in 1999. For multi-family units, the GPA EIR relied on the following student yield factors: 0.43 kindergarten through fifth grade students, 0.18 middle school students, and 0.18 high school units, per unit. **Table 4.14-1** shows the more recent yield factors that were utilized to determine the student generation of mixed use residential construction, which are lower than those used in the GPA EIR:

TABLE 4.14-1
ANTICIPATED STUDENTS PER HOUSEHOLD

Grade Level	Multi-Family Units	Students
K-5	0.068	40
6-8	0.035	21
9-12	0.053	31
Total	**0.156**	**92**

SOURCE: Recht, 2014.

Based on these factors, the proposed project's up to 589 units of condominiums, townhomes, lofts and live-work units would generate a maximum of 92 new students, including 40 K-5 students, 21 grade 6-8 students, and 31 grade 9-12 students.

Current development fees within the City are $3.20 per square foot for residential and $0.51 per square foot for commercial development. Payment of the School Facilities Mitigation Fee has been deemed by the State legislature to be full and complete mitigation for the impacts of a development project on the provision of adequate school facilities. The assessment of the adopted School Facilities Mitigation Fee ensures that the project would not result in a significant impact under CEQA, in accordance with Senate Bill 50, which became effective in 1998.

Table 4.14-2, below, summarizes enrollment and capacity for schools that would serve the proposed project. Although Encinal High is nearing its capacity, all three schools have sufficient capacity to accept the estimated number of students generated by the proposed project. As there are several schools near the project site that have capacity, it is unlikely that the addition of new students associated with the proposed project would cause school enrollment to exceed existing capacity, or result in a need for physical expansion of school facilities. With payment of the school impact fees, the proposed project would have a less-than-significant impact upon public school services within the AUSD. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

TABLE 4.14-2
SCHOOL ENROLLMENT AND CAPACITY

School	2014-2015 Enrollment	Capacity
Henry Haight Elementary	452	591
Wood Middle	439	928
Encinal High	1,052	1,200

SOURCES: CDE, 2016 and City of Alameda, 2006.

a.iv, v) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** For a discussion of parks, see Section 4.15, *Recreation*, below.

The Alameda Free Library offers library services to the residents of Alameda. The West End library branch, located 1.0 mile away from the project site at 788 Santa Clara Avenue, is the closest library. The Library offers a wide range of services, including answering reference questions, staging story times, providing summer reading programs, hosting class visits, and educational events.

The GPA EIR does not contain any specific thresholds for library services or facilities. While the proposed project would generate an incremental increase in demand for library services, the additional demand that would be generated by an estimated population of 1,461 persons, only a small portion of whom would be expected to utilize the library in any given month, would be expected to be a small fraction of the existing monthly

visitors. This would not require an expansion of library facilities, and the project's impact on library services would be considered less than significant. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

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Recreation

Environmental Factors for Determining Environmental Effect	Proposed Project Compared to the GPA EIR Project				
	Potentially Significant Impact – Further Study Required	*Less than Significant Impact with New or Revised Mitigation Incorporated*	*Not Analyzed in the Prior EIR – No Impact or Less Than Significant Impact*	*Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required*	*Substantially Mitigated by Uniformly Applicable Development Policies*
15. RECREATION — Would the project:					
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated?	☐	☐	☐	☒	☐
b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☐	☒	☐

The GPA EIR concluded that the Northern Waterfront GPA would result in beneficial and less-than-significant impacts related to parks, recreation, and open space because the Northern Waterfront GPA would increase opportunities to improve portions of the Bay Trail and would provide additional shoreline access and park areas. Therefore, the proposed project would not result in any new potentially significant recreation effects that were not identified in the GPA EIR or a substantial increase the severity of any previously identified significant recreation effects. This topic will not be discussed further in the SFEIR.

Discussion

a) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** The Alameda General Plan provides the following definitions for the four types of parks and community open space that can be found within the City:

- ***Developed Park Land.*** The City has over 200 acres of neighborhood parks, community parks, community open space, greenways, and regional parks.

- ***Planned Park Lands.*** Undeveloped park lands include the 20-acre Mt. Trashmore site, planned 22-acre Jean Sweeny Open Space Park, planned greenways and trails, and the future Catellus Mixed-Use Development and Alameda Point open space.

- ***Limited Access Lands.*** Limited-access park lands either require a fee for use or are closed to the general public, and include the Chuck Corica Municipal Golf Course, College of Alameda recreation and open space facilities, AUSD facilities, and two public swimming pools. The City has a joint agreement with AUSD for the use of the pools, which are used by students, City Swim Clubs, and the Master's Program

during the school year. The Recreation and Park Department provides public aquatic programs during the summer at the pools.

- ***School Parks.*** All AUSD school properties, which are generally not available for public use after school and on weekends due to locked gates.

The City's ratio of neighborhood and community parkland is approximately 2.1 acres per 1,000 residents, including school playgrounds and fields. The City of Alameda's General Plan does not state a specific goal of park acreage per 1,000 residents; however, most California cities strive for three to six acres of park per 1,000 residents. About 95 percent of Alameda residents live within ⅜-mile of a park, the maximum radius for effective service as indicated by studies in other cities (City of Alameda, 1991).

The City of Alameda Urban Greening Plan states that the City has nearly 150 acres of municipal park land, not including the Chuck Corica Golf Complex, and that while the parks are small, they are well distributed geographically and effectively programmed to meet much of the community's recreation needs. In accordance with California's Quimby Act, cities may require new development to contribute land or funding to help the City meet statewide goals of providing three acres of parkland per 1,000 new residents. The City currently provides approximately two acres of park and recreation space per 1,000 residents (not including the 325+ acre Chuck Corica Golf Complex). The Urban Greening Plan states that as the population grows and the City is further built out, it is appropriate to set three acres per 1,000 residents as the City standard, and as Alameda Point develops, new residential development should provide three acres of neighborhood parkland per 1,000 new residents (Gates and Associates, 2012).

The following three parks would be accessible to residents of the site:

- ***Marina Cove Waterfront Park*** is a 3.2-acre park located at 1591 Clement Avenue that runs along the marina from Clement Avenue to the Alameda Yacht Club. The park features open lawn areas at each end connected by a walk overlooking the water, picnic areas, benches, and a play area, all of which provide opportunities to rest and enjoy the views. Park lighting enhances safety.

- ***Littlejohn Park*** is a 3.45-acre park located at 1401 Pacific Avenue, immediately south of the project site. Littlejohn Park features an unlighted multi-use field for baseball, softball, soccer, and football. The park has several picnic areas, two half basketball courts, a 2-12 year-old age group playground, and open lawn for informal play. There is enhanced planting at the entry near the community building. Parking is on-street only, and the park is surrounded on three sides by residences. There is ADA access to the group picnic area.

- ***Neptune Park*** is a 3.08-acre park located at 2301 Webster Street. The park features the City's monument sign and flagpoles set in a large open lawn area. Enhanced planting areas with a path and seating run the south edge of the park, near the adjacent residences. The park is highly visible from the street.

- ***Jean Sweeny Open Space Park*** is a planned 22-acre park located a few hundred feet to the west of the project site, across Sherman Street. The park will feature passive and active recreation, with a bike path along a proposed extension of the CAT running east to west through the site, a community garden, play areas, lawns, and other features. Construction on the park is set to commence in 2016.

Although the proposed project would result in an incremental increase in demand for existing parks, the amount of additional use by new residents would not be expected to result in physical deterioration of the parks, or otherwise adversely affect park facilities. As described in the Public Services section, above, the project would also include recreational opportunities through establishment of a waterfront promenade along the perimeter of the project site and creation of a central open space over one acre in size. The project would pay Citywide Development Fees, which would mitigate the impacts of new development on existing city parks. Because the project includes open space and recreational uses and would pay Citywide Development Fees, the project would have a less-than-significant impact on park facilities. This topic will not be discussed further in the SFEIR.

b) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** The proposed project would result in the construction of a new promenade along the perimeter of the project site and open space areas throughout the project site. The promenade would provide connectivity to the proposed Clement Avenue extension to the San Francisco Bay Trail. Physical environmental effects that could result from construction of the promenade and open space uses are discussed throughout this IS and all impacts have been determined to be less than significant with implementation of measures identified in this IS.

In addition, and as described in the GPA EIR, extension of Clement Avenue from Entrance Road to Sherman Street would provide connectivity to the Bay Trail and the proposed 22-acre Jean Sweeny Park to the west of the site. While construction of the proposed Clement Avenue extension could result in potentially significant environmental impacts, implementation of mitigation measures described throughout this IS would reduce construction-related impacts to a less-than-significant level. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

References

City of Alameda, Alameda Northern Waterfront General Plan Amendment, Draft Environmental Impact Report, Page IV.N-5, January 2006.

Gates + Associates, Urban Greening Plan: Parks Improvement Assessment, Alameda, California, June 2012.

Transportation and Traffic

Environmental Factors for Determining Environmental Effect	Proposed Project Compared to the GPA EIR Project				
	Potentially Significant Impact – Further Study Required	*Less than Significant Impact with New or Revised Mitigation Incorporated*	*Not Analyzed in the Prior EIR – No Impact or Less Than Significant Impact*	*Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required*	*Substantially Mitigated by Uniformly Applicable Development Policies*
16. TRANSPORTATION AND TRAFFIC — Would the project:					
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☒	☐	☐	☐	☐
b) Conflict with an applicable congestion management program, including, but not limited to, level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☒	☐	☐	☐	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location, that results in substantial safety risks?	☒	☐	☐	☐	☐
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☒	☐	☐	☐	☐
e) Result in inadequate emergency access?	☒	☐	☐	☐	☐
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☒	☐	☐	☐	☐

The proposed project would result in a greater level of development than the project that was analyzed in the Northern Waterfront GPA EIR; therefore, the project as proposed could result in new or greater impacts to transportation and circulation than those identified in the GPA EIR. For purposes of this IS, transportation and circulation related impacts are identified as ***potentially significant***. Project effects related to conflicts with applicable plans, policies, and programs, changes in air traffic patterns, increases in traffic hazards, emergency access, and transit and pedestrian facilities will be analyzed in the SFEIR, which will determine the significance of the project's impacts and develop mitigation measures, as feasible, to reduce those impacts found to be significant.

Utilities and Service Systems

Environmental Factors for Determining Environmental Effect	Proposed Project Compared to the GPA EIR Project				
	Potentially Significant Impact – Further Study Required	*Less than Significant Impact with New or Revised Mitigation Incorporated*	*Not Analyzed in the Prior EIR – No Impact or Less Than Significant Impact*	*Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required*	*Substantially Mitigated by Uniformly Applicable Development Policies*
17. UTILITIES AND SERVICE SYSTEMS — Would the project:					
a) Conflict with wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒	☐
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒	☐
c) Require or result in the construction of new storm water drainage facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☒	☐	☐	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒	☐
e) Result in a determination by the wastewater treatment provider that would serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☒	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒	☐

The Northern Waterfront GPA EIR concluded that less-than-significant impacts on utilities or impacts that could be reduced to less-than-significant with mitigation would result from buildout of the proposed Northern Waterfront GPA. The GPA EIR indicated that continued use of substandard storm sewer or sanitary sewer on-site utility lines could contribute to peak wastewater or storm water flows that could exceed the capacity of the existing sewage or storm drain facilities. Implementation of **Mitigation Measure UTIL-1**, which required project sponsors to remove or reconstruct all existing sewer and storm drain laterals serving the project site would reduce such impacts to less-than-significant levels.

There are no substantial changes in the proposed project or new information of substantial importance since the GPA EIR that would result in any new significant environmental effects or

substantial increase in the severity of previously identified significant effects related to utilities and service systems. As described below, the proposed project would have less than significant impacts to utilities and service systems, which is consistent with the GPA EIR. Therefore, the proposed project would not result in any new potentially significant utilities and service systems effects that were not identified in the GPA EIR or a substantial increase in the severity of any previously identified significant utilities and service systems effects. This topic will not be discussed further in the SFEIR.

Discussion

a) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** Wastewater flows from the proposed project would consist of typical residential and commercial sewage. Wastewater from the project would be treated by the East Bay Municipal Utility District (EBMUD) at the Main Wastewater Treatment Plant (MWWTP), located at the foot of the San Francisco-Oakland Bay Bridge in the City of Oakland. The wastewater treatment plant is permitted by the Regional Water Quality Control Board (RWQCB) and effluent from the plant is regularly monitored to ensure that water quality standards are not violated. There have been no violation of water quality standards by the treatment plant in recent years (January 1, 2010 through January 1, 2016), and there are no RWQCB enforcement actions pending against EBMUD (SWRCB, 2016).

EBMUD's MWWTP has excess dry weather flow capacity of 66 mgd. Approximately 0.32 mgd of wastewater would be generated by the proposed project (CBG, 2016). Projected flows from the project would comprise less than 0.5 percent of the wastewater treatment plant's average dry weather flow remaining capacity and would therefore have adequate dry weather flow capacity. Wastewater generated by the project would not contain any unusual pollutants that would be within the existing dry weather capacity and permitted discharge volume of the treatment plant.

However, in January 2009, EBMUD entered into a Stipulated Order for Preliminary Relief (Stipulated Order) from the U.S. Environmental Protection Agency (EPA), State Water Resources Control Board (SWRCB), and San Francisco Regional Water Quality Control Board (RWQCB), which contains measures that EBMUD is required to implement in order to address inadequately treated sewage to San Francisco Bay during wet weather conditions (CBG, 2013a). The intent of the stipulated order is to formulate long-term solutions to minimize the high level of infiltration to the East Bay collection systems and eliminate the discharge of the excess flows from the EBMUD's wet weather facilities. Subsequently, in March 2011, the East Bay wastewater collection agencies (referred to as "Satellites"), including the City of Alameda, entered into a Stipulated Order with the EPA, SWRCB, and the RWQCB. This particular Stipulated Order obligates Satellites to improve management of their wastewater collection systems, to address sanitary sewer overflows, and to reduce inflow and infiltration (I&I) in their collection systems.

Consistent with the Stipulated Order, the proposed project would construct new wastewater infrastructure to connect to the EBMUD interceptor in Buena Vista Avenue and an on-site sewer collection system would be installed throughout the proposed street network within the project site (see discussion below for additional details). The new sewer collection system would greatly reduce I&I flows entering the system in wet weather conditions and thereby reduce wet weather flows to the MWWTP. Such improvements are expected to further ensure that the project does not contribute to exceedances of RWQCB treatment standards for water discharged to the Bay; therefore, this impact would be less than significant. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

b) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.**

Water Facilities

EBMUD provides potable water service to the City of Alameda and other communities within Contra Costa and Alameda Counties. EBMUD also owns and maintains the distribution pipeline facilities within public streets throughout its service area.

Existing Water Facilities. There is a 12-inch pipeline in Buena Vista Avenue, an 8-inch pipeline in Sherman Street, and an 8-inch pipeline in Clement Avenue to the east, all of which are owned by EBMUD. There are also existing private water pipelines that extend from the EBMUD distribution system to the existing structures within the project site. The project site currently receives its water from a few water pipelines located in Entrance Road and along the northern side of the Del Monte Warehouse; these pipelines range in size between six to 15 inches.

Proposed Water Demands and New Facilities. The proposed project would generate an increased demand of approximately 0.12 mgd of domestic water (CBG, 2016). With a current total District-wide consumption of approximately 220 mgd in non-drought years , the project's incremental water demand would represent about 0.05 percent of average daily demand in the District. EBMUD has indicated that it would have adequate supply to meet the demand of the proposed project (EBMUD, 2014). With a current treatment capacity of 375 mgd, EBMUD can accommodate projected future demand with the available treatment capacity. EBMUD's long-range planning for future water infrastructure and supply needs is based on population projections compiled by ABAG, which takes into account growth planned in the adopted general plans of Bay Area cities and counties. Development of the project site with new homes has been planned for in the Alameda General Plan for the next 20 years, and therefore has been factored into EBMUD's water demand projections within the Water Supply Management Program 2040.The proposed project's incremental increase in demand would not be significant, and would not require the construction of new water treatment facilities or the expansion of such facilities.

As described in the Project Description, the project would include new water pipelines in Clement Avenue and Entrance Road to serve the project site. These facilities would be owned and maintained by EBMUD and likely range in size from eight to 12 inches. An onsite distribution system would extend from the pipeline in Clement Avenue and be constructed throughout the street network within the project site. These pipelines are expected to range in size from six to eight inches. Construction of these pipelines could result in potentially significant environmental impacts but implementation of mitigation measures described throughout this IS (i.e., construction mitigation measures related to air quality, noise, hydrology, and transportation) would reduce construction-related impacts to a less-than-significant level. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

Wastewater Facilities

Existing Collection Facilities. An existing private 6-inch pipeline is located along the western side of the project site, and historically collected wastewater from container ships utilizing the project site's docks. Wastewater currently generated from the project site is collected and conveyed by an existing privately owned 10-inch pipeline that runs east to west along the southern side of the project site, towards Sherman Street and is aligned along the northern side of the Del Monte Warehouse. At the Sherman Street and Eagle Avenue intersection, this 10-inch pipeline connects with the City's wastewater collection system. The City's pipelines within Sherman Street range in size from eight to 12 inches and flow from north to south. The 10-inch pipeline in Sherman Street connects with the EBMUD 60-inch interceptor pipeline at the intersection with Buena Vista Avenue (CBG, 2013b).

A Sanitary Sewer Study conducted in July 2003 by Bellecci & Associates evaluated the condition of the existing 10-inch pipeline, which identified numerous areas of deterioration within the existing pipe network and large amounts of infiltration occurring, which is common for aged utility systems below groundwater. This study concluded that use of the existing 10-inch pipeline was infeasible due to its deteriorated physical condition as well. In 2010, EBMUD cleaned out sediment that had accumulated in the interceptor mains, which has increased the capacity of the interceptor to 16.3 mgd at the Buena Vista Avenue and Sherman Street intersection.

Proposed Collection Facilities. As described above, the project's 589 new residential units and 30,000 to 50,000 square feet of commercial/office uses and restaurant uses would generate approximately 0.32 mgd of sewage (CBG, 2016). With a current average dry weather flow of approximately 54 mgd and excess dry weather flow capacity of 66 mgd (CBG, 2013a) at EBMUD's MWWTP, EBMUD has adequate dry weather capacity at the MWWTP for the projected wastewater flows.

As described for criterion a.) above, as part of EBMUD's Stipulated Order, the City is working with EBMUD to reduce the amount of I&I entering the wastewater collection

system (CBG, 2013a). Given the deteriorated condition of the existing 10-inch pipeline, the proposed project includes construction of a new 10-inch sewer pipeline that would connect to the EBMUD interceptor in Buena Vista Avenue. Currently, two wastewater infrastructure options are being considered. The first option includes construction of a new 10-inch pipeline that extends from the project site westward to Sherman Street, connecting to the City's existing sewer collection system. The existing six or eight inch pipelines accepting flow from the project site would likely need to be upsized to provide the necessary capacity. The second option includes constructing a new sewer pipeline that flows southerly between the Del Monte and Chipman warehouse parcels in Entrance Road and directly connect to the EBMUD interceptor near the intersection of Buena Vista Avenue and Entrance Road. Under both scenarios, a new onsite sewer collection system would be installed throughout the proposed street network within the project site; pipeline size would range in size from six to eight inches. In addition, a pump/lift station would also be installed at the southern end of the project site to minimize the depth of the proposed system. All new sanitary sewer lines would be designed and constructed to prevent I&I to the maximum extent feasible.

By installing new onsite sanitary sewer pipelines, the project would comply with **Mitigation Measure UTIL-1** from the GPA EIR. Additionally, as described in c.), below, the project would include installation of a new onsite storm drainage system consisting of new inlets and pipelines.

> **Mitigation Measure UTIL-1:** Project sponsors shall remove or reconstruct all existing sewer and storm drain laterals that serve the site of the proposed development project to comply with City, EBMUD, and Regional Water Quality Control Board standards. This measure would reduce the level of impact to less than significant.

Consistent with the Stipulated Order, such improvements would greatly reduce the system's infiltration and inflow. Since the MWWTP and the EBMUD interceptor are expected to have adequate capacity to serve projected new demand generated by the proposed project, the project would not require the construction of any new wastewater treatment facilities or the expansion of such facilities. Therefore, impacts on existing wastewater treatment facilities would be less than significant. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

c) **Less than Significant Impact with New or Revised Mitigation Incorporated.** As part of the project, a new stormwater drainage system that facilitates infiltration and reduces stormwater runoff volumes compared to existing conditions would be installed. Project-related stormwater collection and drainage would maintain the existing patterns of the project site. Stormwater runoff from the project site would be directed to the Arbor Street pump station. The proposed storm drain system improvements would include installation of new inlets and pipelines appropriately sized to convey the site run-off. Any portions of

the storm drainage system that directly discharge to the Oakland Estuary would likely require improved outfall structures; the construction of which would require permits from various regulatory agencies such as U.S. Army Corps of Engineers. Stormwater from the remainder of the project site would be collected and conveyed by a new system of inlets and pipelines that connect to the City's existing 54-inch pipeline along the southern end of the site and eventually discharges to the Arbor Street Pump Station.

Construction activities of the new storm water drainage facilities would include in-street trenching and excavation work. Such activities would be temporary and as described in Section 9, *Hydrology and Water Quality*, would be required to comply with the requirements of the RWQCB concerning discharges of stormwater during project construction, the project applicant would be required to obtain a NPDES permit for construction activities and execute a Stormwater Pollution Prevention Plan (SWPPP) that would outline construction stormwater quality management practices based on the CWPAC Stormwater Quality Management Plan. The SWPPP would describe erosion control measures similar to those recommended by the CWPAC which are designed to reduce the potential for pollutants to contact stormwater and eliminate or reduce discharge of materials to stormwater during on-land construction (see **Mitigation Measure HYD-1)**.

As further discussed in Section 9, in-water construction activities for improvements to the existing outfalls could require removal and disposal of potentially contaminated sediment, which could result in turbidity and other adverse water quality effects within the Oakland Estuary. In-water construction activities would be required to adhere to Sections 401 and 404 of the Clean Water Act and the future project applicant would also be required to obtain necessary permits and approvals from the U.S. Army Corps of Engineers, RWQCB and BCDC. Implementation of **Mitigation Measure HYD-2** would ensure that in-water construction activities are conducted consistent with the Long-Term Management Strategy, a program developed by the above-described agencies. For a detailed discussion of impacts, mitigation measures, and permits regarding construction and operation of the proposed improvements to the project site's stormwater system, please refer to the Hydrology and Water Quality section.

The proposed project would be required to adhere to the C.3. provision in the NPDES by including specific site design features that minimize land features and impervious surfaces and implementation of Low Impact Development (LID) measures, which include bioretention areas to treat stormwater runoff from impervious areas on the project site prior to discharging into the stormwater system. These bio-treatment areas would be integrated in landscaping areas adjacent to parking areas or buildings. With implementation of LID measures and compliance with C.3 provisions, operation impacts of the new storm drainage system would be considered less than significant. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

d) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** See the discussion under criterion b.), above, for discussion of the incremental increase in water demand that would be generated by the proposed project. EBMUD is expected to have the capacity to meet the projected increase in potable water supplies (EBMUD, 2014). In addition, according to EBMUD's 2010 Urban Water Management Plan (UWMP), EBMUD's water supply is adequate to meet existing and projected demand through 2030 under normal conditions and up to two years of drought. EBMUD also implements numerous water conservation and recycling programs to reduce demand and develops projects to manage future water supply needs. The water demand projections used by EBMUD are derived from a land-use based demand forecast that reflects the City's plans and policies, and assumes an amount of future development permitted under the General Plan's growth management ordinance and additional growth. For these reasons, the proposed project would be adequately served by the existing water supply and the impact would be less than significant. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

e) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** See the discussion under criterion b.), above, for discussion of the incremental increase in wastewater that would be generated by the proposed project. As described above, by improving the wastewater collection system within the project site, EBMUD's MWWTP would have adequate dry weather capacity to serve the project's estimated 0.32 mgd of wastewater flows in addition to the plant's existing average wastewater flows. The Estuary siphon facility and the EBMUD interceptor would also have adequate capacity for proposed wastewater flows generated by full buildout of the proposed project. Because this would be a very small increase over current average flow rates and because the plant has adequate dry weather capacity, the project would not substantially increase wastewater service demands. For these reasons, impacts related to wastewater treatment capacity would be less than significant. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

f) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** The City of Alameda delivers its solid waste to the Davis Street Resource Recovery Complex located in San Leandro, where it is sorted and recyclable materials are recovered. Residual solid waste is disposed at the Altamont Landfill, which accepts the following types of waste: ash, construction/ demolition, contaminated soil, green materials, industrial, mixed municipal, other designated waste, tires, shreds. This landfill has an estimated permitted capacity of 62 million cubic yards, a daily permitted capacity of 11,500 tons per day (CalRecycle, 0216a), and an estimated remaining capacity of 47.2 million cubic yards as of 2012 (ACEHD, 2013). The City has

a diversion rate of 72 percent (as of 2011), which is above Assembly Bill 939 diversion goals (Stopwaste.Org, 2013). Measure D (the Alameda County Source Reduction and Recycling Initiative Charter Amendment), requires the County to divert 75 percent of solid waste from the landfill by 2010.

Construction Impacts

Solid waste generated by buildout of the proposed project (from building demolition and generation of construction debris) would largely consist of the existing vacant warehouses. Some of the buildings contain large-scale roof timbers, roof decking, wall-framing timbers, wood or metal siding, interior wall partitions, and concrete slab floors, as well as other systems (e.g., plumbing, fire suppression).When structures are "deconstructed," rather than demolished, wood and fixtures could be retained for resale or other reuse rather than disposed, and the majority of such materials can be diverted from the waste stream (City of Alameda, 2002). Deconstructed materials can be diverted from landfills to recycling and reuse markets. Solid waste generated from demolition of existing utility systems would also require disposal. Because the portions of existing utility systems within development areas may either be abandoned in place or removed and disposed, the amount of solid waste generated from demolition of existing utility systems is unknown at this time.

In addition, the project would be required to comply with Chapter XXI, Section 21 of the City of Alameda Municipal Code, which requires that new developments submit plans for managing construction debris to promote separation of waste types and recycling. These plans would need to be prepared in coordination with City staff, the project sponsor(s), and demolition subcontractors, and must be approved by City staff prior to issuance of a demolition permit. Compliance with the City's Municipal Code regarding management of construction debris, project construction would result in less-than-significant impacts on landfill capacity.

Operation Impacts

CalRecycle reports numerous solid waste generation rates developed by a variety of jurisdictions throughout the State, ranging from four pounds per dwelling unit per day (lb/unit/day) to 8.6 pounds per dwelling unit per day (lb/household/day) for multifamily residential development (CalRecycle, 2016b). Based on the highest of these solid waste generation rates (i.e., 8.6 lb/household/day), estimated by the Draft EIR for the Monterey Park Redevelopment Agency's Central Commercial Redevelopment Project, the proposed project's up to 589 new housing units would generate approximately 5,065 pounds per day (or 2.5 tons per day). CalRecycle also reports solid waste generation rates developed by jurisdictions for commercial uses. For the purposes of this analysis, a rate of five lb/thousand square feet/day was used for commercial uses (CalRecycle, 2016c) resulting in the generation of approximately 250,000 lb/day (125 tons/day). As of 2012, the Altamont Landfill (which serves Alameda) had an estimated remaining capacity of 47.2 million cubic yards and a permitted daily capacity of 11,500 tons/day. The project would represent an incremental increase in current waste disposal at the Altamont

Landfill. Given the City's existing diversion rate and Measure D, the solid waste generated by operation of the project could be expected to be less than this worst-case estimate. Although the Altamont Landfill has an estimated closure date of 2025 (CalRecycle, 2016a), it has an estimated disposal capacity through 2045 (Waste Management, 2013). With more than 30 years of remaining capacity at the landfill, solid waste generated by the project in the long-term would not substantially reduce existing landfill capacity. Therefore, operation of the project would represent a less-than-significant impact on solid waste disposal. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

g) **Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required.** The proposed project would not conflict with or interfere with the City's ability to implement its adopted solid waste management programs and policies, including the Citywide integrated waste management plan and Chapter XXI, Section 21 of the City of Alameda Municipal Code, or Alameda County's Measure D. The project would be served by weekly curbside pickup of recyclable materials by ACI. Waste generated by the proposed project would enter the same stream as other area waste collected by ACI, and would be subject to the same stream as other area waste collected by ACI, and would be subject to the same existing requirements regarding recycling and solid waste disposal. Because existing solid waste collection and disposal in Alameda complies with current federal, State and local requirements, and because the project's solid waste would enter the same existing disposal stream, the proposed project would not violate any federal, State, or local statutes or regulations related to solid waste. This is the same finding as the proposed project in the GPA EIR, and the effects of the proposed project would not increase the severity of previously identified significant effects or introduce a new significant environmental effect. This topic will not be discussed further in the SFEIR.

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Mandatory Findings of Significance

Environmental Factors for Determining Environmental Effect	Proposed Project Compared to the GPA EIR Project				
	Potentially Significant Impact – Further Study Required	*Less than Significant Impact with New or Revised Mitigation Incorporated*	*Not Analyzed in the Prior EIR – No Impact or Less Than Significant Impact*	*Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required*	*Substantially Mitigated by Uniformly Applicable Development Policies*
18. MANDATORY FINDINGS OF SIGNIFICANCE — Would the project:					
a) Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐	☐
b) Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☒	☐	☐	☐	☐
c) Have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐	☐

Discussion

a) **Potentially New Impact – Further Investigation to be Undertaken.** As discussed previously in this IS under Biological Resources, the project has the potential to affect biological resources and therefore could substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, and reduce the number or restrict the range of a rare or endangered plant or animal. These issues will be studied further in the SFEIR.

With respect to the project's potential to eliminate important examples of California history or prehistory, this IS addressed the project's likely effects to cultural resources. The evaluation found that significant cultural resources are not known to be present on the site. Further, the GPA EIR prescribed mitigation measures that would be implemented in the event that previously unknown cultural resources were discovered during project construction. Implementation these measures would ensure that any effects

to cultural resources and important examples of California history and prehistory would be less than significant. Therefore, this topic will not be discussed further in the SFEIR.

b) **Potentially New Impact – Further Investigation to be Undertaken.** Cumulative impacts will be addressed in the SFEIR.

c) **Potentially New Impact – Further Investigation to be Undertaken.** The project may have significant adverse effects on human beings in the areas of air quality, greenhouse gas emissions, noise, and transportation and circulation. These potentially significant adverse effects on humans will be analyzed in the SFEIR.

APPENDIX A
Subarea Plan and Permitted Uses

Master Plan Base Concept

This Master Plan will follow the General Plan/Northern Waterfront Plan and propose a swap of land, which would reconfigure the Tidelands Trust land such that all of the Trust property is in a swath of waterfront property surrounding the site, and would remove the Tidelands restrictions on some of the property in the interior of the site, similar to what is shown in Figure 3.2 above. Such a swap would be subject to approval by the State Lands Commission; the land swap would be finalized after Master Plan approval. The plan which is proposed for approval will be described herein and known as the Master Plan Base Concept.

In the event that a swap is not approved, and the land remains in its current configuration, the No Swap Alternative Plan, which is described in the Appendix, would be adopted.

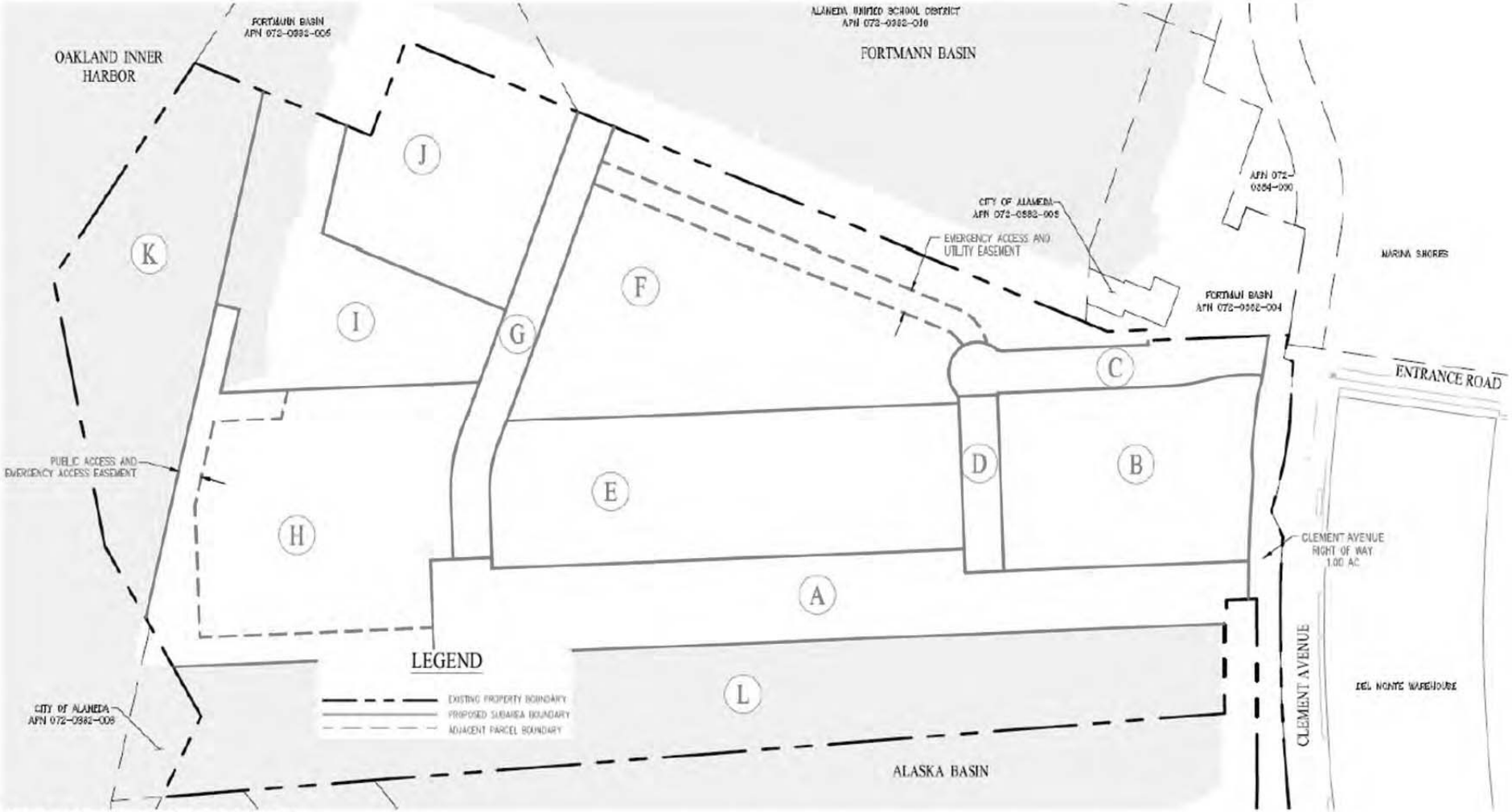
Permitted and Conditionally Permitted Land Uses: Base Concept

This plan assumes that the State of California approves a swap of land to accommodate the uses described below. The following uses shall be permitted in the Subareas defined below, provided that:

1) The parking for the uses can be accommodated on site and the uses are consistent with the truck cap provided in Chapter 2, Truck Access

2) Permitted uses do not conflict with the restrictions of the Tidelands Trust. Some Subareas may have portions of property within them that are be subject to the Tidelands Trust. Such portions of the Subarea that are subject to the Tidelands Trust must adhere to the restrictions of Tidelands Trust, regardless of the Permitted Use.

All development is subject to Planned Development and Design Review approvals.



Base Concept Subarea Plan

Subarea A: Waterfront Pedestrian Promenade and West Entry Street

This Subarea includes submerged property and existing wharf structures. Until there is a specific project proposed and Development Plan created, and until a specific use and configuration of any waterfront facilities is determined, any in-water work, or work in the water related to wharf repair or modification work that may be necessary is unknown. Any specific proposal or wharf modification project proposal will require that further studies be undertaken to evaluate the structural integrity of the wharf, as it relates to the future new intended use(s). Studies will not be undertaken until the ultimate end use is known. Any future wharf repair/modification work that may be required (i.e. replace piers, reinforce existing piers, reconstruct portions of the wharf) will be determined by those studies and investigations Any wharf modifications or repairs are anticipated to be implemented concurrently with a specific Development Plan that may be proposed and approved with the future buildout of Subarea A.

Permitted Uses:

- Publicly-accessible open space, landscape and recreational facilities
- Commercial retail, but not including “super store” type retail commercial uses or drive-through commercial facilities
- Commercial recreational uses
- Artist studios and galleries and museums
- Public Amphitheaters.
- Maritime – recreational boat and small craft rentals and sales but not boat storage or outdoor boat display areas in excess of 800 square feet.
- Public roadways

Permitted Uses Subject to Conditional Use Permit:

- Performance and entertainment facilities, but not multiplex cinemas.
- Restaurants and taverns
- Grocery stores, including alcohol sales for on and off site consumption.
- Light warehousing, light manufacturing, not to exceed 5,000 square feet
- Other uses determined by the Planning Board to be similar to the above and consistent with the plan objectives.

Maximum Building Height:

- 40 feet

Site Development Standards

Building Setbacks

- From subareas B, E and H: 0 feet if adjacent to open space or landscaped areas. 15 feet if adjacent to building setback area. Assure minimum 30-foot building separation to adjacent subareas.
- Buildings shall not be located to block waterfront views from internal street corridors and public open spaces.

Subarea B" Clement Frontage

This Subarea fronts onto Clement Avenue and, with the northern commercial/retail edge of the Del Monte Warehouse, creates the anchor and hub for the mixed use elements of both developments. It also creates a sense of place for the waterfront revitalization and as such is a pivotal element in the project, as it is both a front door to the Encinal Terminals waterfront and a continuation of the retail components of the Del Monte Warehouse. The height of buildings in this Subarea matches the maximum height of the Del Monte Warehouse Master Plan. This Subarea will also tie into the Cross Alameda Trail and cycle track components of the Clement Avenue extension.

Permitted Uses:

- Commercial retail, but not including, "super store" type retail commercial uses or drive-through commercial facilities
- Hotel
- Office or medical uses
- Commercial recreational uses
- Commercial Work / Live units consistent with AMC Section 30-15 Work Live Studios, except that new construction is permitted
- Multi-family residential units
- Home occupations consistent with AMC 30-2
- Artist studios and galleries and museums
- Public amphitheaters
- Maritime-related uses– Recreational boat and small craft rentals and sales but not boat storage or outdoor boat display areas in excess of 800 square feet

Permitted Uses Subject to Conditional Use Permit:

- Performance and entertainment facilities, but not multiplex cinemas.
- Restaurants and taverns
- Grocery stores, including alcohol sales for on and off site consumption.

- Light warehousing, light manufacturing, not to exceed 5,000 square feet
- Other uses determined by the Planning Board to be similar to the above and consistent with the plan objectives.

Maximum Building Height:

- 55 feet

Site Development Standards

Building Setbacks

- From West Entrance Street right-of-way (subarea A): 0 feet.
- From East Entrance Street right-of-way (subarea C): 0 feet.
- From internal street rights-of-way (subarea D): 0 feet.
- From Clement Avenue Right of Way: 15 feet.

Subarea C, D and G: Public Roadway Rights of Way

These Subareas comprise the public roadways for the site.

Permitted Uses:

- Public Roadways, pedestrian walkways, bike paths and landscaping

Maximum Building Height:

Not applicable

Site Development Standards

Building Setbacks

- Not applicable.

Roadway Design Standards

- See Chapter 2

Roadway Locations and Alignments

- Subareas C, D and G may be realigned as needed to accommodate modifications to the building layout, as long as:
    1) Public access, continuity and connections through the overall site are provided consistent with the intent of this Master Plan.
    2) Two means of access are available to/from Clement Avenue to all developed subareas in all phases of development.
    3) Roadway circulation and cross-sections are substantially similar to those defined in Chapter 2 of this Master Plan.

Subareas E, F and J

These Subareas comprise mixed use areas that could accommodate residential neighborhoods. The building heights are intended to accommodate buildings up to seven stories, but a mix of residential building heights could also be accommodated. Residential units or office space over ground floor retail would also work in certain areas of the site.

Permitted Uses:

- Commercial retail, but not including, "super store" type retail commercial uses or drive-through commercial facilities
- Hotel
- Office or medical uses
- Commercial recreational uses
- Commercial work/ live units consistent with AMC Section 30-15 Work Live Studios, except that new construction is permitted
- Multi-family residential units
- Home occupations consistent with AMC 30-2
- Artist studios, galleries and museums
- Public Amphitheaters.
- Maritime – Recreational boat and small craft rentals and sales but not boat storage or outdoor boat display areas in excess of 800 square feet.

Permitted Uses Subject to Conditional Use Permit:

- Performance and entertainment facilities, but not multiplex cinemas.
- Restaurants and taverns
- Grocery stores, including alcohol sales for on and off site consumption.
- Light warehousing, light manufacturing, not to exceed 5,000 square feet
- Other uses determined by the Planning Board to be similar to the above and consistent with the plan objectives.

Maximum Building Height:

- 90 feet

Site Development Standards

Building Setbacks

- From east property line: 15 feet.
- From Internal Street Rights-of-Way (subareas B, C, D): 10 feet.

- From central open space, where applicable (subarea I): 0 feet if adjacent to open space or landscaped areas. 15 feet if adjacent to building setback area. Assure minimum 30-foot building separation to adjacent subareas.
- From Waterfront Public Access / EVA Easement: 0 feet

Subarea H: Northwest Estuary Corner

This Subarea, occupying some prime waterfront land, has excellent views up and down the estuary and of the Oakland Hills to the east. It is envisioned that a strong, tall iconic building could be accommodated here, with retail and at the lower levels and residential above. The estuary fronting wharf in the area could also house future water transit facilities that could be supported by the retail. This Subarea includes submerged property and existing wharf structures. Until there is a specific project proposed and Development Plan created, and until a specific use and configuration of any waterfront facilities is determined, any in-water work, or work in the water related to wharf repair or modification work that may be necessary is unknown. Any specific proposal or wharf modification project proposal will require that further studies be undertaken to evaluate the structural integrity of the wharf, as it relates to the future new intended use(s). Studies will not be undertaken until the ultimate end use is known. Any future wharf repair/modification work that may be required (i.e. replace piers, reinforce existing piers, reconstruct portions of the wharf) will be determined by those studies and investigations Any wharf modifications or repairs are anticipated to be implemented concurrently with a specific Development Plan that may be proposed and approved with the future buildout of Subarea H.

Permitted Uses:

- Commercial retail, but not including, “super store” type retail commercial uses or drive-through commercial facilities.
- Hotel
- Office or medical uses
- Commercial recreational uses
- Commercial Work / Live units consistent with AMC Section 30-15 Work Live Studios, except that new construction is permitted
- Multi-family residential units
- Home occupations consistent with AMC 30-2
- Artist Studios, galleries and museums.
- Public amphitheaters.
- Maritime – Recreational boat and small craft rentals and sales but not boat storage or outdoor boat display areas in excess of 800 square feet.

Permitted Uses Subject to Conditional Use Permit:

- Performance and entertainment facilities, but not multiplex cinemas.

- Restaurants and taverns
- Grocery stores, including alcohol sales for on and off site consumption.
- Light warehousing, light manufacturing, not to exceed 5,000 square feet
- Other uses determined by the Planning Board to be similar to the above and consistent with the plan objectives.

Maximum Building Height:

- 250 feet

Site Development Standards

Building Setbacks

- From West Entry Street right-of-way (subarea A) and internal street right-of-way (subarea G): 10 feet.
- From Central Open Space: (subarea I): 0 feet.
- From Waterfront Public Access / EVA Easement: 0 feet

Subarea I: Public Open Space and Park

This Subarea provides the primary public waterfront recreational space on the site. A Public park that ties into the waterfront promenade is envisioned for this area.

Permitted Uses:

- Publicly-accessible open space, walkways, bike paths and recreational facilities
- Commercial recreational uses
- Public amphitheaters

Permitted Uses Subject to Conditional Use Permit:

- Performance and entertainment facilities, but not multiplex cinemas

Maximum Building Height:

- 40 feet

Site Development Standards

Building Setbacks

- From Internal Street Rights-of-Way (subarea D): 10 feet.
- From Waterfront Public Access / EVA Easement: 0 feet
- From subarea K and subarea M: 0 feet if adjacent to open space or landscaped areas. 15 feet if adjacent to building setback area. Assure minimum 30-foot building separation to adjacent subareas.

Subarea K and L: Submerged Areas (Alaska Basin and Oakland Estuary)

These parcels include submerged property. Until there is a specific marina project proposed, and until a specific use and configuration of any waterfront facilities is determined, any in-water work, or work in the water related to wharf repair or modification work that may be necessary is unknown. Any specific marina proposal or wharf modification project proposal would require that further studies be undertaken to evaluate the structural integrity of the wharf, as it relates to the future new intended use(s). Studies would not be undertaken until the ultimate end use is known. Any future wharf repair/modification work that may be required (i.e. replace piers, reinforce existing piers, reconstruct portions of the wharf) would be determined by those studies and investigations Any wharf modifications or repairs are anticipated to be implemented concurrently with a specific development project that may be proposed with the future buildout of Subareas K and L.

Permitted Uses:

- Public and private open space , walkways, bike paths and recreational facilities
- Maritime – Recreational boat and small craft rentals, sales and launch facilities but not boat storage.
- Maritime--Marina berths; up to160 berths
- Maritime office
- Public and private water transit facilities
- Public and private waterfront athletic clubs and yacht clubs
- Commercial retail, but not including, “super store” type retail commercial uses or drivethrough commercial facilities

Permitted Uses Subject to Conditional Use Permit:

- Performance and entertainment facilities, but not multiplex cinemas.
- Restaurants and taverns
- Grocery stores, including alcohol sales for on and off site consumption.
- Other uses determined by the Planning Board to be similar to the above and consistent with the plan objectives.

Maximum Building Height:

- 40 feet

Site Development Standards

Building Setbacks:

- From Primary Entry Street right-of-way (subarea A) and subareas H, I and J: 0 feet.

- From west property line (within Alaska Basin): 25 feet.
- From north property line (within Oakland Estuary): 0 feet.

Buildings shall be located to minimize blockage waterfront views from internal streets and public open spaces, where possible

APPENDIX B

Notice of Preparation (NOP) Comments

San Francisco Bay Conservation and Development Commission
455 Golden Gate Avenue, Suite 10600, San Francisco, California 94102 tel 415 352 3600 fax 415 352 3606

May 23, 2016

RECEIVED
MAY 25 2016
PERMIT CENTER
ALAMEDA, CA 94501

Andrew Thomas
Planning Services Manager
City of Alameda, Community Development Department
2263 Santa Clara Avenue, Room 190
Alameda, CA 94501

SUBJECT: Initial Study/Notice of Preparation of Environmental Impact Report on Encinal Terminals Master Plan, City of Alameda, Alameda County (SCH No. 2016042076; BCDC Inquiry File No. AL.AA 6515.1)

Dear Mr. Thomas:

On April 28, 2016, the San Francisco Bay Conservation and Development Commission ("Commission") staff received the Notice of Preparation (NOP) of an Environmental Impact Report ("EIR") to construct a waterfront mixed-use development, including public open space and a marina, at the mostly undeveloped 32-acre, City of Alameda ("City") Encinal Terminal site located in the City of Alameda, Alameda County. As a responsible agency with discretionary approval authority over the project, the Commission will rely partly on the Environmental Impact Report (EIR) in evaluating the proposal, as well as other required information.

The Commission staff reviews such documents on behalf of its Commission to assess, among other things, the project's consistency with the McAteer-Petris Act, the Commission's *San Francisco Bay Plan*, the Commission's federally-approved management plan for the San Francisco Bay, and the federal Coastal Zone Management Act (CZMA), and the project's relationship to the Commission's jurisdiction.

The Commission's permit jurisdiction includes: all tidal areas of the Bay up to the mean high tide line or to the inland edge of wetland vegetation in marshlands up to five feet above Mean Sea Level; all areas formerly subject to tidal action that have been filled since September 17, 1965; and the shoreline band that extends 100 feet inland from and parallel to the Bay jurisdiction. The Commission also has jurisdiction over managed wetlands adjacent to the Bay, salt ponds, and certain waterways.

- The NOP states that the project would involve "rehabilitation" work on the wharf surface and pilings. Depending on the extent of such work, the wharf's location could shift from the Commission's 100-foot shoreline band jurisdiction to the Bay jurisdiction; in such a case, any work within 100 feet landward of the wharf would be located within the Commission's shoreline band jurisdiction.

Commission permits are required for construction, dredging, dredged material disposal, fill placement, and substantial changes in use within its jurisdiction. Permits are issued when the Commission finds proposed activities to be consistent with its laws and policies. In addition to any needed permits under its state authority, federal actions, permits, and grants affecting the coastal zone are subject to review by the Commission, pursuant to the federal CZMA, for their consistency with the Commission's federally-approved management program for the Bay.

- Commission permits for the development of residential structures in its Bay jurisdiction are issued under strict and limited conditions. However, fill for Bay-oriented public access, public assembly, and commercial recreation areas can be permitted consistent with the McAteer-Petris Act and other related Commission policies. The EIR should clarify where the project would occur within the Commission's Bay and 100-foot shoreline band jurisdiction.

The Bay Plan Appearance, Design, and Scenic View policies state that "the shores of the Bay should be developed in accordance with the Public Access Design Guidelines" and that "structures...that do not take advantage of... the bay, should be located and designed so as not to impact visually on the Bay and shoreline."

- The EIR should include visual representations of the proposed buildings from various locations along adjacent Bay Trail locations and the nearest public road(s). Particularly, a view looking north to downtown Oakland and the Oakland hills should be included. As the project develops, BCDC recommends that its Design Review Board review the project for its public and visual access components.

Bay Plan Public Access policies state that a "proposed fill project should increase public access to the bay to the maximum extent feasible." This public access should be maintained into perpetuity, universally accessible, barrier free, and connected to public transit routes.

- The EIR should include estimates of the anticipated capacity of the site for both permanent residents and visitors.

Bay Plan Climate Change policies state that "a risk assessment should be prepared...[and] based on the estimated 100-year flood elevation that takes into account the best estimates of future sea level rise and current flood protection and planned flood protection...for the proposed project or shoreline area."

- While the project description includes a discussion regarding flood prevention measures and resilience to sea level rise for habitable structures, the EIR should also address the resilience and adaptability of all public access and open space areas that could be subject to flooding throughout the life of the project. Furthermore, the EIR should include a cross section of the shoreline and wharf areas with Mean High Tide, the 100-year flood (per the Federal Emergency Management Agency standards), and future sea level rise elevations provided in NADV88.

Mr. Andrew Thomas
City of Alameda
May 23, 2016

Regarding the proposed project, the Commission staff is committed to working with the North Waterfront Cove, LLC, the City of Alameda, and other interested parties to ensure that the project is consistent with the laws and policies of the Commission. We realize that the project is in the early design stage and would be happy to meet with the project proponents to discuss potential changes that may come about through the EIR process, the Commission's laws, policies, advisory boards, and permitting procedures. Once we receive additional details of the project, we will be able to provide more detailed responses and work closely with the development team to ensure the project is consistent with the Commission's laws and policies.

Thank you for providing the Commission staff with the opportunity to comment on the project. Please contact me with any questions at (415) 352-3612 or todd.hallenbeck@bcdc.ca.gov.

Sincerely,

Todd R Hallenbeck

TODD HALLENBECK
Coastal Program Analyst

TH/go

DEPARTMENT OF TRANSPORTATION
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May 25, 2016

ALAVAR045
ALA-VAR-PM VAR
SCH# 2016042076

Mr. Andrew Thomas
Community Development Department
City of Alameda
2263 Santa Clara Avenue, Room 190
Alameda, CA 94501

Encinal Terminals Master Plan – Notice of Preparation

Dear Mr. Thomas:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the Encinal Terminals Master Plan. The new Caltrans mission, vision, and goals signal a modernization of our approach to California's transportation system, in which we seek to reduce statewide vehicle miles traveled (VMT) and increase non-auto modes of active transportation. Caltrans plans to increase non-auto mode shares by 2020 through tripling bicycle, and doubling pedestrian and transit trips. These targets also support the Metropolitan Transportation Commission's (MTC) Sustainable Communities Strategy (SCS), which promotes the increase of non-auto mode shares by ten percentage points and a decrease in automobile VMT per capita by ten percent. The following comments are based on the Notice of Preparation.

Project Understanding

The Encinal Terminals Master Plan project proposes to demolish existing structures and develop a new 589-unit residential mixed-use waterfront community supported by transportation and infrastructure improvements. The project includes three acres of waterfront-related public open space and parks, a new marina with up to 160 private berths, between 30,000 and 50,000 sq. ft. of retail, restaurant, and office uses, development of a segment of Clement Avenue, accessible public parking at various locations throughout the project site, and provisions for future public water shuttle, water taxi, or ferry terminal facilities.

The project area is approximately 22 acres of land and ten acres of submerged lands. The project site is located in the north central portion of Alameda. Direct access to the project site is provided by Buena Vista Avenue, Sherman Street, and Entrance Road. Regional vehicular access to the project area is provided by Interstate (I-) 880 via State Route (SR) 260 (the Webster Street Tunnel) and SR 61 (Webster Street/Central Avenue/Encinal Avenue).

The project is included in the Northern Waterfront Amendment to the City of Alameda's (the City) General Plan (Northern Waterfront GPA). The Alameda City Council adopted the Northern

Waterfront GPA and certified the Final EIR in July 2007. Based on changes to the project and analysis in the Initial Study for this project, the City determined that a Supplemental Focused EIR (SFEIR) should be prepared. The SFEIR will evaluate the environmental impacts of the project on the following topics: Air Quality, Biological Resources, Greenhouse Gases, Noise, and Transportation and Traffic.

Lead Agency

As the lead agency, the City of Alameda is responsible for all project mitigation, including any needed improvements to State highways. The project's fair share contribution, financing, scheduling, implementation responsibilities, and lead agency monitoring should be fully discussed for all proposed mitigation measures.

This information should also be presented in the Mitigation Monitoring and Reporting Plan of the environmental document, a draft of which should be included in the draft SFEIR for our review. Required roadway improvements should be in place prior to completion of the project.

Transportation Impact Fees

Please identify the travel demand and estimate the costs of public transportation improvements necessitated by the Encinal Terminals Master Plan project. The project should estimate the costs of the needed improvements and identify viable funding sources such as development impact fees or transportation impact fees. We encourage a sufficient allocation of fair share contributions toward multi-modal improvements and regional transit projects in order to better mitigate and plan for the impact of future cumulative growth on the regional transportation system. We support projects and measures to reduce VMT and increase sustainable mode shares.

Traffic Impact Study

Please ensure that the environmental document includes an analysis of the travel demand expected from the proposed project and its impact on I-880, SR 61, and SR 260. We recommend using the Caltrans *Guide for the Preparation of Traffic Impact Studies* (TIS Guide) for determining which scenarios and methodologies to use in the analysis, available at the following website:

http://dot.ca.gov/hq/tpp/offices/ocp/igr_ceqa_files/tisguide.pdf

Please ensure that a TIS is prepared providing the information detailed below:

- A vicinity map, regional location map, and site plan clearly showing project access in relation to nearby State roadways. Ingress and egress for all project components should be clearly identified. The State right-of-way (ROW) should be clearly identified. The maps should also include project driveways, local roads and intersections, car/bike parking, and transit facilities.
- Project-related trip generation, travel demand, distribution, and assignment including per capita use of transit, rideshare or active transportation modes such as existing bus service, new bus service, and VMT reduction factors. The assumptions and methodologies used to develop this information should be detailed in the study, utilize the latest place-based

research, and be supported with appropriate documentation.

- 2035 Cumulative Conditions and 2035 Cumulative Plus Project Conditions. Caltrans recommends the TIS include turning movement traffic per study intersection under Existing, Project Only, Existing + Project, Background, 2035 Cumulative, 2035 Cumulative + Project Conditions.
- A schematic illustration of walking, biking, and auto conditions at the project site and study area roadways, trip distribution percentages and volumes, and intersection geometrics (i.e., lane configurations for AM and PM peak hour periods). Potential safety issues for all road users should be identified and fully mitigated.
- The planning area's building potential as identified in local and regional plans. The environmental document should evaluate the project's consistency with the Circulation Element of the City's General Plan, the Congestion Management Agency's Congestion Management Plan, as well as with MTC's SCS. In evaluating consistency with the SCS, specify if the project is in a Priority Development Area.
- Mitigation for increasing VMT should be identified. Mitigation may include contributions to the regional fee program as applicable, and should support the use of transit and active transportation modes. Potential mitigation measures that include the requirements of other agencies such as Caltrans are fully enforceable through permit conditions, agreements, or other legally-binding instruments under the control of the City.
- The project's primary and secondary effects on pedestrians, bicycles, disabled travelers, and transit performance should be evaluated; this includes countermeasures and trade-offs resulting from mitigating VMT increases. Access to pedestrian, bicycle, and transit facilities must be maintained.

Public Transit

The Initial Study states that the project site would be served by AC Transit Line 19, a new bus line planned to begin operation in December 2016. Please note that the current Service Expansion Plan does not confirm this service. In preparing the SFEIR, please clarify when this service is expected to begin through coordination with AC Transit. The SFEIR should present the most up-to-date information regarding how public transit can serve the project site.

Vehicle Trip Reduction

Given the size of the project and its potential to increase VMT, the project should include a robust Transportation Demand Management (TDM) Program to reduce VMT and greenhouse gas emissions. Such measures will be critical in order to facilitate efficient transportation access to and from the site and reduce transportation impacts associated with the project. Caltrans commends the City for including a proposed TDM in the Initial Study, which includes:

- An annual fee per residential unit and per sq. ft. of commercial space to fund transit services;

- Creation of a Transportation Management Authority with representation from each phase of the development to manage the Transit Fund and plan appropriate transportation programs;
- Provision of shuttle services to BART beginning on the first day of occupancy, and
- An annual report to the City evaluating the effectiveness of the TDM measures.

Please consider the following TDM strategies to further reduce VMT and greenhouse gas emissions:

- Project design to encourage walking, bicycling, and convenient transit access;
- Lower parking ratios;
- Parking cash out/parking pricing;
- Extending the shuttle services to include a connection to the Alameda Main Street Ferry Terminal;
- Designated bicycle parking; and
- Reducing headway times of nearby Alameda-Contra Costa (AC) Transit routes.

Implementing these TDM measures will help the project become more consistent with the MTC Sustainable Community Strategy and the Caltrans Strategic Management Plan goals. Please refer to Chapter 8 the FHWA *Integrating Demand Management into the Transportation Planning Process: A Desk Reference*, regarding TDM at the local planning level. The reference is available online at:

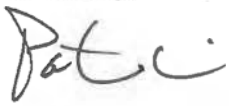
http://www.ops.fhwa.dot.gov/publications/fhwahop12035/fhwahop12035.pdf

Please also refer to *Reforming Parking Policies to Support Smart Growth*—a Caltrans-funded MTC study—for sample parking ratios and strategies that support compact growth. Reducing parking supply can encourage alternate forms of transportation, reduce regional vehicle miles traveled, and lessen future impacts. This handbook is available online at:

http://mtc.ca.gov/sites/default/files/Toolbox-Handbook.pdf

In addition to sending the draft SFEIR to the State Clearinghouse, CEQA Guideline Article 13, section 15206(b)(2)(A) requires that the lead agency also submit to the appropriate metropolitan area council of governments for review and comment. Should you have any questions regarding this letter, please contact Jesse Schofield at 510-286-5562 or jesse.schofield@dot.ca.gov.

Sincerely,



PATRICIA MAURICE
District Branch Chief
Local Development - Intergovernmental Review

c: State Clearinghouse

EAST BAY
MUNICIPAL UTILITY DISTRICT

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MAY 31 2016
PERMIT CENTER
ALAMEDA, CA 94501

May 27, 2016

Andrew Thomas, City Planner
City of Alameda
Community Development Department
2263 Santa Clara Avenue, Room 190
Alameda, CA 94501

Re: Notice of Preparation of a Draft Environmental Impact Report for the Encinal Terminals Project, Alameda

Dear Mr. Thomas:

East Bay Municipal Utility District (EBMUD) appreciates the opportunity to comment on the Notice of Preparation (NOP) of a Draft Environmental Impact Report (EIR) for the Encinal Terminals Project located in the City of Alameda (City). EBMUD has the following comments.

WATER SERVICE

On page 21, Section 2.3 Project Characteristics, under Potable Water and on page 91, under Environmental Checklist, Discussion, and Mitigation Measures, Section 4, subsection 4.1. under Utilities and Service Systems paragraph b. Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required, should be changed to read (*added text in* ***bold italics***):

> "There is a 12-inch pipeline in Buena Vista Avenue, an 8-inch pipeline in Sherman Street, ***an 8-inch pipeline in Entrance Road,*** and an 8-inch pipeline in Clement Avenue to the east, all of which are owned by EBMUD. …"

Pursuant to Sections 10910-10915 of the California Water Code, EBMUD approved a Water Supply Assessment (WSA) for the Northern Waterfront General Plan Amendment, which included the Encinal Terminals Project, and provided the City a written response to the WSA on April 22, 2014. The 2014 Encinal Terminals Project consisted of 505 dwelling units, 25,000 square feet of retail/commercial, 400 marina slips and 3.21 acres of open space with an estimated water demand of about 96,000 gallons per day (gpd). EBMUD's estimate of water demand for the revised project consisting of 589 dwelling units, 50,000 square feet of retail/commercial, 160 marina slips and 3.21 acres of open space is about 108,000 gpd. EBMUD concludes that the changes in the project will result in an overall project demand increase of about thirteen percent and that the demand increase is minor and would not result in changes in the conclusion of the WSA. The WSA

Recycled Paper

approved by EBMUD on April 22, 2014 is still valid, and a second WSA is not required for the Encinal Terminals Project.

EBMUD's Central Pressure Zone, with a service elevation between 0 and 100 feet, will serve the proposed development. Individual units in a structure of three stories in height or less are required to be individually metered. A water main extension, at the project sponsor's expense, will be required to serve the proposed development. When the development plans are finalized, the project sponsor should contact EBMUD's New Business Office and request a water service estimate to determine costs and conditions for providing water service to the proposed project. Engineering and installation of water services require substantial lead time, which should be provided for in the project sponsor's development schedule.

The Initial Study indicates the potential for contaminated soils or groundwater to be present within the project site boundaries. The project sponsor should be aware that EBMUD will not install piping or services in contaminated soil or groundwater (if groundwater is present at any time during the year at the depth piping is to be installed) that must be handled as a hazardous waste or that may be hazardous to the health and safety of construction and maintenance personnel wearing Level D personal protective equipment. Nor will EBMUD install piping or services in areas where groundwater contaminant concentrations exceed specified limits for discharge to the sanitary sewer system and sewage treatment plants.

The Initial Study also indicates the potential for exposure to lead, PCBs and asbestos containing materials within the project site boundaries. The project sponsor should be aware that EBMUD will not install piping or services in areas where EBMUD staff can or will be exposed to hazardous materials including but not limited to lead, asbestos and PCBs. The project sponsor must submit copies to EBMUD of all known information regarding soil, groundwater quality, and hazardous materials within or adjacent to the project boundary and a legally sufficient, complete and specific written remediation plan establishing the methodology, planning and design of all necessary systems for the removal, treatment, and disposal of contaminated soil and groundwater. EBMUD will not design piping or services until soil and groundwater quality data and remediation plans have been received and reviewed and will not start underground work until remediation has been carried out and documentation of the effectiveness of the remediation has been received and reviewed. If no soil or groundwater quality data exists, or the information supplied by the project sponsor is insufficient, EBMUD may require the project sponsor to perform sampling and analysis to characterize the soil and groundwater that may be encountered during excavation, or EBMUD may perform such sampling and analysis at the project sponsor's expense. If evidence of hazardous materials or contamination is discovered during EBMUD work on the project site, work may be suspended until such contamination is adequately characterized and remediated to EBMUD standards.

WATER RECYCLING

On page 91, under Environmental Checklist, Discussion, and Mitigation Measures, Section 4, subsection 4.1., under Utilities and Service Systems paragraph d. Analyzed in the Prior EIR – No Change to Previous Impact or Mitigation and No Further Study Required, please add the following language:

> EBMUD's Policy 9.05 requires that customers use non-potable water, including recycled water, for non-domestic purposes when it is of adequate quality and quantity, available at reasonable cost, not detrimental to public health and not injurious to plant, fish and wildlife to offset demand on EBMUD's limited potable water supply. Appropriate recycled water uses could include landscape irrigation, commercial and industrial process uses, toilet and urinal flushing in non-residential buildings and other applications.
>
> The proposed development is located over half a mile away from the closest future planned EBMUD recycled water supply pipeline. Based on the size and residential and retail nature of this project, EBMUD currently does not anticipate providing recycled water to the development but recommends that the project sponsor coordinate with EBMUD during project development should it become feasible to provide recycled water in the future.

WASTEWATER SERVICE

EBMUD's Main Wastewater Treatment Plant (MWWTP) and interceptor system are anticipated to have adequate dry weather capacity to accommodate the proposed wastewater flows from this project and to treat such flows provided that the wastewater generated by the project meets the requirements of the EBMUD Wastewater Control Ordinance. However, wet weather flows are a concern. The East Bay regional wastewater collection system experiences exceptionally high peak flows during storms due to excessive infiltration and inflow (I/I) that enters the system through cracks and misconnections in both public and private sewer lines. EBMUD has historically operated three Wet Weather Facilities (WWFs) to provide primary treatment and disinfection for peak wet weather flows that exceed the treatment capacity of the MWWTP. Due to reinterpretation of applicable law, EBMUD's National Pollutant Discharge Elimination System (NPDES) permit now prohibits discharges from EBMUD's WWFs. Additionally, the seven wastewater collection system agencies that discharge to the EBMUD wastewater interceptor system ("Satellite Agencies") hold NPDES permits that prohibit them from causing or contributing to WWF discharges. These NPDES permits have removed the regulatory coverage the East Bay wastewater agencies once relied upon to manage peak wet weather flows.

A federal consent decree, negotiated among EBMUD, the Satellite Agencies, the Environmental Protection Agency (EPA), the State Water Resources Control Board (SWRCB), and the Regional Water Quality Control Board (RWQCB), requires EBMUD and the Satellite Agencies to eliminate WWF discharges by 2036. To meet this requirement, actions will need to be taken over time to reduce I/I in the system. The consent decree requires EBMUD to continue implementation of its Regional Private Sewer Lateral Ordinance (www.eastbaypsl.com), construct various improvements to its interceptor system, and identify key areas of inflow and rapid infiltration over a 22-year period. Over the same time period, the consent decree requires the Satellite Agencies to perform I/I reduction work including sewer main rehabilitation and elimination of inflow sources. EBMUD and the Satellite Agencies must jointly demonstrate at specified intervals that this work has resulted in a sufficient, pre-determined level of reduction in WWF discharges. If sufficient I/I reductions are not achieved, additional investment into the region's wastewater infrastructure would be required, which may result in significant financial implications for East Bay residents.

To ensure that the proposed project contributes to these legally required I/I reductions, the lead agency should require the project applicant to comply with EBMUD's Regional Private Sewer Lateral Ordinance. Additionally, it would be prudent for the lead agency to require the following mitigation measures for the proposed project: (1) replace or rehabilitate any existing sanitary sewer collection systems, including sewer lateral lines to ensure that such systems and lines are free from defects or, alternatively, disconnected from the sanitary sewer system, and (2) ensure any new wastewater collection systems, including sewer lateral lines, for the project are constructed to prevent I/I to the maximum extent feasible while meeting all requirements contained in the Regional Private Sewer Lateral Ordinance and applicable municipal codes or Satellite Agency ordinances.

WATER CONSERVATION

The proposed project presents an opportunity to incorporate water conservation measures. EBMUD requests that the City include in its conditions of approval a requirement that the project sponsor comply with Assembly Bill 325, "Model Water Efficient Landscape Ordinance," (Division 2, Title 23, California Code of Regulations, Chapter 2.7, Sections 490 through 495). The project sponsor should be aware that Section 31 of EBMUD's Water Service Regulations requires that water service shall not be furnished for new or expanded service unless all the applicable water-efficiency measures described in the regulation are installed at the project sponsor's expense. EBMUD staff would appreciate the opportunity to meet with the project sponsor to discuss water conservation programs and best management practices applicable to the project area. A key objective of this discussion will be to explore timely opportunities to expand conservation via early consideration of EBMUD's conservation programs and best management practices applicable to the project.

If you have any questions concerning this response, please contact Timothy R. McGowan, Senior Civil Engineer, Major Facilities Planning Section at (510) 287-1981.

Sincerely,

David J. Rehnstrom
Manager of Water Distribution Planning

DJR:AMM:djr
sb16_092

cc: North Waterfront Cove LLC
c/o Tim Lewis Communities
12667 Alcosta Blvd., Suite 170
San Ramon, CA 94583

APPENDIX C

aster P an

ENCINAL TERMINALS

A New Waterfront Mixed-Use Neighborhood
Alameda, California
MASTER PLAN
May 12, 2016

OWNER/APPLICANT
North Waterfront Cove LLC
c/o Tim Lewis Communities
12667 Alcosta Blvd., Suite 170
San Ramon, CA 94583

ARCHITECT:
Van Tilburg Banvard Soderbergh, AIA
1738 Berkeley Street
Santa Monica, CA 90404

CIVIL ENGINEER:
Carlson, Barbee & Gibson, Inc.
2633 Camino Ramon, Suite 350
San Ramon, CA 94583

LANDSCAPE ARCHITECT:
Page/BMS Design Group
414 Jackson Street
San Francisco, CA 94111

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INTRODUCTION

PROJECT GOALS

This Master Plan will guide the reuse and enhancement of the former Encinal Terminals site, consistent with the General Plan Northern Waterfront goals and policies adopted by City of Alameda City Council in 2008. In 2009, the Alameda City Council rezoned the Encinal Terminals and adjacent Del Monte properties for mixed-use development (MX) consistent with General Plan policies for the area. The MX zoning requires that a Master Plan be prepared that will guide the reuse of the property consistent with the policies and goals of the General Plan and Zoning Ordinance.

In 2011, a Master Plan was prepared for the Encinal Terminals site and the adjacent Del Monte Warehouse and Chipman sites but never formally adopted. Since that time, the Chipman site has been approved for 89 residential units, and construction has commenced on this site, now known as Marina Shores. The Del Monte Master Plan was approved in December 2014 for 380 dwelling units and 30,000 square feet of non-residential retail, restaurant and entertainment uses.

The goal of this Master Plan is to implement the vision first contemplated in the City of Alameda's Northern Waterfront Plan. It provides land use, circulation and infrastructure standards and guidelines for development of the Encinal Terminals site in conformance with the requirements of the City's MX zoning ordinance. It also defines open space and waterfront public access provisions as well as use and design standards for the submerged lands within the project area.

ORGANIZATION OF THIS DOCUMENT

The Master Plan is organized as follows:

- Chapter 1 re-affirms the General Plan objectives for the Master Plan area and describes a vision for the plan area
- Chapter 2 establishes the public realm improvements, which include its interface with the streets, parks, promenades, alleys, and open spaces that will be used by the public and are necessary to achieve the Plan objectives for the area
- Chapter 3 establishes the site development standards for the subareas within the Encinal Terminals site
- Chapter 4 discusses the development processes and procedures for implementation of the Master Plan.

EXISTING SITE LOCATION

The Encinal Terminals project site is located in the north central portion of the City of Alameda in Alameda County, California, in an area approximately two miles south and west of downtown Oakland and approximately 12 miles from San Francisco (10 miles by ferry). The property is located on the north shore of Alameda overlooking the Oakland Estuary. It is surrounded on three sides by water with the Alaska Basin on the west, the Oakland Estuary on the north, the Fortman Marina on the east, and the future Atlantic / Clement Avenue on the south.

Surrounding land uses in the vicinity include:

- Wind River Systems office / research park across the Alaska Basin channel to the west
- The Oakland Estuary to the north. Approximately 425 yards across the Estuary is the Oakland shoreline, with a mix of underutilized former maritime industrial sites that are currently entitled for high density residential mixed use development, known as the Brooklyn Basin project. Approximately 375 yards to the northeast lies Coast Guard Island which is situated generally in the middle of the Estuary.
- The Fortman Marina to the east. The marina is relatively large, containing approximately 500 boat slips as well as the Alameda Yacht Club, which is owned by the City of Alameda.
- The Del Monte Plant # 48 building to the south, which is currently partially used for warehousing activities. As mentioned above, the Del Monte Warehouse Master Plan was approved in December 2014 for 380 dwelling units and 30,000 square feet of commercial uses. Beyond the Del Monte building to the south are primarily single family residential neighborhoods and Littlejohn Park.

Figure i.1: Regional context

EXISTING AREAWIDE CONTEXT

The Oakland Estuary, on which the Encinal Terminals site is strategically located, is an area undergoing significant change. Historically, the Estuary and its surrounding lands were devoted almost exclusively to maritime industrial uses. Over the past several decades, the land and water use patterns have changed, as industrial uses have moved to more efficient locations for production and transportation, and a variety of mixed residential, commercial and recreational uses are taking their place.

The high amenity value of the Estuary has attracted new high quality retail and restaurant uses as well as office and residential development. In addition, the Estuary is becoming a prime location for new recreational open space opportunities both on land and on the water. The result is existing and planned development at relatively high densities, on both the Oakland and Alameda shorelines, that maximizes the opportunity for people to live, work and play in, on and near the water. In Oakland, this includes Jack London Square, The Landing and Portobello West, and the planned Brooklyn Basin Development, which collectively are changing the face of the Oakland shoreline directly across from the Encinal Terminals site. The same opportunities exist on the Alameda side of the Estuary, which is gradually being redeveloped.

Viewed holistically, the Estuary and its surrounding ring of waterfront land in both Alameda and Oakland can become an important subdistrict in the East Bay with the Estuary serving as a recreation- and water-oriented "Central Park". The scale of the Estuary is ideal for the creation of such a high-density subdistrict. It is large enough to accommodate numerous water-related activities and high density development, while providing long distance views and a sense of openness. At the same time, it is small enough to facilitate connections between the cities and their services via water shuttles and ferries.

It is in this context that the re-use of the Encinal Terminals site is conceived: A relatively high density waterfront place that is part of a new Oakland Estuary "neighborhood."

EXISTING SITE ACCESS

Access to the Encinal Terminals site is currently limited. The only public street access to the site is from the north-south Entrance Road, which connects to Buena Vista Avenue one block to the south. To the west, Atlantic Avenue dead ends near the western property line of the site, into the existing Wind River Systems parking lots.

The Alameda General Plan indicates that Clement Avenue is to be extended from its existing terminus at Ohlone Street, which is approximately 790 feet to the east. Clement Avenue will be extended along the south property line of the Encinal Terminals site as a collector roadway connecting to Atlantic Avenue to the west near the main entrance to the Wind River Systems property. This segment of Clement Avenue is not currently in place. It is envisioned that it will be completed concurrently with the development of the properties adjacent to the planned alignment, including Encinal Terminals.

There are currently no designated bicycle or pedestrian facilities (bicycle lanes or sidewalks) providing access to the Encinal Terminals site. The nearest dedicated pedestrian facilities are a narrow walkway along the Fortman Marina waterfront edge, sidewalks along Buena Vista Avenue one block to the south, and sidewalks along Atlantic Avenue up to its existing terminus approximately 1000 feet west of the property.

See Chapter 2 of this document for further discussion related to site access and circulation in and around the Encinal Terminals reuse project.

EXISTING SITE CONDITIONS

Encinal Terminals Master Plan encompasses approximately 32 acres of both land and water, with a net usable land area of approximately 22 acres, including wharves. The property consists of four parcels, one of which is leased from the City of Alameda under a long-term ground lease (the "Leased Parcel"). The owner of the three fee parcels, North Waterfront Cove LLC ("NWC"), is also the tenant under the lease for the Leased Parcel.

The existing character of the Encinal Terminals site is a byproduct of its past maritime industrial use. The project site and the surrounding area was once a vital component of the fish canning industry. Fishing boats delivered their catch to Alaska Basin, where it would be unloaded and processed on the Del Monte property, to the south of the project site. Most recently, the site served as a shipping container dock. However, that use ended in the early 2000's and the property is now largely vacant.

The project site is flat and above the mean high tide in elevation. Surface materials consist primarily of asphalt and concrete paving, with both concrete and wooden wharves and a wooden pier along the northwestern edge. There is a large metal shed in the middle of the property and miscellaneous small buildings scattered around the edges, none of which have been identified as being of historic or architectural significance.

Far right: The Encinal Terminals site was once the home of the Alaska Packers, with one of the largest fishing fleets and processing facilities in the world. Near right: In recent years, the site has served as a storage facility for shopping containers.

The Encinal Terminals site is generally flat with few existing structures.

Top: A wood and concrete wharf structure, portions of which were constructed in 1927 and 1965, are located along the west and northwest edges of the site. Bottom: Existing structures on the site include a large metal shed and a two story office building in poor condition. Surface materials are primarily asphalt and concrete paving.

Along the north waterfront edge, views extend to the west along the Estuary all the way to Mt. Tamalpais in Marin County. Views to the north include downtown Oakland, the Oakland Hills and Coast Guard Island. Inset: Encinal Terminals at dusk looking northwest.

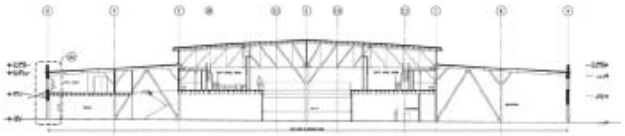
To the west, the site has views of the Alaska Basin waterway. Across the waterway is the Wind River Systems campus.

To the east, the large Fortman Marina provides attractive views of boats of all sizes and sailing activities.

EXISTING SITE VIEWS

The site enjoys attractive views in all directions. Unlike hilly cities like San Francisco and Oakland, where waterfront development can block waterfront views, the flat terrain of Alameda, combined with the large mass of the existing Del Monte Building, creates a situation where development of the Encinal Terminals site will have minimal impacts on views of the water from existing neighborhoods.

To the south is the historic Del Monte Warehouse building (formerly Del monte Cannery #48). This building is an attractive brick structure which provides interesting short distance views from the Encinal Terminals property. The building is over 950 feet long and visually separates the Encinal Terminals site from existing residential neighborhoods to the south. A Master Plan for the site, with 380 units and 30,000 s.f. of commercial use.



Beyond the Del Monte building to the south are existing residential neighborhoods and Littlejohn Park. Due to the great length of the Del Monte building, no portion of the Encinal Terminals property or Estuary is currently visible from existing surrounding neighborhoods, with the exception of a short segment of Sherman Street between Eagle Street and Atlantic Avenue.

CHAPTER 1: MASTER PLAN OBJECTIVES & VISION

MASTER PLAN OBJECTIVES FOR THE NORTHERN WATERFRONT

This Master Plan is designed to ensure that the reuse of the plan area achieves the General Plan objectives for the Northern Waterfront area:

Reconnecting the community to the waterfront. The Master Plan seeks to reconnect the community to its waterfront by requiring new public shoreline access, extending the existing street grid to the waterfront, replacing existing waterfront industrial and warehouse uses with residential, commercial, retail, and open space.

Improving access through and around the district. Extending the existing Alameda grid system into and through the area allows for the extension of the Clement Avenue truck route, reduces traffic volumes on Buena Vista, and increases access to the waterfront. Requirements promote use of alternative modes of transportation, such as shuttles, water taxis, and bicycles and a future light rail line to reduce present and future congestion.

Fostering a vibrant new mixed-use environment. The Master Plan seeks to create a new and vibrant district with a variety of uses that are compatible with the waterfront location and adjacent neighborhoods and create a pedestrian-friendly, transit-oriented environment.

Preserving the unique history and environment of the Northern Waterfront Area. This Master Plan will preserve the unique environmental, cultural, and architectural assets within the area and repurpose and improve those assets in the creation of a new, vibrant mixed-use district.

Economic Development. This Master Plan seeks to generate jobs and services for the community while reducing citywide traffic and the associated environmental, economic and social impacts of long commute trips through mixed-use development.

Financially Sound Development. The Master Plan requires that new development fund and construct the public facilities and services that are needed to serve the plan area, achieve General Plan objectives, and avoid any financial impact on the City's ability to provide services to the rest of the City.

MASTER PLAN OBJECTIVES FOR THE ENCINAL TERMINALS SITE

To meet the City of Alameda's General Plan objectives, specific goals for the development of Encinal Terminals site include:

- ***Repurpose the site*** with a mix of residential, commercial, and water-related uses that will create and support a lively waterfront and a pedestrian-friendly environment.
- ***Provide water and maritime-related job and business opportunities*** consistent with the site's waterfront location and maritime history.
- ***Create a continuous public waterfront promenade*** and sequence of public waterfront open spaces that provide opportunities for walking, biking, kayaking, and other waterfront activities.
- ***Reduce truck traffic in the adjacent neighborhoods*** by replacing warehouse and trucking uses with employment and residential uses.
- ***Provide a mix of uses and activities*** that will support a variety of lifestyles and employment opportunities.
- ***Assure a significant portion of new residential development is affordable*** to households at all income levels.
- ***Establish linkages to the surrounding city and neighborhoods*** for all modes of travel.
- ***Provide clear, safe access and linkages for pedestrians and bicyclists,*** where none have existed in the past.
- ***Strengthen references to the historic background of the site*** and environs through design.

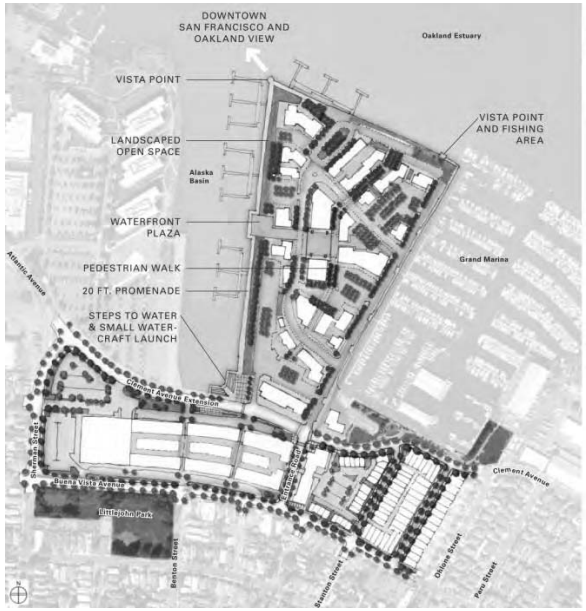


FIGURE 1.1 CITY CONCEPT MASTER PLAN

The Concept Master Plan for the Encinal Terminals area prepared by the City of Alameda, January 2012. This plan was prepared to illustrate the City's intent and desire to see a mix of residential and commercial uses in the area, consistent with General Plan objectives. It was not intended to represent a specific design or physical layout.

MASTER PLAN VISION

The vision for the reuse of the Encinal Terminals site is a future that is no longer a place of 18 wheeled trucks, warehouses, shipping containers, and chain link fences. Instead, Alameda residents and visitors will be able to walk, jog, stroll, and bicycle along the water's edge, moving freely through the area to new waterfront promenades, parks, trails, and public facilities.

SHORELINE ACCESS

The Encinal Terminals project will meet the objectives of the City of Alameda's General Plan by providing unprecedented access to the shoreline and Estuary in this location that has, throughout its history, been closed off to all but industrial users. Public access to these amenities will be provided around the entire Encinal Terminals site.

A MIXED USE WATERFRONT RESIDENTIAL COMMUNITY

Envisioned primarily as a residential community with a strong tie to the water that surrounds it, Encinal Terminals seeks to combine a mix of restaurants and entertainment, artist studios and galleries, work spaces for maritime activities and craftspeople, a marina, work/live

studios, retail establishments, kayak and bicycle rental shops and multiple public gathering spaces, all encircled by a public shoreline promenade with views of the Marin County hills, the Oakland skyline and hills, the Oakland Estuary and Coast Guard Island and Fortman Marina.

PART OF AN EMERGING NEW ESTUARY NEIGHBORHOOD

Beyond providing public waterfront access, infrastructure improvements and a mix of waterfront-oriented uses, the redeveloped site will become a part of the new sub-center that is emerging with the Estuary as its center. The Encinal Terminals location is just one of several on both shores of the Estuary that is changing from a formerly industrial district to a mixed-use water-oriented neighborhood. The mix of uses, densities, open space and recreational facilities conceived for the Encinal Terminals site are consistent with the overall reuse and enhancement of the Estuary as a whole.

Over time, the increased mix of uses and development densities surrounding the Estuary will enhance the economic feasibility of establishing new connections between the island of Alameda and the mainland via water shuttles, taxis and ferries. Over time, it will also be possible to circumnavigate the entire Estuary as a pedestrian or bicyclist. The Encinal Terminals project will provide a key link in these improved facilities and connections, with its location in the geographic center of Alameda's north waterfront.

MINIMAL IMPACTS ON EXISTING NEIGHBORHOODS

The Encinal Terminals site is geographically separated from the existing residential neighborhoods that constitute the inland portions of the city. Therefore, the Encinal Terminals site will have minimal impact on existing neighborhoods.

POTENTIAL FEATURES OF THE ENCINAL TERMINALS PLAN

The objective for developing the new Encinal Terminals development plan site is to create a vibrant and exciting waterfront. Many of the features below could be incorporated into the ultimate plan:

- Waterfront-related public open space and parks, including public access around the entire waterfront perimeter
- Locations for direct public access to the water, including kayak/small craft launches, waterfront steps and ramps
- A potential marina, with possibly a harbormasters office

- Facilities for boat sales and rentals including small craft such as kayaks, row boats and board sailing equipment
- Water transit opportunities, including water shuttles or taxis to provide transportation across the Estuary.
- A mixed-density residential neighborhood, with residential dwelling units in a variety of configurations, including townhomes, stacked flats, live/work, lofts
- Commercial uses (a mix of retail, restaurant and office) along Clement Avenue and along the waterfront
- Mixed use buildings, with ground floor retail and residential units above

- Accessible public waterfront parking strategically located at various points to allow access to the waterfront perimeter

FIGURE 1.2 ILLUSTRATIVE CONCEPTUAL MASTER PLAN FOR POTENTIAL DEVELOPMENT AREAS

This plan illustrates how the concepts defined in this Master Plan as may be applied to portions of the site. This is NOT a proposed development plan; rather, it is best to look at each of the components in a vacuum, such as how townhomes may be developed, or how podium buildings may be spaced and developed. Development Plans will be developed in accordance with the details included in Chapters 2, 3 and 4, and each Subarea will require further Development Plan and Design Review.

Legend

- A. Mixed-use Commercial / Residential
- B. Low-Rise Condominiums
- C. Mixed-use Commercial / Residential
- D. Townhomes
- E. Public Park
- F. Public Waterfront Promenade
- G: Ferry / Water Shuttle
- H. Marina
- I. Primary Entry
- J. Secondary Entry
- K. Small Craft (Kayak) Launch

CHAPTER 2: THE PUBLIC REALM

INTRODUCTION

This chapter establishes the requirements for improvements related to the entire Encinal Terminals site, including the following:

- Circulation and Public Access
- Public Open Space
- Landscape Improvements
- Infrastructure

CIRCULATION AND PUBLIC ACCESS

This section establishes the general circulation requirements for the Encinal Terminals site, including the streets, sidewalks and bicycle facilities that allow the public to move through and enjoy the waterfront location as well as service and emergency vehicle access and general parking requirements. It is the intent of this Master Plan to implement the guidelines contained in the City's Master Plan for the Encinal Terminals, Del Monte Warehouse, Chipman/Marina Cove Sites (January 2012).

AUTOMOBILE, TRUCK, TRANSIT, WATER TRANSPORT, EMERGENCY VEHICLE ACCESS AND TRANSPORTATION DEMAND MANAGEMENT

Off-site Roadways

Clement Avenue will be extended along the frontage of the Encinal Terminals project area from the intersection of Entrance Road to a point approximately 400 feet to the west. It will be designed and constructed for a maximum operating speed of 25 miles per hour to reduce noise and calm traffic-flow past residential areas. It will accommodate the movement of trucks, transit and/or rail transit vehicles, bicycles, and pedestrians through its area. The roadway extension will be constructed in conjunction with the development of the Del Monte Warehouse.

Internal Streets

An inviting, well-designed internal public street system will be established. Key elements of this street system include:

- The western vehicular access into the site will occur along a new street (West Entrance Street) that will originate at a three-way intersection at Clement Avenue approximately 320 feet west of the centerline of the Clement Avenue / Entrance Road intersection. The new West Entrance Street will extend northward into the property along the west shoreline near, but setback from, the Alaska Basin. Over most of its length, it will be a two lane roadway. Parallel and perpendicular parking shall be allowed along the West Entrance Street.
- The eastern site entrance shall be provided at the Clement Avenue / Entrance Road intersection extending northward into the site along the east property line adjacent to the Fortman Marina. This East Entrance Street will also be a two lane roadway. Parallel and perpendicular parking shall be allowed along the East Entrance Street.
- Internal east-west streets will cross the site generally perpendicular to the West Entrance Street in order to serve the interior development subareas. East-west streets will be two lane roadways. Parallel and perpendicular parking shall be allowed along the internal East-West Streets.
- All of the above-mentioned streets shall be open and accessible to the public 24 hours per day.
- The location and spacing of all internal streets described here are illustrative of intent only. Actual location and alignment of internal streets may be modified based on development plans for specific subareas, provided the intent of these provisions is assured and subject to approval by the City of Alameda.

Truck Access

All publicly-accessible streets will be designed and constructed to be accessible to service and maintenance vehicles. Permitted use of the Encinal Terminals site shall be limited to a maximum of 50 truck trips per day

Transit Access and Facilities

If bus transit service is provided along Clement Avenue by a public transit agency in the future, a bus shelter with seating shall be provided on the Clement Avenue frontage of the project at a location agreed upon with the City of Alameda and relevant transit agencies.

Water Transit Access

Opportunities for water transit facilities are expected to be provided along the northern edge of the Encinal Terminals site.

Emergency Vehicle Access (EVA)

- Two points of access/egress for emergency vehicles onto the project site from Clement Avenue shall be provided at buildout.
- An internal network of improved roadways and easements, suitable for access by all City and County emergency vehicles, shall be provided such that two access routes are provided to all building sites.
- Locations of EVA easements shown on illustrative exhibits are illustrative of intent only. Actual alignment of EVA easements may be modified based on development plans for specific subareas, provided the intent of these provisions is assured and subject to approval by the City of Alameda and relevant agencies.

Transportation Demand Management (TDM) Program:

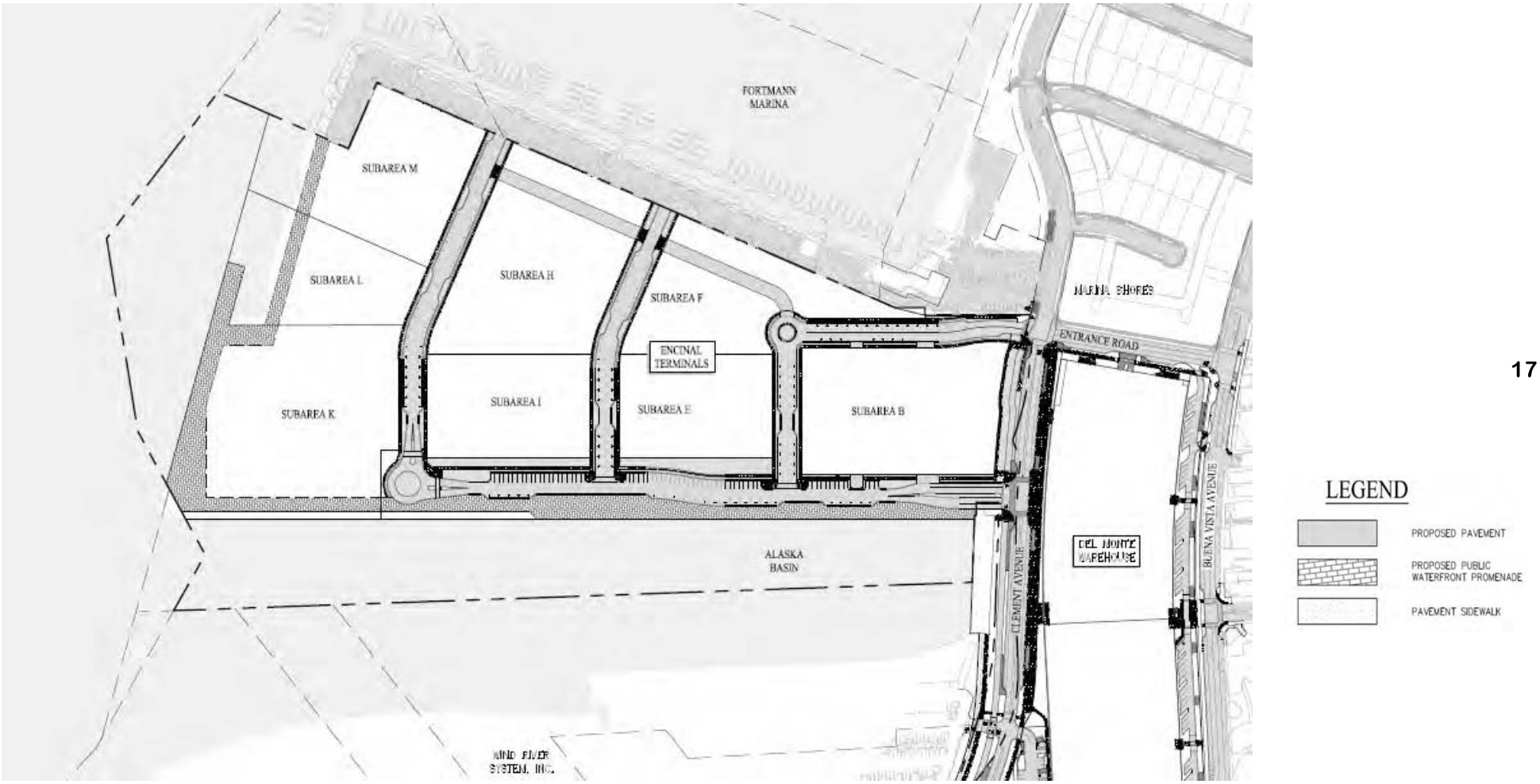
The TDM Program shall be approved prior to approval of the first subdivision map for the first development. The TDM Program shall include:

- An annual fee per residential unit and a per square foot fee for commercial space will be applied to transit services ("Transit Fund");
- Creation of a Transportation Management Authority (TMA) with representation from each phase of the development shall be established to manage the Transit Fund and plan its transportation programs (or join other existing TMA's);
- Provision of shuttle services (bus and/or water shuttle) to BART on Day One;
- An annual report to the City evaluating the effectiveness of the TDM measures.

The TDM measures may be combined with other developments to more effectively manage the program. The TDM Program may include shuttle services, car share programs and parking programs provided with funds from an assessment district and any onsite parking revenues.

FIGURE 2.1 AREA-WIDE ROADWAY SYSTEM

FIGURE 2.2 CIRCULATION DIAGRAM



PEDESTRIAN ACCESS

- All new streets shall include sidewalks on both sides of the street and pedestrian crossings at all intersections.
- A traffic signal with pedestrian countdowns is planned for the intersection of Sherman Street and Clement Avenue. Traffic signals may be added at a future date at the intersections of Entrance Road and Clement Avenue, and Entrance Road and Buena Vista Avenue, in the event that a new traffic engineering study is prepared and approved by the City Public Works Department that demonstrates that one or more of the intersections needs to be signalized.
- Internal sidewalks shall be a minimum of 5 feet wide, but shall be a minimum of 7 feet wide when fronting a major public road (i.e., fronting Clement Avenue or either of the major north-south entry roads into the site).
- Pedestrian access ways shall be well lit and have clear sightlines in order to provide pedestrians with a sense of safety and comfort.
- Street trees shall be provided on all streets and pedestrian areas. Street trees should be planted within the planting strips on each of side of the street and spaced on average every 30 feet.

BICYCLE ACCESS

Bicycle access within the Encinal Terminals site will be provided in accordance with the following:

- Bicycle facilities shall be provided in conformance with the standards established by the Alameda Bicycle Plan on the Clement Avenue Extension. It is expected that the Cross Alameda Trail will pass along the frontage of the Encinal Terminals site, with a planned 12' wide cycle track.
- Bicycle racks shall be provided at strategic spots and located in convenient, well-lit areas, clearly visible from a building's primary entrance. Racks shall be placed at sufficiently short intervals so that bicyclists can easily find a place to park their bicycles.

WATERFRONT ACCESS

A continuous public shoreline promenade shall be provided around the waterfront perimeter of the site. The promenade will include a sequence of open spaces and recreational opportunities including walking, running, bicycling, rollerblading, fishing, watercraft launch, and vista points, and will include the necessary structural and safety improvements that will allow convenient pedestrian access to the Alaska Basin and Encinal Terminals site.

The shoreline public promenade will be limited to use by pedestrians and bicyclists and not available to general vehicular traffic. It shall, however, be designed to be available for use by emergency, service and maintenance vehicles. In addition,

- The shoreline public promenade shall have a paved width of a minimum 12 feet adjacent to the Alaska Basin and around the perimeter of the Encinal Terminals site from the Wind River Systems property to the Fortman Marina property. It shall be designed to include public viewing and gathering areas at the northwest corner of the Encinal Terminals project site.
- Docking facilities to encourage waterborne modes of transportation should be encouraged.
- Opportunities for a public human powered/non-motorized boat launch facility, as well as pedestrian steps down to the water in the Alaska Basin and/or along the northern shoreline shall be provided.
- The shoreline public promenade shall be designed to avoid flood inundation with considerations for climate change and sea level rise.
- Physical and visual connections between Alameda and the waterfront shall be provided to the extent possible in order to support and enhance public access to the waterfront.
- Public use areas along the shoreline shall be clearly delineated with "Public Shore" signs, planting and/or special features.
- Public amenities including, bike racks, benches, trash containers, restrooms, and drinking fountains shall be provided for public use within the shoreline public access areas.
- Public art and public view areas shall be provided within the public areas.

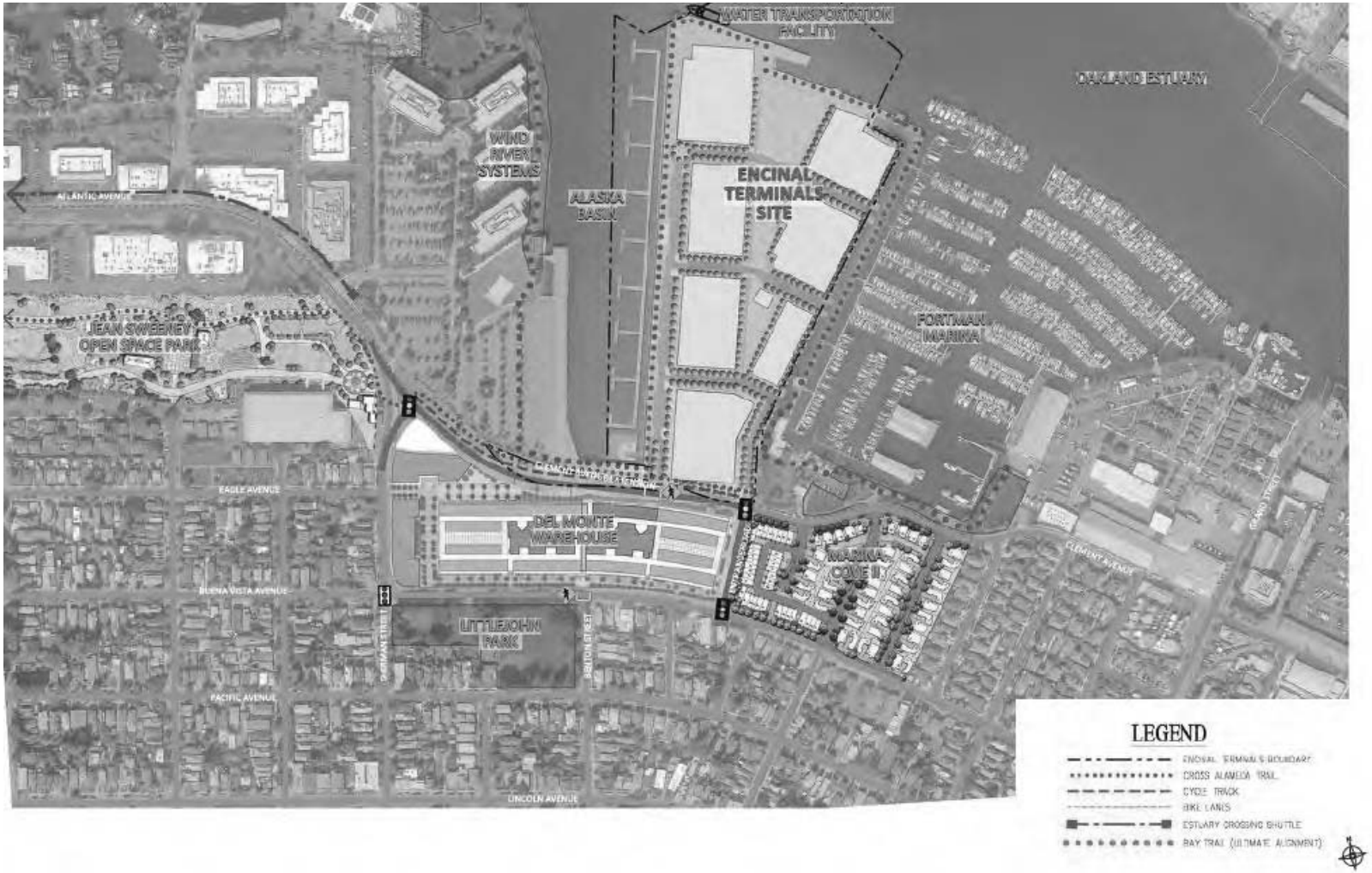
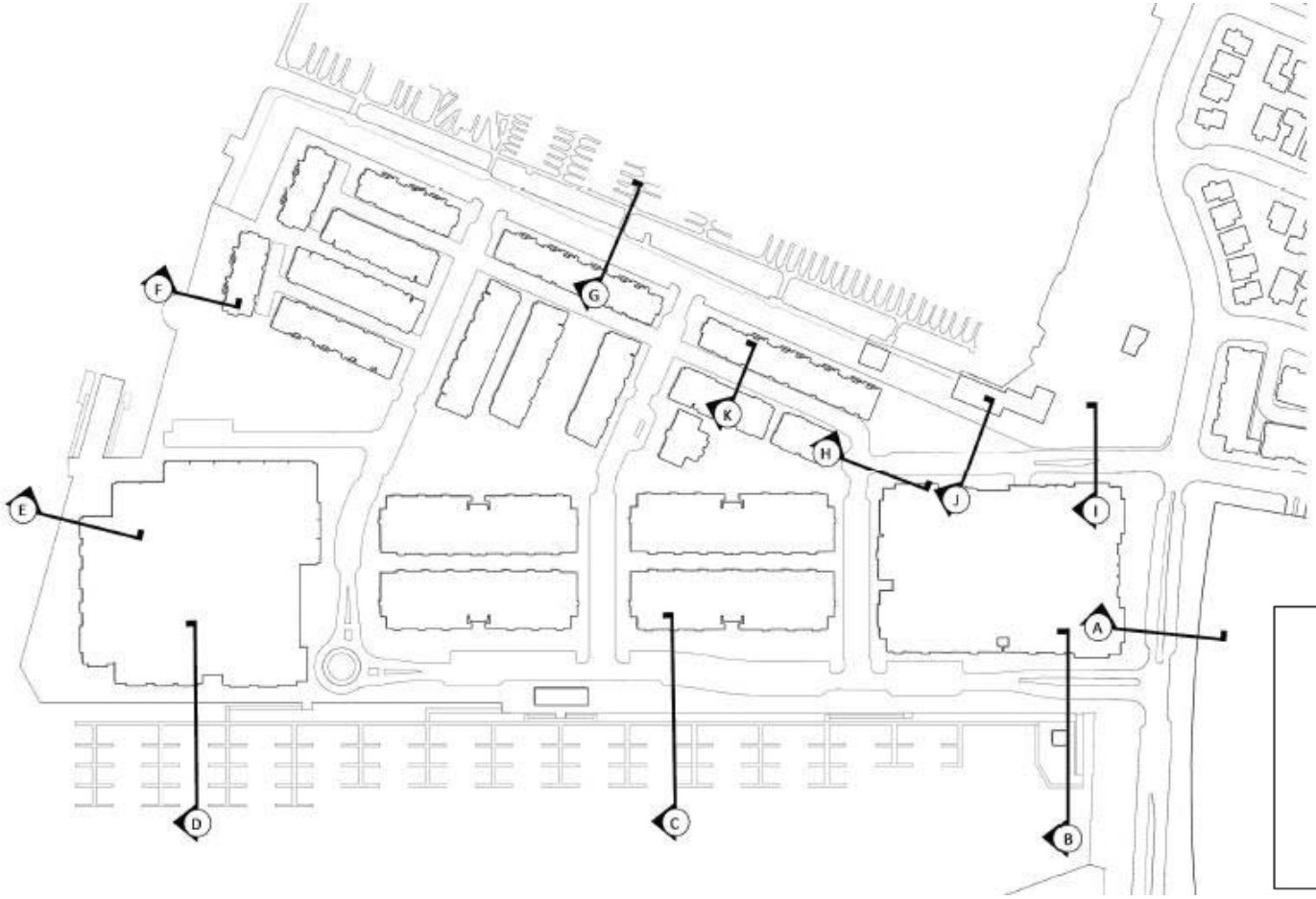


FIGURE 2.3 AREA-WIDE PEDESTRIAN AND BICYCLE CIRCULUATION AND OPEN SPACE FRAMEWORK PLAN

FIGURE 2.4 CROSS SECTION LOCATION DIAGRAM



This Diagram illustrates the locations of the conceptual illustrative cross-sections illustrated on the following pages.

LEGEND

A. Clement Avenue
B. Main Vehicular Entry and Public Promenade
C. Promenade midway along Main Entry Road
D. Promenade adjacent to Mixed-use Center
E. Promenade at Water Shuttle / Ferry Landing
F. Promenade along North Edge
G. East Property Line adjacent to Fortman Marina
H. Internal Street
I / J. East Entry Road
K. Private Drive

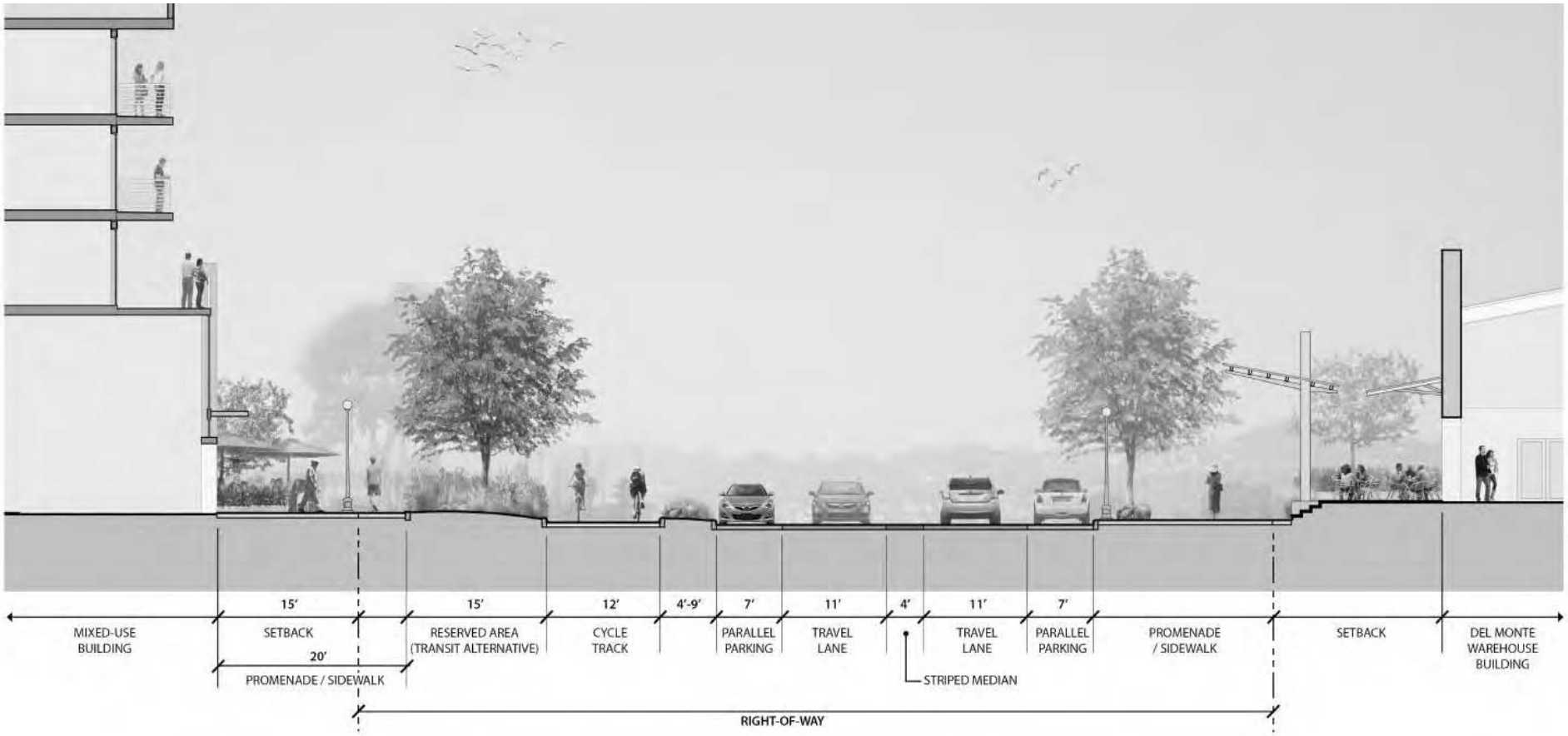


FIGURE 2.5 ILLUSTRATIVE CONCEPTUAL CROSS SECTION A: CLEMENT AVENUE

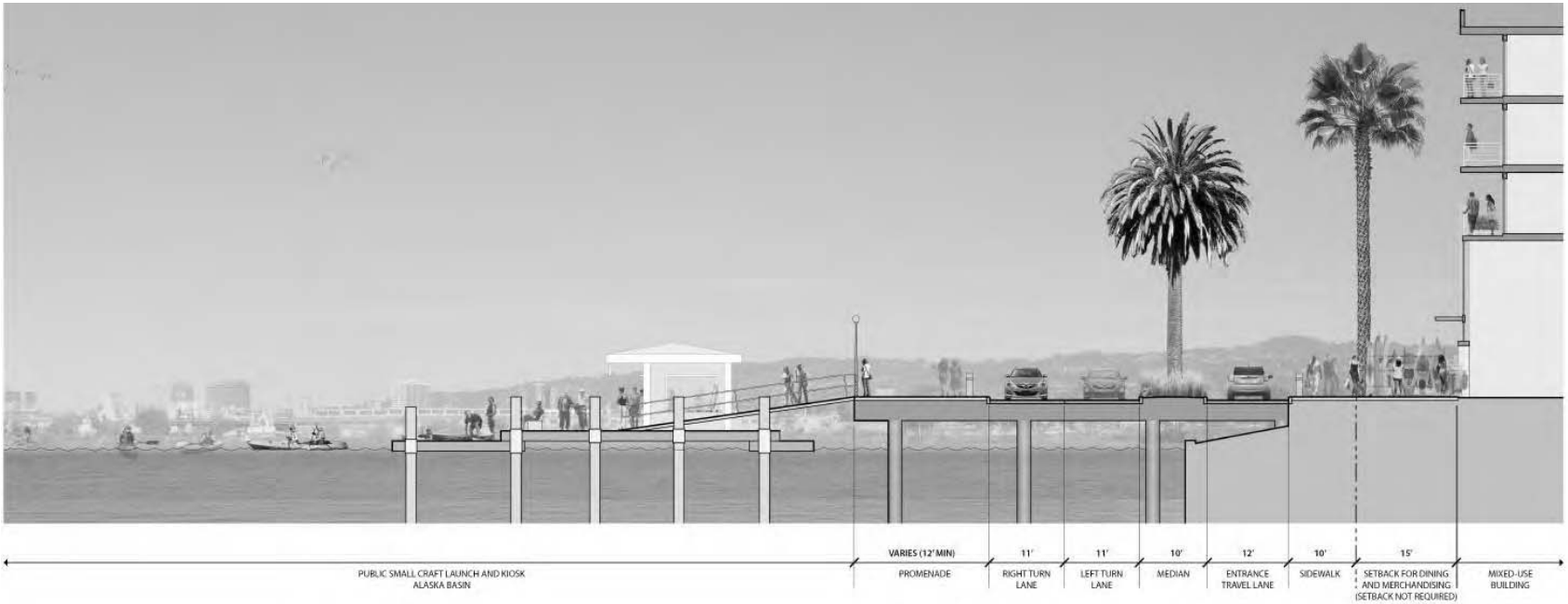


FIGURE 2.6 ILLUSTRATIVE CONCEPTUAL CROSS SECTION B: WESTERN ENTRY ROAD AND WATERFRONT PROMENADE AT CLEMENT AVENUE (VIEW NORTH)

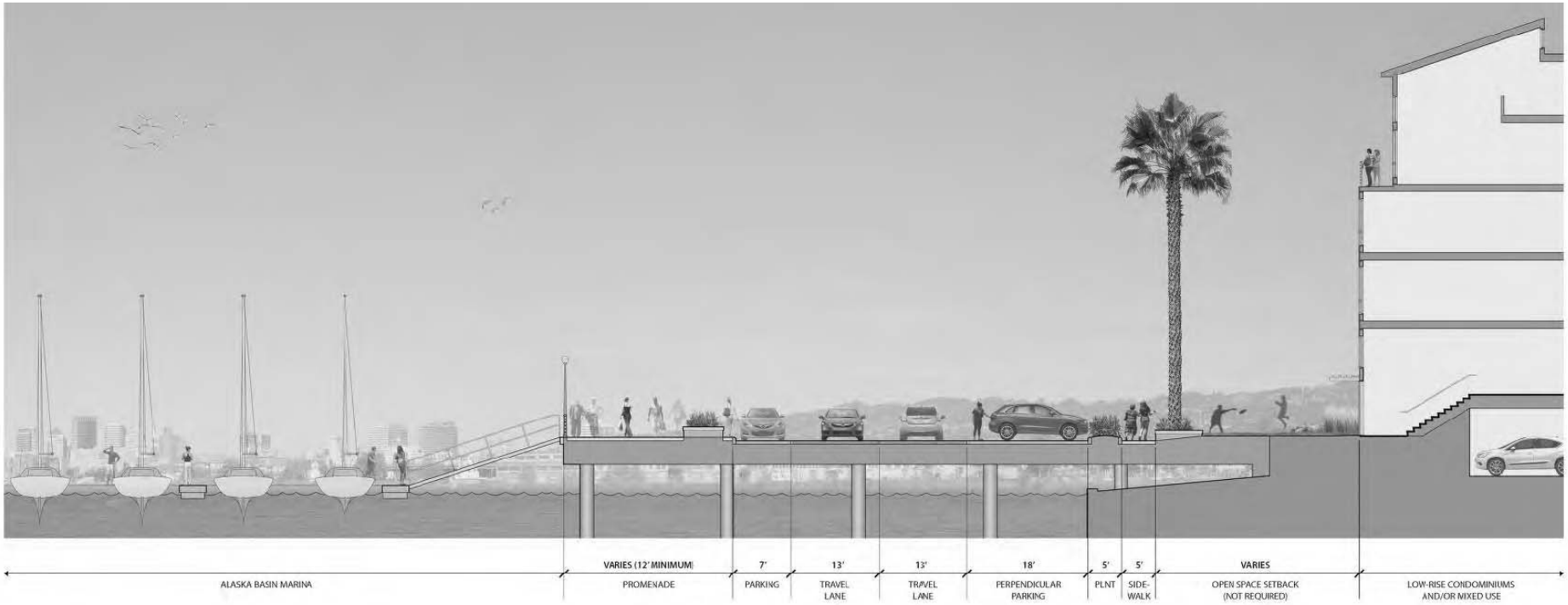


FIGURE 2.7 ILLUSTRATIVE CONCEPTUAL CROSS SECTION C: PUBLIC WATERFRONT PROMENADE MIDWAY ALONG THE WEST ENTRY ROAD ADJACENT TO ALASKA BASIN AND POSSIBLE MARINA (VIEW NORTH).

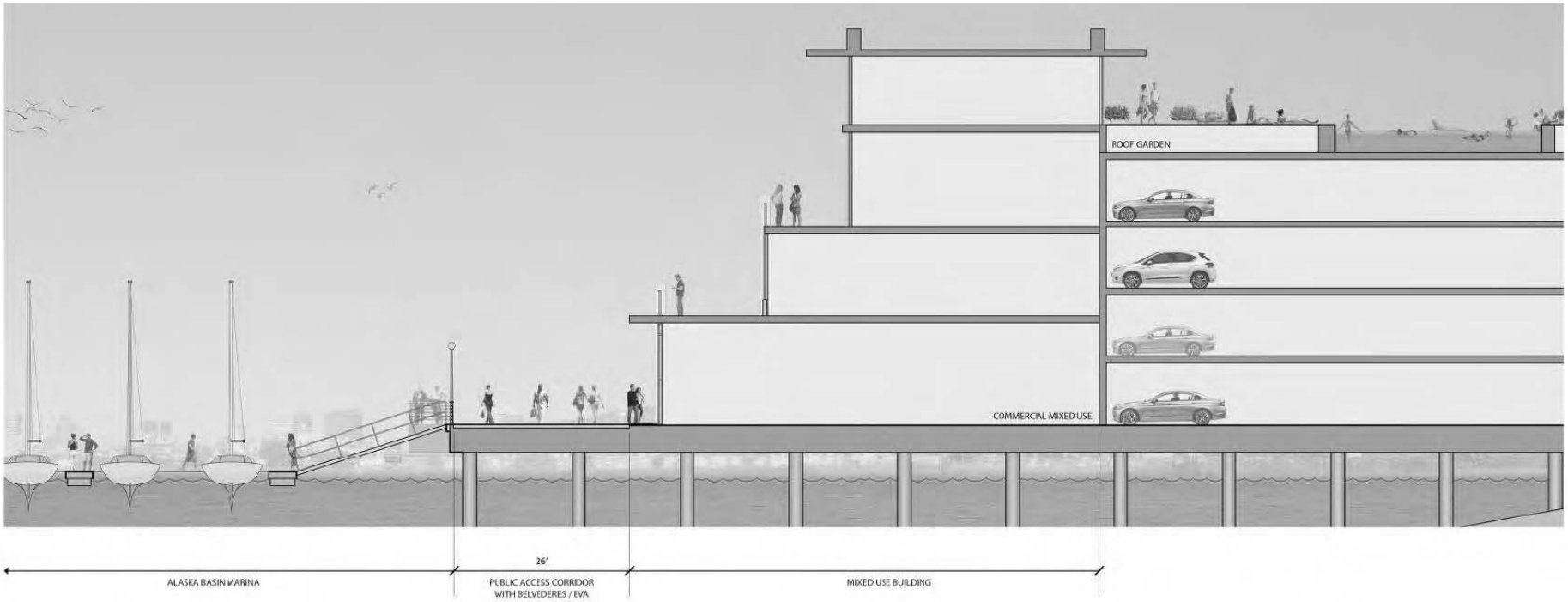


FIGURE 2.8 ILLUSTRATIVE CONCEPTUAL CROSS SECTION D: PUBLIC WATERFRONT PROMENADE ADJACENT TO MIXED USE CENTER AT NORTHWEST CORNER OF THE SITE (VIEW NORTH).

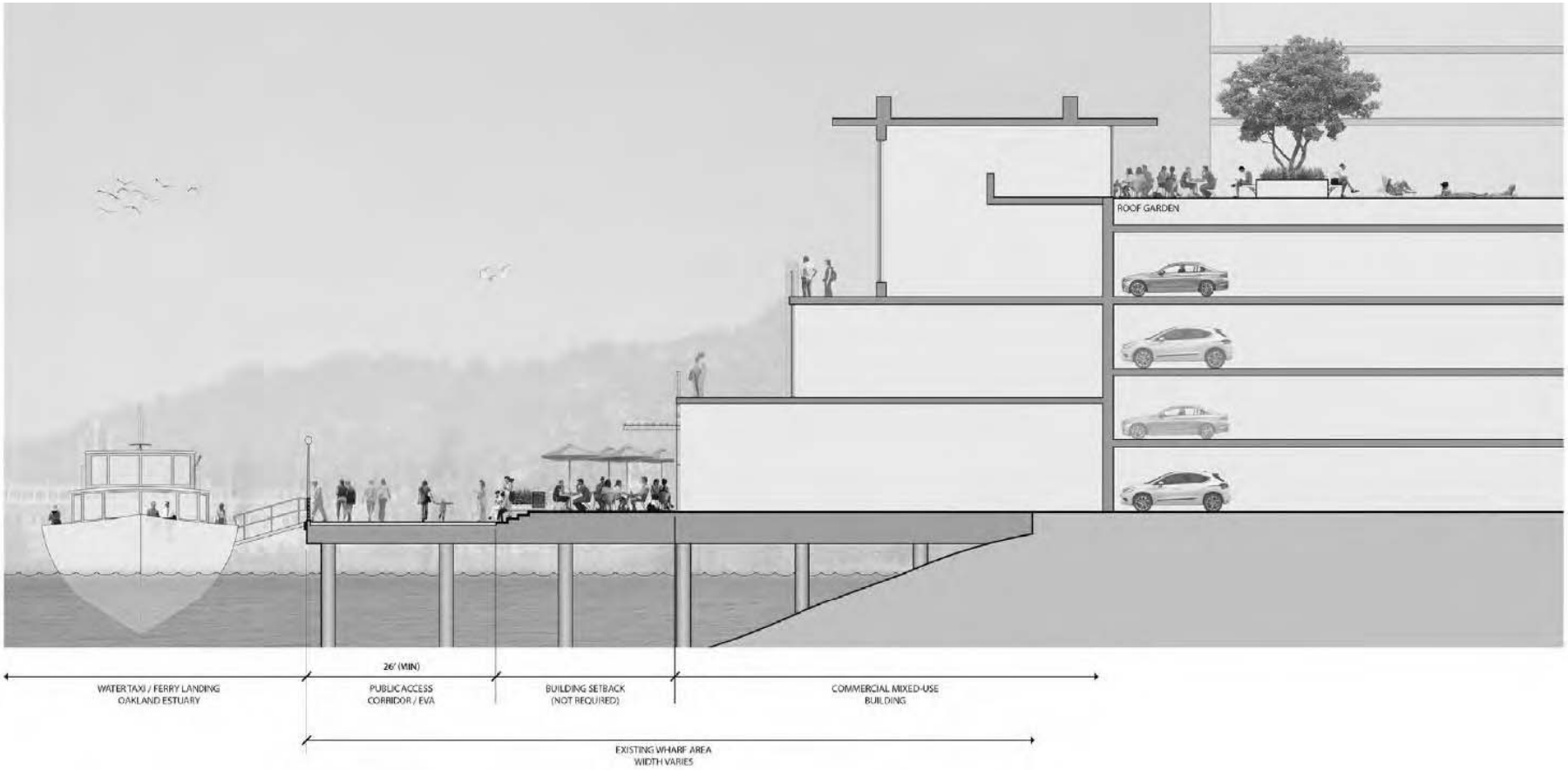


FIGURE 2.9 ILLUSTRATIVE CONCEPTUAL CROSS SECTION E: PUBLIC WATERFRONT PROMENADE AT THE WATER SHUTTLE/FERRY LANDING ALONG NORTH EDGE OF THE SITE AT THE ESTUARY (VIEW EAST).

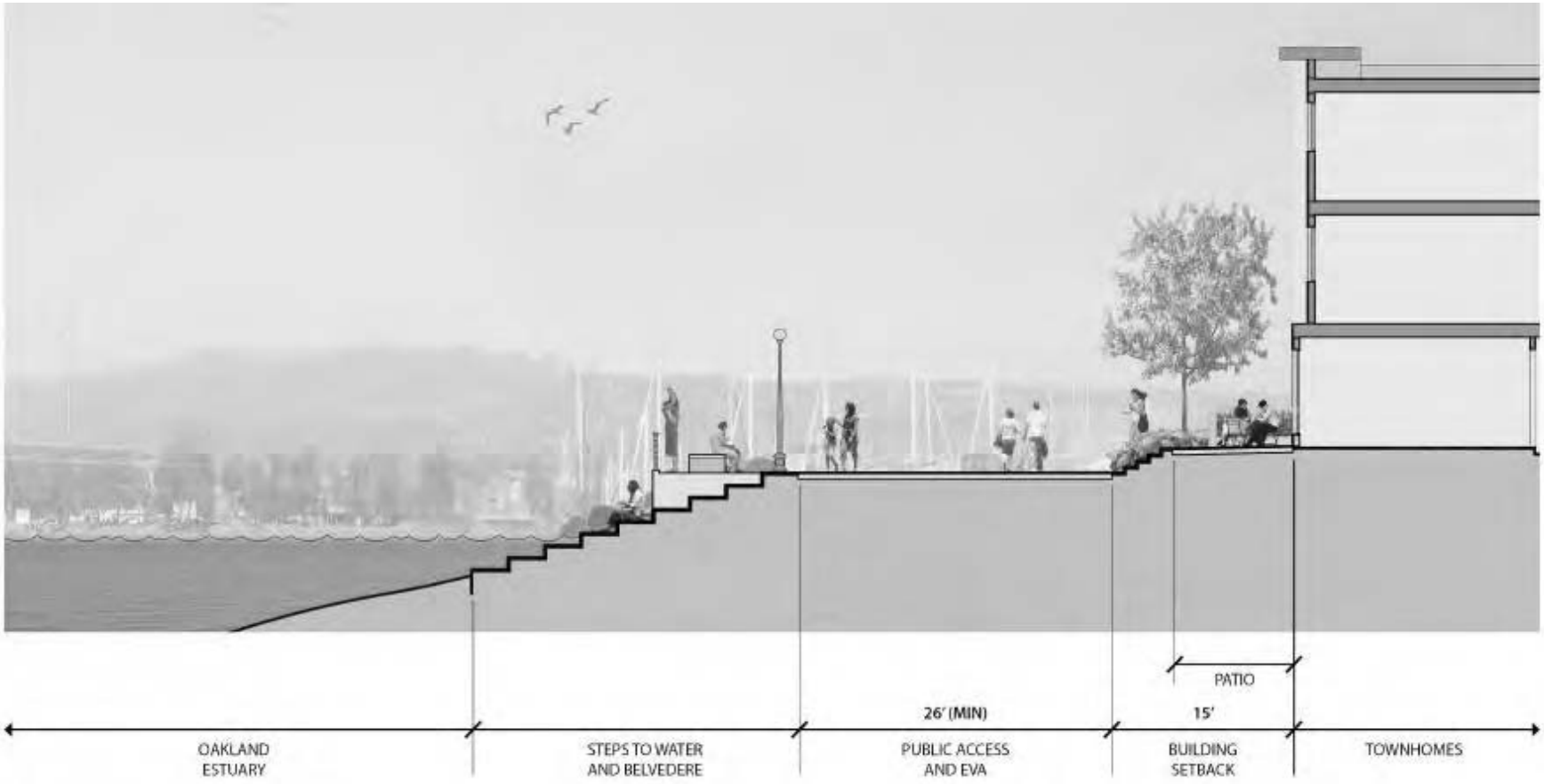


FIGURE 2.10 ILLUSTRATIVE CONCEPTUAL CROSS SECTION F: PUBLIC WATERFRONT PROMENADE ALONG THE NORTH EDGE OF THE SITE AT THE ESTUARY (VIEW EAST).

FIGURE 2.11 ILLUSTRATIVE CONCEPTUAL CROSS SECTION G: PUBLIC WATERFRONT PROMENADE ALONG EAST EDGE OF THE SITE (VIEW EAST).

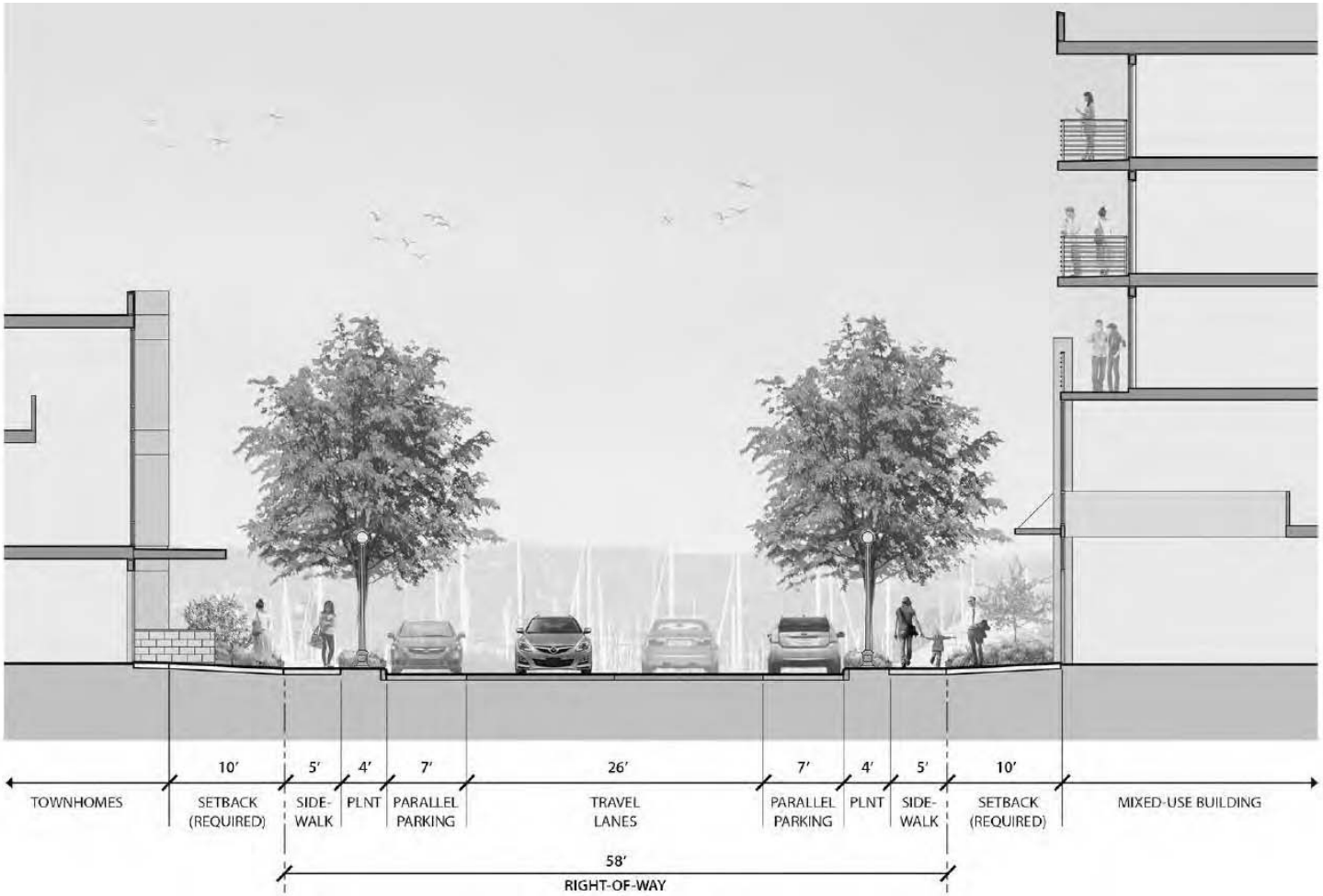


FIGURE 2.12 ILLUSTRATIVE CONCEPTUAL CROSS-SECTION H- INTERNAL STREET EAST ENTRY ROAD

2.13 ILLUSTRATIVE CONCEPTUAL CROSS SECTION I – EAST ENTRY ROAD

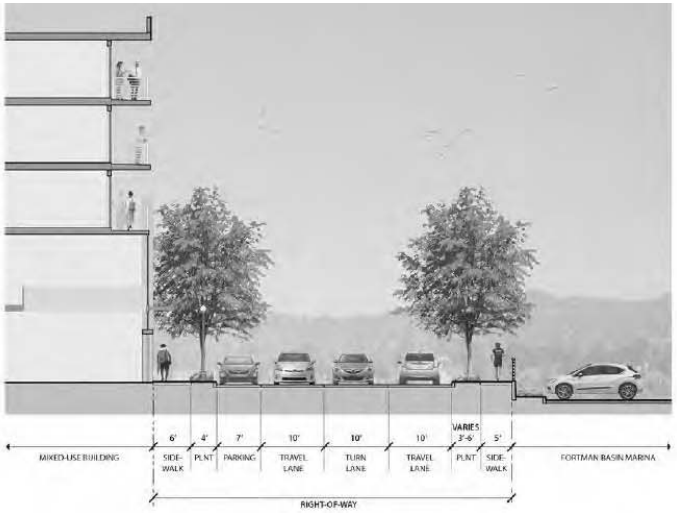
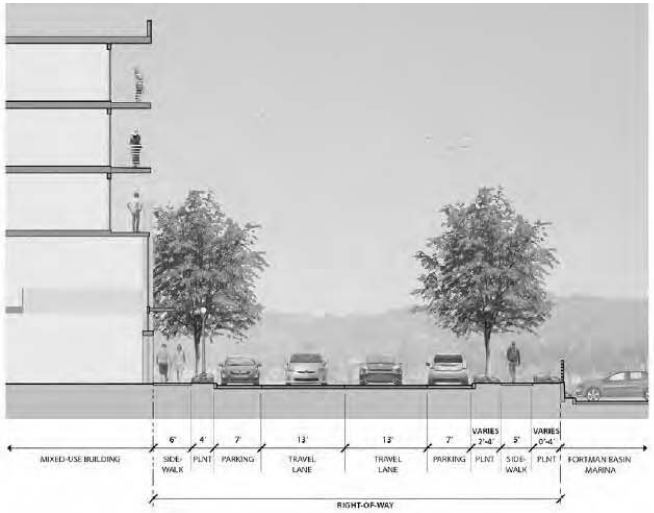


FIGURE 2.14 ILLUSTRATIVE CONCEPTUAL CROSS-SECTION J- EAST ENTRY ROAD



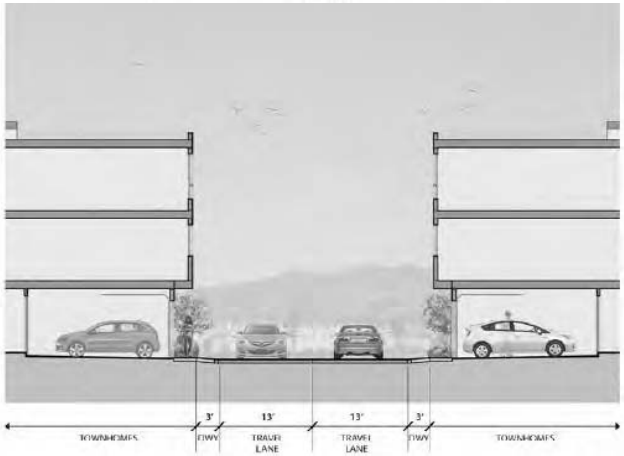


FIGURE 2.15 ILLUSTRATIVE CONCEPTUAL CROSS SECTION K: PRIVATE DRIVE/EVA

PUBLIC OPEN SPACE

In addition to the public access and open space to be provided in the continuous public promenade that will extend around the waterfront perimeter of the site, the Encinal Terminals site shall provide a central open space of over an acre with at least one side open to allow views to the Estuary. The site will also be proximate to the planned 22 acre Jean Sweeney Open Space Park.

Acreage allotted to public open space within the site will also include open space within each of the subareas, as part of the development plan for each subarea. In addition, the project will include both public common open space as well as private open space in the form of mini-parks and open space patios for the ground floor units and balconies/decks for elevated units, or possibly in the form of rooftop gardens.

AMC Section 30-5.12 requires a minimum of 300 square feet of common open space per housing unit. It is expected that the site plan will well exceed the minimum requirements. However, to the extent that the minimum 300 square feet of common open space per housing unit is not met, any residential development shall make off-site improvements to City parks (or contribute an in-lieu fee) as a condition of a subdivision map. The amount of the improvements or fee shall be determined prior to, and included in, any Subdivision Map or Development Agreement. Please refer to the "Area Wide Pedestrian and Bicycle Circulation and Open Space Framework Plan (Figure 2.3).

LANDSCAPE IMPROVEMENTS

The landscape of Encinal Terminals will celebrate its stunning location on the waterfront. It will reinforce the extension of the block pattern and street grid of Alameda. Most plant materials shall be compliant with *Bay Friendly Landscape Guidelines,* with the exception of isolated ornamental gardens and recreational turf areas. Plant materials will consist of mostly native and non-invasive species, tolerant of salt water and air. Views will be respected and framed by tree and plant locations.

Plantings will be organized to respond to six site typologies or zones, including:

Waterfront – Plant materials will be salt and wind tolerant, arranged to not block views, and will support Bayfront habitat and species. Initial criteria for the selection of these trees includes:

- Palm trees along the main entry drive
- Shoreline trees at the Northern Waterfront, which are tolerant of salt water and air
- Appropriate tree species to consider include:
  - *Washingtonia filifera*, California Fan Palm
  - *Phoenix canariensis*, Canary Island Date Palm
  - *Arbutus unedo*, Strawberry Tree.

Clement Avenue – Plantings will be colorful and inviting, arranged to not block views of Alaska Basin, and will identify the project area and its main entry road. Initial criteria for the selection of these plants includes:

- Deciduous trees
- Large, spreading canopy
- Palm trees within the street median
- Ornamental trees along the pedestrian promenades
- Colorful low shrubs and ground covers beneath the trees and within the planters
- Appropriate tree species to consider include:
  - *Platanus x acerifolia,* London Plane
  - *Washingtonia filifera*, California Fan Palm
  - *Phoenix canariensis*, Canary Island Date Palm
  - *Cercis occidentalis,* Western Redbud.
  - *Leptospermum laevigatum,* Tea Tree

Major Parks and Open Spaces – These spaces will utilize turf or similar ground plane materials to enable active recreation and will incorporate screening and buffering of wind/noise/objectionable views in key locations. Initial criteria for the selection of these materials includes:

- Evergreen trees and screening materials
- Turf or a lawn substitute for the ground plane
- Appropriate species to consider include:
  - *Arctostaphylos hookeri,* Hooker's Manzanita
  - *Festuca rubra,* Red Fescue
  - *Quercus agrifolia*, Coast Live Oak

Internal Streets – The streets will be lined with large shade trees, on a regular spacing, which will provide shade in the summer, sun during the winter, shelter, and a unique definition/identity for each street. Initial criteria for the selection of these trees includes:

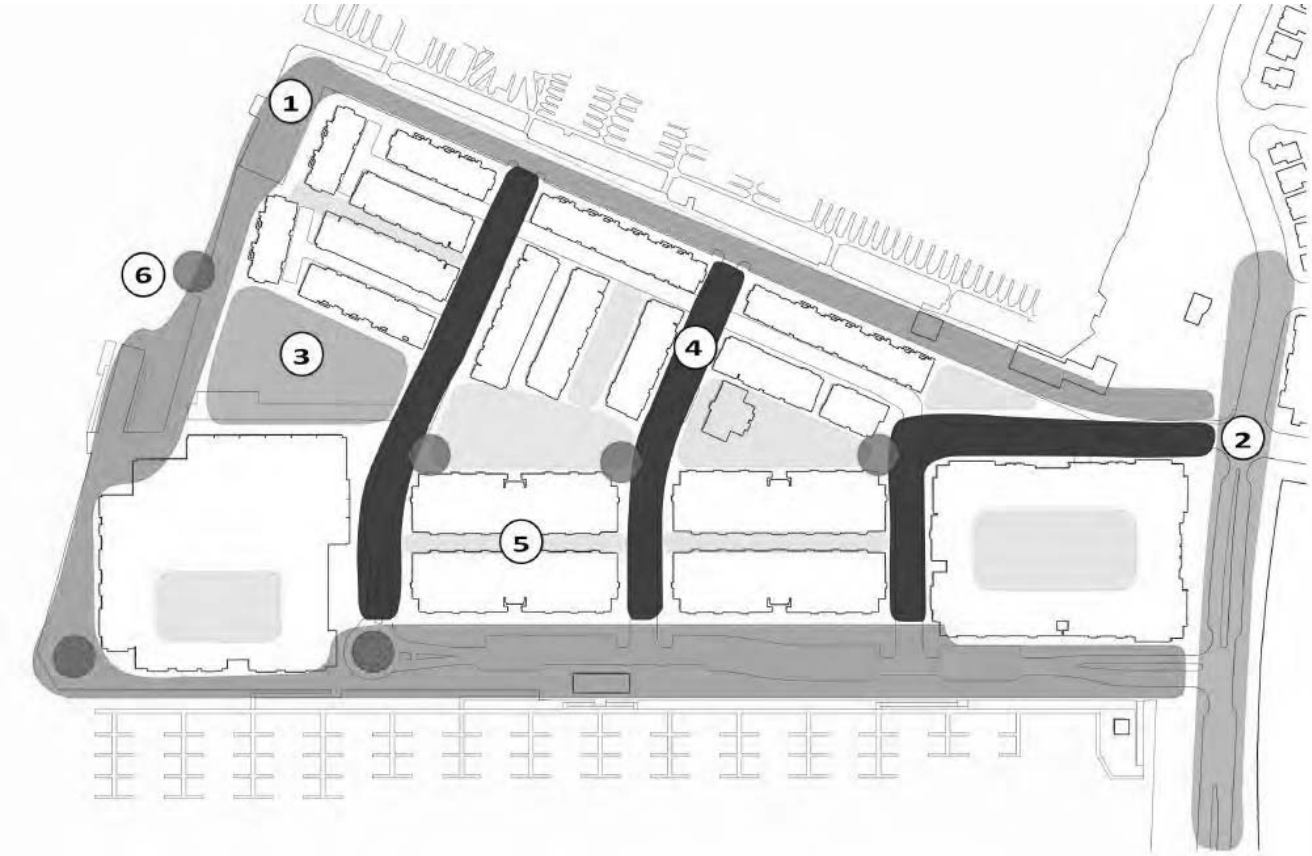
- Deciduous trees
- Large, spreading canopy
- Provide interest and color in more than one season, if possible.
- Appropriate species to consider include:
  - *Acer negundo "californicum",* California Box Elder
  - *Corylus cornuta "californica"* Western Hazelnut
  - *Platanus x acerifolia,* London Plane
  - *Populus fremontii,* Fremont Cottonwood

Private and Semi-Private Gardens – Spaces will be provided within the residential areas, which will include colorful ornamental materials and possibly some non-native species as focal points. Initial criteria for the selection of these materials includes:

- Both deciduous and evergreen trees
- Flowering ornamental trees and perennial plants
- Turf (or lawn substitute), showy shrubs and ground covers for the ground plane
- Appropriate tree species to consider include:
  - *Acer circinatum*, Vine Maple
  - *Ceanothus spp.,* Ceanothus
  - *Cercis occidentalis,* Western Redbud
  - *Pinus torreyana,* Torrey Pine
  - *Quercus agrifolia*, Coast Live Oak
  - *Ranunculas californiucus*, California Buttercup

Nodes and Accent Areas – A number of special "spots" will occur at key locations within the community and will provide focal points. Initial criteria for the selection of these trees includes:

- Small shrubs, grasses, perennials and ground covers
- Evergreen shrubs and ground covers
- Colorful/flowering shrubs , perennials and ground covers
- Appropriate species to consider include:
  - *Baccharis pilularis "pilularis",* Dwarf Coyote Bush
  - *Ceanothus thyrsiflorus repens,* Creeping Blue Blossom
  - *Dichelostemma congestum,* Ookow
  - *Muhlenbergia rigens,* Deer Grass
  - *Limonium californicum*, Sea Lavender



This Exhibit diagrams how the landscape concepts discussed on the immediately preceding pages might be applied to the Illustrative Conceptual Master Plan shown in Figure 1.1. Actual locations of landscape zones will vary; landscape elements will be defined in Development Plans for each Subarea.

LEGEND

1. WATERFRONT
2. CLEMENT AVENUE
3. MAJOR PARKS & OPEN SPACES
4. INTERNAL STREETS
5. PRIVATE & SEMI-PRIVATE GARDENS
6. NODES & ACCENT AREAS

FIGURE 2.16 LANDSCAPE TYPOLOGIES

INFRASTRUCTURE

INTRODUCTION

The project site is currently served by existing private utilities that are deteriorated and at the end of their service life. Many of these existing utilities do not meet current codes or standards.

The Encinal Terminals project will replace the existing infrastructure with utility systems that include stormwater, wastewater, potable water, electrical, natural gas and telecommunications that will be designed in accordance with current adopted standards.

FLOOD AND SEA LEVEL RISE PROTECTION

The existing topography of the project site is generally flat with elevations ranging from 4 to 8(City of Alameda Datum), and the proposed project is not located in a 100-year floodplain as defined by FEMA. The current 100-year tidal elevation has been established as 3.9 (City of Alameda Datum) for this area of the City of Alameda by the Federal Emergency Management Agency (FEMA).

The flood protection criteria for this project site are established by the 100-year tidal elevation of the adjacent Oakland Estuary plus consideration for sea level rise. The majority of the existing elevations are well above existing mean high tide, on average over four feet above the mean high tide, providing built-in protection against anticipated sea level rise. The proposed project will establish a minimum elevation within the project site above the 100-year tidal elevation of the Estuary plus consideration for sea level rise.

A flood protection system shall be constructed for the Encinal Terminals project that provides protection from anticipated impacts of climate change and sea level rise. Additional improvements will be implemented to improve the seismic and soil stability of the project site. Furthermore, an adaptive management design strategy will be implemented along the shoreline perimeter of the Encinal Terminals site in the event that sea level rise exceeds the currently anticipated amounts. A portion of the site along the perimeter will be reserved for future adaptive measures to allow for future adjustments to the perimeter of the project site, should they be necessary. These perimeter improvements shall be designed to be implemented without requiring fill to be placed within the Bay. Adaptive measures may include increasing the height of a sea wall or levee. These adaptive measures would only be implemented if future sea level rise exceeds the projected amount assumed in the original design.

Additionally, a funding mechanism will be established for the Project to generate the Project's ability to implement the adaptive management of this issue. This mechanism may be a Community Facilities District (CFD) and / or a Geologic Hazards Abatement District (GHAD). The Project residents and businesses will begin to contribute to the funding of the future sea level rise adaptive measures immediate upon their occupancy of the structures within the project site.

STORMWATER SYSTEM

The majority of the storm run-off from the Encinal Terminals site is collected by on-site inlets and conveyed to various private on-site outfalls that discharge directly to the Oakland Estuary. The southernmost portion of the site is collected and conveyed to the City of Alameda's storm drain system, eventually discharging to the Arbor Street Pump Station.

The storm drain system shall maintain the existing drainage patterns of the site in order to avoid potential capacity impacts associated with diverting additional run-off to the City's system. The proposed system shall include the following:

- Installation of new inlets and pipelines appropriately sized to convey the site run-off. The proposed collection pipelines will range in size from 12 to 24 inches in diameter. The portions of the system that directly discharge to the Oakland Estuary will likely require improved outfall structures.
- The remainder of the project site shall be collected and conveyed by a new system of inlets and pipelines which will connect to the City's 54-inch pipeline, and eventually discharge to the Arbor Street Pump Station.
- The proposed quantity of run-off conveyed to the City's system will be reduced in comparison to the existing condition because of the reduced amount of impervious area included in the proposed site plan, and if necessary implementation of an on-site underground detention system. Bio-treatment areas to treat runoff from the proposed impervious areas shall be in accordance with Alameda County Clean Water Program guidelines.
- To the maximum extent feasible, bio-treatment areas shall be integrated into landscaping areas adjacent to street and parking areas or buildings.

WASTEWATER SYSTEM

Currently, the wastewater generated from the Encinal Terminals site is collected and conveyed by an existing 10-inch pipeline that falls east to west towards Sherman Street, along the north side of the Del Monte Warehouse building. The 10-inch pipeline extends to Sherman Street and connects into the City of Alameda collection system near the intersection with Eagle Avenue. The City's pipelines within Sherman Street range in size from 8 to 12 inches and flow from north to south. The 12-inch pipeline in Sherman Street connects to the East Bay Municipal Utility District (EBMUD) 60-inch interceptor pipeline at the intersection with Buena Vista Avenue.

New wastewater infrastructure shall be constructed throughout the Encinal Terminals project site which will connect to the EBMUD interceptor in Buena Vista Avenue. The existing private wastewater collection facilities will be abandoned in place or removed.

A new on-site wastewater collection system will be installed throughout the proposed street network within the project site and shall include:

- Pipelines ranging in size from 6 to 8 inches in diameter.
- Construction of a pump / lift station in order to minimize the depth of the proposed system.
- Installation of wastewater facilities extending off site through Entrance Road to convey the Encinal Terminals project wastewater from the project site and surrounding properties to Buena Vista Avenue.
- Construction of a short segment of pipeline in Buena Vista Avenue flowing westerly to connect to an existing manhole on the EBMUD interceptor.
- Construction of new wastewater infrastructure throughout the project site which will connect to the EBMUD interceptor in Buena Vista Avenue

POTABLE WATER

EBMUD provides potable water service to the City of Alameda and the Project Site via a 12-inch pipeline in Buena Vista Avenue, an 8-inch pipeline in Sherman Street and a 10-inch pipeline in Clement Avenue to the east. Existing private water pipelines extend from the EBMUD distribution system to the existing structures within the project site. The project site is currently served by existing pipelines ranging in size from 6-inches to 15-inches that are located in Entrance Road and along the northern side of the Del Monte Warehouse building.

A new potable water distribution system will be constructed to serve the Encinal Terminals project site and will include the following:

- New supply lines within Clement Avenue and Entrance Road with pipes ranging in size from 8-inches to 12-inches.
- An on-site distribution system extending from the pipeline in Clement Street and located within the street network throughout the project site. Distribution pipelines will range in size from 6 to 8 inches in diameter.

DRY UTILITIES

Alameda Municipal Power (AMP) provides electric service to the Project Site. Existing transmission and distribution lines extend along Buena Vista Avenue, and will likely be the electrical source for the project.

Pacific Gas & Electric (PG&E) provides natural gas service to the Project Site

AT&T will provide telecommunication service to the Project Site.

A new joint trench will be constructed from the source to and throughout the project site, and will include new facilities for all dry utility systems.

MISCELLANEOUS PROVISIONS

An Assessment District and/or Community Facilities District may be established on all properties in the Plan area to fund public improvements, municipal services such as street and sewer maintenance, and transit services to the area.

Alameda Municipal Power shall review each phase of the development to ensure that adequate facilities for the provision of power are provided.

The City of Alameda Public Works Department shall review each phase of the development to ensure that adequate water, storm drain, wastewater, and transportation infrastructure are provided.

CHAPTER 3: SITE DEVELOPMENT REQUIREMENTS AND STANDARDS

INTRODUCTION

This chapter establishes the requirements for improvements related to specific subareas of the Encinal Terminals Master Plan, and will outline the specifics for the Master Plan area, including:

- Land Use
- Residential Density, Maximums and Minimums
- Non-Residential Density, Maximums and Minimums
- Residential and Non-Residential Development Balance
- Affordable Housing
- Parking
- Building Design

LAND USE

TIDELANDS VS. NON-TIDELANDS PROPERTY

The Land Use section must start with an understanding of the Tidelands Trust which affects a portion of the site that is approximately 6 acres. Lands subject to the Tidelands Trust are restricted in their usage, as outlined below.

Permitted Land Uses on Property Subject to the Tidelands Trust

The following uses are permitted on lands that are subject to the Tidelands Trust

- Public recreation facilities, hotels, restaurants, commercial recreation centers, entertainment facilities and attractions
- Public waterfront promenades, pedestrian trails, sidewalks, landscaped areas
- Public Parks and open space
- Public buildings, convention centers, museums, assembly areas and meeting places
- Streets, parking, landscaped areas
- Maritime related industry (excluding boat repair and storage), boat sales with limited outside display, rentals, leasing, marina berths

Permitted Land Uses on Property Not Subject to the Tidelands Trust

The following uses are permitted on lands that are not subject to the Tidelands Trust

- Commercial retail, but not including "super store" type retail commercial uses or drive-through commercial facilities.
- Hotels, restaurants, taverns and associated parking and landscape areas
- Office or medical facilities
- Commercial Recreational uses
- Commercial Work/ Live Units consistent with AMC Section 30-15 Work Live Studios, except that new construction is permitted.
- Multi-Family Residential Units
- Roadways, Private and public Parks and Open Space and Playgrounds
- Home Occupations consistent with AMC 30-2.
- Artist Studios and Galleries and Museums.
- Performance, Entertainment, Amphitheater, Amusement Parks but not multiplexes
- Maritime – Boat sales, rentals, leasing, marina berths
- Light warehousing, light manufacturing conditionally permitted with Planning Board approved Use Permit and finding that the use will not generate significant truck traffic.
- Farmers Markets and Community Gardens
- Other uses determined by the Planning Board to be similar to the above and consistent with the plan objectives

CURRENT TIDELANDS TRUST CONFIGURATION

Currently, there are approximately 6 acres of land that are subject to the Tidelands Trust restrictions ("Trust Property") noted above; this is shown in brown below. The remaining approximately 16 acres is not subject to the Tidelands Trust restrictions, and is indicated below in red.

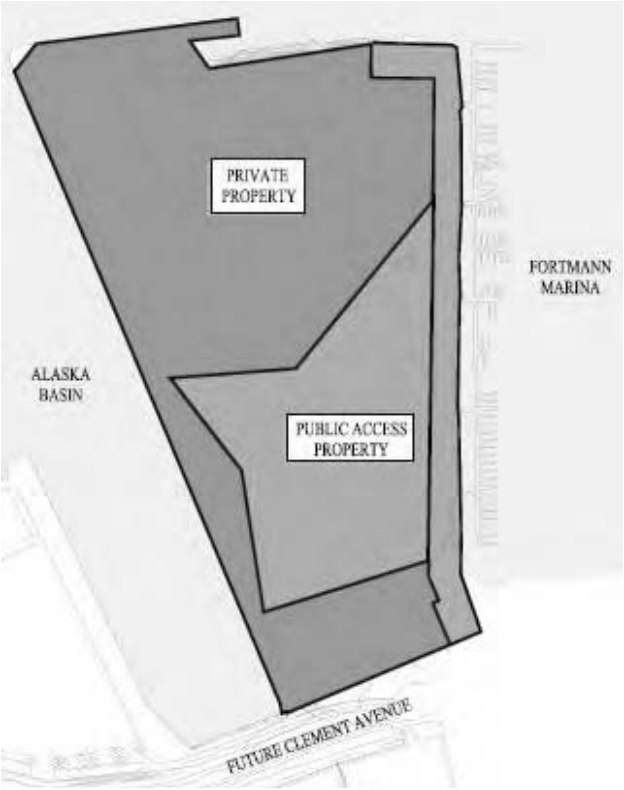


FIGURE 3.1 CURRENT TIDELANDS CONFIFGURATION

CONTEMPLATED SWAP TIDELANDS TRUST CONFIGURATION

The Northern Waterfront Plan contemplates that a swap of land would reconfigure the Tidelands Trust land such that all of the Trust Property is in a swath of waterfront property on the perimeter of the site, and would remove the Tidelands restrictions on some of the property in the interior of the site. One potential configuration of the swap is shown below.

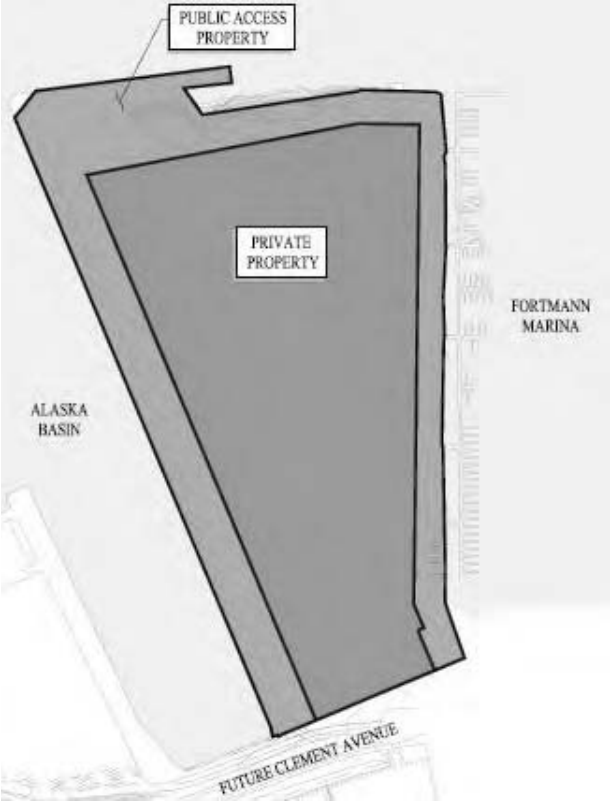


FIGURE 3.2 CONCEPTUAL LAND SWAP

MASTER PLAN BASE CONCEPT

This Master Plan will follow the General Plan/Northern Waterfront Plan and propose a swap of land, which would reconfigure the Tidelands Trust land such that all of the Trust property is in a swath of waterfront property surrounding the site, and would remove the Tidelands restrictions on some of the property in the interior of the site, similar to what is shown in Figure 3.2 above. Such a swap would be subject to approval by the State Lands Commission; the land swap would be finalized after Master Plan approval. The plan which is proposed for approval will be described herein and known as the Master Plan Base Concept.

In the event that a swap is not approved, and the land remains in its current configuration, a No Swap Alternative Plan, which is described in the Appendix, would be adopted.

Permitted and Conditionally Permitted Land Uses: Base Concept

This plan assumes that the State of California approves a swap of land to accommodate the uses described below. The following uses shall be permitted in the Subareas defined below, provided that:

1) The parking for the uses can be accommodated on site and the uses are consistent with the truck cap provided in Chapter 2, Truck Access
2) Permitted uses do not conflict with the restrictions of the Tidelands Trust. Some Subareas may have portions of property within them that are be subject to the Tidelands Trust. Such portions of the Subarea that are subject to the Tidelands Trust must adhere to the restrictions of Tidelands Trust, regardless of the Permitted Use.

All development is subject to Planned Development and Design Review approvals.

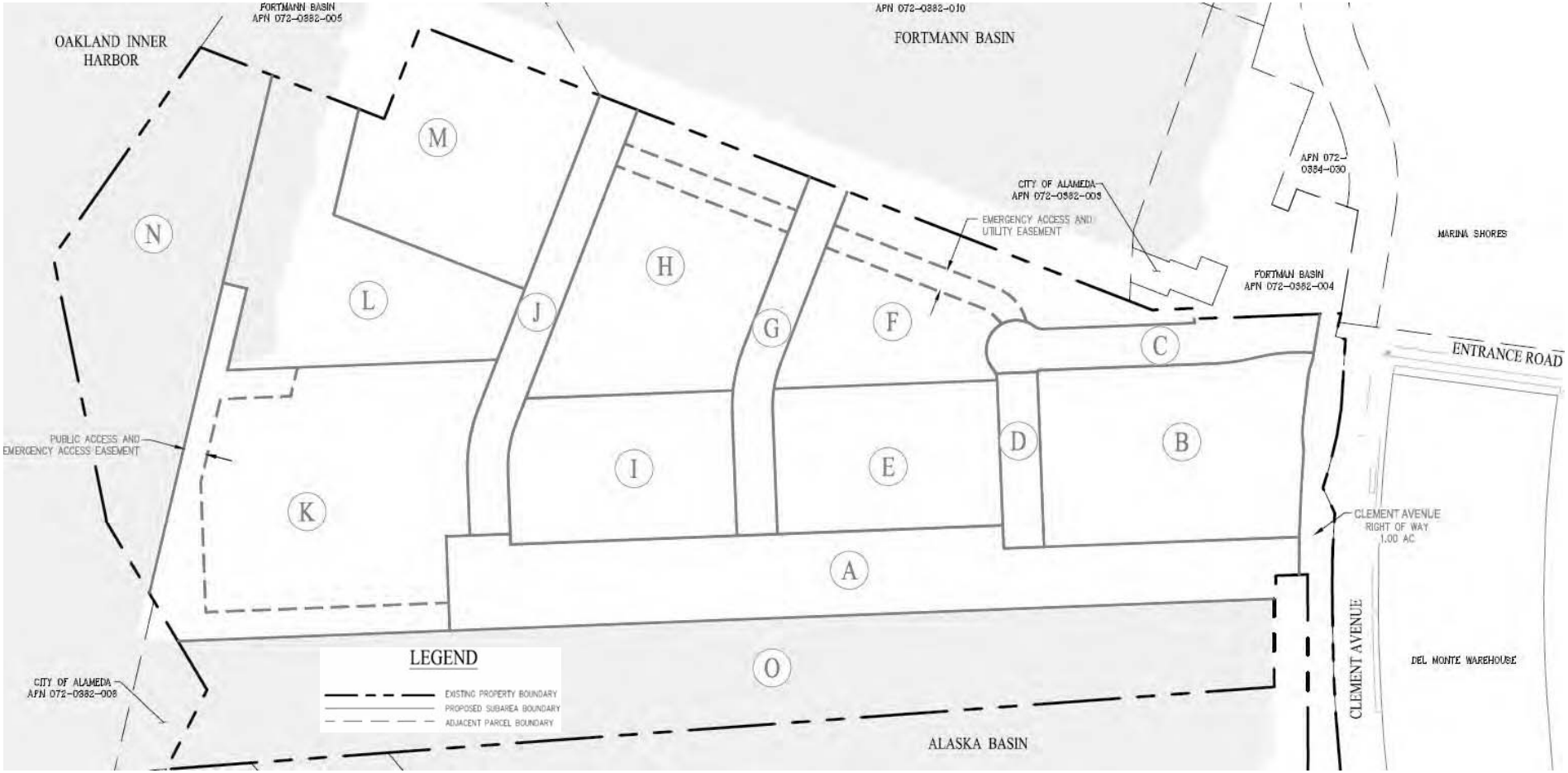


FIGURE 3.3 Base Concept Subarea Plan

SUBAREA A: WATERFRONT PEDESTRIAN PROMENADE AND WEST ENTRY STREET

This Subarea includes submerged property and existing wharf structures. Until there is a specific project proposed and Development Plan created, and until a specific use and configuration of any waterfront facilities is determined, any in-water work, or work in the water related to wharf repair or modification work that may be necessary is unknown. Any specific proposal or wharf modification project proposal will require that further studies be undertaken to evaluate the structural integrity of the wharf, as it relates to the future new intended use(s). Studies will not be undertaken until the ultimate end use is known. Any future wharf repair/modification work that may be required (i.e. replace piers, reinforce existing piers, reconstruct portions of the wharf) will be determined by those studies and investigations Any wharf modifications or repairs are anticipated to be implemented concurrently with a specific Development Plan that may be proposed and approved with the future buildout of Subarea A.

Permitted Uses:

- Publicly-accessible open space, landscape and recreational facilities
- Commercial retail, but not including "super store" type retail commercial uses or drive-through commercial facilities
- Commercial recreational uses
- Artist studios and galleries and museums
- Public Amphitheaters.
- Maritime – recreational boat and small craft rentals and sales but not boat storage or outdoor boat display areas in excess of 800 square feet.
- Public roadways

Permitted Uses Subject to Conditional Use Permit:

- Performance and entertainment facilities, but not multiplex cinemas.
- Restaurants and taverns
- Grocery stores, including alcohol sales for on and off site consumption.
- Light warehousing, light manufacturing, not to exceed 5,000 square feet
- Other uses determined by the Planning Board to be similar to the above and consistent with the plan objectives.

Maximum Building Height:

- 40 feet

Site Development Standards

Building Setbacks

- From subareas B, E and H: 0 feet if adjacent to open space or landscaped areas. 15 feet if adjacent to building setback area. Assure minimum 30-foot building separation to adjacent subareas.
- Buildings shall not be located to block waterfront views from internal street corridors and public open spaces.

SUBAREA B: CLEMENT FRONTAGE

This Subarea fronts onto Clement Avenue and, with the northern commercial/retail edge of the Del Monte Warehouse, creates the anchor and hub for the mixed use elements of both developments. It also creates a sense of place for the waterfront revitalization and as such is a pivotal element in the project, as it is both a front door to the Encinal Terminals waterfront and a continuation of the retail components of the Del Monte Warehouse. The height of buildings in this Subarea matches the maximum height of the Del Monte Warehouse Master Plan. This Subarea will also tie into the Cross Alameda Trail and cycle track components of the Clement Avenue extension.

Permitted Uses:

- Commercial retail, but not including, "super store" type retail commercial uses or drive-through commercial facilities
- Hotel
- Office or medical uses
- Commercial recreational uses
- Commercial Work / Live units consistent with AMC Section 30-15 Work Live Studios, except that new construction is permitted
- Multi-family residential units
- Home occupations consistent with AMC 30-2
- Artist studios and galleries and museums

- Public amphitheaters
- Maritime-related uses– Recreational boat and small craft rentals and sales but not boat storage or outdoor boat display areas in excess of 800 square feet

Permitted Uses Subject to Conditional Use Permit:

- Performance and entertainment facilities, but not multiplex cinemas.
- Restaurants and taverns
- Grocery stores, including alcohol sales for on and off site consumption.
- Light warehousing, light manufacturing, not to exceed 5,000 square feet
- Other uses determined by the Planning Board to be similar to the above and consistent with the plan objectives.

Maximum Building Height:

- 55 feet

Site Development Standards

Building Setbacks

- From West Entrance Street right-of-way (subarea A): 0 feet.
- From East Entrance Street right-of-way (subarea C): 0 feet.
- From internal street rights-of-way (subarea D): 0 feet.
- From Clement Avenue Right of Way: 15 feet.

SUBAREAS C, D, G AND J: PUBLIC ROADWAY RIGHTS OF WAY

These Subareas comprise the public roadways for the site.

Permitted Uses:
Public Roadways, pedestrian walkways, bike paths and landscaping

Maximum Building Height:
Not applicable

Site Development Standards
Building Setbacks
Not applicable.

Roadway Design Standards
See Chapter 2

Roadway Locations and Alignments
Subareas C, D and G may be realigned as needed to accommodate modifications to the building layout, as long as:

1) Public access, continuity and connections through the overall site are provided consistent with the intent of this Master Plan.
2) Two means of access are available to/from Clement Avenue to all developed subareas in all phases of development.
3) Roadway circulation and cross-sections are substantially similar to those defined in Chapter 2 of this Master Plan.

SUBAREAS E, F, H, I AND M

These Subareas comprise mixed use areas that could accommodate residential neighborhoods. The building heights are intended to accommodate buildings up to seven stories, but a mix of residential building heights could also be accommodated. Residential units or office space over ground floor retail would also work in certain areas of the site.

Permitted Uses:

- Commercial retail, but not including, "super store" type retail commercial uses or drive-through commercial facilities
- Hotel
- Office or medical uses
- Commercial recreational uses
- Commercial work/ live units consistent with AMC Section 30-15 Work Live Studios, except that new construction is permitted
- Multi-family residential units
- Home occupations consistent with AMC 30-2
- Artist studios, galleries and museums
- Public Amphitheaters.
- Maritime – Recreational boat and small craft rentals and sales but not boat storage or outdoor boat display areas in excess of 800 square feet.

Permitted Uses Subject to Conditional Use Permit:

- Performance and entertainment facilities, but not multiplex cinemas.
- Restaurants and taverns
- Grocery stores, including alcohol sales for on and off site consumption.
- Light warehousing, light manufacturing, not to exceed 5,000 square feet
- Other uses determined by the Planning Board to be similar to the above and consistent with the plan objectives.

Maximum Building Height:

- 90 feet

Site Development Standards

Building Setbacks

- From east property line: 15 feet.
- From Internal Street Rights-of-Way (subareas B, C, D): 10 feet.
- From central open space, where applicable (subarea I): 0 feet if adjacent to open space or landscaped areas. 15 feet if adjacent to building setback area. Assure minimum 30-foot building separation to adjacent subareas.
- From Waterfront Public Access / EVA Easement: 0 feet

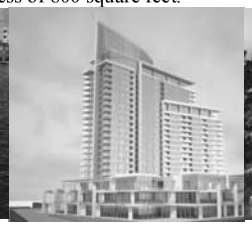
SUBAREA K: NORTHWEST ESTUARY CORNER

This Subarea, occupying some prime waterfront land, has excellent views up and down the estuary and of the Oakland Hills to the east. It is envisioned that a strong, tall iconic building could be accommodated here, with retail and at the lower levels and residential above. The estuary fronting wharf in the area could also house future water transit facilities that could be supported by the retail. This Subarea includes submerged property and existing wharf structures. Until there is a specific project proposed and Development Plan created, and until a specific use and configuration of any waterfront facilities is determined, any in-water work, or work in the water related to wharf repair or modification work that may be necessary is unknown. Any specific proposal or wharf modification project proposal will require that further studies be undertaken to evaluate the structural integrity of the wharf, as it relates to the future new intended use(s). Studies will not be undertaken until the ultimate end use is known. Any future wharf repair/modification work that may be required (i.e. replace piers, reinforce existing piers, reconstruct portions of the wharf) will be determined by those studies and investigations Any wharf modifications or repairs are anticipated to be implemented concurrently with a specific Development Plan that may be proposed and approved with the future buildout of Subarea H.

Permitted Uses:

- Commercial retail, but not including, "super store" type retail commercial uses or drive-through commercial facilities.
- Hotel
- Office or medical uses
- Commercial recreational uses
- Commercial Work / Live units consistent with AMC Section 30-15 Work Live Studios, except that new construction is permitted
- Multi-family residential units

- Home occupations consistent with AMC 30-2
- Artist Studios, galleries and museums.
- Public amphitheaters.
- Maritime – Recreational boat and small craft rentals and sales but not boat storage or outdoor boat display areas in excess of 800 square feet.



Permitted Uses Subject to Conditional Use Permit:

- Performance and entertainment facilities, but not multiplex cinemas.
- Restaurants and taverns
- Grocery stores, including alcohol sales for on and off site consumption.
- Light warehousing, light manufacturing, not to exceed 5,000 square feet
- Other uses determined by the Planning Board to be similar to the above and consistent with the plan objectives.

Maximum Building Height:

- 250 feet

Site Development Standards

Building Setbacks

- From West Entry Street right-of-way (subarea A) and internal street right-of-way (subarea G): 10 feet.
- From Central Open Space: (subarea I): 0 feet.
- From Waterfront Public Access / EVA Easement: 0 feet

SUBAREA L: PUBLIC OPEN SPACE AND PARK

This Subarea provides the primary public waterfront recreational space on the site. A Public park that ties into the waterfront promenade is envisioned for this area.

Permitted Uses:

- Publicly-accessible open space, walkways, bike paths and recreational facilities
- Commercial recreational uses
- Public amphitheaters

Permitted Uses Subject to Conditional Use Permit:

- Performance and entertainment facilities, but not multiplex cinemas

Maximum Building Height:

- 40 feet

Site Development Standards

Building Setbacks

- From Internal Street Rights-of-Way (subarea D): 10 feet.
- From Waterfront Public Access / EVA Easement: 0 feet
- From subarea K and subarea M: 0 feet if adjacent to open space or landscaped areas. 15 feet if adjacent to building setback area. Assure minimum 30-foot building separation to adjacent subareas.

SUBAREAS N AND O: SUBMERGED AREAS (ALASKA BASIN AND OAKLAND ESTUARY)

These parcels include submerged property. Until there is a specific marina project proposed, and until a specific use and configuration of any waterfront facilities is determined, any in-water work, or work in the water related to wharf repair or modification work that may be necessary is unknown. Any specific marina proposal or wharf modification project proposal would require that further studies be undertaken to evaluate the structural integrity of the wharf, as it relates to the future new intended use(s). Studies would not be undertaken until the ultimate end use is known. Any future wharf repair/modification work that may be required (i.e. replace piers, reinforce existing piers, reconstruct portions of the wharf) would be determined by those studies and investigations Any wharf modifications or repairs are anticipated to be implemented concurrently with a specific development project that may be proposed with the future buildout of Subareas K and L.

Permitted Uses:

- Public and private open space , walkways, bike paths and recreational facilities
- Maritime – Recreational boat and small craft rentals, sales and launch facilities but not boat storage.
- Maritime--Marina berths; up to160 berths
- Maritime office
- Public and private water transit facilities
- Public and private waterfront athletic clubs and yacht clubs
- Commercial retail, but not including, "super store" type retail commercial uses or drive-through commercial facilities

Permitted Uses Subject to Conditional Use Permit:

- Performance and entertainment facilities, but not multiplex cinemas.
- Restaurants and taverns
- Grocery stores, including alcohol sales for on and off site consumption.
- Other uses determined by the Planning Board to be similar to the above and consistent with the plan objectives.

Maximum Building Height:

- 40 feet

Site Development Standards

Building Setbacks:

- From Primary Entry Street right-of-way (subarea A) and subareas H, I and J: 0 feet.
- From west property line (within Alaska Basin): 25 feet.
- From north property line (within Oakland Estuary): 0 feet.

Buildings shall be located to minimize blockage waterfront views from internal streets and public open spaces, where possible.

RESIDENTIAL DENSITY/ MAXIMUM DEVELOPMENT

RESIDENTIAL DENSITY

In 2008, the North Waterfront General Plan Amendment (GPA) changed the land use designation for the property from Industrial to Mixed Use. More recently, in July 2012, with the adoption of the City's new Housing Element, the City rezoned the property to Mixed Use with a Multi-Family Overlay, which allows for a wide variety of residential, retail, marine and commercial uses.

All of the property is comprised of the MX Mixed Use Zoning District which permits a maximum allowable base residential density of one unit per 2,000 square feet of lot area for land designated for residential use or a gross residential density of up to 21.78 units per acre. In addition, the majority of the property (15.48 acres) on the site also contains the Multi Family Overlay (MFO) on the MX Zoning, which allows the maximum density to increase to 30 units per acre for this acreage. The portion of the property without the MF Overlay is 1.25 acres. There is an additional 6.4 acre portion of a parcel within the Master Plan that is currently owned by the City of Alameda and is zoned Mixed Use (MX) but is not included in the density calculation due to its status of being subject to the Tidelands Trust, which does not permit residential development.

Consistent with the existing zoning, 15.48 acres at 30 units per acre (MFO) yields 464 housing units. The 1.25 acres at 21.78 units per acre (MX) yields 27 housing units. Therefore, the existing zoning allows 491 housing units. However, since this Master Plan proposes to provide additional affordable housing units in excess of the minimum required (See Affordable Housing below), a density bonus will be applied to increase the number of units.

MAXIMUM RESIDENTIAL DEVELOPMENT

Notwithstanding the base density and bonus development standards stated above, the maximum residential development for the overall Encinal Terminals site shall not exceed 589 residential units.

NON-RESIDENTIAL DENSITY/ MINIMUM DEVELOPMENT

NON-RESIDENTIAL DENSITY

It is anticipated that the commercial square footage for the Master Plan will contain between 30,000 and 50,000 square feet.

MINIMUM NON-RESIDENTIAL DEVELOPMENT

There will be not less than 30,000 s.f. of commercial space provided at the Encinal Terminals site.

RESIDENTIAL AND NON-RESIDENTIAL DEVELOPMENT BALANCE

It is the intent of this Master Plan to allow a mix of uses, of up to 589 residential units, up to 160 marina berths and up to 50,000 square feet of commercial space. The Planning Board may approve additional uses or an increase in the number of units in a subarea provided that a corresponding reduction in the authorized amount of another use is made or it can be demonstrated that the change will not result in new or substantially more severe environmental impacts.

AFFORDABLE HOUSING

Since the redevelopment proposal seeks to provide additional affordable housing units in excess of the required, the additional units will qualify the project for affordable housing incentives, waivers, and a density bonus in accordance with AMC 30-17 Affordable Housing Density Bonus. As such, the project will build a total of 79 affordable units, broken down as follows:

- Five percent (5%) of all units shall be affordable to very low income households (25 units).
- Four percent (4%) shall be affordable to low income households (20 units).
- Seven percent (7%) shall be affordable to moderate income households (34 units).

The project developer/owner shall be responsible for funding and constructing all 79 of the affordable housing units in the Encinal Terminals site. The project developer/owner may enter into an agreement with the Alameda Housing Authority or a non-profit housing developer to construct a portion of the units, but any such agreement shall not override the requirements of this Master Plan or the approved Affordable Housing Agreement with the City of Alameda. The project developer/owner may also seek whatever funding sources it deems necessary, including Low Income Housing Tax Credits and/or tax-exempt bond financing, to construct the affordable housing units, but failure to secure said funding shall not override the requirements of this Master Plan or the approved Affordable Housing Agreement with the City of Alameda.

This Master Plan and the Affordable Housing Agreement will ensure that the affordable units are provided throughout the project and concurrent with the provision of the market rate units, the project developer/owner shall comply with the following regulations:

1. It is anticipated that the 34 Moderate income units would be spread among and within the market rate units throughout the site, built in proportion to the market rate units. This will be specified further in the Affordable Housing Agreement.

2. The 45 Low and Very Low income units will all be built in one or more new buildings within the Encinal Terminals Master Plan area.

3. The project developer/owner shall enter into an Affordable Housing Agreement, covering all 79 affordable units, with the City of Alameda prior to issuance of the first Building Permit for the first market rate building to be constructed on the Encinal Terminals Master Plan properties, or prior to approval of the first final map for the project, whichever occurs first.

4. All 79 affordable units shall be provided within the first 500 of the total units permitted by the Master Plan.

5. The Development Plan and Design Review plans for the first Low/Very Low building must be reviewed and approved prior to the issuance of the first building permit for the first market rate building to be constructed among the Encinal Terminals Master Plan properties.

6. If the Low/Very Low income units are distributed within more than one building, the building permit for the building that includes at least 23 of the 45 Low/Very Low income affordable housing units shall be issued before any occupancy permits are issued for any market rate units. The building permit for the last of the 45 Low/Very Low units shall be issued prior to occupancy of the 300th market rate unit in the Master Plan.

7. In the event that the Alameda Housing Authority chooses to enter into an agreement with the property developer/owner for a portion of the 79 affordable units, the Planning Board may waive or adjust the timing requirements described above for the construction and occupancy of one or more of the buildings upon request from the Alameda Housing Authority, if the Planning Board is able to make the finding that the adjustment in the timing requirements is necessary to facilitate the provision of affordable housing or improve the overall coordination of development activities on the properties. In any event, the project developer/owner must provide all funding for the affordable housing project if the Housing Authority or other affordable housing entity is not able to secure all of the financing needed, such that the building(s) housing the last of the 45 low/very low affordable units must be completed no later than 24 months from occupancy of the 300th market rate unit.

8. Because this is a multi-phased Master Plan project, it is expected that the final building plans will be developed with an affordable housing provider pursuant to the Affordable Housing Agreement. As a result of this phasing, project site plans, floor plans and architectural elevations for all affordable units will be shown at the time that applications for Development Plan and Design Review are submitted for review by the Planning Board. Photographic or artist rendered examples of potential architecture for the Low/Very Low are included in the Master Plan, with the intent that the Low/Very Low building(s) will be compatible with other buildings on the site.

PARKING

GENERAL GUIDELINES

All parking for uses on the Encinal Terminals site shall be accommodated on site or along the Clement Avenue frontage.

All on-site, surface parking spaces shall be shared among the on-site uses and available for public use in support of the Transportation Demand Management (TDM) program.

Parking shall be allowed on all internal streets and Clement Avenue. Provisions will be made to ensure that all on-site, surface parking spaces are shared and available for public use.

Parking areas, garages, and driveway areas on private residential parcels are exempted from the shared parking requirement.

The following parking requirements are reduced from Alameda Municipal Code standard parking rates in recognition that all the spaces will be shared and that the development will include a site specific Transportation Demand Management program. Parking lots shall not be located or designed in a manner that would deter access to the waterfront or reduce the quality of the waterfront experience. The minimum number of multi-family residential parking spaces shall be 1.25 per unit and 2 per townhome unit. Minimum parking standards for non-residential uses will be as follows.

- Commercial retail uses: 2 spaces per 1,000 square feet.
- Hotel Use: One space per room plus one space for on-site manager.
- Office or medical use: 2 spaces per 1,000 feet.
- Entertainment and Recreational uses: 2 spaces per 1,000 square feet.
- Light warehousing, light manufacturing: 0.5 spaces per 1,000 feet.
- Commercial Recreational uses: 0.5 spaces per 1,000 square feet.
- Artist Studios and Galleries and Museums: 0.5 spaces per 1,000 square feet.
- Performance, Entertainment, Amphitheater: 1 space per 1,000 square feet.
- Restaurants and Taverns: Parking: 2 spaces per 1,000 square ft.
- Maritime: 1 space per 1,000 square feet of gross floor area.
- Schools and Educational Facilities - Per AMC or Planning Board decision based on type of school or facility.
- Farmers Markets, Community Gardens- no parking required.

Upon review of the TDM program and the proposed uses in each phase of the site development, the Planning Board may increase or decrease the number of parking spaces required for a particular phase of the site development through Site Development Plan approval.

BUNDLED/UNBUNDLED PARKING

In order to reduce traffic trips and parking demand, a mix of bundled and unbundled parking will be implemented in all residential buildings with structured parking (i.e., townhomes would be exempt) within the Encinal Terminals Master Plan area consistent with the following regulations, guidelines, and exceptions:

The on-site parking shall be managed by the Parking Owner/Operator (PO). The PO shall assign one (1) parking space to each owner or tenant of a residential unit (i.e., one bundled space). The cost of the assigned space shall be automatically included in the housing unit lease agreement or purchase price.

The PO shall lease the remaining additional spaces to individual users pursuant to the following guidelines:

- Monthly lease rates will be at market rate, and may be adjusted by the Parking Owner/Operator as market conditions change.
- Monthly leases shall be limited to one additional space per unit.
- The PO shall maintain the on-site parking pool to ensure that all on-site users have fair access to the available parking.
- If the available on site parking is 100% utilized, the PO shall maintain a waiting list of residents or commercial tenants who wish to lease spaces.
- The PO may offer spaces for lease to non-residents or non-tenants of the Encinal Terminals Master Plan, with the provision that such spaces must be vacated on 30 days' notice if needed for tenants or residents or car share spaces of the Encinal Terminals Master Plan.
- The PO shall maintain a written record of residents' and commercial tenants' on-site parking use. The record shall be provided annually to the City of Alameda as part of the TDM Annual report. The annual report shall include at least the following information:
    - Number of spaces leased to residents, commercial tenants, or others.
    - Number of car share spaces provided.
    - Current number of residents or tenants on waiting list if any.

Tenants of affordable residential units shall have an equal opportunity to rent a parking space on the same terms and conditions as offered to the potential buyers and renters of market rate units, at a price proportional to the rental price of their units as compared to comparable market rate units. In the circumstance that 100% of the units in a building are affordable to very low and low income households and the financing of the building depends upon Low Income Housing Tax Credits, and the Tax Credit financing prohibits unbundling of the parking, the Planning Board may grant an exception to the unbundled parking regulations contained in the TDM Plan.

SHARED PARKING

Mixed-use development creates opportunities for shared parking because of the staggered demand peaks for parking associated with different uses. All land uses generate unique levels and patterns of parking demand, varying by time of day and day of the week. Parking supplies at mixed-use locations accommodate these demand fluctuations more efficiently than segregated supplies, by accommodating peaking uses with spaces left vacant by other uses, thereby substantially reducing the overall number of parking spaces needed by a project. For example, spaces occupied by daytime retail shoppers or office workers during the day are largely empty during the evening and can be filled, or "shared," with residents who are parking overnight or visitors to a nearby restaurant. Shared parking is included in the Encinal Terminals Master Plan.

CAR SHARE PARKING

Car share companies are growing the Bay Area and Alameda as more and more Bay Area residents choose to reduce personal automobile ownership costs in favor for membership in a car share program. These programs allow members to use a car, when a car is needed, without the cost of owning a car. Car share spaces will be interspersed throughout the Master Plan to ensure that there are sufficient opportunities for residents to use car share programs.

BUILDING DESIGN

DESIGN AND ORIENTATION

Buildings should have a strong relationship to the sidewalk, shoreline promenade, and other public spaces.

Buildings shall provide a pedestrian-friendly scale along the waterfront edge that will enhance the waterfront experience for pedestrians.

Building facades adjacent to public pedestrian areas (especially at the ground floor) should have design elements that are human-scaled in order to enhance pedestrian comfort at the ground level.

All new buildings should include interesting façade treatments including ample building articulation, a variety of building materials, visually interesting facades, and window types that are complementary to the existing architectural styles in the area. Blank facades, unfenestrated walls and mirrored or darkly tinted glass should be avoided.

BUILDING ENTRIES

Primary commercial building entrances (for example, the entry to a store or the lobby entry to an office building) shall front onto public streets, entry plazas or public open spaces in order to emphasize the primary importance of the pedestrian realm.

BUILDING HEIGHTS

Building heights shall be as specified in Chapter 3, Subarea Development Standards.

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VIEW CORRIDORS

New buildings and trees shall be located to maximize view corridors to the Estuary. Permanent marina berths may be located on the northern edge of the site facing the Estuary and Coast Guard Island, but care should be taken to respect views of the water and Oakland.

BUILDING MATERIALS

Architectural character should be complementary to, but not mimic, the historic industrial/maritime character of the waterfront.

Materials should create an architectural character in keeping with the existing buildings and maritime architecture of the area in terms of color, scale, and texture, and convey a sense of durability.

SUSTAINABLE DESIGN REQUIREMENTS

Building improvements should be consistent with a LEED Silver designation or its equivalent. Use of solar panels for energy generation is encouraged.

UNIVERSAL DESIGN

All residential units shall be designed to be universally adaptable. All primary floors will be served by an elevator and every residential unit will have an accessible route to it and within it. Townhouse units will have an adaptable first floor and a second floor or mezzanine that is not adaptable.

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CHAPTER 4: DEVELOPMENT PROCESSES AND PROCEDURES

GENERAL REQUIREMENTS

All private and public improvements within the Master Plan area shall be consistent with the requirements of this Plan and the Alameda Municipal Code (AMC). In the event of a conflict between the provisions of this Master Plan and the AMC, the provisions of this Master Plan shall govern.

PHASING REQUIREMENTS

The project may be constructed and occupied in phases. The phasing may need to be adjusted from time to time due to economic conditions, public infrastructure improvements, or land acquisition timing. Phasing may occur in any logical pattern so long as:

- Each phase shall be consistent with the site wide infrastructure and open space plan, Transportation Demand Management Plan, Affordable Housing Plan, and the requirements of this Master Plan. All required public access and site wide infrastructure improvements shall be completed with completion of each phase, consistent with the Site Wide infrastructure and open space plans.
- Two completed means of access are available to/from Clement Street and /or Buena Vista
- Open space parcels or public open space or waterfront public access will be offered for dedication and improved concurrently with completion of the residential or commercial areas immediately inland of them.
- Each phase of the development shall be responsible for ensuring compliance with Federal, State and Regional standards and permits. Future specific development projects do not exceed the maximum densities specified in the Master Plan. All phase submittals must include:
    - Reconciliation of maximum unit densities for the Residential component as it relates to the entirety of the site build out.
    - Reconciliation of maximum square footage for the Non-Residential component as it relates to the entirety of the site build out.
    - An explanation of how all uses are consistent with the on-site parking plan, site wide infrastructure plan, and site wide public access plan.
    - A commitment that all required public access, and site wide infrastructure improvements are completed with completion of final residential phase.

PHASING APPROVALS

Prior to the issuance of a building permit for construction of the first phase, the applicant shall prepare and submit the following documents and applications for Planning Board review and approval:
In addition to the submittal requirements of AMC Section 30-4.20 and AMC Section 30-4.13, the first phase submittals must include:

- The site development plan shall include a site wide, "full build out" parking plan, a Clement Avenue extension plan, and an overall site development and open space phasing plan.
- A site wide Master Infrastructure and Site Improvement Plan that includes a wharf and perimeter assessment and improvement plan, storm water improvement plan, wastewater assessment and improvement plan, master grading plan, master on-site public space improvement plan, master on site power plan, and implementation and phasing plan for the Clement Avenue extension from Entrance Road to Sherman Road and Atlantic Avenue as shown in Exhibit A.
- A Tidelands Plan.
- The site wide Transportation Demand Management Plan,
- The site wide Affordable Housing Plan.
- The Development Plan for the first phase. The application submittals shall include the materials required by AMC Section 30-4.20 MX Zoning District and AMC Section 30-4.13 Planned Development
- Design Review application for the phase consistent with the requirements of AMC Section 30-36 and AMC Section 30-37 "Design Review".
- Density Bonus application consistent with AMC Section 30-17 "Affordable Housing Density Bonus," if requested by applicant. Residential use in excess of 491 residential units (up to 530 units) shall require approval of a Density Bonus Application

Prior to issuance of the first building permit for the first phase, the Community Development Director and Public Works Director shall review and approve a site wide Master Infrastructure and Site Improvement Plan that includes storm water improvement plan, wastewater assessment and improvement plan, master grading plan, master on-site public space improvement plan, and a master on-site power plan.

Prior to the issuance of a building permit for construction of any subsequent phase, the applicant shall prepare and submit the following documents and applications for Planning Board review and approval:

- The Development Plan for that phase. The application submittals shall include the materials required by AMC Section 30-4.20 MX Zoning District and AMC Section 30-4.13 Planned Development
- Design Review application for that phase consistent with the requirements of AMC Section 30-36 and AMC Section 30-37 "Design Review".
- Any updates to the site wide Phasing Plan.
- Alameda Municipal Power shall review each phase of the development to ensure that adequate facilities for the provision of power are provided.
- City of Alameda Public Works Department shall review each phase of the development to ensure that adequate water, storm drain, wastewater, and transportation infrastructure are provided.
- City of Alameda Fire Department shall review each phase of the development to ensure that adequate emergency vehicle access is provided
- Any proposed subdivision of the property shall be subject to AMC 30-87 Subdivision.

ASSESSMENT DISTRICT/COMMUNITY FACILITIES DISTRICT

An Assessment District or Community Facilities District may be established to fund public improvements and/or municipal services such as street and sewer maintenance, and transit services to the site.

PRELIMINARY DEVELOPMENT SCHEDULE

It is anticipated that, upon receipt of all land use approvals, including approval of this Master Plan , Development Plan, Density Bonus Application and Design Review approvals, that the project team will commence preparation of improvement plans for the site and its adjacent frontages. It is expected that preparation of and approval of these plans will take up to one year. It is expected that construction could commence as early as late 2017, with first occupancies in 2019 or 2020. Phasing plans will be developed at the time of approval of the Master Tentative Map.

A New Waterfront Mixed-Use Neighborhood

May 12, 2016

APPENDIX

APPENDIX 1: NO SWAP ALTERNATIVE PLAN

This Master Plan Base Concept followed the General Plan/Northern Waterfront Plan and anticipated a swap of land, to reconfigure the Tidelands Trust land such that all of the Trust property is in a swath of waterfront property surrounding the site, and would remove the Tidelands restrictions on some of the property in the interior of the site. Such a swap would be subject to approval by the State Lands Commission; the land swap would be finalized after Master Plan approval. In the event that the a swap is not approved, and the land remains in its current configuration, the Non-Swap Alternative Plan, which is described in the pages following the Base Plan, would be adopted. The following pages would be substituted for pages 28 to 37.

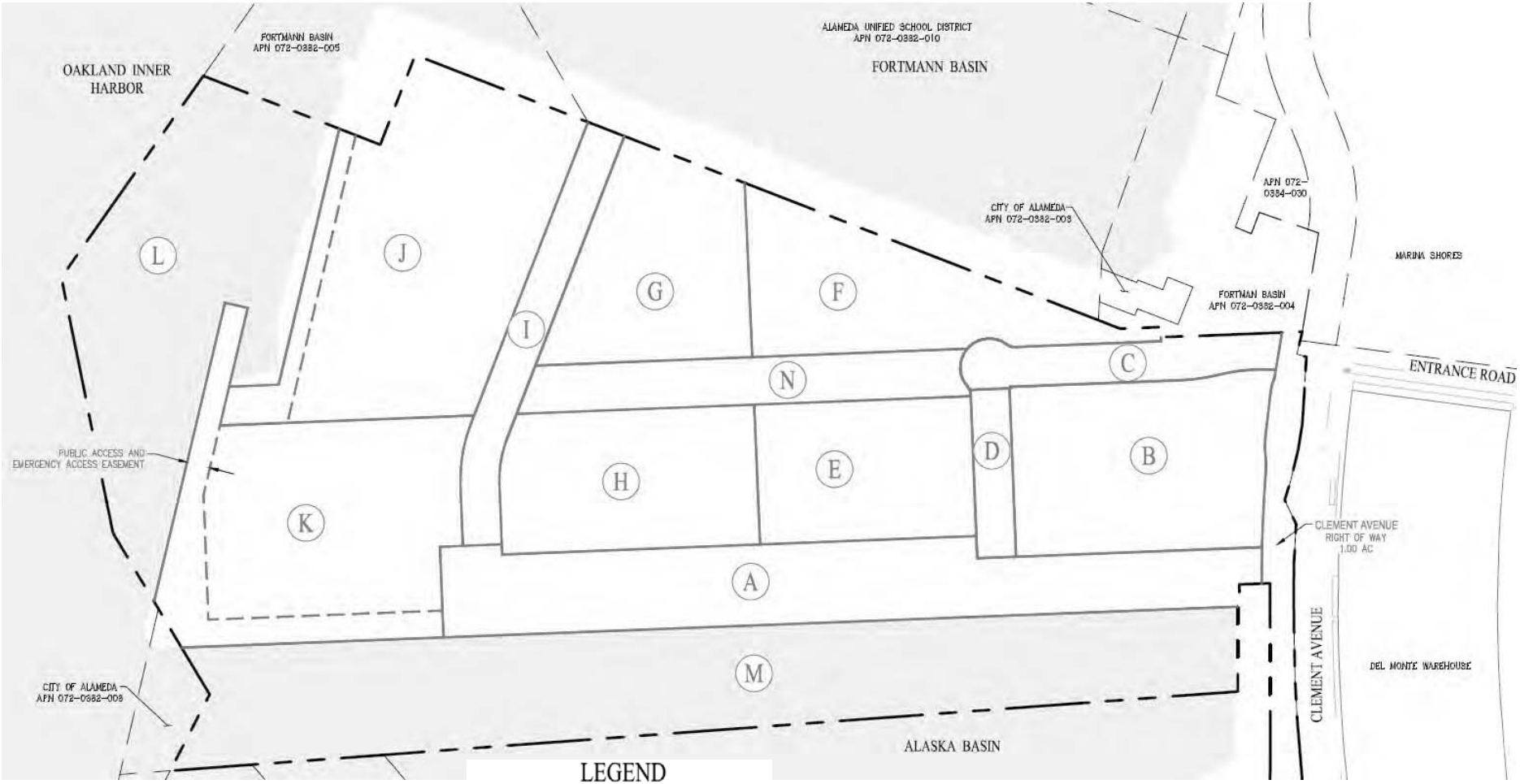
Permitted and Conditionally Permitted Land Uses: No Swap Alternative

This plan assumes that there is no swap of land, and that the Tidelands Trust lands remain as they are currently configured (as shown in Tidelands Trust A).

The following uses shall be permitted in the Subareas defined below, provided that:

1) The parking for the uses can be accommodated on site and the uses are consistent with the truck cap provided in Chapter 2, Truck Access.
2) Permitted uses do not conflict with the restrictions of the Tidelands Trust. Some Subareas (see Subareas A, B, C, D, E, F and N) have portions of property within them that are within the areas subject to the Tidelands Trust. Such portions of the Subarea that are subject to the Tidelands Trust must adhere to the restrictions of Tidelands Trust, regardless of the Permitted Use.

All development is subject to Planned Development and Design Review approvals.



No Swap Subarea Plan

LEGEND

EXISTING PROPERTY BOUNDARY
PROPOSED SUBAREA BOUNDARY
ADJACENT PARCEL BOUNDARY

SUBAREA A: WATERFRONT PEDESTRIAN PROMENADE AND WEST ENTRY STREET

This Subarea includes submerged property and existing wharf structures. Until there is a specific project proposed and Development Plan created, and until a specific use and configuration of any waterfront facilities is determined, any in-water work, or work in the water related to wharf repair or modification work that may be necessary is unknown. Any specific proposal or wharf modification project proposal will require that further studies be undertaken to evaluate the structural integrity of the wharf, as it relates to the future new intended use(s). Studies will not be undertaken until the ultimate end use is known. Any future wharf repair/modification work that may be required (i.e. replace piers, reinforce existing piers, reconstruct portions of the wharf) will be determined by those studies and investigations Any wharf modifications or repairs are anticipated to be implemented concurrently with a specific Development Plan that may be proposed and approved with the future buildout of Subarea A.

Permitted Uses:

Publicly-accessible roadways, open space, landscape and recreational facilities

- Commercial retail, but not including "super store" type retail commercial uses or drive-through commercial facilities
- Commercial recreational uses
- Artist studios and galleries and museums
- Public Amphitheaters.
- Maritime – recreational boat and small craft rentals and sales but not boat storage or outdoor boat display areas in excess of 800 square feet.

Permitted Uses Subject to Conditional Use Permit:

- Performance and entertainment facilities, but not multiplex cinemas.
- Restaurants and taverns
- Grocery stores, including alcohol sales for on and off site consumption.
- Light warehousing, light manufacturing, not to exceed 5,000 square feet
- Other uses determined by the Planning Board to be similar to the above and consistent with the plan objectives.

Maximum Building Height:

- 40 feet

Site Development Standards

Building Setbacks

- From subareas B, E and H: 0 feet if adjacent to open space or landscaped areas. 15 feet if adjacent to building setback area. Assure minimum 30-foot building separation to adjacent subareas.
- Buildings shall not be located to block waterfront views from internal street corridors and public open spaces

SUBAREA B: CLEMENT FRONTAGE

This Subarea fronts onto Clement Avenue and, with the northern commercial/retail edge of the Del Monte Warehouse, creates the anchor and hub for the mixed use elements of both developments. It also creates a sense of place for the waterfront revitalization and as such is a pivotal element in the project, as it is both a front door to the Encinal Terminals waterfront and a continuation of the retail components of Del Monte. The height of buildings in this Subarea matches the maximum height of the Del Monte Warehouse Master Plan. This Subarea will also tie into the Cross Alameda Trail and cycle track components of the Clement Avenue extension.

Permitted Uses:

- Commercial retail, but not including, "super store" type retail commercial uses or drive-through commercial facilities
- Hotel
- Office or medical uses
- Commercial recreational uses
- Commercial Work / Live units consistent with AMC Section 30-15 Work Live Studios, except that new construction is permitted
- Multi-family residential units
- Home occupations consistent with AMC 30-2
- Artist studios and galleries and museums
- Public amphitheaters
- Maritime-related uses– Recreational boat and small craft rentals and sales but not boat storage or outdoor boat display areas in excess of 800 square feet

Permitted Uses Subject to Conditional Use Permit:

- Performance and entertainment facilities, but not multiplex cinemas.
- Restaurants and taverns
- Grocery stores, including alcohol sales for on and off site consumption.
- Light warehousing, light manufacturing, not to exceed 5,000 square feet
- Other uses determined by the Planning Board to be similar to the above and consistent with the plan objectives.

Maximum Building Height:

- 60 feet

Site Development Standards

Building Setbacks

- From West Entrance Street right-of-way (subarea A): 0 feet.
- From East Entrance Street right-of-way (subarea C): 0 feet.
- From internal street rights-of-way (subarea D): 0 feet.
- From Clement Avenue Right of Way: 15 feet.

SUBAREAS C, D, I AND N: PUBLIC ROADWAY RIGHTS OF WAY

These Subareas comprise the public roadways for the site.

Permitted Uses:
Public Roadways, pedestrian walkways, bike paths and landscaping

Maximum Building Height:
Not applicable

Site Development Standards
Building Setbacks
Not applicable.

Roadway Design Standards
See Chapter 2

Roadway Locations and Alignments
Subareas C, D, I and N may be realigned as needed to accommodate modifications to the building layout, as long as:

1) Public access, continuity and connections through the overall site are provided consistent with the intent of this Master Plan.
2) Two means of access are available to/from Clement Avenue to all developed subareas in all phases of development.
3) Roadway circulation and cross-sections are substantially similar to those defined in Chapter 2 of this Master Plan.

SUBAREAS E AND F: SUBJECT TO TIDELANDS TRUST USES

These upland parcels would be wholly subject to the Tidelands Trust restrictions.

Permitted Uses:

- Public and private open space , walkways, bike paths and recreational facilities
- Maritime – Recreational boat and small craft rentals, sales and launch facilities but not boat storage.
- Maritime office
- Public and private water transit facilities
- Public and private waterfront athletic clubs and yacht clubs

Permitted Uses Subject to Conditional Use Permit:

- Performance and entertainment facilities, but not multiplex cinemas.
- Restaurants and taverns
- Other uses determined by the Planning Board to be similar to the above and consistent with the plan objectives.

Maximum Building Height:

- 40 feet

Site Development Standards

***Building Setbacks*:**

- From Internal Street Rights-of-way (Subareas C, D and N): 10 feet.
- From E's west property line: 15 feet.
- From F's east property line: 15 feet.
- From subarea G and subarea H: 0 feet if adjacent to open space or landscaped areas. 15 feet if adjacent to building setback area. Assure minimum 30-foot building separation to adjacent subareas.

Buildings shall be located to minimize blockage waterfront views from internal streets and public open spaces, where possible.

SUBAREAS G AND H: MIXED USE TIDELANDS/NON-TIDELANDS

These Subareas comprise mixed use areas that could accommodate residential neighborhoods. The building heights are intended to accommodate buildings up to seven stories, but a mix of residential building heights could also be accommodated. Residential units or office space over ground floor retail would also work in certain areas of the site. Portions of these Subareas are within the Tidelands Trust area, and in those portions, uses are limited to the Tidelands Uses. Portions of the Subarea not subject to the Tidelands Trust are therefore only subject to the restrictions contained in the this section.

Permitted Uses:

- Commercial retail, but not including, "super store" type retail commercial uses or drive-through commercial facilities
- Hotel
- Office or medical uses
- Commercial recreational uses
- Commercial work/ live units consistent with AMC Section 30-15 Work Live Studios, except that new construction is permitted
- Multi-family residential units
- Home occupations consistent with AMC 30-2
- Artist studios, galleries and museums
- Public Amphitheaters.
- Maritime – Recreational boat and small craft rentals and sales but not boat storage or outdoor boat display areas in excess of 800 square feet.

Permitted Land Uses on Property Subject to the Tidelands Trust

The following uses are permitted on lands that are subject to the Tidelands Trust

- Public recreation facilities, including hotels, restaurants, commercial recreation centers, entertainment facilities and attractions
- Public waterfront promenades, pedestrian trails, sidewalks, landscaped areas
- Public Parks and open space
- Public buildings, convention centers, museums, assembly areas and meeting places
- Streets, parking, landscaped areas
- Maritime related industry (excluding boat repair and storage), boat sales with limited outside display, rentals, leasing, marina berths

Permitted Uses Subject to Conditional Use Permit:

- Performance and entertainment facilities, but not multiplex cinemas.
- Restaurants and taverns
- Grocery stores, including alcohol sales for on and off site consumption.
- Light warehousing, light manufacturing, not to exceed 5,000 square feet
- Other uses determined by the Planning Board to be similar to the above and consistent with the plan objectives.

Maximum Building Height:

- 90 feet

Site Development Standards

Building Setbacks

- From Subarea G's east property line: 15 feet.
- From Internal Street Rights-of-Way (Subareas I and N): 10 feet.
- From subareas A, E and F: 0 feet if adjacent to open space or landscaped areas. 15 feet if adjacent to building setback area. Assure minimum 30-foot building separation to adjacent subareas.

SUBAREA J: NORTHEAST ESTUARY CORNER

This Subarea comprises mixed use areas that could accommodate residential neighborhoods. The building heights are intended to accommodate buildings up to seven stories, but a mix of residential building heights could also be accommodated. Residential units or office space over ground floor retail would also work in certain areas of the site.

Permitted Uses:

- Commercial retail, but not including, "super store" type retail commercial uses or drive-through commercial facilities
- Hotel
- Office or medical uses
- Commercial recreational uses
- Commercial work/ live units consistent with AMC Section 30-15 Work Live Studios, except that new construction is permitted
- Multi-family residential units
- Home occupations consistent with AMC 30-2
- Artist studios, galleries and museums
- Public Amphitheaters.
- Maritime – Recreational boat and small craft rentals and sales but not boat storage or outdoor boat display areas in excess of 800 square feet.

Permitted Uses Subject to Conditional Use Permit:

- Performance and entertainment facilities, but not multiplex cinemas.
- Restaurants and taverns
- Grocery stores, including alcohol sales for on and off site consumption.
- Light warehousing, light manufacturing, not to exceed 5,000 square feet
- Other uses determined by the Planning Board to be similar to the above and consistent with the plan objectives.

Maximum Building Height:

- 250 feet

Site Development Standards

Building Setbacks

- From east property line: 0 feet if adjacent to open space or landscaped areas. 15 feet if adjacent to building setback area. Assure minimum 30-foot building separation to adjacent subareas
- From Subarea K: 0 feet if adjacent to open space or landscaped areas. 15 feet if adjacent to building setback area. Assure minimum 30-foot building separation to adjacent subareas.
- From Internal Street Rights-of-Way (Subarea I): 10 feet.

SUBAREA K: NORTHWEST ESTUARY CORNER

This Subarea, occupying some prime waterfront land, has excellent views up and down the estuary and of the Oakland Hills to the east. It is envisioned that a strong, tall iconic building could be accommodated here, with retail and at the lower levels and residential above. The estuary fronting wharf in the area could also house future water transit facilities that could be supported by the retail. This Subarea includes submerged property and existing wharf structures. Until there is a specific project proposed and Development Plan created, and until a specific use and configuration of any waterfront facilities is determined, any in-water work, or work in the water related to wharf repair or modification work that may be necessary is unknown. Any specific proposal or wharf modification project proposal will require that further studies be undertaken to evaluate the structural integrity of the wharf, as it relates to the future new intended use(s). Studies will not be undertaken until the ultimate end use is known. Any future wharf repair/modification work that may be required (i.e. replace piers, reinforce existing piers, reconstruct portions of the wharf) will be determined by those studies and investigations Any wharf modifications or repairs are anticipated to be implemented concurrently with a specific Development Plan that may be proposed and approved with the future buildout of Subarea H.

Permitted Uses:

- Commercial retail, but not including, “super store” type retail commercial uses or drive-through commercial facilities.
- Hotel
- Office or medical uses
- Commercial recreational uses
- Commercial Work / Live units consistent with AMC Section 30-15 Work Live Studios, except that new construction is permitted
- Multi-family residential units
- Home occupations consistent with AMC 30-2
- Artist Studios, galleries and museums.
- Public amphitheaters.
- Maritime – Recreational boat and small craft rentals and sales but not boat storage or outdoor boat display areas in excess of 800square feet.

Permitted Uses Subject to Conditional Use Permit:

- Performance and entertainment facilities, but not multiplex cinemas.
- Restaurants and taverns
- Grocery stores, including alcohol sales for on and off site consumption.
- Light warehousing, light manufacturing, not to exceed 5,000 square feet
- Other uses determined by the Planning Board to be similar to the above and consistent with the plan objectives.

Maximum Building Height:

- 250 feet

Site Development Standards

Building Setbacks

- From West Entry Street right-of-way (subarea A) and internal street right-of-way (subarea G): 10 feet.
- From Central Open Space: (subarea I): 0 feet.
- From Waterfront Public Access / EVA Easement: 0 feet

SUBAREAS L AND M: SUBMERGED AREAS (ALASKA BASIN AND OAKLAND ESTUARY)

These parcels include submerged property. Until there is a specific marina project proposed, and until a specific use and configuration of any waterfront facilities, any in-water work, or work in the water related to wharf repair or modification work that may be necessary is unknown. Any specific marina proposal or wharf modification project proposal would require that further studies be undertaken to evaluate the structural integrity of the wharf, as it relates to the future new intended use(s). Studies would not be undertaken until the ultimate end use is known. Any future wharf repair/modification work that may be required (i.e. replace piers, reinforce existing piers, reconstruct portions of the wharf) would be determined by those studies and investigations Any wharf modifications or repairs are anticipated to be implemented concurrently with a specific development project that may be proposed with the future buildout of Parcels K and L.

Permitted Uses:

- Public and private open space , walkways, bike paths and recreational facilities
- Maritime – Recreational boat and small craft rentals, sales and launch facilities but not boat storage.
- Maritime--Marina berths; up to160 berths
- Maritime office
- Public and private water transit facilities
- Public and private waterfront athletic clubs and yacht clubs
- Commercial retail, but not including, “super store” type retail commercial uses or drive-through commercial facilities

Permitted Uses Subject to Conditional Use Permit:

- Performance and entertainment facilities, but not multiplex cinemas.
- Restaurants and taverns
- Grocery stores, including alcohol sales for on and off site consumption.
- Other uses determined by the Planning Board to be similar to the above and consistent with the plan objectives.

Maximum Building Height:

- 40 feet

Site Development Standards

Building Setbacks:

- From Primary Entry Street right-of-way (subarea A) and subareas H, I and J: 0 feet.
- From west property line (within Alaska Basin): 25 feet.
- From north property line (within Oakland Estuary): 0 feet.

Buildings shall be located to minimize blockage waterfront views from internal streets and public open spaces, where possible.

APPENDIX D

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AIR QUALITY IMPACT ANALYSIS

ENCINAL TERMINAL

CITY OF ALAMEDA, CALIFORNIA

LSA

January 2017

AIR QUALITY IMPACT ANALYSIS

ENCINAL TERMINAL

CITY OF ALAMEDA, CALIFORNIA

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January 2017

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1.0 INTRODUCTION

The Encinal Terminal Development project would construct a mix of residential, retail and marina uses in the north-central coast area of Alameda Island in the City of Alameda. This Air Quality Impact Analysis (AQIA) has been prepared using methods and assumptions recommended in the CEQA Air Quality Guidelines of the Bay Area Air Quality Management District (BAAQMD).[1] In keeping with these guidelines, this analysis describes existing air quality, potential impacts generated by the project on local carbon monoxide levels, emissions generated from project-related sources, and regional air pollution. Mitigation measures to reduce or eliminate significant air quality impacts are identified, where appropriate.

The project is located on four irregular parcels (Assessor's Parcel Numbers [APN] 072-0382-001, -002, -003 and -009) in the area known as the Central Alameda neighborhood on Alameda Island. The proposed project would construct 589 apartments, 50,000 square feet of retail space and 160 marina berths on approximately 35.35 gross acres. Due to the project site's proximity to the Oakland Estuary, two parcels include submerged land, leaving 23.45 net acres available for development. The project location and vicinity map is shown in Figure 1.

The four parcels are shown together on Figure 1. To the west and the north, the project is bordered by the Oakland Estuary (the waterway separating Alameda Island from the mainland). The Fortmann Marina borders the project site to the east and the former Del Monte and Chipman Warehouses are south of the project site, separated by a private road. The project site previously served as a shipping terminal for a food manufacturer.

The project site is directly bordered by two private roads: a private road to the south (running east-west), which served the former industrial uses; and Marina Frontage Road to the west, which serves the Fortmann Marina and runs north-south. Sherman Street and Entrance Road connect to these private roads and provide access to the project site. Regional vehicular access to the project site would be provided by Interstate 880 (I-880) from Oakland through the Webster Street (State Route [SR] 260) Tunnel to Alameda Island.

[1] Bay Area Air Quality Management District, 2011. *CEQA Air Quality Guidelines*. May.

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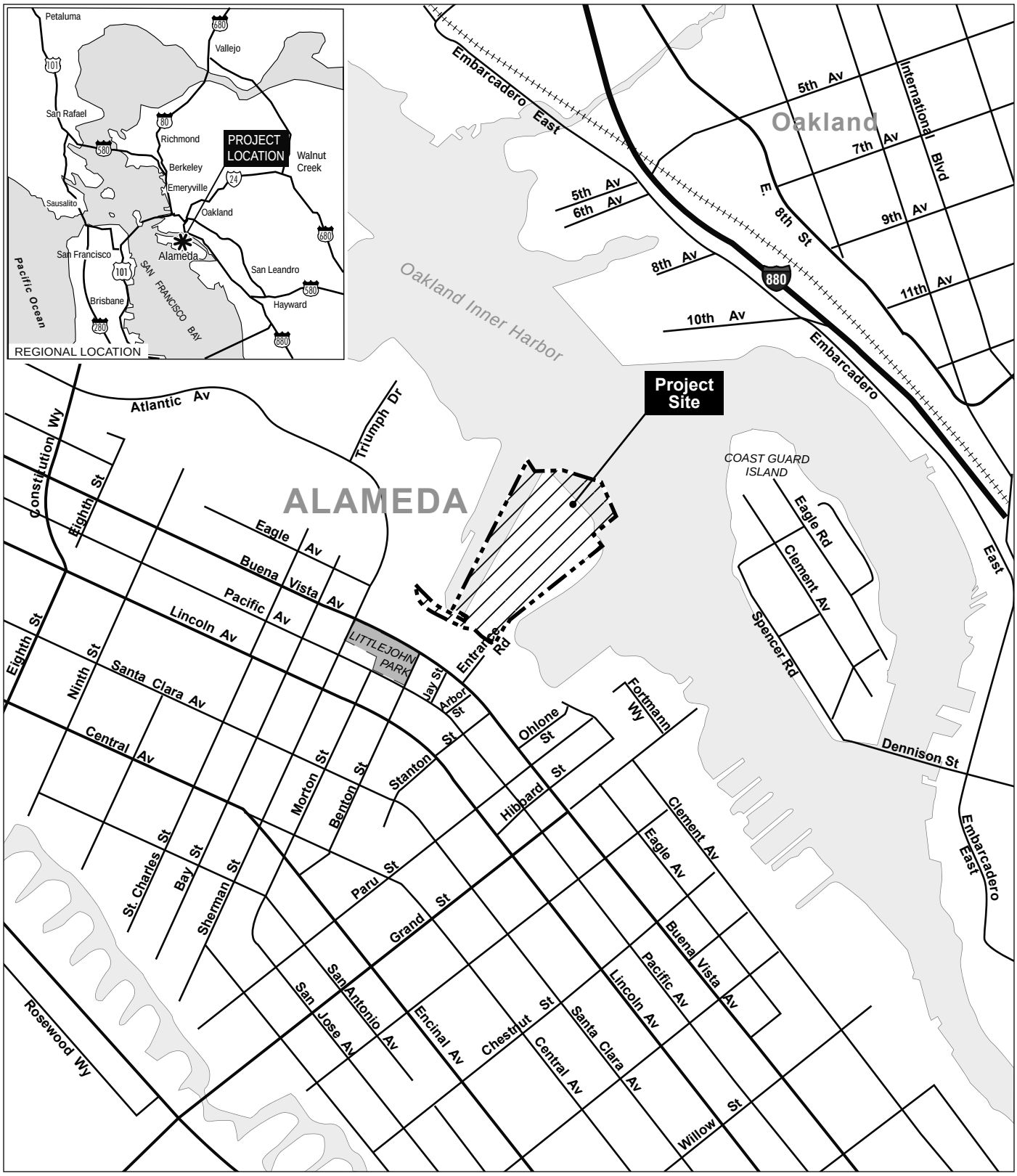

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FIGURE 1

N

Project Site

0 700 1400
FEET

Encinal Terminals

Project Location and Vicinity

SOURCES: AAA, 2002; LSA ASSOCIATES, INC., 2012.

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2.0 EXISTING CONDITIONS

2.1 AFFECTED ENVIRONMENT

2.1.1 Air Pollution Climatology

Air quality is a function of both local climate and local sources of air pollution. The amount of a given pollutant in the atmosphere is determined by the amount of the pollutant released and the atmosphere's ability to transport and dilute the pollutant. The major determinants of transport and dilution are wind, atmospheric stability, terrain, and for photochemical pollutants, sunshine.

A region's topographic features have a direct correlation with air pollution flow and therefore are used to determine the boundary of air basins. The proposed project is located in the San Francisco Bay Area Air Basin (SFBAAB), which covers seven counties including Marin, San Francisco, San Mateo, Santa Clara, Alameda, Contra Costa, Napa, and portions of Solano and Sonoma Counties.

The SFBAAB is characterized by complex terrain consisting of coastal mountain ranges, inland valleys and bays. Elevations of 1,500 feet are common in the higher terrain of this area. The mountains surrounding the valleys of the Bay Area are responsible directly or indirectly for much of the high pollution potential of some areas. Winter rains (December through March) account for about 75 percent of the average annual rainfall; about 90 percent of the annual total rainfall is received in the November-April period; and between June and September, normal rainfall is typically less than 1/10 inch.

Several types of temperature inversions are influential in the SFBAAB. The strong inversions typical of summer are formed by subsidence, the heating of downward-moving air in the high pressure anticyclone over the western Pacific. The surface inversions typical of winter are formed by radiation as air is cooled in contact with the earth's cold surface at night. Though there is a prevalent type related to season, both inversion mechanisms may operate at any time of the year. At times, surface inversions formed by radiational cooling may reinforce the subsidence inversion aloft, particularly in fall and winter. The thick, strong inversion resulting in this case is, of course, especially effective in trapping pollutants.

In the morning the seasonal variations are most dramatic. From June through September there are only two days per year, on average, with no inversion below 5,000 feet. March and April have fewer morning inversions. The occurrence of surface inversions is highest from October through January, when the characteristic radiation inversion predominates. A wide cluster of cases between 500 to 2,500 feet dominates from May through September, when the summer subsidence inversion over the marine layer dominates. There is substantial day-to-day variability in the depth of the marine layer.

In the afternoon two differences from the morning are most striking and significant. First is the frequent disappearance of the surface radiation inversion that dominates the winter nights. In these months, a surface inversion observed in the morning persists through the afternoon less than 20 percent of the time. However, a corresponding afternoon increase may be noted in the cases from 500

to 2,500 feet. Thus the inversion is frequently raised and perhaps weakened, but not destroyed. Second is the afternoon lowering of the marine inversion that dominates the summer months. In July and August the most frequent cases are in the 500 to 1,000 foot interval, compared with the 1,000 to 1,500 foot interval in the morning.

In summary, the SFBAAB is subject to a combination of physiographic and climatic factors which result in a low potential for pollutant buildups near the coast and a high potential in sheltered inland valleys.

The Encinal Terminal project is located within the Northern Alameda Western Contra Costa Counties subregion of the SFBAAB. This area stretches 20 miles from the Richmond area through Oakland to San Leandro. Its western boundary is defined by the San Francisco Bay and its eastern boundary by the Oakland- Berkeley Hills. The Oakland-Berkeley Hills are a significant barrier to air flow having an approximate ridge line height of 1,500 feet. The most densely populated area of the region is that strip of land between the bay and the 500 foot elevation, where most people live, drive and work. It is a narrow strip of land averaging about 4 miles in width, with a 2 mile minimum in the Berkeley and southern Richmond areas and an 8 mile maximum at points in the San Leandro and Oakland areas. This area is home to an international airport, major chemical, petroleum, shipping and other industrial operations, a large university, and over 3/4 of a million people.

In this area, marine air intrusion through the Golden Gate, across San Francisco, and through the San Bruno Gap is a dominant weather factor throughout the year. The Oakland-Berkeley Hills causes a bifurcation of westerly flow in the vicinity of Oakland, with southerly winds observed over the San Francisco Bay north of the Golden Gate and northwesterlies over the bay to the south of the Golden Gate. The divergent wind field results in diminished speed on the east side of the bay, with a higher frequency of near calm conditions than areas west of this split flow. Temperatures have a narrow range due to the proximity of the moderating marine air. Maximum summertime temperatures average in the upper 60s to low 70s, with minimums in the mid-50s. Winter highs are in the mid to high 50s, and winter lows are in the low to mid-40s. Precipitation totals, generally, increase from south to north and from the lowlands to the Oakland-Berkeley Hills' ridge line.

The site of the historic Alameda Naval Air Station (closed in 1997) is located on the far western edge of Alameda Island, some two miles southeast of the Bay Bridge. By virtue of its closeness to the Golden Gate, it is representative of the most marine zone of the Northern Alameda - Western Contra Costa Counties subregion. The prevailing wind direction is westerly with a 57 percent frequency for wind within the northwest-southwest sector. The average speed for this sector is 9 miles per hour and ranges from 7 to 10 mph. Winds less than 5 mph occur 30 percent of the time. Maximum temperatures in summer average only in the upper 60s, with minimum in the mid-50s. Winter highs are in the mid-50s and winter lows in the mid-40s. Sunshine is somewhat scarcer than at stations located inland. Precipitation averages about 20 inches per year.

The air pollution potential of the areas closest to the marine air is minor, due to frequent good ventilation and less influx of high pollutant concentrations from upwind sources. Occurrence of light winds, however, mainly during the night and early morning, may set the scene for occasional elevated pollutant levels. The air pollution potential south and north of this region is higher and might be termed marginal. Its location, downwind and surrounded by air pollution sources, coupled with a

relatively high frequency of light winds, mainly in the nighttime and early morning hours, could augment higher pollutant levels.

2.2 AIR POLLUTANTS AND REGULATION

2.2.1 Ambient Air Quality Standards

Pursuant to the federal Clean Air Act (CAA) of 1970, the U.S. Environmental Protection Agency (EPA) established national ambient air quality standards (NAAQS). The NAAQS were established for major pollutants, termed "criteria" pollutants. Criteria pollutants are defined as those pollutants for which the federal and State governments have established ambient air quality standards, or criteria, for outdoor concentrations in order to protect public health.

Both the EPA and the California Air Resources Board (ARB) have established ambient air quality standards for common pollutants: carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (Pb), and suspended particulate matter (PM). In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety. These ambient air quality standards are levels of contaminants which represent safe levels that avoid specific adverse health effects associated with each pollutant. The ambient air quality standards cover what are called "criteria" pollutants.

Federal standards include both primary and secondary standards. Primary standards set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.[2] Health effects of criteria pollutants and their potential sources are described below and are summarized in Table 1. The standards would have to be exceeded by a large margin or for a prolonged period of time for the health effects to occur. Table 2 shows both federal and State standards for these criteria pollutants. The California Ambient Air Quality Standards (CAAQS) are more stringent than the NAAQS.

[2] U.S. Environmental Protection Agency, 2011. Website: www.epa.gov/air/criteria.html (accessed November 2012).

Table 1: Sources and Health Effects of Air Pollutants

Pollutants	Sources	Primary Effects
Carbon Monoxide (CO)	• Incomplete combustion of fuels and other carbon-containing substances, such as motor exhaust. • Natural events, such as decomposition of organic matter.	• Reduced tolerance for exercise. • Impairment of mental function. • Impairment of fetal development. • Death at high levels of exposure. • Aggravation of some heart diseases (angina).
Nitrogen Dioxide (NO_2)	• Motor vehicle exhaust. • High temperature stationary combustion. • Atmospheric reactions.	• Aggravation of respiratory illness. • Reduced visibility. • Reduced plant growth. • Formation of acid rain.
Ozone (O_3)	• Atmospheric reaction of organic gases with nitrogen oxides in sunlight.	• Aggravation of respiratory and cardiovascular diseases. • Irritation of eyes. • Impairment of cardiopulmonary function. • Plant leaf injury.
Lead (Pb)	• Contaminated soil.	• Impairment of blood functions and nerve construction. • Behavioral and hearing problems in children.
Suspended Particulate Matter ($PM_{2.5}$ and PM_{10})	• Stationary combustion of solid fuels. • Construction activities. • Industrial processes. • Atmospheric chemical reactions.	• Reduced lung function. • Aggravation of the effects of gaseous pollutants. • Aggravation of respiratory and cardiorespiratory diseases. • Increased cough and chest discomfort. • Soiling. • Reduced visibility.
Sulfur Dioxide (SO_2)	• Combustion of sulfur-containing fossil fuels. • Smelting of sulfur-bearing metal ores. • Industrial processes.	• Aggravation of respiratory diseases (asthma, emphysema). • Reduced lung function. • Irritation of eyes. • Reduced visibility. • Plant injury. • Deterioration of metals, textiles, leather, finishes, coatings, etc.

Source: California Air Resources Board (ARB), 2015.

Table 2: Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [a]		Federal Standards [b]		
		Concentration [c]	Method [d]	Primary [c,e]	Secondary [c,f]	Method [g]
Ozone (O_3)	1-Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	–	Same as Primary Standard	Ultraviolet Photometry
	8-Hour	0.07 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM_{10})	24-Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		–		
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	-		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	15 µg/m^3		
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	–	Non-Dispersive Infrared Photometry (NDIR)
	1-Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8-Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		–	–	
Nitrogen Dioxide (NO_2)[h]	Annual Arithmetic Mean	0.03 ppm (57 µg/m^3)	Gas Phase Chemi-luminescence	0.053 ppm (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemi-luminescence
	1-Hour	0.18 ppm (339 µg/m^3)		100 ppb (188 µg/m^3)	-	
Lead (Pb) [j,k]	30-Day Average	1.5 µg/m^3	Atomic Absorption	–	–	High-Volume Sampler and Atomic Absorption
	Calendar Quarter	–		1.5 µg/m^3 (for certain areas)[k]	Same as Primary Standard	
	Rolling 3-Month Average [i]	–		0.15 µg/m^3		
Sulfur Dioxide (SO_2)[i]	24-Hour	0.04 ppm (105 µg/m^3)	Ultraviolet Fluorescence	0.14 ppm (for certain areas)[i]	–	Ultraviolet Fluorescence; Spectro-photometry (Pararosaniline Method)
	3-Hour	–		–	0.5 ppm (1300 µg/m^3)	
	1-Hour	0.25 ppm (655 µg/m^3)		75 ppb (196 µg/m^3)	–	
	Annual Arithmetic Mean	–		0.030 ppm (for certain areas)[i]	–	
Visibility-Reducing Particles [l]	8-Hour	Extinction coefficient of 0.23 per kilometer - visibility of 10 miles or more (0.07–30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal Standards		
Sulfates	24-Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride [j]	24-Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

Table notes are provided on the following page.

[a] California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, suspended particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact EPA for further clarification and current federal policies.

[c] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] Any equivalent procedure which can be shown to the satisfaction of the CARB to give equivalent results at or near the level of the air quality standard may be used.

[e] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[f] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[g] Reference method as described by the EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the EPA.

[h] To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national standards are in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national standards to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb are identical to 0.100 ppm.

[i] On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standards to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

[j] The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[k] The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

[l] In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

°C = degrees Celsius
CARB = California Air Resources Board
EPA = United States Environmental Protection Agency
ppb = parts per billion
ppm = parts per million
mg/m^3 = milligrams per cubic meter
$\mu g/m^3$ = micrograms per cubic meter

Source: California Air Resources Board, 2016.

2.2.2 Air Pollutants and Associated Health Effects

Both State and federal governments have established health-based Ambient Air Quality Standards (AAQS) for six criteria air pollutants:[3] carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (Pb), and suspended particulate matter (PM). In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride and visibility-reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety. O_3 and NO_2 are considered regional pollutants because they (or their precursors) affect air quality on a regional scale. Pollutants such as CO, SO_2, and Pb are considered local pollutants that tend to accumulate in the air locally.

The primary pollutants of concern in the project area are O_3, CO, and PM. Significance thresholds established by an air district are used to manage total regional and local emissions within an air basin based on the air basin's attainment status for criteria pollutants. These emission thresholds were established for individual development projects that would contribute to regional and local emissions and could adversely affect or delay the Air Basin's projected attainment target goals for nonattainment criteria pollutants.

Because of the conservative nature of the significance thresholds, and the basin-wide context of individual development project emissions, there is no direct correlation between a single project and localized air quality-related health effects. One individual project that generates emissions exceeding a threshold does not necessarily result in adverse health effects for residents in the project vicinity. This condition is especially true when the criteria pollutants exceeding thresholds are those with regional effects, such as ozone precursors like nitrogen oxides (NO_x) and reactive organic gases (ROG).

Occupants of facilities such as schools, day care centers, parks and playgrounds, hospitals, and nursing and convalescent homes are considered to be more sensitive than the general public to air pollutants because these population groups have increased susceptibility to respiratory disease. Persons engaged in strenuous work or exercise also have increased sensitivity to poor air quality. Residential areas are considered more sensitive to air quality conditions, compared to commercial and industrial areas, because people generally spend longer periods of time at their residences, with greater associated exposure to ambient air quality conditions. Recreational uses are also considered sensitive compared to commercial and industrial uses due to greater exposure to ambient air quality conditions associated with exercise.

Ozone (O_3). Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving ROG and NO_x. The main sources of ROG and NO_x, often referred to as ozone precursors, are combustion processes (including combustion in motor vehicle engines) and the evaporation of solvents, paints, and fuels. In the Bay Area, automobiles are the single largest source of ozone precursors. Ozone is referred to as a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production through the

[3] Criteria pollutants are defined as those pollutants for which the Federal and State governments have established ambient air quality standards, or criteria, for outdoor concentrations in order to protect public health.

photochemical reaction process. Ozone causes eye irritation, airway constriction, and shortness of breath and can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema.

Reactive of Organic Gases including Volatile Organic Compounds (VOCs) and Reactive Organic Gases (ROGs). ROGs include all hydrocarbons except those exempted by the ARB. Therefore, ROGs are a set of organic gases based on state rules and regulations. VOCs are similar to ROGs in that they include all organic gases except those exempted by federal law. Both VOCs and ROGs are emitted from incomplete combustion of hydrocarbons or other carbon-based fuels. Combustion engine exhaust, oil refineries, and oil fueled power plants are the primary sources of hydrocarbons. Another source of hydrocarbons is evaporation from petroleum fuels, solvents, dry cleaning solutions, and paint. The primary health effects of hydrocarbons result from the formation of ozone and its related health effects (see ozone health effects discussion above). High levels of hydrocarbons in the atmosphere can interfere with oxygen intake by reducing the amount of available oxygen through displacement. There are no separate federal or California ambient air quality standards for ROG. Carcinogenic forms of ROG are considered toxic air contaminants (TACs). An example is benzene, which is a carcinogen. The health effects of individual ROGs are described below under the toxic air contaminants heading below.

Carbon Monoxide (CO). CO is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuels. The single largest source of CO is motor vehicles. While CO transport is limited, it disperses with distance from the source under normal meteorological conditions. However, under certain extreme meteorological conditions, CO concentrations near congested roadways or intersections may reach unhealthful levels that adversely affect local sensitive receptors (e.g., residents, schoolchildren, the elderly, and hospital patients). Typically, high CO concentrations are associated with roadways or intersections operating at unacceptable levels of service (LOS) or with extremely high traffic volumes. Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause headaches, nausea, dizziness, and fatigue, impair central nervous system function, and induce angina (chest pain) in persons with serious heart disease. Very high levels of CO can be fatal.

Particulate Matter (PM_{10} and $PM_{2.5}$). Particulate matter is a class of air pollutants that consists of heterogeneous solid and liquid airborne particles from manmade and natural sources. Particulate matter is categorized in two size ranges: PM_{10} for particles less than 10 microns in diameter and $PM_{2.5}$ for particles less than 2.5 microns in diameter. In the Bay Area, motor vehicles generate about half of the air basin's particulates, through tailpipe emissions as well as brake pad and tire wear. Wood burning in fireplaces and stoves, industrial facilities, and ground-disturbing activities such as construction are other sources of such fine particulates. These fine particulates are small enough to be inhaled into the deepest parts of the human lung and can cause adverse health effects. According to the California ARB, studies in the United States and elsewhere have demonstrated a strong link between elevated particulate levels and premature deaths, hospital admissions, emergency room visits, and asthma attacks, and studies of children's health in California have demonstrated that particle pollution may significantly reduce lung function growth in children. The ARB also reports that Statewide attainment of particulate matter standards could prevent thousands of premature deaths, lower hospital admissions for cardiovascular and respiratory disease and asthma-related

emergency room visits, and avoid hundreds of thousands of episodes of respiratory illness in California.[4]

Nitrogen Oxides (NO_2). NO_2 is a reddish brown gas that is a byproduct of combustion processes. Automobiles and industrial operations are the main sources of NO_2. Aside from its contribution to ozone formation, NO_2 also contributes to other pollution problems, including a high concentration of fine particulate matter, poor visibility, and acid deposition. NO_2 may be visible as a coloring component on high pollution days, especially in conjunction with high ozone levels. NO_2 decreases lung function and may reduce resistance to infection. On January 22, 2010, the U.S. EPA strengthened the health-based NAAQS for NO_2.

Sulfur Dioxide (SO_2). SO_2 is a colorless acidic gas with a strong odor. It is produced by the combustion of sulfur-containing fuels such as oil, coal, and diesel. SO_2 has the potential to damage materials and can cause health effects at high concentrations. It can irritate lung tissue and increase the risk of acute and chronic respiratory disease. SO_2 also reduces visibility and the level of sunlight at the ground surface.

Lead. Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result of the phase-out of leaded gasoline, metal processing is currently the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery factories.

Twenty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, the U.S. EPA established national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. The U.S. EPA banned the use of leaded gasoline in highway vehicles in December 1995. As a result of the U.S. EPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector and levels of lead in the air decreased dramatically.

Toxic Air Contaminants. In addition to the criteria pollutants discussed above, TACs are another group of pollutants of concern. Some examples of TACs include: benzene, butadiene, formaldehyde, and hydrogen sulfide. Potential human health effects of TACs include birth defects, neurological damage, cancer, and death. There are hundreds of different types of TACs with varying degrees of toxicity. Individual TACs vary greatly in the health risk they present; at a given level of exposure, one TAC may pose a hazard that is many times greater than another.

TACs do not have ambient air quality standards, but are regulated by the U.S. EPA and ARB. In 1998, ARB identified particulate matter from diesel-fueled engines as a toxic air contaminant. ARB has completed a risk management process that identified potential cancer risks for a range of activities and land uses that are characterized by use of diesel-fueled engines.[5] High volume freeways, station-

[4] California Air Resources Board, 2004. *Recent Research Findings: Health Effects of Particulate Matter and Ozone Air Pollution*. Website: www.arb.ca.gov/research/health/fs/PM-03fs.pdf. January.

[5] California Air Resources Board, 2000. *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*. October.

ary diesel engines, and facilities attracting heavy and constant diesel vehicle traffic (distribution centers, truck stops) were identified as posing the highest risk to adjacent receptors. Other facilities associated with increased risk include warehouse distribution centers, large retail or industrial facilities, high volume transit centers, and schools with a high volume of bus traffic. Health risks from TACs are a function of both concentration and duration of exposure.

The BAAQMD regulates TACs using a risk-based approach. This approach uses a health risk assessment to determine what sources and pollutants to control as well as the degree of control. A health risk assessment is an analysis in which human health exposure to toxic substances is estimated, and considered together with information regarding the toxic potency of the substances, in order to provide a quantitative estimate of health risks.[6] As part of ongoing efforts to identify and assess potential health risks to the public, the BAAQMD has collected and compiled air toxics emissions data from industrial and commercial sources of air pollution throughout the Bay Area. Monitoring data and emissions inventories of TACs help the BAAQMD determine health risk to Bay Area residents.

Ambient monitoring concentrations of TACs indicate that pollutants emitted primarily from motor vehicles (1,3-butadiene and benzene) account for slightly over 50 percent of the average calculated cancer risk from ambient air in the Bay Area.[7] According to the BAAQMD, ambient benzene levels declined dramatically in 1996 with the advent of Phase 2 reformulated gasoline. Due to this reduction, the calculated average cancer risk based on monitoring results has been reduced to 143 in 1,000,000; however, this risk does not include the risk resulting from exposure to diesel particulate matter or other compounds not monitored.

Unlike TACs emitted from industrial and other stationary sources noted above, most diesel particulate matter is emitted from mobile sources – primarily “off-road” sources such as construction and mining equipment, agricultural equipment, and truck-mounted refrigeration units, as well as trucks and buses traveling on freeways and local roadways. Agricultural and mining equipment is not commonly used in urban parts of the Bay Area, while construction equipment typically operates for a limited time at various locations. As a result, the readily identifiable locations where diesel particulate matter is emitted in the Bay Area include high-traffic roadways and other areas with substantial truck traffic.

Although not specifically monitored, recent studies indicate that exposure to diesel particulate matter may contribute significantly to a cancer risk (a risk of approximately 500 to 700 in 1,000,000) that is greater than all other measured TACs combined.[8] The ARB's Diesel Risk Reduction Plan is intended to substantially reduce diesel particulate matter emissions and associated health risks through introduction of ultra-low-sulfur diesel fuel – a step already implemented – and cleaner-burning diesel engines. The technology for reducing diesel particulate matter emissions from heavy-duty trucks is well established, and both State and federal agencies are moving aggressively to regulate engines and

[6] In general, a health risk assessment is required if the BAAQMD concludes that projected emissions of a specific air toxic compound from a proposed new or modified source suggests a potential public health risk. Such an assessment generally evaluates chronic, long term effects, including the increased risk of cancer as a result of exposure to one or more TACs.

[7] Bay Area Air Quality Management District, 2007. *Toxic Air Contaminant Control Program Annual Report 2003 Volume 1.* August.

[8] Ibid.

emission control systems to reduce and remediate diesel emissions. ARB anticipates that by 2020 average Statewide diesel particulate matter concentrations will decrease by 85 percent from levels in 2000 with full implementation of the Diesel Risk Reduction Plan, meaning that the Statewide health risk from diesel particulate matter is expected to decrease from 540 cancer cases in 1,000,000 to 21.5 cancer cases in 1,000,000. It is likely that the Bay Area cancer risk from diesel particulate matter will decrease by a similar factor by 2020.

2.2.3 Greenhouse Gases and Global Climate Change

Global climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans in recent decades. The Earth's average near-surface atmospheric temperature rose 0.6 ± 0.2° Celsius (°C) or 1.1 ± 0.4° Fahrenheit (°F) in the 20th century. The prevailing scientific opinion on climate change is that most of the warming observed over the last 50 years is attributable to human activities. The increased amounts of carbon dioxide (CO_2) and other greenhouse gases (GHGs) are the primary causes of the human-induced component of warming. GHGs are released by the burning of fossil fuels, land clearing, agriculture, and other activities, and lead to an increase in the greenhouse effect.[9]

GHGs are present in the atmosphere naturally, are released by natural sources, or are formed from secondary reactions taking place in the atmosphere. The gases that are widely seen as the principal contributors to human-induced global climate change are:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur Hexafluoride (SF_6)

Over the last 200 years, humans have caused substantial quantities of GHGs to be released into the atmosphere. These extra emissions are increasing GHG concentrations in the atmosphere, and enhancing the natural greenhouse effect, which is believed to be causing global warming. While manmade GHGs include naturally-occurring GHGs such as CO_2, methane, and N_2O, some gases, like HFCs, PFCs, and SF_6 are completely new to the atmosphere.

Certain gases, such as water vapor, are short-lived in the atmosphere. Others remain in the atmosphere for significant periods of time, contributing to climate change in the long term. Water vapor is excluded from the list of GHGs above because it is short-lived in the atmosphere and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation. For the

[9] The temperature on Earth is regulated by a system commonly known as the "greenhouse effect." Just as the glass in a greenhouse lets heat from sunlight in and reduces the heat escaping, greenhouse gases like carbon dioxide, methane, and nitrous oxide in the atmosphere keep the Earth at a relatively even temperature. Without the greenhouse effect, the Earth would be a frozen globe; thus, although an excess of greenhouse gas results in global warming, the *naturally occurring* greenhouse effect is necessary to keep our planet at a comfortable temperature.

purposes of this air quality analysis, the term "GHGs" will refer collectively to the gases listed above only.

These gases vary considerably in terms of Global Warming Potential (GWP), which is a concept developed to compare the ability of each greenhouse gas to trap heat in the atmosphere relative to another gas. The global warming potential is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and length of time that the gas remains in the atmosphere ("atmospheric lifetime"). The GWP of each gas is measured relative to carbon dioxide, the most abundant GHG; the definition of GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to the ratio of heat trapped by one unit mass of CO_2 over a specified time period. GHG emissions are typically measured in terms of pounds or tons of "CO_2 equivalents" (CO_2e). Table 3 shows the GWP for each type of GHG. For example, sulfur hexafluoride is 22,800 times more potent at contributing to global warming than carbon dioxide.

Table 3: Global Warming Potential of Greenhouse Gases

Gas	Atmospheric Lifetime (Years)	Global Warming Potential (100-Year Time Horizon)
Carbon Dioxide	50-200	1
Methane	12	25
Nitrous Oxide	114	298
HFC-23	270	14,800
HFC-134a	14	1,430
HFC-152a	1.4	124
PFC: Tetrafluoromethane (CF_4)	50,000	7,390
PFC: Hexafluoromethane (C_2F_6)	10,000	12,200
Sulfur Hexafluoride (SF_6)	3,200	22,800

Source: IPCC, 2007. *Climate Change 2007: The Physical Science Basis*. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.

The following discussion summarizes the characteristics of the six GHGs.

Carbon Dioxide (CO_2). In the atmosphere, carbon generally exists in its oxidized form, as CO_2. Natural sources of CO_2 include the respiration (breathing) of humans, animals and plants, volcanic out gassing, decomposition of organic matter and evaporation from the oceans. Human caused sources of CO_2 include the combustion of fossil fuels and wood, waste incineration, mineral production, and deforestation. Natural sources release approximately 150 billion tons of CO_2 each year, far outweighing the 7 billion tons of man-made emissions of CO_2 each year. Nevertheless, natural removal processes, such as photosynthesis by land- and ocean-dwelling plant species, cannot keep pace with this extra input of man-made CO_2, and consequently, the gas is building up in the atmosphere.

In 2002, CO_2 emissions from fossil fuel combustion accounted for approximately 98 percent of man-made CO_2 emissions and approximately 84 percent of California's overall GHG emissions (CO_2e). The transportation sector accounted for California's largest portion of CO_2 emissions, with gasoline consumption making up the greatest portion of these emissions. Electricity generation was California's second largest category of GHG emissions.

Methane (CH_4). Methane is produced when organic matter decomposes in environments lacking sufficient oxygen. Natural sources include wetlands, termites, and oceans. Decomposition occurring in landfills accounts for the majority of human-generated CH_4 emissions in California and in the United States as a whole. Agricultural processes such as intestinal fermentation, manure management, and rice cultivation are also significant sources of CH_4 in California. Methane accounted for approximately 6 percent of gross climate change emissions (CO_2e) in California in 2002.

Total annual emissions of methane are approximately 500 million tons, with manmade emissions accounting for the majority. As with CO_2, the major removal process of atmospheric methane – a chemical breakdown in the atmosphere – cannot keep pace with source emissions, and methane concentrations in the atmosphere are increasing.

Nitrous Oxide (N_2O). Nitrous oxide is produced naturally by a wide variety of biological sources, particularly microbial action in soils and water. Tropical soils and oceans account for the majority of natural source emissions. Nitrous oxide is a product of the reaction that occurs between nitrogen and oxygen during fuel combustion. Both mobile and stationary combustion emit N_2O, and the quantity emitted varies according to the type of fuel, technology, and pollution control device used, as well as maintenance and operating practices. Agricultural soil management and fossil fuel combustion are the primary sources of human-generated N_2O emissions in California. Nitrous oxide emissions accounted for nearly 7 percent of man-made GHG emissions (CO_2e) in California in 2002.

Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulfur Hexafluoride (SF_6). HFCs are primarily used as substitutes for ozone-depleting substances regulated under the Montreal Protocol.[10] PFCs and SF_6 are emitted from various industrial processes, including aluminum smelting, semiconductor manufacturing, electric power transmission and distribution, and magnesium casting. There is no aluminum or magnesium production in California; however, the rapid growth in the semiconductor industry leads to greater use of PFCs. HFCs, PFCs, and SF_6 accounted for about 3.5 percent of man-made GHG emissions in California in 2002.

Black Carbon. Black carbon is the most strongly light-absorbing component of PM formed by burning fossil fuels such as coal, diesel, and biomass. Black carbon is emitted directly into the atmosphere in the form of $PM_{2.5}$ and is the most effective form of PM, by mass, at absorbing solar energy. Per unit of mass in the atmosphere, black carbon can absorb a million times more energy than CO_2. Black carbon contributes to climate change both directly, such as absorbing sunlight, and indirectly, such as affecting cloud formation. However, because black carbon is short-lived in the atmosphere, it can be difficult to quantify its effect on global-warming.

Most U.S. emissions of black carbon come from mobile sources (52 percent), especially diesel engines and vehicles.[11] The other major source is open biomass burning, including wildfires, although residential heating and industry also contribute. The ARB estimates that the annual black carbon

[10] The Montreal Protocol is an international treaty that was approved on January 1, 1989, and was designated to protect the ozone layer by phasing out the production of several groups of halogenated hydrocarbons believed to be responsible for ozone depletion.

[11] U.S. EPA, 2015. *Black Carbon.* Website: www3.epa.gov/blackcarbon/basic.html (accessed on September 17, 2015). September.

emissions in California have decreased approximately 70 percent between 1990 and 2010 and are expected to continue to decline significantly due to controls on mobile diesel emissions.

2.2.4 Air Quality Regulatory Setting

The EPA and the California ARB regulate direct emissions from motor vehicles. The BAAQMD is the regional agency primarily responsible for regulating air pollution emissions from stationary sources (e.g., factories) and indirect sources (e.g., traffic associated with new development), as well as monitoring ambient pollutant concentrations.

Federal Clean Air Act. The 1970 Federal Clean Air Act authorized the establishment of national health-based air quality standards and also set deadlines for their attainment. The Federal Clean Air Act Amendments of 1990 changed deadlines for attaining national standards as well as the remedial actions required of areas of the nation that exceed the standards. Under the Clean Air Act, State and local agencies in areas that exceed the national standards are required to develop State Implementation Plans to demonstrate how they will achieve the national standards by specified dates.

California Clean Air Act. In 1988, the California Clean Air Act required that all air districts in the State endeavor to achieve and maintain CAAQS for carbon monoxide, ozone, sulfur dioxide and nitrogen dioxide by the earliest practical date. The California Clean Air Act provides districts with authority to regulate indirect sources and mandates that air quality districts focus particular attention on reducing emissions from transportation and area-wide emission sources. Each nonattainment district is required to adopt a plan to achieve a 5 percent annual reduction, averaged over consecutive 3-year periods, in district-wide emissions of each nonattainment pollutant or its precursors. A Clean Air Plan (CAP) shows how a district would reduce emissions to achieve air quality standards. Generally, the State standards for these pollutants are more stringent than the national standards.

California Air Resources Board (ARB) Handbook. The California ARB has developed an Air Quality and Land Use Handbook[12] which is intended to serve as a general reference guide for evaluating and reducing air pollution impacts associated with new projects that go through the land use decision-making process. According to the ARB Handbook, recent air pollution studies have shown an association between respiratory and other non-cancer health effects and proximity to high traffic roadways. Other studies have shown that diesel exhaust and other cancer-causing chemicals emitted from cars and trucks are responsible for much of the overall cancer risk from airborne toxics in California. The ARB Handbook recommends that planning agencies strongly consider proximity to these sources when finding new locations for "sensitive" land uses such as homes, medical facilities, daycare centers, schools and playgrounds.

Air pollution sources of concern include freeways, rail yards, ports, refineries, distribution centers, chrome plating facilities, dry cleaners and large gasoline service stations. Key recommendations in the ARB Handbook include taking steps to avoid siting new, sensitive land uses:

- Within 500 feet of a freeway, urban roads with 100,000 vehicles/day or rural roads with 50,000 vehicles/day.

[12] California Air Resources Board, 2005. *Air Quality and Land Use Handbook: A Community Health Perspective.* April.

- Within 1,000 feet of a major service and maintenance rail yard.
- Immediately downwind of ports (in the most heavily impacted zones) and petroleum refineries.
- Within 300 feet of any dry cleaning operation (for operations with two or more machines, provide 500 feet).
- Within 300 feet of a large gas station (defined as a facility with a throughput of 3.6 million gallons per year or greater).

The ARB Handbook specifically states that its recommendations are advisory and acknowledges land use agencies have to balance other considerations, including housing and transportation needs, economic development priorities, and other quality of life issues.

The recommendations are generalized and do not consider site specific meteorology, freeway truck percentages or other factors that influence risk for a particular project site. The purpose of this analysis is to further examine the project site for actual health risk associated with the location of new housing on the project site.

Bay Area Air Quality Management District. The BAAQMD has jurisdiction over most air quality matters in the SFBAAB. The BAAQMD is tasked with implementing certain programs and regulations required by the Federal Clean Air Act and the California Clean Air Act. The BAAQMD prepares plans to attain state and national ambient air quality standards.

The Clean Air Plan guides the region's air quality planning efforts to attain the CAAQS. The BAAQMD's 2010 Clean Air Plan is the latest Clean Air Plan which contains district-wide control measures to reduce ozone precursor emissions (i.e., ROG and NO_x), particulate matter and green-house gas emissions.

The Bay Area 2010 Clean Air Plan, which was adopted on September 15, 2010, by the BAAQMD's board of directors:

- Updates the Bay Area 2005 Ozone Strategy in accordance with the requirements of the California Clean Air Act to implement "all feasible measures" to reduce ozone;
- Provides a control strategy to reduce ozone, PM, TACs, and greenhouse gases in a single, integrated plan;
- Reviews progress in improving air quality in recent years; and
- Establishes emission control measures to be adopted or implemented in the 2010 to 2012 timeframe.

The BAAQMD just released the new Draft 2017 Clean Air Plan for public review. The 2017 Plan aims to continue progress toward attaining all State and federal air quality standards and includes a wide range of proposed control measures to reduce combustion-related activities, decrease fossil fuel combustion, improve energy efficiency, and decrease emissions of potent greenhouse gases.

2.2.5 Global Climate Change Regulation

This section describes regulations related to Global Climate Change at the federal, State and local level.

Federal Regulations. The United States has historically had a voluntary approach to reducing GHG emissions. However, on April 2, 2007, the United States Supreme Court ruled that the EPA has the authority to regulate CO_2 emissions under the federal Clean Air Act (CAA). While there currently are no adopted federal regulations for the control or reduction of GHG emissions, the EPA commenced several actions in 2009 to implement a regulatory approach to global climate change, including the ones described below.

On September 22, 2009, EPA issued a final rule for mandatory reporting of GHGs from large GHG emission sources in the United States. In general, this national reporting requirement will provide the EPA with accurate and timely GHG emissions data from facilities that emit 25,000 metric tons or more of CO_2 per year. This publicly-available data will allow the reporters to track their own emissions, compare them to similar facilities, and aid in identifying cost-effective opportunities to reduce emissions in the future. Reporting is at the facility level, except that certain suppliers of fossil fuels and industrial GHGs, along with vehicle and engine manufacturers, will report at the corporate level. An estimated 85 percent of the total U.S. GHG emissions, from approximately 10,000 facilities, are covered by this rule.

On December 7, 2009, the EPA Administrator signed a final action under the CAA, finding that six GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6) constitute a threat to public health and welfare, and that the combined emissions from motor vehicles cause and contribute to global climate change. This EPA action does not impose any requirements on industry or other entities. However, the findings are a prerequisite to finalizing the GHG emission standards for light-duty vehicles mentioned below. EPA received ten petitions challenging this determination. On July 29, 2010, EPA denied these petitions.

On April 1, 2010, the EPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) announced a final joint rule to establish a national program consisting of new standards for model year 2012 through 2016 light-duty vehicles that will reduce GHG emissions and improve fuel economy. EPA is finalizing the first-ever national GHG emissions standards under the Clean Air Act, and NHTSA is finalizing Corporate Average Fuel Economy standards under the Energy Policy and Conservation Act. The EPA GHG standards require light-duty vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile in model year 2016, equivalent to 35.5 miles per gallon. The EPA and the NHTSA also established standards to reduce GHG emissions and improve the fuel efficiency of heavy-duty trucks and buses.

In May 2010, the USEPA sought to tailor existing regulations to accommodate GHG emissions for all stationary sources. However, the tailoring rule was challenged by several States, and the Supreme Court ruled on June 23, 2014 that the EPA cannot tailor an existing provision in the Clean Air Act. The Court ruled that the EPA may establish a de minimis threshold level for GHG (similar to the General Conformity Rule). On August 19, 2015, EPA published rule removing the tailoring provision vacated by the Court. EPA announced plans to proposed de minimis threshold for GHG in June 2016.

State Regulations. The ARB is the lead agency for implementing climate change regulations in the State. Since its formation, the ARB has worked with the public, the business sector, and local governments to find solutions to California's air pollution problems. Key efforts by the State are described below.

Executive Order S-3-05 (2005). Governor Arnold Schwarzenegger signed Executive Order S-3-05 on June 1, 2005, which proclaimed that California is vulnerable to the impacts of climate change. The executive order declared that increased temperatures could reduce snowpack in the Sierra Nevada Mountains, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the executive order established California's GHG emissions reduction targets, which established the following goals:

- GHG emissions should be reduced to 2000 levels by 2010;
- GHG emissions should be reduced to 1990 levels by 2020; and
- GHG emissions should be reduced to 80 percent below 1990 levels by 2050.

The Secretary of the California Environmental Protection Agency (CalEPA) is required to coordinate efforts of various State agencies in order to collectively and efficiently reduce GHGs. A biannual progress report must be submitted to the Governor and State Legislature disclosing the progress made toward GHG emission reduction targets. In addition, another biannual report must be submitted illustrating the impacts of global warming on California's water supply, public health, agriculture, the coastline, and forestry, and report possible mitigation and adaptation plans to address these impacts.

The Secretary of CalEPA leads this Climate Action Team (CAT) made up of representatives from State agencies as well as numerous other boards and departments. The CAT members work to coordinate Statewide efforts to implement global warming emission reduction programs and the State's Climate Adaptation Strategy. The CAT is also responsible for reporting on the progress made toward meeting the Statewide GHG targets that were established in the executive order and further defined under Assembly Bill 32, the "Global Warming Solutions Act of 2006" (AB 32). The first CAT Report to the Governor and the Legislature was released in March 2006, which it laid out 46 specific emission reduction strategies for reducing GHG emissions and reaching the targets established in the Executive Order. The CAT Report to the Governor and Legislature and will be updated and issued every two years thereafter; the most recent was released in December 2010.

Assembly Bill 32 (2006), California Global Warming Solutions Act. California's major initiative for reducing greenhouse gas emissions is AB 32, passed by the State Legislature on August 31, 2006. This effort aims at reducing greenhouse gas emissions to 1990 levels by 2020. The ARB has established the level of greenhouse gas emissions in 1990 at 427 MMT CO_2e. The emissions target of 427 MMT requires the reduction of 169 MMT from the State's projected business-as-usual 2020 emissions of 596 MMT. AB 32 required the ARB to prepare a Scoping Plan that outlines the main State strategies for meeting the 2020 deadline and to reduce greenhouse gases that contribute to global climate change. The Scoping Plan was approved by the ARB on December 11, 2008, and contains the main strategies California will implement to achieve the reduction of approximately 169 MMT of CO_2e, or approximately 30 percent, from the State's projected 2020 emission level of 596 MMT of CO_2e under a business-as-usual scenario (this is a reduction of 42 MMT CO_2e, or almost 10 percent from 2002-2004 average emissions). The Scoping Plan also includes ARB-recommended greenhouse gas reductions for each emissions sector of the State's greenhouse gas inventory. The

Scoping Plan calls for the largest reductions in greenhouse gas emissions to be achieved by implementing the following measures and standards:

- Improved emissions standards for light-duty vehicles (estimated reductions of 31.7 MMT CO_2e);
- The Low-Carbon Fuel Standard (15.0 MMT CO_2e);
- Energy efficiency measures in buildings and appliances and the widespread development of combined heat and power systems (26.3 MMT CO_2e); and
- A renewable portfolio standard for electricity production (21.3 MMT CO_2e).

The Scoping Plan identifies 18 emission reduction measures that address cap-and-trade programs, vehicle gas standards, energy efficiency, low carbon fuel standards, renewable energy, regional transportation-related greenhouse gas targets, vehicle efficiency measures, goods movement, solar roof programs, industrial emissions, high speed rail, green building strategies, recycling, sustainable forests, water, and air. The measures would result in a total reduction of 174 MMT CO_2e by 2020.

On August 24, 2011, the ARB unanimously approved both ARB's new supplemental assessment and reapproved its Scoping Plan, which provides the overall roadmap and rule measures to carry out AB 32. The ARB also approved a more robust CEQA equivalent document supporting the supplemental analysis of the cap-and-trade program. The cap-and-trade took effect on January 1, 2012, with an enforceable compliance obligation that began January 1, 2013.

ARB has not yet determined what amount of greenhouse gas reductions it recommends from local government operations and local land use decisions; however, the Scoping Plan states that land use planning and urban growth decisions will play an important role in the State's greenhouse gas reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions (meanwhile, ARB is also developing an additional protocol for community emissions). ARB further acknowledges that decisions on how land is used will have large impacts on the greenhouse gas emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emission sectors. The Scoping Plan states that the ultimate greenhouse gas reduction assignment to local government operations is to be determined. With regard to land use planning, the Scoping Plan expects an approximately 5.0 MMT CO_2e reduction due to implementation of SB 375.

In addition to reducing greenhouse gas emissions to 1990 levels by 2020, AB 32 directed the ARB and the newly created Climate Action Team (CAT) to identify a list of "discrete early action greenhouse gas reduction measures" that could be adopted and made enforceable by January 1, 2010. On January 18, 2007, Governor Schwarzenegger signed Executive Order S-1-07, further solidifying California's dedication to reducing greenhouse gases by setting a new Low Carbon Fuel Standard. The Executive Order sets a target to reduce the carbon intensity of California transportation fuels by at least 10 percent by 2020 and directs the ARB to consider the Low Carbon Fuel Standard as a discrete early action measure. In 2011, U.S. District Court Judge Lawrence O'Neil issued an injunction preventing implementation of the Low Carbon Fuel Standard, ruling that it is unconstitutional. In 2012, the Ninth Circuit Court of Appeal stayed the District Court's injunction, allowing

implementation of the Low Carbon Fuel Standard while the appeal is pending. The Ninth Circuit has not yet issued its decision.

In June 2007, the ARB approved a list of 37 early action measures, including three discrete early action measures (Low Carbon Fuel Standard, Restrictions on GWP Refrigerants, and Landfill CH_4 Capture).[13] Discrete early action measures are measures that were required to be adopted as regulations and made effective no later than January 1, 2010, the date established by Health and Safety Code Section 38560.5. The ARB adopted additional early action measures in October 2007 that tripled the number of discrete early action measures. These measures relate to truck efficiency, port electrification, reduction of PFCs from the semiconductor industry, reduction of propellants in consumer products, proper tire inflation, and SF_6 reductions from the non-electricity sector. The combination of early action measures is estimated to reduce State-wide greenhouse gas emissions by nearly 16 MMT.[14]

The ARB approved the First Update to the Climate Change Scoping Plan on May 22, 2014, which is currently underway. The First Update identifies opportunities to leverage existing and new funds to further drive greenhouse gas emission reductions through strategic planning and targeted low carbon investments. The First Update defines ARB's climate change priorities until 2020, and also sets the groundwork to reach long-term goals set forth in Executive Orders S-3-05 and B-16-2012. The Update highlights California's progress toward meeting the "near-term" 2020 greenhouse gas emission reduction goals as defined in the initial Scoping Plan. It also evaluates how to align the State's "longer-term" greenhouse gas reduction strategies with other State policy priorities for water, waste, natural resources, clean energy, transportation, and land use. The ARB is moving forward with a second update to the Scoping Plan to reflect the 2030 target established in Executive Order B-30-15.

Senate Bill 97 (2007). SB 97, signed by the Governor in August 2007 (Chapter 185, Statutes of 2007; Public Resources Code, Sections 21083.05 and 21097), acknowledges climate change is a prominent environmental issue that requires analysis under CEQA. This bill directed the OPR to prepare, develop, and transmit to the California Natural Resources Agency guidelines for mitigating GHG emissions or the effects of GHG emissions, as required by CEQA.

The California Natural Resources Agency adopted the amendments to the *CEQA Guidelines* in January 2010, which went into effect in March 2010. The amendments do not identify a threshold of significance for GHG emission, nor do they prescribe assessment methodologies or specific mitigation measures. The amendments encourage lead agencies to consider many factors in performing a CEQA analysis, but preserve the discretion granted by CEQA to lead agencies in making their own determinations based on substantial evidence. The amendments also encourage public agencies to make use of programmatic mitigation plans and programs when they perform individual project analyses.

[13] California Air Resources Board, 2007. *Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California Recommended for Board Consideration*. October.

[14] California Air Resources Board, 2007. "ARB approves tripling of early action measures required under AB 32" News Release 07-46. October 25.

City of Alameda Local Action Plan for Climate Protection. The City of Alameda's Local Action Plan for Climate Protection was adopted in February 2008.[15] The City is working to comply with state and federal regulations to reduce greenhouse gas emissions. Through the implementation of initiatives, the Local Action Plan for Climate Protection seeks to reduce greenhouse gas emissions to 25 percent below 2005 levels by 2020. The five critical initiatives included in the Local Action Plan for Climate Protection include:

1. Adopt "Zero Waste Strategy" Programs and Ordinances.
2. Develop a multi-faceted community outreach program to increase public awareness and participation in greenhouse gas reductions.
3. Amend the Alameda Municipal Code to include sustainable design and green building standards for all new, substantially expanded, and remodeled buildings.
4. Encourage the Alameda Public Utilities Board to require that Alameda Power & Telecom maintain and expand its source mix to 100 percent carbon-free energy.
5. Develop and fund alternative transportation strategies in the City's budget.

2.2.6 Existing Air Quality Conditions

Air quality monitoring stations are located throughout the nation and maintained by the local air pollution control district and state air quality regulating agencies. Ambient air data collected at permanent monitoring stations are used by the EPA to identify regions as "attainment" or "nonattainment" depending on whether the regions met the requirements stated in the primary NAAQS. Attainment areas are required to maintain their status through moderate, yet effective air quality maintenance plans. Nonattainment areas are imposed with additional restrictions as required by the EPA. In addition, different classifications of attainment such as marginal, moderate, serious, severe, and extreme are used to classify each air basin in the state on a pollutant-by-pollutant basis. Different classifications have different mandated attainment dates and are used as guidelines to create air quality management strategies to improve air quality and comply with the NAAQS by the attainment date. A region is determined to be unclassified when the data collected from the air quality monitoring stations do not support a designation of attainment or nonattainment, due to lack of information, or a conclusion cannot be made with the available data.

The BAAQMD monitors air quality at several locations within its jurisdiction in the San Francisco Bay Area Air Basin. The closest, multi-pollutant monitoring site to the project is located in Oakland at the Oakland-West air pollutant monitoring station (1100 21st Street, Oakland). Monitored pollutants include CO, NO_2, SO_2, and O_3. The pollutant, $PM_{2.5}$, is monitored at the Oakland – 9925 International Boulevard monitoring station, and the pollutant PM_{10}, is monitored at the San Pablo – 1865 Rumrill Boulevard monitoring station. Air quality trends at these monitoring stations are representative of the ambient air quality in the project area. Thus the data shown in Table 4 provides a good characterization of levels of pollutants within the project site. Monitoring data indicates that air quality in the region has generally been good with no exceedances of CO, PM_{10}, O_3, NO_2, or SO_2 over the three-year period. $PM_{2.5}$ levels were however exceeded twice in 2013, once in 2014, and once in 2015.

[15] Alameda, City of, 2008. *Local Action Plan for Climate Protection.* February 5.

Table 4: Ambient Air Quality Monitoring Station Data

Pollutant	Standard	2013	2014	2015
Carbon Monoxide (CO)[a]				
Maximum 1-hour concentration (ppm)		3.8	3	4.7
Number of days exceeded:	State: > 20 ppm	0	0	0
	Federal: > 35 ppm	0	0	0
Maximum 8-hour concentration (ppm)		3.2	2.6	2.6
Number of days exceeded:	State: > 9 ppm	0	0	0
	Federal: > 9 ppm	0	0	0
Ozone (O_3)[a]				
Maximum 1-hour concentration (ppm)		0.071	0.072	0.091
Number of days exceeded:	State: > 0.09 ppm	0	0	0
Maximum 8-hour concentration (ppm)		0.059	0.059	0.064
Number of days exceeded:	State: > 0.07 ppm	0	0	0
	Federal: > 0.08 ppm	0	0	0
Coarse Particulates (PM_{10})[c]				
Maximum 24-hour concentration ($\mu g/m^3$)		45.6	44.3	43.0
Number of days exceeded:	State: > 50 $\mu g/m^3$	0	0	0
	Federal: > 150 $\mu g/m^3$	0	0	0
Annual arithmetic average concentration ($\mu g/m^3$)		17.8	16.0	18.4
Exceeded for the year:	State: > 20 $\mu g/m^3$	No	No	No
	Federal: > 50 $\mu g/m^3$	No	No	No
Fine Particulates ($PM_{2.5}$)[b]				
Maximum 24-hour concentration ($\mu g/m^3$)		37.9	37.6	44.7
Number of days exceeded:	Federal: > 35 $\mu g/m^3$	2	1	1
Annual arithmetic average concentration ($\mu g/m^3$)		10.3	8.5	ND
Exceeded for the year:	State: > 12 $\mu g/m^3$	No	No	ND
	Federal: > 12 $\mu g/m^3$	No	No	ND
Nitrogen Dioxide (NO_2)[a]				
Maximum 1-hour concentration (ppm)		0.063	0.056	0.057
Number of days exceeded:	State: > 0.250 ppm	0	0	0
Annual arithmetic average concentration (ppm)		0.017	0.014	0.014
Exceeded for the year:	Federal: > 0.053 ppm	No	No	No
Sulfur Dioxide (SO_2)[a]				
Maximum 1-hour concentration (ppm)		0.050	0.017	0.022
Number of days exceeded:	State: > 0.25 ppm	0	0	0
Maximum 3-hour concentration (ppm)		ND	ND	ND
Number of days exceeded:	Federal: > 0.50 ppm	ND	ND	ND
Maximum 24-hour concentration (ppm)		0.007	0.003	0.004
Number of days exceeded:	State: > 0.04 ppm	0	0	0
	Federal: > 0.14 ppm	0	0	0
Annual arithmetic average concentration (ppm)		ND	ND	ND
Exceeded for the year:	Federal: > 0.030 ppm	ND	ND	ND

[a] Results based on readings at the Oakland - 1100 21st Street monitoring station.
[b] Results based on readings at the Oakland – 9925 International Blvd. monitoring station.
[c] Results based on readings at the San Pablo – 1865 Rumrill Blvd. monitoring station.
ppm = parts per million
$\mu g/m^3$ = micrograms per cubic meter
ND = No data. There was insufficient (or no) data to determine the value.

Source: ARB and USEPA, 2016.

2.2.7 Attainment Status

The California ARB is required to designate areas of the State as attainment, nonattainment or unclassified for all State standards. An "attainment" designation for an area signifies that the pollutant concentrations did not violate the standard for a pollutant in that area. A "nonattainment" designation indicates that a pollutant concentration violated the standard, excluding those occasions when a violation was caused by an exceptional event, as defined in the criteria. An "unclassified" designation signifies that data does not support either an attainment or nonattainment status. The California Clean Air Act divides districts into moderate, serious, and severe air pollution categories, with increasingly stringent control requirements mandated for each category.

The EPA designates areas for ozone, CO, and NO_2 as either "does not meet the primary standards," or "cannot be classified," or "better than national standards." For SO_2, areas are designated as "does not meet the primary standards," "does not meet the secondary standards," "cannot be classified" or "better than national standards." Table 5 provides a summary of the attainment status for the San Francisco Bay Area Air Basin with respect to national and State ambient air quality standards.

Table 5: San Francisco Bay Area Attainment Status

		California Standards [a]		National Standards [b]	
	Averaging Time	**Concentration**	**Attainment Status**	**Concentration [c]**	**Attainment Status**
Ozone (O_3)	8-Hour	0.070 ppm (137µg/m^3)	Nonattainment [h]	0.075 ppm	Nonattainment [d]
	1-Hour	0.09 ppm (180 µg/m^3)	Nonattainment	Not Applicable	Not Applicable [e]
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m^3)	Attainment	9 ppm (10 mg/m^3)	Attainment [f]
	1-Hour	20 ppm (23 mg/m^3)	Attainment	35 ppm (40 mg/m^3)	Attainment
Nitrogen Dioxide (NO_2)	1-Hour	0.18 ppm (339 µg/m^3)	Attainment	0.100 ppm	Unclassified
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	Not Applicable	0.053 ppm (100 µg/m^3)	Attainment
Sulfur Dioxide (SO_2)	24-Hour	0.04 ppm (105 µg/m^3)	Attainment	0.14 ppm (365 µg/m^3)	Attainment
	1-Hour	0.25 ppm (655 µg/m^3)	Attainment	0.075 ppm (196 µg/m^3)	Attainment
	Annual Arithmetic Mean	Not Applicable	Not Applicable	0.030 ppm (80 µg/m^3)	Attainment [j]
Coarse Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 µg/m^3	Nonattainment [g]	Not Applicable	Not Applicable
	24-Hour	50 µg/m^3	Nonattainment	150 µg/m^3	Unclassified
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m^3	Nonattainment [g]	15 µg/m^3	Attainment
	24-Hour	Not Applicable	Not Applicable	35 µg/m^3 [i]	Nonattainment

Table notes are provided on the following page.

[a] California standards for ozone, carbon monoxide (except in the Lake Tahoe air basin), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter – PM_{10}, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, Lake Tahoe carbon monoxide, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour or 24-hour average (i.e., all standards except for lead and the PM_{10} annual standard), then some measurements may be excluded. In particular, measurements are excluded that ARB determines would occur less than once per year on average. The Lake Tahoe CO standard is 6.0 ppm, a level one-third the national standard and two-thirds the State standard.

[b] National standards shown are the "primary standards" designed to protect public health. National standards other than for ozone, particulates and those based on annual averages are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent 3-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than 1. The 8-hour ozone standard is attained when the 3-year average of the fourth highest daily concentrations is 0.075 ppm (75 ppb) or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 $\mu g/m^3$. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of 98th percentiles is less than 35 $\mu g/m^3$. Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM_{10} is met if the 3-year average falls below the standard at every site. The annual $PM_{2.5}$ standard is met if the 3-year average of annual averages spatially-averaged across officially-designed clusters of sites falls below the standard.

[c] National air quality standards are set by USEPA at levels determined to be protective of public health with an adequate margin of safety.

[d] In June 2004, the Bay Area was designated as a marginal nonattainment area for the national 8-hour ozone standard. USEPA lowered the national 8-hour ozone standard from 0.80 to 0.75 PPM (i.e., 75 ppb), effective May 27, 2008.

[e] The national 1-hour ozone standard was revoked by USEPA on June 15, 2005.

[f] In April 1998, the Bay Area was redesignated to attainment for the national 8-hour carbon monoxide standard.

[g] In June 2002, ARB established new annual standards for $PM_{2.5}$ and PM_{10}.

[h] The 8-hour California ozone standard was approved by the ARB on April 28, 2005 and became effective on May 17, 2006.

[i] On January 9, 2013, USEPA issued a final rule to determine that the Bay Area attains the 24-hour $PM_{2.5}$ national standard. This USEPA rule suspends key SIP requirement as long as monitoring data continues to show that the Bay Area attains the standard. Despite this USEPA action, the Bay Area will continue to be designated as nonattainment for the national 24-hour $PM_{2.5}$ standard until such time as the Air District submits a redesignation request and a maintenance plan to USEPA and USEPA approves the proposed redesignation.

[j] On June 2, 2010, the USEPA established a new 1-hour SO_2 standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. The existing 0.030 ppm annual and 0.14 ppm 24-hour SO_2 NAAQS , however, must be used until one year following USEPA initial designations of the new 1-hour SO_2 NAAQS.

Lead (Pb) is not listed in the above table because it has been in attainment since the 1980s.
ppm = parts per million
mg/m^3 = milligrams per cubic meter
$\mu g/m^3$ = micrograms per cubic meter

Source: Bay Area Air Quality Management District, Bay Area Attainment Status, 2015.

2.2.8 Air Quality Issues

Key air quality issues related to the proposed project – CO hotspots, operational emissions, fugitive dust, odors, construction and equipment exhaust– are described below.

Local Carbon Monoxide Hotspots. Local air quality can be affected by CO emissions from motor vehicles. CO is typically a pollutant of concern because it is created in abundance by motor vehicles and it does not readily disperse into the air. Since CO does not readily disperse, areas of vehicle congestion can create "pockets" of high CO concentration, called "hot spots." These pockets have the potential to exceed the State 1-hour standard of 20 ppm and/or the 8-hour standard of 9.0 ppm.

While CO transport is limited, it does disperse over time and with distance from the source under normal meteorological conditions. However, under certain meteorological conditions, such as stagnant air or temperature inversions, CO concentrations near congested roadways or intersections may reach unhealthful levels affecting local sensitive receptors (e.g., residents, schoolchildren, the elderly, and hospital patients). Typically, high CO concentrations are associated with roadways or intersections operating at unacceptable levels of service or with extremely high traffic volumes. In areas with high ambient background CO concentration, air quality modeling is needed to determine a project's effect on local CO levels.

Operational Emissions. Long-term air emission impacts are those associated with increases in automobile travel within and around the County over time. Mobile source emissions would result from vehicle trips associated with increased vehicular travel. As is true throughout much of the U.S., motor vehicle use is projected to increase substantially in the region. The BAAQMD, local jurisdictions, and other parties responsible for protecting public health and welfare are continually seeking ways of minimizing the air quality impacts of growth and development in order to avoid further exceedances of the standards.

Fugitive Dust. Fugitive dust emissions are generally associated with demolition, land clearing, exposure of soils to the air, and cut and fill operations. Dust generated during construction varies substantially on a project-by-project basis, depending on the level of activity, the specific operations and weather conditions. The EPA has developed an approximate emission factor of 1.2 tons per acre per month of activity for construction-related emissions of total suspended particulate. This factor assumes a moderate activity level, moderate silt content in soils being disturbed and a semi-arid climate. The ARB estimates that 64 percent of construction-related total suspended particulate emissions occur in the form of PM_{10}.

However, construction emissions can vary greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, weather conditions, and other factors. There are a number of feasible control measures that can be reasonably implemented to significantly reduce PM_{10} emissions from construction.

Odors. Odors are also an important element of local air quality conditions. While odors rarely cause any physical harm, they still can be unpleasant, leading to distress among the public and generating citizen complaints to local governments and the BAAQMD. Specific land uses (e.g., landfills, manufacturing plants and agricultural operations) can raise concerns on the part of nearby neighbors. The occurrence and severity of odor impacts depends on numerous factors, including the nature, frequency and intensity of the source, wind speed and direction, and the sensitivity of the receptor(s).While sources that generate objectionable odors must comply with air quality regulations, the public's sensitivity to locally produced odors often exceeds local ordinance regulations.

Construction Equipment Exhaust. Construction activities cause combustion emissions from utility engines, heavy-duty construction vehicles, equipment hauling materials to and from construction sites and motor vehicles transporting construction crews. Exhaust emissions from construction activities vary daily as construction activity levels change. The use of construction equipment results in localized exhaust emissions.

3.0 METHODOLOGY AND THRESHOLDS

3.1 METHODOLOGY

Numerous air quality modeling tools are available to assess air quality impacts of projects; however, certain air districts such as the BAAQMD have created guidelines and requirements to conduct air quality analysis. The analysis of air quality impacts for the proposed project followed the BAAQMD *CEQA Air Quality Guidelines*.[16]

In June 2010, BAAQMD adopted updated draft California Environmental Quality Act (CEQA) Air Quality Guidelines and finalized them in May 2011. These guidelines superseded previously adopted agency air quality guidelines of 1999 and were intended to advise lead agencies on how to evaluate potential air quality impacts.

In late 2010, the Building Industry Association filed a lawsuit in Alameda Superior Court, challenging BAAQMD's CEQA Guidelines on the grounds that the agency did not comply with CEQA. On March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the thresholds of significance in the BAAQMD *CEQA Air Quality Guidelines*. The court did not determine whether the thresholds of significance were valid on their merits, but found that the adoption of the thresholds was a project under CEQA. The court issued a writ of mandate ordering the BAAQMD to set aside the thresholds and cease dissemination of them until the BAAQMD complied with CEQA. In May of 2012, the BAAQMD filed an appeal of the court's decision. In August of 2013 the First District Court of Appeal overturned the trial court and held that the thresholds of significance were not subject to CEQA review. The Court of Appeal's decision was appealed to the California Supreme Court, which granted limited review.

On December 21, 2015, the California Supreme Court rejected the BAAQMD's requirement for a so-called reverse CEQA analysis, and concluding that CEQA does not generally require a lead agency to consider the effects of existing environmental conditions on a proposed project's future residents. The Court also noted that while assessing the impacts of the environment on the project is not required by CEQA, this approach is not prohibit when the lead agency proposes to undertake its own project.

The BAAQMD has not yet revised the 2011 Guidelines; however, the City supports continued use of the BAAQMD's receptor threshold for CEQA review of development projects, which have been incorporated into this report for purposes of identifying significant air quality impacts.

[16] Bay Area Air Quality Management District, 2011, op. cit.

3.1.1 Operational Emissions

The air quality analysis includes estimating emissions associated with long-term operation of the proposed project. Criteria pollutants with regional impacts would be emitted by mobile (indirect) sources associated with the proposed project. In addition, localized air quality impacts (i.e., higher carbon monoxide concentrations or "hot spots") near intersections or roadway segments in the project vicinity would potentially occur due to project generated vehicle trips.

Consistent with BAAQMD guidance for estimating emissions associated with land use development projects, the California Emission Estimator Model (CalEEMod v.2016.3.1) computer program was used to calculate the long-term operational emissions associated with the project.

3.1.2 Construction Emissions

Construction activities can generate a substantial amount of air pollution. In some cases, the emissions from construction represent the largest air quality impact associated with a project. Construction activities are considered temporary; however, short term impacts can contribute to exceedances of air quality standards. Construction activities include site preparation, earthmoving and general construction. The emissions generated from these common construction activities include fugitive dust from soil disturbance, fuel combustion from mobile heavy-duty diesel and gasoline powered equipment, portable auxiliary equipment, and worker commute trips. The CalEEMod model was used to calculate emissions from on-site construction equipment and emissions from worker and vehicle trips to the site.

3.1.3 Greenhouse Gas Emissions

Greenhouse gas emissions associated with the project would occur over the short term from construction activities, consisting primarily of emissions from equipment exhaust. There would also be minimal long-term greenhouse gas emissions associated with project-related vehicular trips. Recognizing that the field of global climate change analysis is rapidly evolving, the approaches advocated most recently indicate that lead agencies should calculate, or estimate, emissions from vehicular traffic, energy consumption, water conveyance and treatment, waste generation, construction activities, and any other significant source of emissions within the project area. The CalEEMod model was used to quantify greenhouse gas emissions for the proposed project.

3.2 THRESHOLDS OF SIGNIFICANCE

The State *CEQA Guidelines* indicate that a project would normally have a significant adverse air quality impact if project-generated pollutant emissions would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project is nonattainment under applicable federal or state ambient air quality standards (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

The BAAQMD has further defined these criteria of significance to indicate the project would result in a significant air quality impact if it would:

- Violate the Bay Area Air Quality Management District's air quality standards or contribute substantially to an existing or projected air quality violation by:
  - Generating average daily criteria air pollutant emissions of ROG, NO_x or $PM_{2.5}$ exhaust emissions in excess of 54 pounds per day or PM_{10} exhaust emissions of 82 pounds per day during project construction;
  - For project operations, generating average daily criteria air pollutant emissions of ROG, NO_x, or $PM_{2.5}$ in excess of 54 pounds per day, or maximum annual emissions of 10 tons per year. For emissions of PM_{10}, generating average daily emissions of 82 pounds per day or 15 tons per year; or
  - Contributing to CO concentrations exceeding the State ambient air quality standards of 9 ppm averaged over 8 hours and 20 ppm for 1-hour for project operations.
- Expose sensitive receptors (including residential areas) or the general public to toxic air contaminants in excess of the following thresholds:
  - An excess cancer risk level of more than 10 in one million, or non-cancer (i.e., chronic or acute) risk greater than 1.0 hazard index from a single source;
  - An incremental increase of greater than 0.3 $\mu g/m^3$ annual average $PM_{2.5}$ from a single source;
  - An excess cancer risk level of more than 100 in one million, or non-cancer risk greater than 100 in one million from all sources; or
  - An incremental increase of greater than 0.8 $\mu g/m^3$ annual average $PM_{2.5}$ from all sources.

It should be noted that the emission thresholds were established based on the attainment status of the air basin in regard to air quality standards for specific criteria pollutants. Because the concentration standards were set at a level that protects public health with an adequate margin of safety, these emission thresholds are regarded as conservative and would overstate an individual project's contribution to health risks.

The State *CEQA Guidelines* indicate that a project would normally have a significant adverse green-house gas emission impact if the project would:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reduction the emissions of greenhouse gases.

The BAAQMD has further defined these criteria of significance to indicate the project would result in a less-than-significant air quality impact if it would:

- Result in operational-related greenhouse gas emissions of less than 1,100 metric tons of CO_2e a year, or
- Result in operational-related greenhouse gas emissions of less than 4.6 metric tons of CO_2e per service population (residents plus employees).

4.0 IMPACTS AND MITIGATION MEASURES

The project would affect air quality both during construction and operation. Operational impacts would be indirect and related to vehicle trips generated by future residents.

This section identifies the air quality impacts associated with implementation of the proposed project. Mitigation measures are recommended, as appropriate, for significant impacts to eliminate or reduce them to a less-than-significant level. This section also identifies impacts that are considered to be less-than-significant.

4.1.1 Construction Emissions

During construction, short-term degradation of air quality may occur due to the release of particulate emissions generated by excavation, grading, hauling, and other activities. Emissions from construction equipment are also anticipated and would include CO, NO_x, ROG, directly-emitted particulate matter ($PM_{2.5}$ and PM_{10}), and TACs such as diesel exhaust particulate matter.

Site preparation and project construction would involve grading, paving and building activities. Construction-related effects on air quality from the proposed project would be greatest during the site preparation phase due to the disturbance of soils. If not properly controlled, these activities would temporarily generate particulate emissions. Sources of fugitive dust would include disturbed soils at the construction sites. Unless properly controlled, vehicles leaving the site would deposit dirt and mud on local streets, which could be an additional source of airborne dust after it dries. PM_{10} emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM_{10} emissions would depend on soil moisture, silt content of soil, wind speed, and the amount of operating equipment. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

Water or other soil stabilizers can be used to control dust, resulting in emission reductions of 50 percent or more. The BAAQMD has established standard measures for reducing fugitive dust emissions (PM_{10}). With the implementation of these Best Management Practice measures, fugitive dust emissions from construction activities would not result in adverse air quality impacts.

In addition to dust-related PM_{10} emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO, SO_2, NO_x, VOCs and some soot particulate ($PM_{2.5}$ and PM_{10}) in exhaust emissions. If construction activities were to increase traffic congestion in the area, CO and other emissions from traffic would increase slightly while those vehicles are delayed. These emissions would be temporary and limited to the immediate area surrounding the construction site.

Precise details of construction activities are unknown at this time; therefore, default assumptions (e.g., construction fleet activities and duration) from CalEEMod were assumed. For purposes of this analysis the construction schedule for all improvements was assumed to be approximately 46 months (or approximately 840 construction days). Construction emissions were estimated for the project

using CalEEMod, consistent with BAAQMD recommendations. Construction-related emissions are presented in Table 6. CalEEMod output sheets are included in Appendix A.

Table 6: Project Construction Emissions in Pounds Per Day

Project Construction	ROG	CO	NO_x	Exhaust $PM_{2.5}$	Fugitive Dust $PM_{2.5}$	Total $PM_{2.5}$	Exhaust PM_{10}	Fugitive Dust PM_{10}	Total PM_{10}
Average Daily Emissions	15.2	34.4	38.2	1.6	1.9	3.5	1.7	5.5	7.2
BAAQMD Thresholds	54.0	NA	54.0	54.0	BMP	NA	82.0	BMP	NA
Exceed Threshold?	No	NA	No	No	NA	NA	No	NA	NA

NA = Not Applicable, the BAAQMD does not have thresholds.
BMP = Best Management Practices.
Source: LSA Associates, Inc., January 2017

As shown in Table 6, construction emissions associated with the project would be less than significant for ROG, NO_x and $PM_{2.5}$ and PM_{10} exhaust emissions. The BAAQMD requires the implementation of Best Management Practices to reduce construction dust impacts to a less-than-significant level. Implementation of Mitigation Measure AIR-1 would require implementation of the BAAQMD's Best Management Practices:

> Mitigation Measure AIR-1: Consistent with guidance from the BAAQMD, the following actions shall be required of construction contracts and specifications for the project:
>
> - All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
> - All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
> - All visible mud or dirt tracked-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
> - All vehicle speeds on unpaved roads shall be limited to 15 mph.
> - All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible.
> - Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
> - Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
> - All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
> - A publicly visible sign shall be posted with the telephone number and person to contact at the City of Alameda regarding dust complaints. This person shall respond and take

corrective action within 48 hours. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

Construction Health Risk Impacts. During construction, various diesel-powered vehicles and equipment would be in use. In 1998, the ARB identified particulate matter from diesel-fueled engines as a TAC. The ARB has completed a risk management process that identifies potential cancer risks for a range of activities using diesel-fueled engines.[17] High volume freeways, stationary diesel engines and facilities attracting heavy and constant diesel vehicle traffic (e.g., distribution centers and truck stops) were identified as having the highest associated risk.

Health risks from TACs are a function of both concentration and duration of exposure. Unlike the above types of sources, construction diesel emissions are temporary, affecting an area for a period of days or perhaps weeks. Additionally, construction-related sources are mobile and transient in nature, and the emissions occur within the project site. The BAAQMD provides a screening approach to evaluate the potential health risk from exposure to TACs, including diesel particulate matter, and $PM_{2.5}$ from construction activities.[18] The screening tables use conservative assumptions including two year construction duration and that all equipment would operate at the fence line, when actual equipment will rotate in different areas of the site away from sensitive receptors. According to the screening tables a project of this size must be located at a minimum of 492 feet from the closest sensitive receptor to avoid potentially significant health risks.

The closest sensitive receptors to the project site are residences located approximately 500 feet southwest of the project boundary. Therefore, the project would pass the screening size for construction health risk, and construction impacts would not be expected to be significant.

4.1.2 Operational Air Quality Impacts

Long-term air emission impacts are those associated with area sources and mobile sources involving any change related to the proposed project. In addition to the short-term construction emissions, the project would also generate long-term air emissions, such as those associated with changes in permanent use of the project site. These long-term emissions are primarily mobile source emissions that would result from vehicle trips associated with the proposed project. Area sources, such as natural gas heaters, landscape equipment, and use of consumer products, would also result in pollutant emissions.

PM_{10} emissions result from running exhaust, tire and brake wear, and the entrainment of dust into the atmosphere from vehicles traveling on paved roadways. Entrainment of PM_{10} occurs when vehicle tires pulverize small rocks and pavement and the vehicle wakes generate airborne dust. The contribution of tire and brake wear is small compared to the other PM emission processes. Gasoline-powered engines have small rates of particulate matter emissions compared with diesel-powered vehicles. Since much of the project traffic fleet would be made up of light-duty gasoline-powered

[17] California Air Resources Board, 2000. *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*, October.

[18] Bay Area Air Quality Management District, 2010. *Screening Tables for Construction Health Risk Impacts.* May.

vehicles, a majority of the PM_{10} emissions would result from entrainment of roadway dust from vehicle travel.

Energy source emissions result from activities in buildings for which electricity and natural gas are used (non-hearth). The quantity of emissions is the product of usage intensity (i.e., the amount of electricity or natural gas) and the emission factor of the fuel source. Major sources of energy demand include building mechanical systems, such as heating and air conditioning, lighting, and plug-in electronics, such as refrigerators or cooking equipment. Greater building or appliance efficiency reduces the amount of energy for a given activity and thus lowers the resultant emissions. The emission factor is determined by the fuel source, with cleaner energy sources, like renewable energy, producing fewer emissions than conventional sources.

Area source emissions associated with the project would include emissions from wood-burning devices, water heating and the use of landscaping equipment.

Emission estimates for the project were calculated using CalEEMod. The ultimate mix of housing units by type (e.g., apartments, condominiums, townhouses) has not been finalized, therefore, for purposes of the air quality analysis, all residential units were assumed to be low-rise apartment units. Emissions for mid-rise apartments, condominiums or townhouses would be similar to the emissions shown in Table 7. Trip generation rates were based on the project's traffic impact analysis which estimates the proposed project is would generate an average of approximately 3,921 trips per day, including reductions for transit use. The project emission estimates include the Bay Area specific model default values assuming the following: approximately 3 percent of residential units would have wood-stoves, approximately 25 percent would have open hearth fireplaces, and 12 percent of the units would have natural gas fireplaces.

Table 7: Project Regional Emissions

Emissions in Pounds Per Day				
	Reactive Organic Gases	**Nitrogen Oxides**	**PM_{10}**	**$PM_{2.5}$**
Area Source Emissions	259.8	5.9	45.7	45.7
Energy Source Emissions	0.5	4.3	0.3	0.3
Mobile Source Emissions	5.1	25.1	17.2	4.7
Total Emissions	**265.4**	**35.3**	**63.2**	**50.8**
BAAQMD Significance Threshold	**54.0**	**54.0**	**82.0**	**54.0**
Exceed?	**Yes**	**No**	**Yes**	**Yes**
Emissions in Tons Per Year				
Area Source Emissions	4.4	0.1	0.3	0.3
Energy Source Emissions	0.1	0.8	0.1	0.1
Mobile Source Emissions	0.9	4.5	3.0	0.8
Total Emissions	**5.5**	**5.4**	**3.4**	**1.2**
BAAQMD Significance Threshold	**10.0**	**10.0**	**15.0**	**10.0**
Exceed?	**No**	**No**	**No**	**No**

Source: LSA Associates, Inc., January 2017.

The daily emissions associated with project operational trip generation, energy and area sources are identified in Table 7 for ROG, NO_x, PM_{10}, and $PM_{2.5}$. The primary emissions associated with the project are regional in nature, meaning that air pollutants are rapidly dispersed on release or, in the case of vehicle emissions associated with the project; emissions are released in other areas of the air basin. Because the resulting emissions are dispersed rapidly and contribute only a small fraction of the region's air pollution, air quality in the immediate vicinity of the project site would not

substantially change compared to existing conditions or the air quality monitoring data reported in Table 4.

The results shown in Table 7 indicate the project would exceed the criteria for daily ROG, PM_{10} and $PM_{2.5}$ emissions; therefore, the proposed project could have a significant effect on regional air quality and mitigation would be required. The primary source of emissions would be from residential wood burning as indicated in the project's area source emissions.

Implementation of the following measure would reduce emissions to a less than significant level:

> Mitigation Measure AIR-2: All wood-burning devices, such as woodstoves and open hearth fire places shall be prohibited in residential units associated with the proposed project. Only natural gas fireplaces shall be permitted.

As shown in Table 8, with implementation of Mitigation Measure AIR-2, emissions associated with the proposed project would be less than significant. Emission calculations are included in Appendix A.

Table 8: Mitigated Project Regional Emissions

Emissions in Pounds Per Day				
	Reactive Organic Gases	**Nitrogen Oxides**	**PM_{10}**	**$PM_{2.5}$**
Area Source Emissions	17.6	0.6	0.3	0.3
Energy Source Emissions	0.5	4.3	0.3	0.3
Mobile Source Emissions	5.1	25.1	17.2	4.7
Total Emissions	**23.1**	**29.9**	**17.8**	**5.3**
BAAQMD Significance Threshold	**54.0**	**54.0**	**82.0**	**54.0**
Exceed?	**No**	**No**	**No**	**No**
Emissions in Tons Per Year				
Area Source Emissions	3.1	0.1	0.0	0.0
Energy Source Emissions	0.1	0.8	0.1	0.1
Mobile Source Emissions	0.9	4.5	3.0	0.8
Total Emissions	**4.1**	**5.3**	**3.1**	**0.9**
BAAQMD Significance Threshold	**10.0**	**10.0**	**15.0**	**10.0**
Exceed?	**No**	**No**	**No**	**No**

Source: LSA Associates, Inc., January 2017.

4.1.3 Odors

According to the BAAQMD, odors are generally regarded as an annoyance rather than a health hazard. Manifestations of a person's reaction to odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

The ability to detect odors varies considerably among the population and overall is quite subjective. People may have different reactions to the same odor. An odor that is offensive to one person may be perfectly acceptable to another (e.g., coffee roaster). An unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. Known as odor fatigue, a person can become desensitized to almost any odor and recognition only occurs with an alternation in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word strong to describe the intensity of an odor. Odor intensity

depends on the concentration in the air. When an odor sample is progressively diluted, the odor concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odor reaches a level that is no longer detectable.

The proposed project itself would not contain any major sources of odor, but would develop residential receptors. According to the BAAQMD, sensitive receptors should be located 1,000 feet from odor sources with a substantial number of odor complaints; specifically, more than five confirmed complaints per year averaged over the past three years, would indicate an odor impact. LSA obtained an odor complaint history from the BAAQMD for the City of Alameda from January 2013 to May 2016. Of the 39 complaints received during this time period, only two were confirmed complaints. Both of these confirmed odor complaints occurred at a soil remediation site at Clement Avenue and Oak Street in August 2013. This location is well over 1,000 feet from the project site and therefore, would not impact the project site. Additionally, this location has an average rate of less than five confirmed complaints per year. Thus, the location of the project would not expose future residents of the project to sources of odors.

4.1.4 Localized CO Impacts

The BAAQMD has established a screening methodology that provides a conservative indication of whether the implementation of a proposed project would result in significant CO emissions. According to the BAAQMD's *CEQA Guidelines*, a proposed project would result in a less-than-significant impact to localized CO concentrations if the following screening criteria are met:

The project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, and the regional transportation plan and local congestion management agency plans.

- Project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.
- The project would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, or below-grade roadway).

The proposed project would not conflict with the Alameda County Transportation Commission's (ACTC) program for designated roads or highways, a regional transportation plan, or other agency plans, as the proposed project would not cause the level of service to significantly deteriorate on any regional roadway. In addition, traffic volumes on roadways in the vicinity of the project site are less than 44,000 vehicles per hour. Therefore, the proposed project would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour and would not result in localized CO concentrations that exceed State or federal standards.

4.1.5 Exposure of Sensitive Receptors to Toxic Air Contaminants

Future residents of the project site could be exposed to elevated levels of toxic air contaminants from vehicle emissions on high volume roadways or from stationary sources in the project vicinity.

High Volume Roadways. High volume roadways in the project vicinity could expose future residents of the project site to toxic air contaminants. BAAQMD developed roadway health risk screening tables,[19] which provide a screening level analysis the risk and hazards impacts between 10 to 1,000 feet on either side of high volume roadways in the Bay Area. Toxic air contaminants disperse rapidly and thus the impacts to sensitive receptors located beyond 1,000 feet are considered less-than-significant. The closest high volume roadways to the project would be Webster Street (4,200 feet) and Central Avenue (2,500 feet). However, these roadways are located further than 1,000 feet and, therefore, the impacts from high volume roadways would not be significant.

Stationary Sources. The BAAQMD issues permits to businesses whose operation includes the release of toxic air contaminants. These operations are known as stationary air pollution sources and should be considered for their potential exposure when locating sensitive receptors in a new location. In order to identify stationary sources for a particular location, the BAAQMD provides KML (Google Earth) files for each county within the BAAQMD jurisdiction. Using the KML file for Alameda County and a 1,000-foot buffer zone, the three stationary sources shown in Table 9 were identified. Results of the stationary source analysis indicate that all sources in the project vicinity would be below the established significance criteria.

Table 9: Stationary Sources within 1,000 feet of the Project Site

Facility ID	Plant ID	Stationary Source (address & name)	Distance (feet)	Adjusted Risk (in one million)	$PM_{2.5}$ Conc. ($\mu g/m^3$)	Hazard
1623	19702	Wind River Systems, Inc., 500 Wind River Way	618	0.996	0.002	0.001
391	15606	City of Alameda Public Works, 1616 Fortmann Way	988	0.904	<0.001	<0.001
337	10449	Con Global Industries [a] 1523 Buena Vista	1,056	NA	NA	NA
Total Health Risk				1.9	0.003	0.002
BAAQMD Cumulative Threshold				100 in a million	0.80	10.0
Exceed? (Yes/No)				No	No	No

[a] Con Global Industries is no longer in operation.
NA = Not Applicable
<0.001= The value is less than one one-thousandth. No significant risk.

Source: BAAQMD, 2016; LSA Associates, Inc., January 2017.

4.1.6 Consistency with Existing Air Quality Plans

The applicable air quality plan is the BAAQMD's 2010 Clean Air Plan, which was adopted on September 15, 2010. The Clean Air Plan is a comprehensive plan to improve Bay Area air quality and protect public health. The Clean Air Plan defines a control strategy to reduce emissions and ambient concentrations of air pollutants; safeguard public health by reducing exposure to air pollutants that pose the greatest health risk, with an emphasis on protecting the communities most heavily affected by air pollution; and reduce greenhouse gas emissions to protect the climate.

[19] Bay Area Air Quality Management District, 2011. *Roadway Screening Tables.* May.

Consistency with the Clean Air Plan can be determined if the project does the following: 1) supports the goals of the Clean Air Plan; 2) includes applicable control measures from the Clean Air Plan; and 3) would not disrupt or hinder implementation of any control measures from the Clean Air Plan.

1. Does the project support the goals of the Clean Air Plan?

The primary goals of the Clean Air Plan are to: attain air quality standards; reduce population exposure to air pollutants and protect public health in the Bay Area; and reduce greenhouse gas emissions and protect the climate. As indicated in the analysis discussion above, the proposed project would not exceed the BAAQMD's significance criteria. Thus, the proposed project would not hinder the region from attainment of the goals outlined in the Clean Air Plan.

2. Does the project include applicable control measures from the Clean Air Plan?

The control strategies of the Clean Air Plan include measures in the traditional categories of stationary source measures, mobile source measures, and transportation control measures. This latest Clean Air Plan identifies two new subcategories of control measures, including land use and local impact measures and energy and climate measures. Stationary source measures are not specifically applicable to the proposed project and therefore are not evaluated as part of this Air Quality Impact Analysis.

Transportation and Mobile Source Control Measures. The BAAQMD identifies control measures as part of the Clean Air Plan to reduce ozone precursor emissions from stationary, area, mobile, and transportation sources. The transportation control measures are designed to reduce emissions from motor vehicles by reducing vehicle trips and vehicle miles traveled (VMT) in addition to vehicle idling and traffic congestion. The proposed project would not conflict with the identified transportation and mobile source control measures of the Clean Air Plan.

Land Use and Local Impact Measures. The Clean Air Plan includes Land Use and Local Impacts Measures (LUMs) to achieve the following: promote mixed-use, compact development to reduce motor vehicle travel and emissions; and ensure that planned growth is focused in a way that protects people from exposure to air pollution from stationary and mobile sources of emissions. The LUMs identified by the BAAQMD are not specifically applicable to the proposed project as they relate to actions the BAAQMD will take to reduce impacts from goods movement and health risks in affected communities. Therefore, the project would not conflict with any of the LUMs of the Clean Air Plan.

Energy Measures. The Clean Air Plan also includes Energy and Climate Control Measures (ECM), which are designed to reduce ambient concentrations of criteria pollutants and reduce emissions of CO_2. Implementation of these measures is intended to promote energy conservation and efficiency in buildings throughout the community, promote renewable forms of energy production, reduce the "urban heat island" effect by increasing reflectivity of roofs and parking lots, and promote the planting of (low-VOC-emitting) trees to reduce biogenic emissions, lower air temperatures, provide shade, and absorb air pollutants. The energy measures of the Clean Air Plan are not specifically applicable to the proposed project.

3. Would the project disrupt or hinder implementation of any control measures from the Clean Air Plan?

The project would develop residential uses in an area previously used as government office space. The proposed project would not hinder or disrupt implementation of any control measures from the Clean Air Plan. As discussed above, implementation of the proposed project would not disrupt or hinder implementation of the applicable measures outlined in the Clean Air Plan, including Transportation and Mobile Source Control Measures, Land Use and Local Impact Measures, and Energy Measures.

4.1.7 Cumulative Impact Assessment

CEQA defines a cumulative impact as two or more individual effects, which when considered together, are considerable or which compound or increase other environmental impacts. According to the BAAQMD, air pollution is largely a cumulative impact. No single project is sufficient in size to, by itself; result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. Therefore, if daily average or annual emissions of operational-related criteria air pollutants exceed any applicable threshold established by the BAAQMD, the proposed project would result in a cumulatively significant impact.

As shown in Table 9, above, implementation of the proposed project with implementation of Mitigation Measure AIR-2 would generate less than significant regional emissions. As shown in the project-specific air quality impacts discussion above, the proposed project would not result in individually significant impacts and therefore would also not make a cumulatively considerable contribution to regional air quality impacts.

4.1.8 Greenhouse Gas Analysis

This section discusses the project's impacts related to the release of greenhouse gas emissions for both construction and project operation.

Construction Activities. Construction activities would produce combustion emissions from various sources. During construction of the project, GHGs would be emitted through the operation of construction equipment and from worker and builder supply vendor vehicles, each of which typically use fossil-based fuels to operate. The combustion of fossil-based fuels creates GHGs such as CO_2, CH_4, and N_2O. Furthermore, CH_4 is emitted during the fueling of heavy equipment. Exhaust emissions from on-site construction activities would vary daily as construction activity levels change.

The BAAQMD does not have an adopted Threshold of Significance for construction-related GHG emissions. However, lead agencies are encouraged to quantify and disclose GHG emissions that would occur during construction.

Using CalEEMod, the total project construction emissions are estimated to be 1,005 metric tons of CO_2e per year. Implementation of the construction emission control measures in Mitigation Measure AIR-1 would reduce GHG emissions during the construction period which would reduce construction GHG emissions to a less-than-significant level.

Operational GHG Emissions. Long-term operation of the proposed project would generate GHG emissions from area and mobile sources, and indirect emissions from sources associated with energy consumption. Mobile-source emissions of GHGs would include project-generated vehicle trips associated with residence trips to the project site. Area-source emissions would be associated with activities such as landscaping and maintenance of proposed land uses, and other sources.

Operational emissions estimates for the proposed project are discussed below and were calculated using a method that is consistent with the methodology recommended in the BAAQMD's *CEQA Air Quality Guidelines*, as described below.

Methodology. The methodology and/or qualitative description of the sources of GHG emissions related to transportation, electricity, water use, and solid waste disposal are described below.

Transportation. Transportation associated with the project would result in GHG emissions from the combustion of fossil fuels in daily automobile and truck trips. Transportation is the largest source of GHG emissions in California and represents approximately 38 percent of annual CO_2 emissions generated in the State. For land use development projects, vehicle miles traveled (VMT) and vehicle trips are the most direct indicators of GHG emissions associated with the project. The proposed project is forecast to generate 3,921 trips per day.

Electricity and Natural Gas. Buildings represent 39 percent of United States primary energy use and 70 percent of electricity consumption.[20] Electricity use can result in GHG production if the electricity is generated by combusting fossil fuel. The project is anticipated to increase the use of electricity and natural gas; however, as part of the project's compliance with the latest California building code standards, the project is expected to be relatively energy efficient.

Water Use. Water and wastewater related GHG emissions are based on water supply and conveyance, water treatment, water distribution, and wastewater treatment. Each element of the water use cycle has unique energy intensities (kilowatt hours [kWh]/million gallons). Recognizing that the actual energy intensity in each component of the water use cycle will vary by utility, the California Energy Commission (CEC) assumes that approximately 3,950 kWh per million gallons are consumed for water that is supplied, treated, consumed, treated again, and disposed of in northern California.

Solid Waste Disposal. Solid waste generated by the project could contribute to GHG emissions in a variety of ways. Average waste generation rates from a variety of sources are available from the California Department of Resources, Recycling and Recovery (Cal Recycle).[21] Land filling and other methods of disposal use energy for transporting and managing the waste, and these activities produce additional GHGs to varying degrees. Land filling, the most common waste management practice, results in the release of CH_4 from the anaerobic decomposition of organic materials. CH_4 is 25 times more potent a GHG than CO_2. However, landfill CH_4 can also be a source of energy. In addition, many materials in landfills do not decompose fully, and the carbon that remains is sequestered in the landfill and not released into the atmosphere.

[20] United States Department of Energy, 2003. *Buildings Energy Data Book.*

[21] California Department of Resources, Recycling and Recovery, 2012. *Estimated Solid Waste Generation and Disposal Rates.* Website: www.calrecycle.ca.gov/wastechar/wastegenrates/ (accessed November 11, 2012).

Project Emissions. When calculating project GHG emissions to compare to the thresholds of significance, BAAQMD recommends that the lead agency consider project design features, attributes, and local development requirements as part of the project as proposed and not as mitigation measures. Consistent with BAAQMD guidance, GHG emissions were estimated using CalEEMod.

Table 10 shows the calculated GHG emissions for the proposed project. Mobile source emissions are the largest source of GHG emissions at approximately 64 percent of the total. Energy use is next largest category at approximately 31 percent of CO_2e emissions. Area source emissions are less than 1 percent of the total emissions, and waste and water source emissions are approximately 3 percent and 2 percent, respectively. Additional calculation details are provided in Appendix A.

Table 10: GHG Emissions (Metric Tons Per Year)

	Operational Emissions				
Emissions Source	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Percent of Total**
Area Sources Emissions	7.1	0.0	0.0	7.3	< 1
Energy Source Emissions	1,516.4	0.1	0.0	1,525.3	31
Mobile Source Emissions	3,195.3	0.1	0.0	3,198.4	64
Waste Source Emissions	65.7	3.9	0.0	162.7	3
Water Source Emissions	76.2	1.4	0.0	120.5	2
Total Annual Emissions	**4,860.7**	**5.4**	**0.1**	**5,014.2**	**100**

Source: LSA Associates, Inc., January 2017.

Based on the analysis results, the proposed project would generate 5,014.2 metric tons of CO_2e which would be above the BAAQMD's numeric threshold of 1,100 metric tons CO_2e.

The project would develop 589 residential units which would provide residence for 1,549 people. Additionally, the retail and marina portion of the project would generate approximately 50 employees for a total service population (residents plus employees) of 1,599. Therefore, the project's GHG emissions would result in a GHG efficiency of 3.1 metric tons CO_2e per service population which is below the BAAQMD's threshold of 4.6. According to the BAAQMD, a project would have less-than-significant GHG emissions if it would meet one or more of the criteria. Therefore, because the project result in emissions below the 4.6 metric tons CO_2e per service, the project would not have a significant effect on the environment related to greenhouse gas emissions.

APPENDIX A

CALEEMOD OUTPUT DATA

Alameda Encinal Terminal

Bay Area AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	1.00	Acre	1.00	43,560.00	0
Apartments Low Rise	589.00	Dwelling Unit	21.30	589,000.00	1549
Strip Mall	50.00	1000sqft	1.15	50,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2022
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	427	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Per PG&E, 2015

Land Use - Total lot size 35.35 gross acres, two parcels are submerged land, therefore 23.45 net acres for development.
Population based on 2.63 persons per household according to US Census.

Construction Phase - Construction is planned to begin in 2018, with completion of the first phase of the project in 2020 and full project completion by 2022

Vehicle Trips - Rates based on revised TIA (11/9/16)

Woodstoves -

Energy Use - Default

Area Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	41.00
tblConstructionPhase	NumDays	370.00	739.00
tblConstructionPhase	NumDays	20.00	41.00
tblConstructionPhase	NumDays	35.00	81.00
tblConstructionPhase	NumDays	20.00	43.00
tblConstructionPhase	NumDays	10.00	52.00
tblGrading	AcresOfGrading	202.50	87.50
tblLandUse	LotAcreage	36.81	21.30
tblLandUse	Population	1,685.00	1,549.00
tblProjectCharacteristics	CO2IntensityFactor	641.35	427
tblProjectCharacteristics	OperationalYear	2018	2022
tblVehicleTrips	ST_TR	7.16	3.78
tblVehicleTrips	ST_TR	22.75	426.60
tblVehicleTrips	ST_TR	42.04	25.36
tblVehicleTrips	SU_TR	6.07	3.78
tblVehicleTrips	SU_TR	16.74	426.60
tblVehicleTrips	SU_TR	20.43	25.36
tblVehicleTrips	WD_TR	6.59	3.78
tblVehicleTrips	WD_TR	1.89	426.60
tblVehicleTrips	WD_TR	44.32	25.36

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.6219	5.9875	4.0127	8.1600e-003	0.9522	0.2833	1.2356	0.4489	0.2625	0.7115	0.0000	743.7447	743.7447	0.1546	0.0000	747.6097
2019	0.5729	4.2003	4.2075	0.0110	0.5390	0.1804	0.7195	0.1450	0.1697	0.3147	0.0000	1,002.2639	1,002.2639	0.1011	0.0000	1,004.7902
2020	0.5161	3.8346	3.9772	0.0109	0.5411	0.1553	0.6964	0.1455	0.1460	0.2915	0.0000	986.2907	986.2907	0.0979	0.0000	988.7375
2021	4.6744	2.0261	2.2647	5.9900e-003	0.2839	0.0811	0.3650	0.0763	0.0761	0.1524	0.0000	540.2501	540.2501	0.0615	0.0000	541.7876
Maximum	**4.6744**	**5.9875**	**4.2075**	**0.0110**	**0.9522**	**0.2833**	**1.2356**	**0.4489**	**0.2625**	**0.7115**	**0.0000**	**1,002.2639**	**1,002.2639**	**0.1546**	**0.0000**	**1,004.7902**

2.1 Overall Construction

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.6219	5.9875	4.0127	8.1600e-003	0.9522	0.2833	1.2356	0.4489	0.2625	0.7115	0.0000	743.7441	743.7441	0.1546	0.0000	747.6091
2019	0.5729	4.2003	4.2075	0.0110	0.5390	0.1804	0.7195	0.1450	0.1697	0.3147	0.0000	1,002.2635	1,002.2635	0.1011	0.0000	1,004.7898
2020	0.5161	3.8346	3.9772	0.0109	0.5411	0.1553	0.6964	0.1455	0.1460	0.2915	0.0000	986.2903	986.2903	0.0979	0.0000	988.7372
2021	4.6744	2.0261	2.2647	5.9900e-003	0.2839	0.0811	0.3650	0.0763	0.0761	0.1524	0.0000	540.2499	540.2499	0.0615	0.0000	541.7873
Maximum	**4.6744**	**5.9875**	**4.2075**	**0.0110**	**0.9522**	**0.2833**	**1.2356**	**0.4489**	**0.2625**	**0.7115**	**0.0000**	**1,002.2635**	**1,002.2635**	**0.1546**	**0.0000**	**1,004.7898**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	1-1-2018	3-31-2018	1.4817	1.4817
2	4-1-2018	6-30-2018	1.9391	1.9391
3	7-1-2018	9-30-2018	1.8529	1.8529
4	10-1-2018	12-31-2018	1.3315	1.3315
5	1-1-2019	3-31-2019	1.1855	1.1855
6	4-1-2019	6-30-2019	1.1822	1.1822
7	7-1-2019	9-30-2019	1.1952	1.1952
8	10-1-2019	12-31-2019	1.2118	1.2118

9	**1-1-2020**	**3-31-2020**	1.0881	1.0881
10	**4-1-2020**	**6-30-2020**	1.0740	1.0740
11	**7-1-2020**	**9-30-2020**	1.0858	1.0858
12	**10-1-2020**	**12-31-2020**	1.1001	1.1001
13	**1-1-2021**	**3-31-2021**	0.9753	0.9753
14	**4-1-2021**	**6-30-2021**	0.9791	0.9791
15	**7-1-2021**	**9-30-2021**	2.9325	2.9325
		Highest	2.9325	2.9325

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	4.4280	0.0818	6.2499	3.9500e-003		0.2917	0.2917		0.2917	0.2917	26.8523	18.1743	45.0267	0.0501	1.7600e-003	46.8027
Energy	0.0908	0.7768	0.3353	4.9500e-003		0.0628	0.0628		0.0628	0.0628	0.0000	1,516.3581	1,516.3581	0.0592	0.0252	1,525.3338
Mobile	0.9330	4.4948	9.9985	0.0348	2.9795	0.0318	3.0112	0.7997	0.0297	0.8294	0.0000	3,195.3223	3,195.3223	0.1214	0.0000	3,198.3578
Waste						0.0000	0.0000		0.0000	0.0000	65.6737	0.0000	65.6737	3.8812	0.0000	162.7037
Water						0.0000	0.0000		0.0000	0.0000	13.3498	62.8472	76.1970	1.3754	0.0333	120.4939
Total	**5.4518**	**5.3534**	**16.5837**	**0.0437**	**2.9795**	**0.3862**	**3.3657**	**0.7997**	**0.3842**	**1.1839**	**105.8759**	**4,792.7019**	**4,898.5778**	**5.4873**	**0.0602**	**5,053.6919**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	3.0690	0.0505	4.3786	2.3000e-004		0.0242	0.0242		0.0242	0.0242	0.0000	7.1448	7.1448	6.8900e-003	0.0000	7.3171
Energy	0.0908	0.7768	0.3353	4.9500e-003		0.0628	0.0628		0.0628	0.0628	0.0000	1,516.3581	1,516.3581	0.0592	0.0252	1,525.3338
Mobile	0.9330	4.4948	9.9985	0.0348	2.9795	0.0318	3.0112	0.7997	0.0297	0.8294	0.0000	3,195.3223	3,195.3223	0.1214	0.0000	3,198.3578
Waste						0.0000	0.0000		0.0000	0.0000	65.6737	0.0000	65.6737	3.8812	0.0000	162.7037
Water						0.0000	0.0000		0.0000	0.0000	13.3498	62.8472	76.1970	1.3754	0.0333	120.4939
Total	**4.0928**	**5.3221**	**14.7124**	**0.0400**	**2.9795**	**0.1187**	**3.0982**	**0.7997**	**0.1167**	**0.9164**	**79.0235**	**4,781.6724**	**4,860.6959**	**5.4441**	**0.0584**	**5,014.2063**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**24.93**	**0.58**	**11.28**	**8.51**	**0.00**	**69.27**	**7.95**	**0.00**	**69.64**	**22.60**	**25.36**	**0.23**	**0.77**	**0.79**	**2.92**	**0.78**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2018	2/26/2018	5	41	
2	Site Preparation	Site Preparation	2/27/2018	5/9/2018	5	52	
3	Grading	Grading	5/10/2018	8/30/2018	5	81	
4	Building Construction	Building Construction	8/31/2018	6/30/2021	5	739	
5	Paving	Paving	6/30/2021	8/27/2021	5	43	
6	Architectural Coating	Architectural Coating	8/28/2021	10/25/2021	5	41	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 87.5

Acres of Paving: 0

Residential Indoor: 1,192,725; Residential Outdoor: 397,575; Non-Residential Indoor: 75,000; Non-Residential Outdoor: 25,000; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Alameda Encinal Terminal - Bay Area AQMD Air District, Annual

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	458.00	78.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	92.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0762	0.7856	0.4572	8.0000e-004		0.0397	0.0397		0.0370	0.0370	0.0000	72.0044	72.0044	0.0198	0.0000	72.5003
Total	**0.0762**	**0.7856**	**0.4572**	**8.0000e-004**		**0.0397**	**0.0397**		**0.0370**	**0.0370**	**0.0000**	**72.0044**	**72.0044**	**0.0198**	**0.0000**	**72.5003**

3.2 Demolition - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2400e-003	9.4000e-004	9.5000e-003	3.0000e-005	2.4300e-003	2.0000e-005	2.4500e-003	6.5000e-004	2.0000e-005	6.6000e-004	0.0000	2.2659	2.2659	7.0000e-005	0.0000	2.2676
Total	**1.2400e-003**	**9.4000e-004**	**9.5000e-003**	**3.0000e-005**	**2.4300e-003**	**2.0000e-005**	**2.4500e-003**	**6.5000e-004**	**2.0000e-005**	**6.6000e-004**	**0.0000**	**2.2659**	**2.2659**	**7.0000e-005**	**0.0000**	**2.2676**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0762	0.7856	0.4572	8.0000e-004		0.0397	0.0397		0.0370	0.0370	0.0000	72.0043	72.0043	0.0198	0.0000	72.5002
Total	**0.0762**	**0.7856**	**0.4572**	**8.0000e-004**		**0.0397**	**0.0397**		**0.0370**	**0.0370**	**0.0000**	**72.0043**	**72.0043**	**0.0198**	**0.0000**	**72.5002**

3.2 Demolition - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2400e-003	9.4000e-004	9.5000e-003	3.0000e-005	2.4300e-003	2.0000e-005	2.4500e-003	6.5000e-004	2.0000e-005	6.6000e-004	0.0000	2.2659	2.2659	7.0000e-005	0.0000	2.2676
Total	**1.2400e-003**	**9.4000e-004**	**9.5000e-003**	**3.0000e-005**	**2.4300e-003**	**2.0000e-005**	**2.4500e-003**	**6.5000e-004**	**2.0000e-005**	**6.6000e-004**	**0.0000**	**2.2659**	**2.2659**	**7.0000e-005**	**0.0000**	**2.2676**

3.3 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4697	0.0000	0.4697	0.2582	0.0000	0.2582	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1186	1.2532	0.5844	9.9000e-004		0.0670	0.0670		0.0616	0.0616	0.0000	90.3758	90.3758	0.0281	0.0000	91.0791
Total	**0.1186**	**1.2532**	**0.5844**	**9.9000e-004**	**0.4697**	**0.0670**	**0.5367**	**0.2582**	**0.0616**	**0.3198**	**0.0000**	**90.3758**	**90.3758**	**0.0281**	**0.0000**	**91.0791**

3.3 Site Preparation - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8800e-003	1.4400e-003	0.0145	4.0000e-005	3.7000e-003	3.0000e-005	3.7200e-003	9.8000e-004	2.0000e-005	1.0100e-003	0.0000	3.4486	3.4486	1.0000e-004	0.0000	3.4511
Total	**1.8800e-003**	**1.4400e-003**	**0.0145**	**4.0000e-005**	**3.7000e-003**	**3.0000e-005**	**3.7200e-003**	**9.8000e-004**	**2.0000e-005**	**1.0100e-003**	**0.0000**	**3.4486**	**3.4486**	**1.0000e-004**	**0.0000**	**3.4511**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4697	0.0000	0.4697	0.2582	0.0000	0.2582	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1186	1.2532	0.5844	9.9000e-004		0.0670	0.0670		0.0616	0.0616	0.0000	90.3757	90.3757	0.0281	0.0000	91.0790
Total	**0.1186**	**1.2532**	**0.5844**	**9.9000e-004**	**0.4697**	**0.0670**	**0.5367**	**0.2582**	**0.0616**	**0.3198**	**0.0000**	**90.3757**	**90.3757**	**0.0281**	**0.0000**	**91.0790**

3.3 Site Preparation - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8800e-003	1.4400e-003	0.0145	4.0000e-005	3.7000e-003	3.0000e-005	3.7200e-003	9.8000e-004	2.0000e-005	1.0100e-003	0.0000	3.4486	3.4486	1.0000e-004	0.0000	3.4511
Total	**1.8800e-003**	**1.4400e-003**	**0.0145**	**4.0000e-005**	**3.7000e-003**	**3.0000e-005**	**3.7200e-003**	**9.8000e-004**	**2.0000e-005**	**1.0100e-003**	**0.0000**	**3.4486**	**3.4486**	**1.0000e-004**	**0.0000**	**3.4511**

3.4 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2903	0.0000	0.2903	0.1391	0.0000	0.1391	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2062	2.4106	1.4211	2.5100e-003		0.1067	0.1067		0.0981	0.0981	0.0000	229.4264	229.4264	0.0714	0.0000	231.2120
Total	**0.2062**	**2.4106**	**1.4211**	**2.5100e-003**	**0.2903**	**0.1067**	**0.3970**	**0.1391**	**0.0981**	**0.2372**	**0.0000**	**229.4264**	**229.4264**	**0.0714**	**0.0000**	**231.2120**

3.4 Grading - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.2600e-003	2.4800e-003	0.0250	7.0000e-005	6.4000e-003	4.0000e-005	6.4500e-003	1.7000e-003	4.0000e-005	1.7400e-003	0.0000	5.9687	5.9687	1.8000e-004	0.0000	5.9731
Total	**3.2600e-003**	**2.4800e-003**	**0.0250**	**7.0000e-005**	**6.4000e-003**	**4.0000e-005**	**6.4500e-003**	**1.7000e-003**	**4.0000e-005**	**1.7400e-003**	**0.0000**	**5.9687**	**5.9687**	**1.8000e-004**	**0.0000**	**5.9731**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2903	0.0000	0.2903	0.1391	0.0000	0.1391	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2062	2.4106	1.4211	2.5100e-003		0.1067	0.1067		0.0981	0.0981	0.0000	229.4262	229.4262	0.0714	0.0000	231.2118
Total	**0.2062**	**2.4106**	**1.4211**	**2.5100e-003**	**0.2903**	**0.1067**	**0.3970**	**0.1391**	**0.0981**	**0.2372**	**0.0000**	**229.4262**	**229.4262**	**0.0714**	**0.0000**	**231.2118**

3.4 Grading - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.2600e-003	2.4800e-003	0.0250	7.0000e-005	6.4000e-003	4.0000e-005	6.4500e-003	1.7000e-003	4.0000e-005	1.7400e-003	0.0000	5.9687	5.9687	1.8000e-004	0.0000	5.9731
Total	**3.2600e-003**	**2.4800e-003**	**0.0250**	**7.0000e-005**	**6.4000e-003**	**4.0000e-005**	**6.4500e-003**	**1.7000e-003**	**4.0000e-005**	**1.7400e-003**	**0.0000**	**5.9687**	**5.9687**	**1.8000e-004**	**0.0000**	**5.9731**

3.5 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1166	1.0175	0.7648	1.1700e-003		0.0652	0.0652		0.0613	0.0613	0.0000	103.4288	103.4288	0.0253	0.0000	104.0623
Total	**0.1166**	**1.0175**	**0.7648**	**1.1700e-003**		**0.0652**	**0.0652**		**0.0613**	**0.0613**	**0.0000**	**103.4288**	**103.4288**	**0.0253**	**0.0000**	**104.0623**

3.5 Building Construction - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0178	0.4547	0.1207	9.4000e-004	0.0223	3.4900e-003	0.0257	6.4300e-003	3.3400e-003	9.7700e-003	0.0000	90.0180	90.0180	5.1800e-003	0.0000	90.1476
Worker	0.0801	0.0611	0.6155	1.6300e-003	0.1574	1.1000e-003	0.1585	0.0419	1.0200e-003	0.0429	0.0000	146.8083	146.8083	4.3300e-003	0.0000	146.9166
Total	**0.0979**	**0.5158**	**0.7362**	**2.5700e-003**	**0.1797**	**4.5900e-003**	**0.1843**	**0.0483**	**4.3600e-003**	**0.0527**	**0.0000**	**236.8262**	**236.8262**	**9.5100e-003**	**0.0000**	**237.0642**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1166	1.0175	0.7648	1.1700e-003		0.0652	0.0652		0.0613	0.0613	0.0000	103.4286	103.4286	0.0253	0.0000	104.0621
Total	**0.1166**	**1.0175**	**0.7648**	**1.1700e-003**		**0.0652**	**0.0652**		**0.0613**	**0.0613**	**0.0000**	**103.4286**	**103.4286**	**0.0253**	**0.0000**	**104.0621**

3.5 Building Construction - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0178	0.4547	0.1207	9.4000e-004	0.0223	3.4900e-003	0.0257	6.4300e-003	3.3400e-003	9.7700e-003	0.0000	90.0180	90.0180	5.1800e-003	0.0000	90.1476
Worker	0.0801	0.0611	0.6155	1.6300e-003	0.1574	1.1000e-003	0.1585	0.0419	1.0200e-003	0.0429	0.0000	146.8083	146.8083	4.3300e-003	0.0000	146.9166
Total	**0.0979**	**0.5158**	**0.7362**	**2.5700e-003**	**0.1797**	**4.5900e-003**	**0.1843**	**0.0483**	**4.3600e-003**	**0.0527**	**0.0000**	**236.8262**	**236.8262**	**9.5100e-003**	**0.0000**	**237.0642**

3.5 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3081	2.7508	2.2399	3.5100e-003		0.1683	0.1683		0.1583	0.1583	0.0000	306.8110	306.8110	0.0747	0.0000	308.6795
Total	**0.3081**	**2.7508**	**2.2399**	**3.5100e-003**		**0.1683**	**0.1683**		**0.1583**	**0.1583**	**0.0000**	**306.8110**	**306.8110**	**0.0747**	**0.0000**	**308.6795**

3.5 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0481	1.2890	0.3307	2.7900e-003	0.0668	8.8600e-003	0.0756	0.0193	8.4700e-003	0.0278	0.0000	268.2417	268.2417	0.0149	0.0000	268.6133
Worker	0.2167	0.1605	1.6369	4.7300e-003	0.4723	3.2500e-003	0.4755	0.1256	3.0000e-003	0.1286	0.0000	427.2112	427.2112	0.0115	0.0000	427.4973
Total	**0.2648**	**1.4495**	**1.9676**	**7.5200e-003**	**0.5390**	**0.0121**	**0.5511**	**0.1449**	**0.0115**	**0.1564**	**0.0000**	**695.4529**	**695.4529**	**0.0263**	**0.0000**	**696.1106**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3081	2.7508	2.2399	3.5100e-003		0.1683	0.1683		0.1583	0.1583	0.0000	306.8106	306.8106	0.0747	0.0000	308.6792
Total	**0.3081**	**2.7508**	**2.2399**	**3.5100e-003**		**0.1683**	**0.1683**		**0.1583**	**0.1583**	**0.0000**	**306.8106**	**306.8106**	**0.0747**	**0.0000**	**308.6792**

3.5 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0481	1.2890	0.3307	2.7900e-003	0.0668	8.8600e-003	0.0756	0.0193	8.4700e-003	0.0278	0.0000	268.2417	268.2417	0.0149	0.0000	268.6133
Worker	0.2167	0.1605	1.6369	4.7300e-003	0.4723	3.2500e-003	0.4755	0.1256	3.0000e-003	0.1286	0.0000	427.2112	427.2112	0.0115	0.0000	427.4973
Total	**0.2648**	**1.4495**	**1.9676**	**7.5200e-003**	**0.5390**	**0.0121**	**0.5511**	**0.1449**	**0.0115**	**0.1564**	**0.0000**	**695.4529**	**695.4529**	**0.0263**	**0.0000**	**696.1106**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2777	2.5134	2.2072	3.5300e-003		0.1463	0.1463		0.1376	0.1376	0.0000	303.4091	303.4091	0.0740	0.0000	305.2596
Total	**0.2777**	**2.5134**	**2.2072**	**3.5300e-003**		**0.1463**	**0.1463**		**0.1376**	**0.1376**	**0.0000**	**303.4091**	**303.4091**	**0.0740**	**0.0000**	**305.2596**

3.5 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0395	1.1789	0.2964	2.7900e-003	0.0670	5.7500e-003	0.0728	0.0194	5.5000e-003	0.0249	0.0000	267.5271	267.5271	0.0138	0.0000	267.8720
Worker	0.1989	0.1423	1.4736	4.5900e-003	0.4741	3.1900e-003	0.4773	0.1261	2.9400e-003	0.1291	0.0000	415.3545	415.3545	0.0101	0.0000	415.6059
Total	**0.2384**	**1.3212**	**1.7700**	**7.3800e-003**	**0.5411**	**8.9400e-003**	**0.5500**	**0.1455**	**8.4400e-003**	**0.1539**	**0.0000**	**682.8816**	**682.8816**	**0.0239**	**0.0000**	**683.4779**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2777	2.5134	2.2072	3.5300e-003		0.1463	0.1463		0.1376	0.1376	0.0000	303.4087	303.4087	0.0740	0.0000	305.2592
Total	**0.2777**	**2.5134**	**2.2072**	**3.5300e-003**		**0.1463**	**0.1463**		**0.1376**	**0.1376**	**0.0000**	**303.4087**	**303.4087**	**0.0740**	**0.0000**	**305.2592**

3.5 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0395	1.1789	0.2964	2.7900e-003	0.0670	5.7500e-003	0.0728	0.0194	5.5000e-003	0.0249	0.0000	267.5271	267.5271	0.0138	0.0000	267.8720
Worker	0.1989	0.1423	1.4736	4.5900e-003	0.4741	3.1900e-003	0.4773	0.1261	2.9400e-003	0.1291	0.0000	415.3545	415.3545	0.0101	0.0000	415.6059
Total	**0.2384**	**1.3212**	**1.7700**	**7.3800e-003**	**0.5411**	**8.9400e-003**	**0.5500**	**0.1455**	**8.4400e-003**	**0.1539**	**0.0000**	**682.8816**	**682.8816**	**0.0239**	**0.0000**	**683.4779**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1226	1.1244	1.0691	1.7400e-003		0.0618	0.0618		0.0581	0.0581	0.0000	149.4060	149.4060	0.0361	0.0000	150.3072
Total	**0.1226**	**1.1244**	**1.0691**	**1.7400e-003**		**0.0618**	**0.0618**		**0.0581**	**0.0581**	**0.0000**	**149.4060**	**149.4060**	**0.0361**	**0.0000**	**150.3072**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0160	0.5255	0.1312	1.3600e-003	0.0330	1.1400e-003	0.0341	9.5400e-003	1.0900e-003	0.0106	0.0000	130.4759	130.4759	6.4100e-003	0.0000	130.6363
Worker	0.0907	0.0626	0.6626	2.1800e-003	0.2334	1.5300e-003	0.2350	0.0621	1.4100e-003	0.0635	0.0000	197.3309	197.3309	4.4200e-003	0.0000	197.4416
Total	**0.1066**	**0.5880**	**0.7937**	**3.5400e-003**	**0.2664**	**2.6700e-003**	**0.2691**	**0.0716**	**2.5000e-003**	**0.0742**	**0.0000**	**327.8069**	**327.8069**	**0.0108**	**0.0000**	**328.0779**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1226	1.1244	1.0691	1.7400e-003		0.0618	0.0618		0.0581	0.0581	0.0000	149.4059	149.4059	0.0361	0.0000	150.3070
Total	**0.1226**	**1.1244**	**1.0691**	**1.7400e-003**		**0.0618**	**0.0618**		**0.0581**	**0.0581**	**0.0000**	**149.4059**	**149.4059**	**0.0361**	**0.0000**	**150.3070**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0160	0.5255	0.1312	1.3600e-003	0.0330	1.1400e-003	0.0341	9.5400e-003	1.0900e-003	0.0106	0.0000	130.4759	130.4759	6.4100e-003	0.0000	130.6363
Worker	0.0907	0.0626	0.6626	2.1800e-003	0.2334	1.5300e-003	0.2350	0.0621	1.4100e-003	0.0635	0.0000	197.3309	197.3309	4.4200e-003	0.0000	197.4416
Total	**0.1066**	**0.5880**	**0.7937**	**3.5400e-003**	**0.2664**	**2.6700e-003**	**0.2691**	**0.0716**	**2.5000e-003**	**0.0742**	**0.0000**	**327.8069**	**327.8069**	**0.0108**	**0.0000**	**328.0779**

3.6 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0270	0.2778	0.3150	4.9000e-004		0.0146	0.0146		0.0134	0.0134	0.0000	43.0505	43.0505	0.0139	0.0000	43.3986
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0270**	**0.2778**	**0.3150**	**4.9000e-004**		**0.0146**	**0.0146**		**0.0134**	**0.0134**	**0.0000**	**43.0505**	**43.0505**	**0.0139**	**0.0000**	**43.3986**

3.6 Paving - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.9000e-004	6.8000e-004	7.2300e-003	2.0000e-005	2.5500e-003	2.0000e-005	2.5700e-003	6.8000e-004	2.0000e-005	6.9000e-004	0.0000	2.1543	2.1543	5.0000e-005	0.0000	2.1555
Total	**9.9000e-004**	**6.8000e-004**	**7.2300e-003**	**2.0000e-005**	**2.5500e-003**	**2.0000e-005**	**2.5700e-003**	**6.8000e-004**	**2.0000e-005**	**6.9000e-004**	**0.0000**	**2.1543**	**2.1543**	**5.0000e-005**	**0.0000**	**2.1555**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0270	0.2778	0.3150	4.9000e-004		0.0146	0.0146		0.0134	0.0134	0.0000	43.0504	43.0504	0.0139	0.0000	43.3985
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0270**	**0.2778**	**0.3150**	**4.9000e-004**		**0.0146**	**0.0146**		**0.0134**	**0.0134**	**0.0000**	**43.0504**	**43.0504**	**0.0139**	**0.0000**	**43.3985**

3.6 Paving - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.9000e-004	6.8000e-004	7.2300e-003	2.0000e-005	2.5500e-003	2.0000e-005	2.5700e-003	6.8000e-004	2.0000e-005	6.9000e-004	0.0000	2.1543	2.1543	5.0000e-005	0.0000	2.1555
Total	**9.9000e-004**	**6.8000e-004**	**7.2300e-003**	**2.0000e-005**	**2.5500e-003**	**2.0000e-005**	**2.5700e-003**	**6.8000e-004**	**2.0000e-005**	**6.9000e-004**	**0.0000**	**2.1543**	**2.1543**	**5.0000e-005**	**0.0000**	**2.1555**

3.7 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	4.4069					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.4900e-003	0.0313	0.0373	6.0000e-005		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003	0.0000	5.2342	5.2342	3.6000e-004	0.0000	5.2432
Total	**4.4114**	**0.0313**	**0.0373**	**6.0000e-005**		**1.9300e-003**	**1.9300e-003**		**1.9300e-003**	**1.9300e-003**	**0.0000**	**5.2342**	**5.2342**	**3.6000e-004**	**0.0000**	**5.2432**

3.7 Architectural Coating - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.7900e-003	3.9900e-003	0.0423	1.4000e-004	0.0149	1.0000e-004	0.0150	3.9600e-003	9.0000e-005	4.0500e-003	0.0000	12.5983	12.5983	2.8000e-004	0.0000	12.6054
Total	**5.7900e-003**	**3.9900e-003**	**0.0423**	**1.4000e-004**	**0.0149**	**1.0000e-004**	**0.0150**	**3.9600e-003**	**9.0000e-005**	**4.0500e-003**	**0.0000**	**12.5983**	**12.5983**	**2.8000e-004**	**0.0000**	**12.6054**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	4.4069					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.4900e-003	0.0313	0.0373	6.0000e-005		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003	0.0000	5.2342	5.2342	3.6000e-004	0.0000	5.2431
Total	**4.4114**	**0.0313**	**0.0373**	**6.0000e-005**		**1.9300e-003**	**1.9300e-003**		**1.9300e-003**	**1.9300e-003**	**0.0000**	**5.2342**	**5.2342**	**3.6000e-004**	**0.0000**	**5.2431**

3.7 Architectural Coating - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.7900e-003	3.9900e-003	0.0423	1.4000e-004	0.0149	1.0000e-004	0.0150	3.9600e-003	9.0000e-005	4.0500e-003	0.0000	12.5983	12.5983	2.8000e-004	0.0000	12.6054
Total	**5.7900e-003**	**3.9900e-003**	**0.0423**	**1.4000e-004**	**0.0149**	**1.0000e-004**	**0.0150**	**3.9600e-003**	**9.0000e-005**	**4.0500e-003**	**0.0000**	**12.5983**	**12.5983**	**2.8000e-004**	**0.0000**	**12.6054**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.9330	4.4948	9.9985	0.0348	2.9795	0.0318	3.0112	0.7997	0.0297	0.8294	0.0000	3,195.3223	3,195.3223	0.1214	0.0000	3,198.3578
Unmitigated	0.9330	4.4948	9.9985	0.0348	2.9795	0.0318	3.0112	0.7997	0.0297	0.8294	0.0000	3,195.3223	3,195.3223	0.1214	0.0000	3,198.3578

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	2,226.42	2,226.42	2226.42	5,142,156	5,142,156
City Park	426.60	426.60	426.60	910,728	910,728
Strip Mall	1,268.00	1,268.00	1268.00	1,952,762	1,952,762
Total	3,921.02	3,921.02	3,921.02	8,005,646	8,005,646

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.576985	0.039376	0.193723	0.112069	0.016317	0.005358	0.017943	0.025814	0.002614	0.002274	0.005874	0.000887	0.000768
Apartments Low Rise	0.576985	0.039376	0.193723	0.112069	0.016317	0.005358	0.017943	0.025814	0.002614	0.002274	0.005874	0.000887	0.000768
Strip Mall	0.576985	0.039376	0.193723	0.112069	0.016317	0.005358	0.017943	0.025814	0.002614	0.002274	0.005874	0.000887	0.000768

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	617.4832	617.4832	0.0419	8.6800e-003	621.1172
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	617.4832	617.4832	0.0419	8.6800e-003	621.1172
NaturalGas Mitigated	0.0908	0.7768	0.3353	4.9500e-003		0.0628	0.0628		0.0628	0.0628	0.0000	898.8750	898.8750	0.0172	0.0165	904.2166
NaturalGas Unmitigated	0.0908	0.7768	0.3353	4.9500e-003		0.0628	0.0628		0.0628	0.0628	0.0000	898.8750	898.8750	0.0172	0.0165	904.2166

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Low Rise	1.66133e+007	0.0896	0.7655	0.3258	4.8900e-003		0.0619	0.0619		0.0619	0.0619	0.0000	886.5479	886.5479	0.0170	0.0163	891.8163
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Strip Mall	231000	1.2500e-003	0.0113	9.5100e-003	7.0000e-005		8.6000e-004	8.6000e-004		8.6000e-004	8.6000e-004	0.0000	12.3270	12.3270	2.4000e-004	2.3000e-004	12.4003
Total		**0.0908**	**0.7768**	**0.3353**	**4.9600e-003**		**0.0628**	**0.0628**		**0.0628**	**0.0628**	**0.0000**	**898.8750**	**898.8750**	**0.0172**	**0.0165**	**904.2165**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Low Rise	1.66133e+007	0.0896	0.7655	0.3258	4.8900e-003		0.0619	0.0619		0.0619	0.0619	0.0000	886.5479	886.5479	0.0170	0.0163	891.8163
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Strip Mall	231000	1.2500e-003	0.0113	9.5100e-003	7.0000e-005		8.6000e-004	8.6000e-004		8.6000e-004	8.6000e-004	0.0000	12.3270	12.3270	2.4000e-004	2.3000e-004	12.4003
Total		**0.0908**	**0.7768**	**0.3353**	**4.9600e-003**		**0.0628**	**0.0628**		**0.0628**	**0.0628**	**0.0000**	**898.8750**	**898.8750**	**0.0172**	**0.0165**	**904.2165**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Low Rise	2.6526e+006	513.7654	0.0349	7.2200e-003	516.7891
City Park	0	0.0000	0.0000	0.0000	0.0000
Strip Mall	535500	103.7178	7.0400e-003	1.4600e-003	104.3282
Total		**617.4832**	**0.0419**	**8.6800e-003**	**621.1172**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Low Rise	2.6526e+006	513.7654	0.0349	7.2200e-003	516.7891
City Park	0	0.0000	0.0000	0.0000	0.0000
Strip Mall	535500	103.7178	7.0400e-003	1.4600e-003	104.3282
Total		**617.4832**	**0.0419**	**8.6800e-003**	**621.1172**

6.0 Area Detail

6.1 Mitigation Measures Area

Use only Natural Gas Hearths

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	3.0690	0.0505	4.3786	2.3000e-004		0.0242	0.0242		0.0242	0.0242	0.0000	7.1448	7.1448	6.8900e-003	0.0000	7.3171
Unmitigated	4.4280	0.0818	6.2499	3.9500e-003		0.2917	0.2917		0.2917	0.2917	26.8523	18.1743	45.0267	0.0501	1.7600e-003	46.8027

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4407					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.4960					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	1.3590	0.0313	1.8714	3.7200e-003		0.2676	0.2676		0.2676	0.2676	26.8523	11.0296	37.8819	0.0432	1.7600e-003	39.4856
Landscaping	0.1323	0.0505	4.3786	2.3000e-004		0.0242	0.0242		0.0242	0.0242	0.0000	7.1448	7.1448	6.8900e-003	0.0000	7.3171
Total	**4.4280**	**0.0818**	**6.2499**	**3.9500e-003**		**0.2917**	**0.2917**		**0.2917**	**0.2917**	**26.8523**	**18.1743**	**45.0267**	**0.0501**	**1.7600e-003**	**46.8027**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4407					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.4960					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.1323	0.0505	4.3786	2.3000e-004		0.0242	0.0242		0.0242	0.0242	0.0000	7.1448	7.1448	6.8900e-003	0.0000	7.3171
Total	**3.0690**	**0.0505**	**4.3786**	**2.3000e-004**		**0.0242**	**0.0242**		**0.0242**	**0.0242**	**0.0000**	**7.1448**	**7.1448**	**6.8900e-003**	**0.0000**	**7.3171**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	76.1970	1.3754	0.0333	120.4939
Unmitigated	76.1970	1.3754	0.0333	120.4939

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Low Rise	38.3757 / 24.1934	68.7941	1.2543	0.0303	109.1880
City Park	0 / 1.19148	0.8077	5.0000e-005	1.0000e-005	0.8125
Strip Mall	3.70363 / 2.26996	6.5953	0.1211	2.9300e-003	10.4934
Total		**76.1970**	**1.3754**	**0.0333**	**120.4939**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Low Rise	38.3757 / 24.1934	68.7941	1.2543	0.0303	109.1880
City Park	0 / 1.19148	0.8077	5.0000e-005	1.0000e-005	0.8125
Strip Mall	3.70363 / 2.26996	6.5953	0.1211	2.9300e-003	10.4934
Total		**76.1970**	**1.3754**	**0.0333**	**120.4939**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	65.6737	3.8812	0.0000	162.7037
Unmitigated	65.6737	3.8812	0.0000	162.7037

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	270.94	54.9984	3.2503	0.0000	136.2561
City Park	0.09	0.0183	1.0800e-003	0.0000	0.0453
Strip Mall	52.5	10.6570	0.6298	0.0000	26.4023
Total		**65.6737**	**3.8812**	**0.0000**	**162.7037**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	270.94	54.9984	3.2503	0.0000	136.2561
City Park	0.09	0.0183	1.0800e-003	0.0000	0.0453
Strip Mall	52.5	10.6570	0.6298	0.0000	26.4023
Total		**65.6737**	**3.8812**	**0.0000**	**162.7037**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Alameda Encinal Terminal

Bay Area AQMD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	1.00	Acre	1.00	43,560.00	0
Apartments Low Rise	589.00	Dwelling Unit	21.30	589,000.00	1549
Strip Mall	50.00	1000sqft	1.15	50,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2022
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	427	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Per PG&E, 2015

Land Use - Total lot size 35.35 gross acres, two parcels are submerged land, therefore 23.45 net acres for development.
Population based on 2.63 persons per household according to US Census.

Construction Phase - Construction is planned to begin in 2018, with completion of the first phase of the project in 2020 and full project completion by 2022

Vehicle Trips - Rates based on revised TIA (11/9/16)

Woodstoves -

Energy Use - Default

Area Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	41.00
tblConstructionPhase	NumDays	370.00	739.00
tblConstructionPhase	NumDays	20.00	41.00
tblConstructionPhase	NumDays	35.00	81.00
tblConstructionPhase	NumDays	20.00	43.00
tblConstructionPhase	NumDays	10.00	52.00
tblGrading	AcresOfGrading	202.50	87.50
tblLandUse	LotAcreage	36.81	21.30
tblLandUse	Population	1,685.00	1,549.00
tblProjectCharacteristics	CO2IntensityFactor	641.35	427
tblProjectCharacteristics	OperationalYear	2018	2022
tblVehicleTrips	ST_TR	7.16	3.78
tblVehicleTrips	ST_TR	22.75	426.60
tblVehicleTrips	ST_TR	42.04	25.36
tblVehicleTrips	SU_TR	6.07	3.78
tblVehicleTrips	SU_TR	16.74	426.60
tblVehicleTrips	SU_TR	20.43	25.36
tblVehicleTrips	WD_TR	6.59	3.78
tblVehicleTrips	WD_TR	1.89	426.60
tblVehicleTrips	WD_TR	44.32	25.36

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	5.1744	59.5762	35.7594	0.0889	18.2141	2.6349	20.7920	9.9699	2.4241	12.3416	0.0000	8,926.7400	8,926.7400	1.9491	0.0000	8,948.8801
2019	4.4646	31.9114	33.1994	0.0875	4.2903	1.3822	5.6725	1.1499	1.3002	2.4501	0.0000	8,762.4834	8,762.4834	0.8556	0.0000	8,783.8733
2020	4.0074	29.0389	31.2572	0.0861	4.2903	1.1850	5.4753	1.1499	1.1145	2.2644	0.0000	8,587.5425	8,587.5425	0.8255	0.0000	8,608.1797
2021	215.4869	39.3006	44.7476	0.1086	4.4136	1.6783	6.0918	1.1826	1.5640	2.7466	0.0000	10,760.4199	10,760.4199	1.5194	0.0000	10,798.4048
Maximum	**215.4869**	**59.5762**	**44.7476**	**0.1086**	**18.2141**	**2.6349**	**20.7920**	**9.9699**	**2.4241**	**12.3416**	**0.0000**	**10,760.4199**	**10,760.4199**	**1.9491**	**0.0000**	**10,798.4048**

2.1 Overall Construction (Maximum Daily Emission)

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	5.1744	59.5762	35.7594	0.0889	18.2141	2.6349	20.7920	9.9699	2.4241	12.3416	0.0000	8,926.7400	8,926.7400	1.9491	0.0000	8,948.8801
2019	4.4646	31.9114	33.1994	0.0875	4.2903	1.3822	5.6725	1.1499	1.3002	2.4501	0.0000	8,762.4834	8,762.4834	0.8556	0.0000	8,783.8733
2020	4.0074	29.0389	31.2572	0.0861	4.2903	1.1850	5.4753	1.1499	1.1145	2.2644	0.0000	8,587.5425	8,587.5425	0.8255	0.0000	8,608.1797
2021	215.4869	39.3006	44.7476	0.1086	4.4136	1.6783	6.0918	1.1826	1.5640	2.7466	0.0000	10,760.4199	10,760.4199	1.5194	0.0000	10,798.4047
Maximum	**215.4869**	**59.5762**	**44.7476**	**0.1086**	**18.2141**	**2.6349**	**20.7920**	**9.9699**	**2.4241**	**12.3416**	**0.0000**	**10,760.4199**	**10,760.4199**	**1.9491**	**0.0000**	**10,798.4047**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	259.7936	5.9162	368.6874	0.6191		45.7027	45.7027		45.7027	45.7027	4,930.4284	2,270.2732	7,200.7017	6.8315	0.3485	7,475.3404
Energy	0.4977	4.2566	1.8371	0.0272		0.3439	0.3439		0.3439	0.3439		5,429.2606	5,429.2606	0.1041	0.0995	5,461.5240
Mobile	5.9010	24.0094	56.6305	0.2024	17.0082	0.1740	17.1822	4.5505	0.1629	4.7134		20,473.2356	20,473.2356	0.7365		20,491.6474
Total	**266.1923**	**34.1822**	**427.1549**	**0.8486**	**17.0082**	**46.2206**	**63.2287**	**4.5505**	**46.2094**	**50.7599**	**4,930.4284**	**28,172.7694**	**33,103.1978**	**7.6720**	**0.4480**	**33,428.5118**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	17.5614	0.5611	48.6508	2.5700e-003		0.2688	0.2688		0.2688	0.2688	0.0000	87.5085	87.5085	0.0844	0.0000	89.6196
Energy	0.4977	4.2566	1.8371	0.0272		0.3439	0.3439		0.3439	0.3439		5,429.2606	5,429.2606	0.1041	0.0995	5,461.5240
Mobile	5.9010	24.0094	56.6305	0.2024	17.0082	0.1740	17.1822	4.5505	0.1629	4.7134		20,473.2356	20,473.2356	0.7365		20,491.6474
Total	**23.9601**	**28.8271**	**107.1183**	**0.2321**	**17.0082**	**0.7867**	**17.7949**	**4.5505**	**0.7756**	**5.3260**	**0.0000**	**25,990.0047**	**25,990.0047**	**0.9250**	**0.0995**	**26,042.7909**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	91.00	15.67	74.92	72.65	0.00	98.30	71.86	0.00	98.32	89.51	100.00	7.75	21.49	87.94	77.78	22.09

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2018	2/26/2018	5	41	
2	Site Preparation	Site Preparation	2/27/2018	5/9/2018	5	52	
3	Grading	Grading	5/10/2018	8/30/2018	5	81	
4	Building Construction	Building Construction	8/31/2018	6/30/2021	5	739	
5	Paving	Paving	6/30/2021	8/27/2021	5	43	
6	Architectural Coating	Architectural Coating	8/28/2021	10/25/2021	5	41	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 87.5

Acres of Paving: 0

Residential Indoor: 1,192,725; Residential Outdoor: 397,575; Non-Residential Indoor: 75,000; Non-Residential Outdoor: 25,000; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Alameda Encinal Terminal - Bay Area AQMD Air District, Summer

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	458.00	78.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	92.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.7190	38.3225	22.3040	0.0388		1.9386	1.9386		1.8048	1.8048		3,871.7665	3,871.7665	1.0667		3,898.4344
Total	**3.7190**	**38.3225**	**22.3040**	**0.0388**		**1.9386**	**1.9386**		**1.8048**	**1.8048**		**3,871.7665**	**3,871.7665**	**1.0667**		**3,898.4344**

3.2 Demolition - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0632	0.0408	0.5025	1.3200e-003	0.1232	8.3000e-004	0.1241	0.0327	7.7000e-004	0.0335		131.0346	131.0346	3.8300e-003		131.1303
Total	**0.0632**	**0.0408**	**0.5025**	**1.3200e-003**	**0.1232**	**8.3000e-004**	**0.1241**	**0.0327**	**7.7000e-004**	**0.0335**		**131.0346**	**131.0346**	**3.8300e-003**		**131.1303**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.7190	38.3225	22.3040	0.0388		1.9386	1.9386		1.8048	1.8048	0.0000	3,871.7665	3,871.7665	1.0667		3,898.4344
Total	**3.7190**	**38.3225**	**22.3040**	**0.0388**		**1.9386**	**1.9386**		**1.8048**	**1.8048**	**0.0000**	**3,871.7665**	**3,871.7665**	**1.0667**		**3,898.4344**

3.2 Demolition - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0632	0.0408	0.5025	1.3200e-003	0.1232	8.3000e-004	0.1241	0.0327	7.7000e-004	0.0335		131.0346	131.0346	3.8300e-003		131.1303
Total	**0.0632**	**0.0408**	**0.5025**	**1.3200e-003**	**0.1232**	**8.3000e-004**	**0.1241**	**0.0327**	**7.7000e-004**	**0.0335**		**131.0346**	**131.0346**	**3.8300e-003**		**131.1303**

3.3 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.5627	48.1988	22.4763	0.0380		2.5769	2.5769		2.3708	2.3708		3,831.6239	3,831.6239	1.1928		3,861.4448
Total	**4.5627**	**48.1988**	**22.4763**	**0.0380**	**18.0663**	**2.5769**	**20.6432**	**9.9307**	**2.3708**	**12.3014**		**3,831.6239**	**3,831.6239**	**1.1928**		**3,861.4448**

3.3 Site Preparation - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0758	0.0490	0.6030	1.5800e-003	0.1479	1.0000e-003	0.1489	0.0392	9.2000e-004	0.0401		157.2415	157.2415	4.5900e-003		157.3563
Total	**0.0758**	**0.0490**	**0.6030**	**1.5800e-003**	**0.1479**	**1.0000e-003**	**0.1489**	**0.0392**	**9.2000e-004**	**0.0401**		**157.2415**	**157.2415**	**4.5900e-003**		**157.3563**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.5627	48.1988	22.4763	0.0380		2.5769	2.5769		2.3708	2.3708	0.0000	3,831.6239	3,831.6239	1.1928		3,861.4448
Total	**4.5627**	**48.1988**	**22.4763**	**0.0380**	**18.0663**	**2.5769**	**20.6432**	**9.9307**	**2.3708**	**12.3014**	**0.0000**	**3,831.6239**	**3,831.6239**	**1.1928**		**3,861.4448**

3.3 Site Preparation - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0758	0.0490	0.6030	1.5800e-003	0.1479	1.0000e-003	0.1489	0.0392	9.2000e-004	0.0401		157.2415	157.2415	4.5900e-003		157.3563
Total	**0.0758**	**0.0490**	**0.6030**	**1.5800e-003**	**0.1479**	**1.0000e-003**	**0.1489**	**0.0392**	**9.2000e-004**	**0.0401**		**157.2415**	**157.2415**	**4.5900e-003**		**157.3563**

3.4 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.1677	0.0000	7.1677	3.4339	0.0000	3.4339			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230		6,244.4284	6,244.4284	1.9440		6,293.0278
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**7.1677**	**2.6337**	**9.8014**	**3.4339**	**2.4230**	**5.8570**		**6,244.4284**	**6,244.4284**	**1.9440**		**6,293.0278**

3.4 Grading - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0843	0.0544	0.6701	1.7500e-003	0.1643	1.1100e-003	0.1654	0.0436	1.0200e-003	0.0446		174.7128	174.7128	5.1000e-003		174.8403
Total	**0.0843**	**0.0544**	**0.6701**	**1.7500e-003**	**0.1643**	**1.1100e-003**	**0.1654**	**0.0436**	**1.0200e-003**	**0.0446**		**174.7128**	**174.7128**	**5.1000e-003**		**174.8403**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.1677	0.0000	7.1677	3.4339	0.0000	3.4339			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230	0.0000	6,244.4284	6,244.4284	1.9440		6,293.0278
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**7.1677**	**2.6337**	**9.8014**	**3.4339**	**2.4230**	**5.8570**	**0.0000**	**6,244.4284**	**6,244.4284**	**1.9440**		**6,293.0278**

3.4 Grading - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0843	0.0544	0.6701	1.7500e-003	0.1643	1.1100e-003	0.1654	0.0436	1.0200e-003	0.0446		174.7128	174.7128	5.1000e-003		174.8403
Total	**0.0843**	**0.0544**	**0.6701**	**1.7500e-003**	**0.1643**	**1.1100e-003**	**0.1654**	**0.0436**	**1.0200e-003**	**0.0446**		**174.7128**	**174.7128**	**5.1000e-003**		**174.8403**

3.5 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099		2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**		**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

3.5 Building Construction - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4025	10.2992	2.6087	0.0218	0.5280	0.0797	0.6077	0.1520	0.0762	0.2282		2,304.8823	2,304.8823	0.1266		2,308.0480
Worker	1.9294	1.2459	15.3441	0.0402	3.7624	0.0254	3.7878	0.9980	0.0234	1.0214		4,000.9226	4,000.9226	0.1169		4,003.8439
Total	**2.3319**	**11.5451**	**17.9528**	**0.0620**	**4.2903**	**0.1051**	**4.3954**	**1.1499**	**0.0997**	**1.2496**		**6,305.8049**	**6,305.8049**	**0.2435**		**6,311.8918**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099	0.0000	2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**	**0.0000**	**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

3.5 Building Construction - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4025	10.2992	2.6087	0.0218	0.5280	0.0797	0.6077	0.1520	0.0762	0.2282		2,304.8823	2,304.8823	0.1266		2,308.0480
Worker	1.9294	1.2459	15.3441	0.0402	3.7624	0.0254	3.7878	0.9980	0.0234	1.0214		4,000.9226	4,000.9226	0.1169		4,003.8439
Total	**2.3319**	**11.5451**	**17.9528**	**0.0620**	**4.2903**	**0.1051**	**4.3954**	**1.1499**	**0.0997**	**1.2496**		**6,305.8049**	**6,305.8049**	**0.2435**		**6,311.8918**

3.5 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

3.5 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3617	9.7417	2.3788	0.0216	0.5280	0.0674	0.5954	0.1520	0.0645	0.2165		2,289.7296	2,289.7296	0.1211		2,292.7565
Worker	1.7417	1.0909	13.6568	0.0390	3.7624	0.0249	3.7873	0.9980	0.0230	1.0209		3,881.1737	3,881.1737	0.1032		3,883.7533
Total	**2.1034**	**10.8326**	**16.0356**	**0.0606**	**4.2903**	**0.0923**	**4.3826**	**1.1499**	**0.0874**	**1.2374**		**6,170.9033**	**6,170.9033**	**0.2243**		**6,176.5098**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

3.5 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3617	9.7417	2.3788	0.0216	0.5280	0.0674	0.5954	0.1520	0.0645	0.2165		2,289.7296	2,289.7296	0.1211		2,292.7565
Worker	1.7417	1.0909	13.6568	0.0390	3.7624	0.0249	3.7873	0.9980	0.0230	1.0209		3,881.1737	3,881.1737	0.1032		3,883.7533
Total	**2.1034**	**10.8326**	**16.0356**	**0.0606**	**4.2903**	**0.0923**	**4.3826**	**1.1499**	**0.0874**	**1.2374**		**6,170.9033**	**6,170.9033**	**0.2243**		**6,176.5098**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503		2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**		**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

3.5 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2957	8.8891	2.1204	0.0215	0.5280	0.0436	0.5716	0.1520	0.0417	0.1937		2,275.3228	2,275.3228	0.1121		2,278.1240
Worker	1.5919	0.9638	12.2883	0.0377	3.7624	0.0244	3.7867	0.9980	0.0224	1.0204		3,759.1566	3,759.1566	0.0906		3,761.4212
Total	**1.8876**	**9.8528**	**14.4087**	**0.0592**	**4.2903**	**0.0679**	**4.3583**	**1.1499**	**0.0641**	**1.2141**		**6,034.4794**	**6,034.4794**	**0.2026**		**6,039.5452**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503	0.0000	2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**	**0.0000**	**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

3.5 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2957	8.8891	2.1204	0.0215	0.5280	0.0436	0.5716	0.1520	0.0417	0.1937		2,275.3228	2,275.3228	0.1121		2,278.1240
Worker	1.5919	0.9638	12.2883	0.0377	3.7624	0.0244	3.7867	0.9980	0.0224	1.0204		3,759.1566	3,759.1566	0.0906		3,761.4212
Total	**1.8876**	**9.8528**	**14.4087**	**0.0592**	**4.2903**	**0.0679**	**4.3583**	**1.1499**	**0.0641**	**1.2141**		**6,034.4794**	**6,034.4794**	**0.2026**		**6,039.5452**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2419	8.0606	1.9008	0.0213	0.5280	0.0175	0.5455	0.1520	0.0167	0.1687		2,253.8766	2,253.8766	0.1058		2,256.5212
Worker	1.4726	0.8607	11.2499	0.0364	3.7624	0.0237	3.7860	0.9980	0.0218	1.0198		3,627.1746	3,627.1746	0.0811		3,629.2017
Total	**1.7145**	**8.9213**	**13.1507**	**0.0577**	**4.2904**	**0.0411**	**4.3315**	**1.1499**	**0.0385**	**1.1885**		**5,881.0512**	**5,881.0512**	**0.1869**		**5,885.7229**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013	0.0000	2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**	**0.0000**	**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2419	8.0606	1.9008	0.0213	0.5280	0.0175	0.5455	0.1520	0.0167	0.1687		2,253.8766	2,253.8766	0.1058		2,256.5212
Worker	1.4726	0.8607	11.2499	0.0364	3.7624	0.0237	3.7860	0.9980	0.0218	1.0198		3,627.1746	3,627.1746	0.0811		3,629.2017
Total	**1.7145**	**8.9213**	**13.1507**	**0.0577**	**4.2904**	**0.0411**	**4.3315**	**1.1499**	**0.0385**	**1.1885**		**5,881.0512**	**5,881.0512**	**0.1869**		**5,885.7229**

3.6 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2556	12.9191	14.6532	0.0228		0.6777	0.6777		0.6235	0.6235		2,207.2109	2,207.2109	0.7139		2,225.0573
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2556**	**12.9191**	**14.6532**	**0.0228**		**0.6777**	**0.6777**		**0.6235**	**0.6235**		**2,207.2109**	**2,207.2109**	**0.7139**		**2,225.0573**

3.6 Paving - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0482	0.0282	0.3685	1.1900e-003	0.1232	7.8000e-004	0.1240	0.0327	7.1000e-004	0.0334		118.7939	118.7939	2.6600e-003		118.8603
Total	**0.0482**	**0.0282**	**0.3685**	**1.1900e-003**	**0.1232**	**7.8000e-004**	**0.1240**	**0.0327**	**7.1000e-004**	**0.0334**		**118.7939**	**118.7939**	**2.6600e-003**		**118.8603**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2556	12.9191	14.6532	0.0228		0.6777	0.6777		0.6235	0.6235	0.0000	2,207.2109	2,207.2109	0.7139		2,225.0573
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2556**	**12.9191**	**14.6532**	**0.0228**		**0.6777**	**0.6777**		**0.6235**	**0.6235**	**0.0000**	**2,207.2109**	**2,207.2109**	**0.7139**		**2,225.0573**

3.6 Paving - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0482	0.0282	0.3685	1.1900e-003	0.1232	7.8000e-004	0.1240	0.0327	7.1000e-004	0.0334		118.7939	118.7939	2.6600e-003		118.8603
Total	**0.0482**	**0.0282**	**0.3685**	**1.1900e-003**	**0.1232**	**7.8000e-004**	**0.1240**	**0.0327**	**7.1000e-004**	**0.0334**		**118.7939**	**118.7939**	**2.6600e-003**		**118.8603**

3.7 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	214.9722					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941		281.4481	281.4481	0.0193		281.9309
Total	**215.1911**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**		**281.4481**	**281.4481**	**0.0193**		**281.9309**

3.7 Architectural Coating - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2958	0.1729	2.2598	7.3100e-003	0.7558	4.7600e-003	0.7605	0.2005	4.3800e-003	0.2048		728.6028	728.6028	0.0163		729.0099
Total	**0.2958**	**0.1729**	**2.2598**	**7.3100e-003**	**0.7558**	**4.7600e-003**	**0.7605**	**0.2005**	**4.3800e-003**	**0.2048**		**728.6028**	**728.6028**	**0.0163**		**729.0099**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	214.9722					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941	0.0000	281.4481	281.4481	0.0193		281.9309
Total	**215.1911**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**	**0.0000**	**281.4481**	**281.4481**	**0.0193**		**281.9309**

3.7 Architectural Coating - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2958	0.1729	2.2598	7.3100e-003	0.7558	4.7600e-003	0.7605	0.2005	4.3800e-003	0.2048		728.6028	728.6028	0.0163		729.0099
Total	**0.2958**	**0.1729**	**2.2598**	**7.3100e-003**	**0.7558**	**4.7600e-003**	**0.7605**	**0.2005**	**4.3800e-003**	**0.2048**		**728.6028**	**728.6028**	**0.0163**		**729.0099**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	5.9010	24.0094	56.6305	0.2024	17.0082	0.1740	17.1822	4.5505	0.1629	4.7134		20,473.2356	20,473.2356	0.7365		20,491.6474
Unmitigated	5.9010	24.0094	56.6305	0.2024	17.0082	0.1740	17.1822	4.5505	0.1629	4.7134		20,473.2356	20,473.2356	0.7365		20,491.6474

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	2,226.42	2,226.42	2226.42	5,142,156	5,142,156
City Park	426.60	426.60	426.60	910,728	910,728
Strip Mall	1,268.00	1,268.00	1268.00	1,952,762	1,952,762
Total	3,921.02	3,921.02	3,921.02	8,005,646	8,005,646

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.576985	0.039376	0.193723	0.112069	0.016317	0.005358	0.017943	0.025814	0.002614	0.002274	0.005874	0.000887	0.000768
Apartments Low Rise	0.576985	0.039376	0.193723	0.112069	0.016317	0.005358	0.017943	0.025814	0.002614	0.002274	0.005874	0.000887	0.000768
Strip Mall	0.576985	0.039376	0.193723	0.112069	0.016317	0.005358	0.017943	0.025814	0.002614	0.002274	0.005874	0.000887	0.000768

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.4977	4.2566	1.8371	0.0272		0.3439	0.3439		0.3439	0.3439		5,429.2606	5,429.2606	0.1041	0.0995	5,461.5240
NaturalGas Unmitigated	0.4977	4.2566	1.8371	0.0272		0.3439	0.3439		0.3439	0.3439		5,429.2606	5,429.2606	0.1041	0.0995	5,461.5240

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Low Rise	45515.8	0.4909	4.1946	1.7849	0.0268		0.3391	0.3391		0.3391	0.3391		5,354.8045	5,354.8045	0.1026	0.0982	5,386.6254
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Strip Mall	632.877	6.8300e-003	0.0621	0.0521	3.7000e-004		4.7200e-003	4.7200e-003		4.7200e-003	4.7200e-003		74.4561	74.4561	1.4300e-003	1.3700e-003	74.8985
Total		**0.4977**	**4.2567**	**1.8371**	**0.0271**		**0.3439**	**0.3439**		**0.3439**	**0.3439**		**5,429.2606**	**5,429.2606**	**0.1041**	**0.0995**	**5,461.5240**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Low Rise	45.5158	0.4909	4.1946	1.7849	0.0268		0.3391	0.3391		0.3391	0.3391		5,354.8045	5,354.8045	0.1026	0.0982	5,386.6254
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Strip Mall	0.632877	6.8300e-003	0.0621	0.0521	3.7000e-004		4.7200e-003	4.7200e-003		4.7200e-003	4.7200e-003		74.4561	74.4561	1.4300e-003	1.3700e-003	74.8985
Total		**0.4977**	**4.2567**	**1.8371**	**0.0271**		**0.3439**	**0.3439**		**0.3439**	**0.3439**		**5,429.2606**	**5,429.2606**	**0.1041**	**0.0995**	**5,461.5240**

6.0 Area Detail

6.1 Mitigation Measures Area

Use only Natural Gas Hearths

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	17.5614	0.5611	48.6508	2.5700e-003		0.2688	0.2688		0.2688	0.2688	0.0000	87.5085	87.5085	0.0844	0.0000	89.6196
Unmitigated	259.7936	5.9162	368.6874	0.6191		45.7027	45.7027		45.7027	45.7027	4,930.4284	2,270.2732	7,200.7017	6.8315	0.3485	7,475.3404

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.4148					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	13.6768					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	242.2322	5.3551	320.0366	0.6166		45.4339	45.4339		45.4339	45.4339	4,930.4284	2,182.7647	7,113.1931	6.7470	0.3485	7,385.7208
Landscaping	1.4698	0.5611	48.6508	2.5700e-003		0.2688	0.2688		0.2688	0.2688		87.5085	87.5085	0.0844		89.6196
Total	**259.7936**	**5.9162**	**368.6874**	**0.6191**		**45.7027**	**45.7027**		**45.7027**	**45.7027**	**4,930.4284**	**2,270.2732**	**7,200.7017**	**6.8315**	**0.3485**	**7,475.3404**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.4148					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	13.6768					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.4698	0.5611	48.6508	2.5700e-003		0.2688	0.2688		0.2688	0.2688		87.5085	87.5085	0.0844		89.6196
Total	**17.5614**	**0.5611**	**48.6508**	**2.5700e-003**		**0.2688**	**0.2688**		**0.2688**	**0.2688**	**0.0000**	**87.5085**	**87.5085**	**0.0844**	**0.0000**	**89.6196**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Alameda Encinal Terminal

Bay Area AQMD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	1.00	Acre	1.00	43,560.00	0
Apartments Low Rise	589.00	Dwelling Unit	21.30	589,000.00	1549
Strip Mall	50.00	1000sqft	1.15	50,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2022
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	427	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Per PG&E, 2015

Land Use - Total lot size 35.35 gross acres, two parcels are submerged land, therefore 23.45 net acres for development.
Population based on 2.63 persons per household according to US Census.

Construction Phase - Construction is planned to begin in 2018, with completion of the first phase of the project in 2020 and full project completion by 2022

Vehicle Trips - Rates based on revised TIA (11/9/16)

Woodstoves -

Energy Use - Default

Area Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	41.00
tblConstructionPhase	NumDays	370.00	739.00
tblConstructionPhase	NumDays	20.00	41.00
tblConstructionPhase	NumDays	35.00	81.00
tblConstructionPhase	NumDays	20.00	43.00
tblConstructionPhase	NumDays	10.00	52.00
tblGrading	AcresOfGrading	202.50	87.50
tblLandUse	LotAcreage	36.81	21.30
tblLandUse	Population	1,685.00	1,549.00
tblProjectCharacteristics	CO2IntensityFactor	641.35	427
tblProjectCharacteristics	OperationalYear	2018	2022
tblVehicleTrips	ST_TR	7.16	3.78
tblVehicleTrips	ST_TR	22.75	426.60
tblVehicleTrips	ST_TR	42.04	25.36
tblVehicleTrips	SU_TR	6.07	3.78
tblVehicleTrips	SU_TR	16.74	426.60
tblVehicleTrips	SU_TR	20.43	25.36
tblVehicleTrips	WD_TR	6.59	3.78
tblVehicleTrips	WD_TR	1.89	426.60
tblVehicleTrips	WD_TR	44.32	25.36

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	5.1793	59.5890	35.7262	0.0852	18.2141	2.6349	20.7920	9.9699	2.4241	12.3416	0.0000	8,555.1440	8,555.1440	1.9488	0.0000	8,577.3922
2019	4.5816	32.3008	32.7740	0.0839	4.2903	1.3833	5.6736	1.1499	1.3012	2.4512	0.0000	8,399.6401	8,399.6401	0.8596	0.0000	8,421.1293
2020	4.1148	29.3653	30.8153	0.0826	4.2903	1.1857	5.4761	1.1499	1.1152	2.2651	0.0000	8,233.5951	8,233.5951	0.8288	0.0000	8,254.3138
2021	215.5044	39.5790	44.2833	0.1051	4.4136	1.6789	6.0924	1.1826	1.5646	2.7472	0.0000	10,407.9748	10,407.9748	1.5224	0.0000	10,446.0348
Maximum	**215.5044**	**59.5890**	**44.2833**	**0.1051**	**18.2141**	**2.6349**	**20.7920**	**9.9699**	**2.4241**	**12.3416**	**0.0000**	**10,407.9748**	**10,407.9748**	**1.9488**	**0.0000**	**10,446.0348**

2.1 Overall Construction (Maximum Daily Emission)

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	5.1793	59.5890	35.7262	0.0852	18.2141	2.6349	20.7920	9.9699	2.4241	12.3416	0.0000	8,555.1440	8,555.1440	1.9488	0.0000	8,577.3922
2019	4.5816	32.3008	32.7740	0.0839	4.2903	1.3833	5.6736	1.1499	1.3012	2.4512	0.0000	8,399.6401	8,399.6401	0.8596	0.0000	8,421.1293
2020	4.1148	29.3653	30.8153	0.0826	4.2903	1.1857	5.4761	1.1499	1.1152	2.2651	0.0000	8,233.5951	8,233.5951	0.8288	0.0000	8,254.3138
2021	215.5044	39.5790	44.2833	0.1051	4.4136	1.6789	6.0924	1.1826	1.5646	2.7472	0.0000	10,407.9748	10,407.9748	1.5224	0.0000	10,446.0347
Maximum	**215.5044**	**59.5890**	**44.2833**	**0.1051**	**18.2141**	**2.6349**	**20.7920**	**9.9699**	**2.4241**	**12.3416**	**0.0000**	**10,407.9748**	**10,407.9748**	**1.9488**	**0.0000**	**10,446.0347**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	259.7936	5.9162	368.6874	0.6191		45.7027	45.7027		45.7027	45.7027	4,930.4284	2,270.2732	7,200.7017	6.8315	0.3485	7,475.3404
Energy	0.4977	4.2566	1.8371	0.0272		0.3439	0.3439		0.3439	0.3439		5,429.2606	5,429.2606	0.1041	0.0995	5,461.5240
Mobile	5.0817	25.0932	57.8007	0.1894	17.0082	0.1755	17.1837	4.5505	0.1643	4.7148		19,162.8422	19,162.8422	0.7570		19,181.7675
Total	**265.3729**	**35.2660**	**428.3251**	**0.8357**	**17.0082**	**46.2220**	**63.2302**	**4.5505**	**46.2108**	**50.7613**	**4,930.4284**	**26,862.3761**	**31,792.8045**	**7.6925**	**0.4480**	**32,118.6319**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	17.5614	0.5611	48.6508	2.5700e-003		0.2688	0.2688		0.2688	0.2688	0.0000	87.5085	87.5085	0.0844	0.0000	89.6196
Energy	0.4977	4.2566	1.8371	0.0272		0.3439	0.3439		0.3439	0.3439		5,429.2606	5,429.2606	0.1041	0.0995	5,461.5240
Mobile	5.0817	25.0932	57.8007	0.1894	17.0082	0.1755	17.1837	4.5505	0.1643	4.7148		19,162.8422	19,162.8422	0.7570		19,181.7675
Total	**23.1407**	**29.9109**	**108.2885**	**0.2191**	**17.0082**	**0.7881**	**17.7963**	**4.5505**	**0.7770**	**5.3274**	**0.0000**	**24,679.6113**	**24,679.6113**	**0.9455**	**0.0995**	**24,732.9111**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	91.28	15.18	74.72	73.78	0.00	98.29	71.85	0.00	98.32	89.50	100.00	8.13	22.37	87.71	77.78	23.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2018	2/26/2018	5	41	
2	Site Preparation	Site Preparation	2/27/2018	5/9/2018	5	52	
3	Grading	Grading	5/10/2018	8/30/2018	5	81	
4	Building Construction	Building Construction	8/31/2018	6/30/2021	5	739	
5	Paving	Paving	6/30/2021	8/27/2021	5	43	
6	Architectural Coating	Architectural Coating	8/28/2021	10/25/2021	5	41	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 87.5

Acres of Paving: 0

Residential Indoor: 1,192,725; Residential Outdoor: 397,575; Non-Residential Indoor: 75,000; Non-Residential Outdoor: 25,000; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Alameda Encinal Terminal - Bay Area AQMD Air District, Winter

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	458.00	78.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	92.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.7190	38.3225	22.3040	0.0388		1.9386	1.9386		1.8048	1.8048		3,871.7665	3,871.7665	1.0667		3,898.4344
Total	**3.7190**	**38.3225**	**22.3040**	**0.0388**		**1.9386**	**1.9386**		**1.8048**	**1.8048**		**3,871.7665**	**3,871.7665**	**1.0667**		**3,898.4344**

3.2 Demolition - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0669	0.0504	0.4776	1.2100e-003	0.1232	8.3000e-004	0.1241	0.0327	7.7000e-004	0.0335		120.7180	120.7180	3.6200e-003		120.8085
Total	**0.0669**	**0.0504**	**0.4776**	**1.2100e-003**	**0.1232**	**8.3000e-004**	**0.1241**	**0.0327**	**7.7000e-004**	**0.0335**		**120.7180**	**120.7180**	**3.6200e-003**		**120.8085**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.7190	38.3225	22.3040	0.0388		1.9386	1.9386		1.8048	1.8048	0.0000	3,871.7665	3,871.7665	1.0667		3,898.4344
Total	**3.7190**	**38.3225**	**22.3040**	**0.0388**		**1.9386**	**1.9386**		**1.8048**	**1.8048**	**0.0000**	**3,871.7665**	**3,871.7665**	**1.0667**		**3,898.4344**

3.2 Demolition - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0669	0.0504	0.4776	1.2100e-003	0.1232	8.3000e-004	0.1241	0.0327	7.7000e-004	0.0335		120.7180	120.7180	3.6200e-003		120.8085
Total	**0.0669**	**0.0504**	**0.4776**	**1.2100e-003**	**0.1232**	**8.3000e-004**	**0.1241**	**0.0327**	**7.7000e-004**	**0.0335**		**120.7180**	**120.7180**	**3.6200e-003**		**120.8085**

3.3 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.5627	48.1988	22.4763	0.0380		2.5769	2.5769		2.3708	2.3708		3,831.6239	3,831.6239	1.1928		3,861.4448
Total	**4.5627**	**48.1988**	**22.4763**	**0.0380**	**18.0663**	**2.5769**	**20.6432**	**9.9307**	**2.3708**	**12.3014**		**3,831.6239**	**3,831.6239**	**1.1928**		**3,861.4448**

3.3 Site Preparation - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0802	0.0605	0.5731	1.4600e-003	0.1479	1.0000e-003	0.1489	0.0392	9.2000e-004	0.0401		144.8616	144.8616	4.3400e-003		144.9702
Total	**0.0802**	**0.0605**	**0.5731**	**1.4600e-003**	**0.1479**	**1.0000e-003**	**0.1489**	**0.0392**	**9.2000e-004**	**0.0401**		**144.8616**	**144.8616**	**4.3400e-003**		**144.9702**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.5627	48.1988	22.4763	0.0380		2.5769	2.5769		2.3708	2.3708	0.0000	3,831.6239	3,831.6239	1.1928		3,861.4448
Total	**4.5627**	**48.1988**	**22.4763**	**0.0380**	**18.0663**	**2.5769**	**20.6432**	**9.9307**	**2.3708**	**12.3014**	**0.0000**	**3,831.6239**	**3,831.6239**	**1.1928**		**3,861.4448**

3.3 Site Preparation - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0802	0.0605	0.5731	1.4600e-003	0.1479	1.0000e-003	0.1489	0.0392	9.2000e-004	0.0401		144.8616	144.8616	4.3400e-003		144.9702
Total	**0.0802**	**0.0605**	**0.5731**	**1.4600e-003**	**0.1479**	**1.0000e-003**	**0.1489**	**0.0392**	**9.2000e-004**	**0.0401**		**144.8616**	**144.8616**	**4.3400e-003**		**144.9702**

3.4 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.1677	0.0000	7.1677	3.4339	0.0000	3.4339			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230		6,244.4284	6,244.4284	1.9440		6,293.0278
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**7.1677**	**2.6337**	**9.8014**	**3.4339**	**2.4230**	**5.8570**		**6,244.4284**	**6,244.4284**	**1.9440**		**6,293.0278**

3.4 Grading - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0891	0.0672	0.6368	1.6200e-003	0.1643	1.1100e-003	0.1654	0.0436	1.0200e-003	0.0446		160.9573	160.9573	4.8300e-003		161.0780
Total	**0.0891**	**0.0672**	**0.6368**	**1.6200e-003**	**0.1643**	**1.1100e-003**	**0.1654**	**0.0436**	**1.0200e-003**	**0.0446**		**160.9573**	**160.9573**	**4.8300e-003**		**161.0780**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.1677	0.0000	7.1677	3.4339	0.0000	3.4339			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230	0.0000	6,244.4284	6,244.4284	1.9440		6,293.0278
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**7.1677**	**2.6337**	**9.8014**	**3.4339**	**2.4230**	**5.8570**	**0.0000**	**6,244.4284**	**6,244.4284**	**1.9440**		**6,293.0278**

3.4 Grading - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0891	0.0672	0.6368	1.6200e-003	0.1643	1.1100e-003	0.1654	0.0436	1.0200e-003	0.0446		160.9573	160.9573	4.8300e-003		161.0780
Total	**0.0891**	**0.0672**	**0.6368**	**1.6200e-003**	**0.1643**	**1.1100e-003**	**0.1654**	**0.0436**	**1.0200e-003**	**0.0446**		**160.9573**	**160.9573**	**4.8300e-003**		**161.0780**

3.5 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099		2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**		**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

3.5 Building Construction - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4219	10.4519	2.9725	0.0213	0.5280	0.0809	0.6089	0.1520	0.0774	0.2294		2,248.2861	2,248.2861	0.1373		2,251.7188
Worker	2.0413	1.5398	14.5831	0.0370	3.7624	0.0254	3.7878	0.9980	0.0234	1.0214		3,685.9228	3,685.9228	0.1105		3,688.6852
Total	**2.4632**	**11.9918**	**17.5555**	**0.0583**	**4.2903**	**0.1063**	**4.3967**	**1.1499**	**0.1008**	**1.2508**		**5,934.2089**	**5,934.2089**	**0.2478**		**5,940.4040**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099	0.0000	2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**	**0.0000**	**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

3.5 Building Construction - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4219	10.4519	2.9725	0.0213	0.5280	0.0809	0.6089	0.1520	0.0774	0.2294		2,248.2861	2,248.2861	0.1373		2,251.7188
Worker	2.0413	1.5398	14.5831	0.0370	3.7624	0.0254	3.7878	0.9980	0.0234	1.0214		3,685.9228	3,685.9228	0.1105		3,688.6852
Total	**2.4632**	**11.9918**	**17.5555**	**0.0583**	**4.2903**	**0.1063**	**4.3967**	**1.1499**	**0.1008**	**1.2508**		**5,934.2089**	**5,934.2089**	**0.2478**		**5,940.4040**

3.5 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

3.5 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3791	9.8735	2.7155	0.0211	0.5280	0.0685	0.5965	0.1520	0.0655	0.2175		2,232.7658	2,232.7658	0.1311		2,236.0442
Worker	1.8413	1.3485	12.8947	0.0359	3.7624	0.0249	3.7873	0.9980	0.0230	1.0209		3,575.2942	3,575.2942	0.0971		3,577.7216
Total	**2.2204**	**11.2220**	**15.6102**	**0.0570**	**4.2903**	**0.0934**	**4.3837**	**1.1499**	**0.0885**	**1.2384**		**5,808.0600**	**5,808.0600**	**0.2282**		**5,813.7658**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

3.5 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3791	9.8735	2.7155	0.0211	0.5280	0.0685	0.5965	0.1520	0.0655	0.2175		2,232.7658	2,232.7658	0.1311		2,236.0442
Worker	1.8413	1.3485	12.8947	0.0359	3.7624	0.0249	3.7873	0.9980	0.0230	1.0209		3,575.2942	3,575.2942	0.0971		3,577.7216
Total	**2.2204**	**11.2220**	**15.6102**	**0.0570**	**4.2903**	**0.0934**	**4.3837**	**1.1499**	**0.0885**	**1.2384**		**5,808.0600**	**5,808.0600**	**0.2282**		**5,813.7658**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503		2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**		**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

3.5 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3112	8.9885	2.4257	0.0210	0.5280	0.0443	0.5723	0.1520	0.0424	0.1944		2,217.7525	2,217.7525	0.1212		2,220.7824
Worker	1.6838	1.1908	11.5411	0.0348	3.7624	0.0244	3.7867	0.9980	0.0224	1.0204		3,462.7796	3,462.7796	0.0847		3,464.8970
Total	**1.9950**	**10.1793**	**13.9668**	**0.0557**	**4.2903**	**0.0687**	**4.3590**	**1.1499**	**0.0648**	**1.2148**		**5,680.5321**	**5,680.5321**	**0.2059**		**5,685.6794**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503	0.0000	2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**	**0.0000**	**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

3.5 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3112	8.9885	2.4257	0.0210	0.5280	0.0443	0.5723	0.1520	0.0424	0.1944		2,217.7525	2,217.7525	0.1212		2,220.7824
Worker	1.6838	1.1908	11.5411	0.0348	3.7624	0.0244	3.7867	0.9980	0.0224	1.0204		3,462.7796	3,462.7796	0.0847		3,464.8970
Total	**1.9950**	**10.1793**	**13.9668**	**0.0557**	**4.2903**	**0.0687**	**4.3590**	**1.1499**	**0.0648**	**1.2148**		**5,680.5321**	**5,680.5321**	**0.2059**		**5,685.6794**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2562	8.1299	2.1847	0.0207	0.5280	0.0181	0.5461	0.1520	0.0173	0.1693		2,196.6918	2,196.6918	0.1144		2,199.5529
Worker	1.5601	1.0631	10.5254	0.0335	3.7624	0.0237	3.7860	0.9980	0.0218	1.0198		3,341.2778	3,341.2778	0.0756		3,343.1679
Total	**1.8163**	**9.1930**	**12.7101**	**0.0543**	**4.2904**	**0.0417**	**4.3321**	**1.1499**	**0.0391**	**1.1890**		**5,537.9696**	**5,537.9696**	**0.1900**		**5,542.7208**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013	0.0000	2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**	**0.0000**	**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2562	8.1299	2.1847	0.0207	0.5280	0.0181	0.5461	0.1520	0.0173	0.1693		2,196.6918	2,196.6918	0.1144		2,199.5529
Worker	1.5601	1.0631	10.5254	0.0335	3.7624	0.0237	3.7860	0.9980	0.0218	1.0198		3,341.2778	3,341.2778	0.0756		3,343.1679
Total	**1.8163**	**9.1930**	**12.7101**	**0.0543**	**4.2904**	**0.0417**	**4.3321**	**1.1499**	**0.0391**	**1.1890**		**5,537.9696**	**5,537.9696**	**0.1900**		**5,542.7208**

3.6 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2556	12.9191	14.6532	0.0228		0.6777	0.6777		0.6235	0.6235		2,207.2109	2,207.2109	0.7139		2,225.0573
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2556**	**12.9191**	**14.6532**	**0.0228**		**0.6777**	**0.6777**		**0.6235**	**0.6235**		**2,207.2109**	**2,207.2109**	**0.7139**		**2,225.0573**

3.6 Paving - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0511	0.0348	0.3447	1.1000e-003	0.1232	7.8000e-004	0.1240	0.0327	7.1000e-004	0.0334		109.4305	109.4305	2.4800e-003		109.4924
Total	**0.0511**	**0.0348**	**0.3447**	**1.1000e-003**	**0.1232**	**7.8000e-004**	**0.1240**	**0.0327**	**7.1000e-004**	**0.0334**		**109.4305**	**109.4305**	**2.4800e-003**		**109.4924**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2556	12.9191	14.6532	0.0228		0.6777	0.6777		0.6235	0.6235	0.0000	2,207.2109	2,207.2109	0.7139		2,225.0573
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2556**	**12.9191**	**14.6532**	**0.0228**		**0.6777**	**0.6777**		**0.6235**	**0.6235**	**0.0000**	**2,207.2109**	**2,207.2109**	**0.7139**		**2,225.0573**

3.6 Paving - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0511	0.0348	0.3447	1.1000e-003	0.1232	7.8000e-004	0.1240	0.0327	7.1000e-004	0.0334		109.4305	109.4305	2.4800e-003		109.4924
Total	**0.0511**	**0.0348**	**0.3447**	**1.1000e-003**	**0.1232**	**7.8000e-004**	**0.1240**	**0.0327**	**7.1000e-004**	**0.0334**		**109.4305**	**109.4305**	**2.4800e-003**		**109.4924**

3.7 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	214.9722					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941		281.4481	281.4481	0.0193		281.9309
Total	**215.1911**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**		**281.4481**	**281.4481**	**0.0193**		**281.9309**

3.7 Architectural Coating - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.3134	0.2135	2.1143	6.7300e-003	0.7558	4.7600e-003	0.7605	0.2005	4.3800e-003	0.2048		671.1737	671.1737	0.0152		671.5534
Total	**0.3134**	**0.2135**	**2.1143**	**6.7300e-003**	**0.7558**	**4.7600e-003**	**0.7605**	**0.2005**	**4.3800e-003**	**0.2048**		**671.1737**	**671.1737**	**0.0152**		**671.5534**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	214.9722					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941	0.0000	281.4481	281.4481	0.0193		281.9309
Total	**215.1911**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**	**0.0000**	**281.4481**	**281.4481**	**0.0193**		**281.9309**

3.7 Architectural Coating - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.3134	0.2135	2.1143	6.7300e-003	0.7558	4.7600e-003	0.7605	0.2005	4.3800e-003	0.2048		671.1737	671.1737	0.0152		671.5534
Total	**0.3134**	**0.2135**	**2.1143**	**6.7300e-003**	**0.7558**	**4.7600e-003**	**0.7605**	**0.2005**	**4.3800e-003**	**0.2048**		**671.1737**	**671.1737**	**0.0152**		**671.5534**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	5.0817	25.0932	57.8007	0.1894	17.0082	0.1755	17.1837	4.5505	0.1643	4.7148		19,162.8422	19,162.8422	0.7570		19,181.7675
Unmitigated	5.0817	25.0932	57.8007	0.1894	17.0082	0.1755	17.1837	4.5505	0.1643	4.7148		19,162.8422	19,162.8422	0.7570		19,181.7675

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	2,226.42	2,226.42	2226.42	5,142,156	5,142,156
City Park	426.60	426.60	426.60	910,728	910,728
Strip Mall	1,268.00	1,268.00	1268.00	1,952,762	1,952,762
Total	3,921.02	3,921.02	3,921.02	8,005,646	8,005,646

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.576985	0.039376	0.193723	0.112069	0.016317	0.005358	0.017943	0.025814	0.002614	0.002274	0.005874	0.000887	0.000768
Apartments Low Rise	0.576985	0.039376	0.193723	0.112069	0.016317	0.005358	0.017943	0.025814	0.002614	0.002274	0.005874	0.000887	0.000768
Strip Mall	0.576985	0.039376	0.193723	0.112069	0.016317	0.005358	0.017943	0.025814	0.002614	0.002274	0.005874	0.000887	0.000768

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.4977	4.2566	1.8371	0.0272		0.3439	0.3439		0.3439	0.3439		5,429.2606	5,429.2606	0.1041	0.0995	5,461.5240
NaturalGas Unmitigated	0.4977	4.2566	1.8371	0.0272		0.3439	0.3439		0.3439	0.3439		5,429.2606	5,429.2606	0.1041	0.0995	5,461.5240

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Low Rise	45515.8	0.4909	4.1946	1.7849	0.0268		0.3391	0.3391		0.3391	0.3391		5,354.8045	5,354.8045	0.1026	0.0982	5,386.6254
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Strip Mall	632.877	6.8300e-003	0.0621	0.0521	3.7000e-004		4.7200e-003	4.7200e-003		4.7200e-003	4.7200e-003		74.4561	74.4561	1.4300e-003	1.3700e-003	74.8985
Total		**0.4977**	**4.2567**	**1.8371**	**0.0271**		**0.3439**	**0.3439**		**0.3439**	**0.3439**		**5,429.2606**	**5,429.2606**	**0.1041**	**0.0995**	**5,461.5240**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Low Rise	45.5158	0.4909	4.1946	1.7849	0.0268		0.3391	0.3391		0.3391	0.3391		5,354.8045	5,354.8045	0.1026	0.0982	5,386.6254
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Strip Mall	0.632877	6.8300e-003	0.0621	0.0521	3.7000e-004		4.7200e-003	4.7200e-003		4.7200e-003	4.7200e-003		74.4561	74.4561	1.4300e-003	1.3700e-003	74.8985
Total		**0.4977**	**4.2567**	**1.8371**	**0.0271**		**0.3439**	**0.3439**		**0.3439**	**0.3439**		**5,429.2606**	**5,429.2606**	**0.1041**	**0.0995**	**5,461.5240**

6.0 Area Detail

6.1 Mitigation Measures Area

Use only Natural Gas Hearths

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	17.5614	0.5611	48.6508	2.5700e-003		0.2688	0.2688		0.2688	0.2688	0.0000	87.5085	87.5085	0.0844	0.0000	89.6196
Unmitigated	259.7936	5.9162	368.6874	0.6191		45.7027	45.7027		45.7027	45.7027	4,930.4284	2,270.2732	7,200.7017	6.8315	0.3485	7,475.3404

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.4148					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	13.6768					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	242.2322	5.3551	320.0366	0.6166		45.4339	45.4339		45.4339	45.4339	4,930.4284	2,182.7647	7,113.1931	6.7470	0.3485	7,385.7208
Landscaping	1.4698	0.5611	48.6508	2.5700e-003		0.2688	0.2688		0.2688	0.2688		87.5085	87.5085	0.0844		89.6196
Total	**259.7936**	**5.9162**	**368.6874**	**0.6191**		**45.7027**	**45.7027**		**45.7027**	**45.7027**	**4,930.4284**	**2,270.2732**	**7,200.7017**	**6.8315**	**0.3485**	**7,475.3404**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.4148					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	13.6768					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.4698	0.5611	48.6508	2.5700e-003		0.2688	0.2688		0.2688	0.2688		87.5085	87.5085	0.0844		89.6196
Total	**17.5614**	**0.5611**	**48.6508**	**2.5700e-003**		**0.2688**	**0.2688**		**0.2688**	**0.2688**	**0.0000**	**87.5085**	**87.5085**	**0.0844**	**0.0000**	**89.6196**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX E

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TABLE E-1
SPECIAL-STATUS SPECIES CONSIDERED IN EVALUATION OF ENCINAL TERMINALS PROJECT SITE

Common Name ***Scientific Name***	**Listing Status USFWS/ CDFW/Other**	**General Habitat**	**Potential for Species Occurrence Within Project Site**
SPECIES LISTED OR PROPOSED FOR LISTING			
Plants			
Pallid manzanita *Arctostaphylos pallida*	FT/CE/1B.1	Broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, coastal scrub. Requires fire for reproduction. 185-465 m.	**Absent.** Suitable habitat not found onsite. Project area is outside species' known distribution.
Robust spineflower *Chorizanthe robusta* var. *robusta*	FE/--/1B.1	Cismontane woodland, coastal dunes, coastal scrub, sandy terraces and bluffs or in loose sand. 3-120 m.	**Absent.** Suitable habitat not found onsite. Local occurrences are historical and species is thought to be extirpated from project area.
Presidio clarkia *Clarkia franciscana*	FE/CE/1B.1	Coastal scrub, valley and foothill grassland, and serpentine outcrops in grassland or scrub. 20-335 m.	**Absent.** Suitable habitat not found onsite. Project area is outside species' known distribution.
Santa Cruz tarplant *Holocarpha macradenia*	FT/CE/1B.1	Coastal prairie, valley and foothill grassland. Found on light, sandy soil or sandy clay; often with non-natives. 10-260 m.	**Absent.** Suitable habitat not found onsite. Local occurrences are historical and species is thought to be extirpated from project area.
Contra Costa goldfields *Lasthenia conjugens*	FE/--/1B.1	Valley and foothill grassland, vernal pools, cismontane woodland, swales, low depressions, in open grassy areas. 1-445 m.	**Absent.** Suitable habitat not found onsite. Project area is out of the current known distribution of the species.
Beach layia *Layia carnosa*	FE/CE/1B.1	On sparsely vegetated, semi-stabilized coastal dunes and coastal scrub. 0-60 m.	**Absent.** Suitable habitat not found onsite.
San Francisco popcorn-flower *Plagiobothrys diffusus*	--/CE/1B.1	Coastal prairie, valley and foothill grasslands. 60-360 m.	**Absent.** Suitable habitat not found onsite.
Adobe sanicle *Sanicula maritima*	--/CR/1B.1	Meadows and seeps, valley and foothill grassland, chaparral, coastal prairie. Found on moist clay or ultramafic soils. 30-240 m.	**Absent.** Suitable habitat not found onsite. Local occurrences are historical and species is thought to be extirpated from project area.
California seablite *Suaeda californica*	FE/--/1B.1	Margins of coastal salt marshes and swamps. 0-5 m.	**Absent.** Suitable habitat not found onsite. Local occurrences are historical and natural populations are thought to be extirpated from project area.
Invertebrates			
Vernal pool fairy shrimp *Branchinecta lynchi*	FT/--	Ephemeral freshwater vernal pools.	**Absent.** Suitable habitat not found onsite. No local occurrence records.
Bay checkerspot butterfly *Euphydryas editha bayensis*	FT/--	Restricted to native grasslands on outcrops of serpentine soil in the vicinity of San Francisco Bay. *Plantago erecta* is the primary host plant; *Castilleja exserta,* and *C. densiflora* are the secondary host plants.	**Absent.** Suitable habitat and host plants not found onsite.
Callippe silverspot butterfly *Speyeria callippe callippe*	FE/--	Found in native grasslands with *Viola pedunculata* as larval food plant.	**Absent.** Suitable habitat and host plant not found in the project area.
Green sturgeon *Acipenser medirostris*	FT/--	Spends majority of life in ocean waters near shore, estuaries, and bays, spawns in fresh water rivers.	**Moderate.** Spawns upstream in Sacramento River, but is not known to spawn in San Francisco Bay. Travels through San Francisco Bay and may occasionally be present in project area waters. Project area waters are within designated Critical Habitat for the species.

TABLE E-1 (Continued)
SPECIAL-STATUS SPECIES CONSIDERED IN EVALUATION OF ENCINAL TERMINALS PROJECT SITE

Common Name *Scientific Name*	Listing Status USFWS/ CDFW/Other	General Habitat	Potential for Species Occurrence Within Project Site
SPECIES LISTED OR PROPOSED FOR LISTING (cont.)			
Fish			
Tidewater goby *Eucyclogobius newberryi*	FE/CSC	Brackish water habitats along the California coast from Agua Hedionda Lagoon, San Diego Co. to the mouth of the Smith River. Found in shallow lagoons and lower stream reaches, they need fairly still but not stagnant water and high oxygen levels.	**Low.** Suitable habitat not found in the project area.
Coho salmon - Central California Coast ESU *Oncorhynchus kisutch*	FT/CE	Central and northern California coastal rivers and streams.	**Moderate**. Migrating individuals may occasionally move through Oakland – Alameda Estuary and SF Bay waters within the project area. No spawning habitat available but Estuary and Bay waters may provide juvenile rearing habitat
Steelhead - Central California Coastal DPS *Oncorhynchus mykiss*	FT/--	Spawns and rears in coastal streams between the Russian River and Aptos Creek, as well as drainages tributary to San Francisco Bay, where gravelly substrate and shaded riparian habitat occurs.	**High**. Migrating individuals may move through move through Oakland – Alameda Estuary and SF Bay waters within the project area. No spawning habitat available but Estuary and Bay waters may provide juvenile rearing habitat
Steelhead - Central Valley DPS *Oncorhynchus mykiss*	FT/CT	The Central Valley steelhead DPS is thought to have occurred historically from the McCloud River and other northern tributaries to Tulare Lake and the Kings River in the southern San Joaquin Valley. The species remains widely distributed throughout the Sacramento River basin.	**High**. Migrating individuals may move through Oakland –Alameda Estuary and SF Bay waters within the project area. No spawning habitat available but Estuary and Bay waters may provide juvenile rearing habitat
Chinook salmon – Central Valley spring run ESU *Oncorhynchus tshawytscha*	FT/CT	Spawns and rears in Sacramento River and tributaries where gravelly substrate and shaded riparian habitat occurs.	**High.** Migrating individuals may move through move through Oakland –Alameda Estuary and SF Bay waters within the project area. No spawning habitat available but Estuary and Bay waters may provide juvenile rearing habitat
Chinook salmon – Sacramento River winter run ESU *Oncorhynchus tshawytscha*	FE/CT	Spawning and rearing restricted to Sacramento River basin, migrate through San Francisco Bay and Sacramento-San Joaquin Delta, require clean, cold water and gravel beds for spawning.	**High.** Migrates through San Francisco Estuary. No spawning habitat available but Estuary and Bay waters may provide juvenile rearing habitat.
Longfin smelt *Spirinchus thaleichthys*	FC/CT	Found throughout the nearshore coastal waters and open waters of San Francisco Bay-Delta including the river channels and sloughs of the Delta. Spawns in the Delta.	**Moderate.** No freshwater habitat available for spawning within the project area but larvae and dispersing and foraging juveniles and young adults may be present year-round.
Amphibians and Reptiles			
Alameda whipsnake *Masticophis lateralis euryxanthus*	FT/CT	Restricted to valley-foothill hardwood habitat of the coast ranges between Monterey and north San Francisco Bay. Inhabits south-facing slopes and ravines where shrubs form a vegetative mosaic with oak trees and grasses.	**Absent.** Suitable habitat not found onsite.

TABLE E-1 (Continued)
SPECIAL-STATUS SPECIES CONSIDERED IN EVALUATION OF ENCINAL TERMINALS PROJECT SITE

Common Name *Scientific Name*	Listing Status USFWS/ CDFW/Other	General Habitat	Potential for Species Occurrence Within Project Site
SPECIES LISTED OR PROPOSED FOR LISTING (cont.)			
Amphibians and Reptiles (cont.)			
California red-legged frog *Rana draytonii*	FT/CSC	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development. Must have access to aestivation habitat.	**Absent.** Suitable habitat not found onsite. No recent records of the species west of the East Bay hills.
California tiger salamander *Ambystoma californiense*	FT/CT	Central Valley DPS listed as threatened. Santa Barbara and Sonoma Counties DPS listed as endangered. Needs underground refuges, especially ground squirrel burrows and vernal pools or other seasonal water sources for breeding	**Absent.** Suitable habitat not found onsite. No recent records of the species west of the East Bay hills.
Birds			
Golden eagle *Aquila chrysaetos*	BCC/FP	Rolling foothills, mountain areas, sage-juniper flats, and desert. Cliff-walled canyons and large trees in open areas provide nesting habitat.	**Absent.** Suitable habitat not found onsite.
Western snowy plover *Charadrius alexandrinus nivosus*	FT/CSC	Sandy beaches, salt pond levees and shores of large alkali lakes. Needs sandy, gravelly or friable soils for nesting.	**Absent.** Suitable habitat not found onsite.
White-tailed kite *Elanus leucurus*	--/FP	Rolling foothills and valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodland. Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	**Low.** Species may occur over the project site on a transient basis.
American peregrine falcon *Falco peregrinus anatum*	DL/DL&FPS	Woodlands, coastal habitats, riparian areas, coastal and inland waters, human made structures that may be used as nest or temporary perch sites.	**Moderate.** Nests regularly nearby at the Fruitvale Bridge between Oakland and Alameda. Could occur in the project area on a transient basis.
California black rail *Laterallus jamaicensis coturniculus*	BCC/CT&FP	Inhabits freshwater marshes, wet meadows and shallow margins of saltwater marshes bordering larger bays. Needs water depths of about 1 inch that does not fluctuate during the year and dense vegetation for nesting habitat.	**Absent.** Suitable habitat not found onsite.
California brown pelican *Pelicanus occidentalis californicus*	DL/DL&FPS	Nests on protected islets near freshwater lakes and marine waters.	**Moderate.** May forage and roost within the project area in Alaska Basin or the Oakland-Alameda Estuary.
California clapper rail *Rallus longirostris obsoletus*	FE/CE&FP	Salt-water and brackish marshes traversed by tidal sloughs in the vicinity of San Francisco Bay. Associated with abundant growths of pickleweed, but feeds away from cover on invertebrates from mud-bottomed sloughs.	**Absent.** Suitable habitat not found onsite.
California least tern *Sternula antillarum browni*	FE/CE&FP	Nests along the coast from San Francisco Bay south to northern Baja California. Colonial breeder on bare or sparsely vegetated, flat substrates: sand beaches, alkali flats, landfills, or paved areas.	**Moderate.** May occur over the project area on a transient basis and forage in Alaska Basin. Nesting colony is located on Federal Facilities lands to west of project area.

TABLE E-1 (Continued)
SPECIAL-STATUS SPECIES CONSIDERED IN EVALUATION OF ENCINAL TERMINALS PROJECT SITE

Common Name *Scientific Name*	Listing Status USFWS/ CDFW/Other	General Habitat	Potential for Species Occurrence Within Project Site
SPECIES LISTED OR PROPOSED FOR LISTING (cont.)			
Mammals			
Salt-marsh harvest mouse *Reithrodontomys raviventris*	FE/CE&FP	Only in the saline emergent wetlands of San Francisco Bay and its tributaries. Found primarily in pickleweed (*Salicornia* spp.). Does not burrow, builds loosely organized nests. Requires higher areas for flood escape.	**Absent.** Suitable habitat not found onsite.
OTHER SPECIAL-STATUS SPECIES			
Plants			
Bent-flowered fiddleneck *Amsinckia lunaris*	--/--/1B.2	Cismontane woodland, valley and foothill grassland. 50-500 m.	**Absent.** Suitable habitat not found onsite.
Alkali milk-vetch *Astragalus tener* var. *tener*	--/--/1B.2	Alkali playa and flats, valley, annual, and foothill grassland, vernal pools, low ground, and flooded lands. 1-170 m.	**Absent.** Suitable habitat not found onsite. Local occurrences are historical and species is thought to be extirpated from project area.
San Joaquin spearscale *Atriplex joaquinana*	--/--/1B.2	Chenopod scrub, alkali meadow, valley and foothill grassland. In seasonal alkali wetlands or alkali sink scrub with species such as *Distichlis spicata* and *Frankenia*. 1-250 m.	**Absent.** Suitable habitat not found onsite. Local occurrences are historical and species is thought to be extirpated from project area.
Round-leaved filaree *California macrophylla*	--/--/1B.1	Cismontane woodland, valley and foothill grassland. Clay soils. 15-1,200 m.	**Absent.** Suitable habitat not found onsite. Local occurrences are historical and species is thought to be extirpated from project area.
Coastal bluff morning-glory *Calystegia purpurata* ssp. *saxicola*	--/--/1B.2	Coastal dunes and coastal scrub. 15-105 m.	**Absent.** Suitable habitat not found onsite. Project area is outside species' known distribution.
Bristly sedge *Carex comosa*	--/--/2B.1	Marshes and swamps, lake margins, wet places. 5-1005 m.	**Absent.** Suitable habitat not found onsite.
Congdon's tarplant *Centromadia parryi* ssp. *congdonii*	--/--/1B.1	Valley and foothill grassland. Alkaline soils, sometimes described as heavy white clay. 1-230 m.	**Absent.** Suitable habitat not found onsite. Local occurrences are historical and species is thought to be extirpated from project area.
Point Reyes bird's-beak *Chloropyron maritimus* ssp. *palustris*	--/--/1B.2	Coastal salt marsh usually with *Salicornia*, *Distichlis*, *Jaumea*, *Spartina*, etc. 0-15 m.	**Absent.** Suitable habitat not found onsite. Local occurrences are historical and species is thought to be extirpated from project area.
San Francisco Bay spineflower *Chorizanthe cuspidata* var. *cuspidata*	--/--/1B.2	Coastal bluff scrub, coastal dunes, coastal prairie, coastal scrub, on sandy soil on terraces and slopes. 5-550 m.	**Absent.** Suitable habitat not found onsite. Local occurrences are historical and species is thought to be extirpated from project area.
Western leatherwood *Dirca occidentalis*	--/--/1B.2	Broadleaf upland forest, chaparral, closed-cone coniferous forest, cismontane woodland, north coast coniferous forest, riparian for and woodland. on brushy slopes, mesic sites; mostly in mixed evergreen and foothill woodland communities. 30-550 m.	**Absent.** Suitable habitat not found in the project area.
Tiburon buckwheat *Eriogonum luteolum var. caninum*	--/--/1B.2	Chaparral, valley and foothill grassland, cismontane woodland, coastal prairie. Found on serpentine soils; sandy to gravelly sites. 0-700 m.	**Absent.** Suitable habitat not found onsite—no serpentine soils.

TABLE E-1 (Continued)
SPECIAL-STATUS SPECIES CONSIDERED IN EVALUATION OF ENCINAL TERMINALS PROJECT SITE

Common Name *Scientific Name*	Listing Status USFWS/ CDFW/Other	General Habitat	Potential for Species Occurrence Within Project Site
		OTHER SPECIAL-STATUS SPECIES (cont.)	
Plants (cont.)			
Fragrant fritillary *Fritillaria liliacea*	--/--/1B.2	Coastal scrub, valley and foothill grassland, coastal prairie. Often on serpentine; usually on clay soils, in grassland. 3-410 m.	**Absent.** Suitable habitat not found onsite. Local occurrences are historical and species is thought to be extirpated from project area.
Blue coast gilia *Gilia capitata* ssp. *chamissonis*	--/--/1B.1	Coastal dunes, coastal scrub. 2-200 m.	**Absent.** Suitable habitat not found in project area.
Diablo helianthella *Helianthella castanea*	--/--/1B.2	Broadleaved upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland. Usually in chaparral/oak woodland interface in rocky, azonal soils. Often in partial shade. 25-1,150 m.	**Absent.** Suitable habitat not found onsite. Local occurrences are historical and species is thought to be extirpated from project area.
White seaside tarplant *Hemizonia congesta* ssp. *congesta*	--/--/1B.2	Coastal scrub, valley and foothill grassland, on grassy valleys and hills, often in fallow fields. 25-200 m.	**Absent.** Suitable habitat not found in project area.
Loma Prieta hoita *Hoita strobilina*	--/--/1B.1	Chaparral, cismontane woodland, riparian woodland. Serpentine and mesic sites.	**Absent.** Suitable habitat not found in project area—no serpentine soils.
Kellogg's horkelia *Horkelia cuneata* ssp. *sericea*	--/--/1B.1	Openings in closed-cone coniferous forest, coastal scrub, chaparral, old dunes, coastal sandhills. 10-200 m.	**Absent.** Suitable habitat not found in project area.
Rose leptosiphon *Leptosiphon rosaceus*	--/--/1B.1	Coastal bluff scrub. 0-100 m.	**Absent.** Suitable habitat not found in the project area.
Oregon meconella *Meconella oregana*	--/--/1B.1	Coastal prairie, coastal scrub in open, moist places. 250-500 m.	**Absent.** Suitable habitat not found in the project area.
Woodland woolythreads *Monolopia gracilens*	--/--/1B.2	Serpentine soils in broadleafed upland forest, chaparral, cismontane woodland, valley and foothill grassland. 100-1200 m.	**Absent.** Suitable habitat not found in the project area.
Choris' popcorn-flower *Plagiobothrys chorisianus* var. *chorisianus*	--/--/1B.2	Mesic sites in chaparral, coastal scrub, coastal prairie. 15-100 m.	**Absent.** Suitable habitat not found in the project area.
Most beautiful jewel-flower *Streptanthus albidus* ssp. *peramoenus*	--/--/1B.2	Chaparral, valley and foothill grassland, cismontane woodland, serpentine outcrops, and on ridges and slopes. 120-730 m.	**Absent.** Suitable habitat not found in the project area.
Slender-leaved pondweed *Stuckenia filiformis*	--/--/2.2	Marshes and swamps, in shallow, clear water of lakes and drainage channels. 15-2,310 m.	**Absent.** Suitable habitat not found in the project area.
Saline clover *Trifolium depauperatum var. hydrophilum*	--/--/1B.2	Marshes and swamps, valley and foothill grassland, vernal pools. Mesic, alkaline sites. 0-300 m.	**Absent.** Suitable habitat not found onsite.
Invertebrates			
Sandy beach tiger beetle *Cicindela hirticollis gravida*	--/*	Inhabits areas adjacent to non-brackish water along the coast of California from San Francisco Bay to northern Mexico. Clean, dry, light-colored sand in the upper zone. Subterranean larvae prefer moist sand not affected by wave action.	**Absent.** Suitable habitat not found onsite.

TABLE E-1 (Continued)
SPECIAL-STATUS SPECIES CONSIDERED IN EVALUATION OF ENCINAL TERMINALS PROJECT SITE

Common Name *Scientific Name*	Listing Status USFWS/ CDFW/Other	General Habitat	Potential for Species Occurrence Within Project Site
OTHER SPECIAL-STATUS SPECIES (cont.)			
Invertebrates (cont.)			
Monarch butterfly *Danaus plexippus*	--/*	Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico. Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby.	**Low.** May occur in the project site on a transient basis. Suitable habitat for wintering monarch aggregates is not found onsite.
Bridges' coast range shoulderband *Helminthoglypta nickliniana bridgesi*	--/*	Inhabits open hillsides of Alameda and Contra Costa counties. Tends to colonize under tall grasses and weeds.	**Absent.** Suitable habitat not found in project area.
Lee's micro-blind harvestman *Microcina leei*	--/*	Xeric habitats in the San Francisco Bay region. Found beneath sandstone rocks in open oak grassland.	**Absent.** Suitable habitat not found in project area.
San Francisco Bay Area leaf-cutter bee *Trachusa gummifera*	--/*	Unknown.	**Low.** While exact habitat requirements of this species are unknown, there are no records of this species from the project area, and essentially no native habitat there.
Mimic tryonia (=California brackishwater snail) *Tryonia imitator*	--/*	Inhabits coastal lagoons, estuaries and salt marshes, from Sonoma County south to San Diego County. Found only in permanently submerged areas in a variety of sediment types; able to withstand a wide range of salinities.	**Absent.** Suitable habitat not found in project area. Historical collection from Lake Merritt in Oakland but believed extirpated from that site.
Fish			
Sacramento perch *Archoplites interruptus*	--/CSC	Historically found in the sloughs, slow-moving rivers, and lakes of the Central Valley. Prefers warm water. Aquatic vegetation is essential for young. Tolerates wide range of water conditions.	**Absent.** Not expected to occur in project area waters.
Pacific herring *Clupea pallasii*	MSFCMA	S.F. Bay is a major spawning ground for species. Preferred spawning substrate is eelgrass and algae but will also use pier pilings, riprap, and other rigid, smooth structures within Bay waters.	**Moderate.** This species spawns in San Francisco Bay, and occurs in the Oakland-Alameda Estuary. Potential to spawn in eelgrass beds off western and northern shores of Alameda.
Chinook salmon Central Valley ESU -fall/late fall run *Oncorhynchus tshawytscha*	--/CSC	Spawning and rearing restricted to Sacramento River basin. Migrate through San Francisco Bay and Sacramento-San Joaquin Delta, require clean, cold water and gravel beds for spawning.	**Moderate.** Could travel through the Oakland-Alameda Estuary during migration. No spawning habitat available in project area.
Amphibians and Reptiles			
Western pond turtle *Emys marmorata*	--/CSC	Aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches with aquatic vegetation. Needs basking sites and suitable (sandy banks or grassy open fields) upland habitat for egg-laying.	**Absent.** Suitable habitat not found in project area.
Foothill yellow-legged frog *Rana boylii*	--/CSC	Partly-shaded, shallow streams and riffles with a rocky substrate in a variety of habitats. Needs at least some cobble-sized substrate for egg-laying. Needs at least 15 weeks to attain metamorphosis.	**Absent.** Suitable habitat not found in project area.

TABLE E-1 (Continued)
SPECIAL-STATUS SPECIES CONSIDERED IN EVALUATION OF ENCINAL TERMINALS PROJECT SITE

Common Name *Scientific Name*	Listing Status USFWS/ CDFW/Other	General Habitat	Potential for Species Occurrence Within Project Site
		OTHER SPECIAL-STATUS SPECIES (cont.)	
Birds			
Cooper's hawk *Accipiter cooperi*	--/CDFW WL&3503.5	Woodland, chiefly of open, interrupted or marginal type. Nest sites are mainly in riparian growths of deciduous trees but also relatively common in urban areas.	**Low.** Documented nests on Alameda Island however no suitable foraging or nesting habitat found onsite.
Great egret *Ardea alba*	--/* (rookery site)	Nest colonially in groves of trees. Rookery sites located near marshes, tide-flats, irrigated pastures, and margins of rivers and lakes.	**Low.** No suitable foraging habitat in the project area. Open rafters of the warehouse could provide suitable nesting substrate.
Great blue heron *Ardea herodias*	--/* (rookery site)	Colonial nester in tall trees, cliff sides, and sequestered spots on marshes. Rookery sites in close proximity to foraging areas: marshes, lake margins, tide-flats, rivers and streams, wet meadows.	**Low.** No suitable foraging habitat in the project area. Open rafters of the warehouse could provide suitable nesting substrate.
Burrowing owl *Athene cunicularia*	--/CSC	Open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	**Low.** Suitable foraging and nesting habitat is not found onsite. This species occurs in the Northwest Territories and the Federal Property. Species has been observed regularly on the Federal Property and has been reported nesting in grasslands adjacent to West Beach Landfill Wetland.
Great horned owl *Bubo virginianus*	--/3503.5	Often uses abandoned nests of corvids or squirrels; nests in large oaks, conifers, eucalyptus.	**Moderate.** May occur in the project area on a transient basis.
Red-tailed hawk *Buteo jamaicensis*	--/3503.5	Usually nests in large trees, often in woodland or riparian deciduous habitats. Also known to nest in urban parks and neighborhoods. Forages over open grasslands and scrublands.	**Moderate.** Species is ubiquitous throughout the region. May occur in the project area on a transient basis.
Red-shouldered hawk *Buteo lineatus*	--/3503.5	Usually nests in large trees, often in woodland or riparian deciduous habitats. Forages over open grasslands and woodlands.	**Low.** Relatively common throughout the East Bay Area. May occur in the project area on a transient basis though suitable nesting habitat is not present.
Northern harrier *Circus cyaneus*	--/CSC	Coastal salt and fresh-water marsh. Nests and forages in grasslands. Nests on ground in shrubby vegetation, usually at marsh edge; nest built of a large mound of sticks in wet areas.	**Low.** No suitable foraging or nesting habitat found onsite.
Snowy egret *Egretta thula*	--/* (rookery site)	Colonial nester, with nest sites situated in protected beds of dense tules. Rookery sites situated close to foraging areas: marshes, tidal-flats, streams, wet meadows, and borders of lakes.	**Low.** No suitable foraging habitat in the project area. Open rafters of the warehouse could provide suitable nesting substrate.
California horned lark *Eremophila alpestris actia*	--/CDFW WL (nesting)	Short-grass prairie, annual grasslands, coastal plains, and open fields.	**Low.** The species has been observed nesting in grassland habitat west of the project area on in the Northwest Territories. May occur in the project area on a transient basis.
American kestrel *Falco sparverius*	--/3503.5	Frequents generally open grasslands, pastures, and fields; primarily a cavity nester in large trees near open areas.	**Low.** May occur in the project area on a transient basis.

TABLE E-1 (Continued)
SPECIAL-STATUS SPECIES CONSIDERED IN EVALUATION OF ENCINAL TERMINALS PROJECT SITE

Common Name *Scientific Name*	Listing Status USFWS/ CDFW/Other	General Habitat	Potential for Species Occurrence Within Project Site
		OTHER SPECIAL-STATUS SPECIES (cont.)	
Birds (cont.)			
Saltmarsh common yellowthroat *Geothlypis trichas sinuosa*	BCC/CSC	Resident of the San Francisco Bay region, in fresh and salt water marshes. Requires thick, continuous cover down to water surface for foraging; tall grasses, tule patches, willows for nesting.	**Absent.** No suitable habitat is found in the project area.
Caspian tern *Hydroprogne caspia*	BCC/* (nesting colony)	Nests on sandy or gravely beaches and shell banks in small colonies inland and along the coast. Inland fresh-water lakes and marshes; also, brackish or salt waters of estuaries and bays.	**Moderate.** May forage in nearby Alaska Basin and the Oakland-Alameda Estuary. Nesting colony located at west of the project site at West Beach Landfill Wetland.
Loggerhead shrike *Lanius ludovicianus*	--/CSC	Occurs in semi-open country with utility posts, wires, and trees to perch on. Nests in bushes and trees.	**Low.** May occur in the project area on a transient basis. Has been confirmed as breeding in the Northwest Territories and/or Federal Property.
California gull *Larus californicus*	--/* (nesting colony)	Breeds primarily at lakes and marshes in interior western North America from Canada south to eastern California and Colorado. Birds that breed inland are migratory, most moving to the Pacific coast in winter. More recently, the species has been breeding in large numbers at the salt ponds of south San Francisco Bay. They nest in colonies, sometimes with other bird species.	**Moderate.** Likely to occur in the project area on a transient basis. Known to nest within the Federal Property and/or the Northwest Territories. Forage in adjacent waters of Alaska Basin and the Oakland-Alameda Estuary.
Alameda song sparrow *Melospiza melodia pusillula*	BCC/CSC	Resident of salt marshes bordering central eastern San Francisco Bay. Inhabits pickleweed marshes; nests low in *Grindelia* (high enough to escape high tides) and in pickleweed.	**Absent.** No suitable habitat found onsite. Known to nest and forage in the Northwest Territories.
San Pablo song sparrow *Melospiza melodia samuelis*	BCC/CSC	Resident of salt marshes bordering San Pablo Bay. Inhabits pickleweed marshes; nests low in *Grindelia* bushes (high enough to escape high tides) and in pickleweed.	**Low.** No suitable habitat found onsite. Project area outside known range of this subspecies. Possibly present on a transient basis during migratory or dispersal periods.
Black-crowned night heron *Nycticorax nycticorax*	--/* (rookery site)	Colonial nester, usually in trees, occasionally in tule patches. Rookery sites located adjacent to foraging areas: lake margins, mud-bordered bays, marshy spots.	**Low.** No suitable foraging habitat in the project area. Open rafters of the warehouse could provide suitable nesting substrate. Nearest rookeries located in Oakland and at Lincoln Park in Alameda.
Osprey *Pandion haliaetus*	--/3503.5	Forages and breeds near rivers, lakes, and marine environments.	**High.** May forage in the project area. Nesting pair known to the Northwest Territories. Nest site most recently located in vicinity of USS Hornet. Only known breeding location in Alameda County.
Double-crested cormorant *Phalacrocorax auritus*	--/* (rookery site)	Colonial nester on coastal cliffs, offshore islands, and along lake margins in the interior of the state. Nests along coast on sequestered islets, usually on ground with sloping surface, or in tall trees along lake margins.	**High.** Forage in waters around project site. Open rafters of the warehouse could provide suitable nesting substrate.

TABLE E-1 (Continued)
SPECIAL-STATUS SPECIES CONSIDERED IN EVALUATION OF ENCINAL TERMINALS PROJECT SITE

Common Name *Scientific Name*	Listing Status USFWS/ CDFW/Other	General Habitat	Potential for Species Occurrence Within Project Site
		OTHER SPECIAL-STATUS SPECIES (cont.)	
Birds (cont.)			
Black skimmer *Rynchops niger*	BCC/CSC	Nests on gravel bars, low islets, and sandy beaches, in unvegetated sites.	**Low.** Fairly common on Bay waters but few observations around Alameda Island. Transient individuals may forage in the waters offsite. No suitable nesting habitat found in the project area.
Barn owl *Tyto alba*	--/3503.5	Found in open and partly open habitats, especially grasslands. Nests in tree cavities or buildings.	**Low.** May forage over open space in the project area. Suitable nesting habitat available in vacant buildings. However, no observation records on Alameda Island.
Yellow-headed blackbird *Xanthocephalus xanthocephalus*	--/CSC	Nests in freshwater emergent wetlands with dense vegetation and deep water, often along borders of lakes or ponds. Nests only where large insects are abundant, nesting timed with maximum emergence of aquatic insects.	**Low.** Suitable habitat not present. Transient individuals may pass through project site.
Mammals			
Pallid bat *Antrozous pallidus*	--/CSC	Deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	**Low.** Habitat generally unsuitable for this species, although may migrate through the project area.
Townsend's big-eared bat *Corynorhinus townsendii*	--/CSC	Mesic sites. Roosts in caves and open, hanging from walls and ceilings. Very sensitive to human disturbance.	**Moderate.** Documented occurrences of this species roosting in buildings along Alameda's north shore; may roost in vacant project site buildings.
Berkeley kangaroo rat *Dipodomys heermanni berkeleyensis*	--/*	Open grassy hilltops and open spaces in chaparral and blue oak/digger pine woodlands. Needs fine, deep, well-drained soil for burrowing.	**Absent.** Suitable habitat not found onsite.
Silver-haired bat *Lasionycteris noctivagans*	--/*/WBWG-M	Primarily a coastal and montane forest dweller. Roosts in hollow trees, beneath exfoliating bark, abandoned woodpecker holes and rarely under rocks. Needs drinking water.	**Low.** Habitat generally unsuitable for this species, although may migrate through the project area.
Hoary bat *Lasiurus cinereus*	--/*/WBWG-M	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths.	**Low.** May roost in trees onsite, particularly during migration periods in spring and fall.
San Pablo vole *Microtus californicus sanpabloensis*	--/CSC	Salt marshes of San Pablo Creek, on the south shore of San Pablo Bay. Constructs burrow in soft soil. Feeds on grasses, sedges and herbs. Forms a network of runways leading from the burrow.	**Absent.** Project area is outside known species' distribution range.
Big free-tailed bat *Nyctinomops macrotis*	--/CSC/ WBWG-M	Low-lying arid areas in southern California. Needs high cliffs or rocky outcrops for roosting sites. Feeds principally on large moths.	**Absent.** Suitable habitat not found onsite.
Pacific harbor seal *Phoca vitulina*	MMPA/--	Coastal waters, and throughout Bay-Delta.	**Moderate.** May occur in Alaska Basin and the Oakland-Alameda Estuary.

TABLE E-1 (Continued)
SPECIAL-STATUS SPECIES CONSIDERED IN EVALUATION OF ENCINAL TERMINALS PROJECT SITE

Common Name *Scientific Name*	Listing Status USFWS/ CDFW/Other	General Habitat	Potential for Species Occurrence Within Project Site
OTHER SPECIAL-STATUS SPECIES (cont.)			
Mammals (cont.)			
Alameda Island mole *Scapanus latimanus parvus*	--/CSC	Only known from 18 historical collections on Alameda Island. Found in a variety of habitats, especially annual and perennial grasslands. Prefers moist, friable soils. Avoids flooded soils.	**Low.** While potentially suitable habitat occurs within the project area the species has not been recorded since 1958. There are no recent observations that would confirm the population is still extant. Taxonomic validity of the subspecies needs investigation.
Salt-marsh wandering shrew *Sorex vagrans halicoetes*	--/CSC	Salt marshes of the south arm of San Francisco Bay. Found at medium to high marsh 6-8 ft above sea level where abundant driftwood is scattered among pickleweed.	**Low.** No CNDDB records from the Oakland West topo quad. Tidal marsh extent within the project area is fragmented and isolated from relatively intact high quality habitat with known extant populations.
American badger *Taxidea taxus*	--/CSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Needs sufficient food, friable soils and open, uncultivated ground. Preys on burrowing rodents.	**Absent.** Suitable habitat not found onsite. No recent documented occurrences in the project area.
California sea lion *Zalophus californianus*	MMPA/--	Coastal waters, and throughout Bay-Delta	**Moderate.** May occur in Alaska Basin and the Oakland-Alameda Estuary.

STATUS CODES

Federal (U.S. Fish and Wildlife Service [USFWS]):
FE = Listed as Endangered (in danger of extinction) by the federal government.
FT = Listed as Threatened (likely to become Endangered within the foreseeable future) by the federal government.
DL - Delisted
MSFCMA = Magnuson-Stevens Fishery Conservation and Management Act
MMPA = Marine Mammal Protection Act

State (California Department of Fish and Wildlife [CDFW]):
CE = Listed as Endangered by the State of California.
CT = Listed as Threatened by the State of California.
CR = Listed as Rare by the State of California (plants only)
DL = Delisted
CSC = California Species of Special Concern.
FP = Fully Protected
WL = Watch List
3503.5 = Protection for species of Falconiformes (hawks) and Strigiformes (owls).
*Special animal—listed on CDFW's Special Animals List.

California Native Plant Society (CNPS):
List 1A=Plants presumed extinct in California.
List 1B=Plants rare, Threatened, or Endangered in California and elsewhere.
List 2= Plants rare, Threatened, or Endangered in California but more common elsewhere.

An extension reflecting the level of threat to each species is appended to each rarity category as follows:
.1 – Seriously endangered in California.
.2 – Fairly endangered in California.
.3 – Not very endangered in California.

Western Bay Working Group (WBWG):
WBWGH = High priority; Species that are imperiled or at a high risk of imperilment.
WBWGM = Medium priority; Species that warrant a closer evaluation due to potential imperilment.

SOURCE: CDFW, 2014; CNPS, 2013; USFWS, 2014; eBird, 2013; Bolster, 1998; City of Alameda, 2002; Department of Veterans Affairs, 2013.

APPENDIX F

ransportation

NELSON
NYGAARD

MEMORANDUM

To: Andrew Thomas, City of Alameda

From: Nelson\Nygaard

Date: January 27, 2017

Subject: Encinal Terminals Project – Vehicle Miles Traveled (VMT) Analysis

This technical memorandum presents a detailed methodology and analysis of conducting an evaluation of Vehicle Miles Traveled (VMT) for the Encinal Terminals Project (herein referred to as the "project").

EXECUTIVE SUMMARY

The City of Alameda's significance criteria in identifying whether a project would result in a significant transportation impact is in accordance with the recommended VMT criteria proposed by the State of California Office of Planning & Research (OPR). As stated per OPR's recommendations, it is determined that a new land-use and/or transportation project would have a less-than-significant transportation impact if the project were to achieve either an average daily VMT per capita that is 15% less than the regional average daily VMT rate for Year 2020, or 15% less than the city's average daily VMT rate for Year 2020, whichever is higher. If a project were to result in VMT rates that exceed the 15%-reduction threshold, the project would be inconsistent with statewide and local environmental and transportation policies and therefore, would result in a significant transportation impact.

Based on the findings in this memorandum, the project would primarily result in decreases in VMT per capita compared to citywide and regional average and because the project would result in a VMT rate that is below the above-described 15%-reduction thresholds for both citywide and regional average rates, the project would result in a *less-than-significant transportation impact*. **Table ES-**1, below, summarizes these findings.

Table ES-1: Project VMT Summary Findings (Year 2020)

Metric	Bay Area	City	Project VMT v. Regional/City Averages		
	Regional Average (-15%)	City Average (-15%)	Project VMT rate	±% Regional (-15%)	±% City (-15%)
Per Capita VMT	12.7	12.0	12.3	-3.15%	+2.50%

Source: Nelson\Nygaard, 2017.

PROJECT DESCRIPTION

The project would include a Master Plan and Density Bonus Application for Encinal Terminals, a new residential mixed-use waterfront community, in the north-central portion of the City of Alameda (see **Figure 1**). The existing structures on the property would be demolished and the project would construct up to 589 new housing units, a marina with up to 160 boat slips and a harbormaster's office, between 30,000 and 50,000 square feet of commercial/office and restaurant uses, and over 3 acres of waterfront-related public open space and parks. The residential composition could include condominiums, townhomes, lofts, stacked flats, live-work units, and high-rise view residences.

Figure 1: Project Site Location

Other characteristics of the project include a new internal grid of public streets and public infrastructure. The City of Alameda is planning on extending Clement Avenue along the project frontage to the intersection of Entrance Road (approximately 400 feet); this extension will provide direct access to the project site as well as serve other east-west travel within the city. Transportation amenities and new facilities would also be provided, including a new cycletrack, bike lanes, pedestrian trails, sidewalks, and access to AC Transit Route 19, which connects to Downtown Oakland and Fruitvale Bay Area Rapid Transit (BART) stations.

VEHICLE MILES TRAVELED (VMT) OVERVIEW

Vehicle Miles Traveled (VMT) is a measure used to describe automobile use on a daily or annual basis. General components of VMT include the number of vehicle trips and the length of those trips (trip distance). VMT is the product of the total number of vehicles traveling and the average number of miles traveled per vehicle. This can be calculated either per day or per year.

VMT accounts for the entire home-back-to-home tour that includes the project, and this "tour-based" approach considers all trips, including trips to a workplace. VMT per capita is calculated by dividing total VMT by total persons (population).

Importantly, VMT is a useful measurement to determine changes in travel demand within a given environment. Since VMT captures vehicle trip demand and trip lengths, it constitute several factors, including distance to places of employment, residence, and retail centers as well as other socioeconomic factors, such as income, population, workers per household, and age.[1]

While vehicle turning movements are used to calculate level of service (LOS) and measure average vehicle delay at the intersection level or along a specific street segment, VMT looks at how many miles are traveled by a vehicle within a specific geographic area and network. To reduce the need to drive there must be convenient and comfortable non-driving options that provide access to jobs and services. Dense, urban areas provide this environment and make it easy for people to walk, bike, or take transit, for commute and recreational trips. Using VMT as a metric promotes infill development and encourages transportation projects that expand and enhance non-driving options and the public realm.

High VMT is directly correlated with a variety of widely recognized negative environmental impacts, including greenhouse gas emissions (GHGs) and habitat-spoiling sprawl. Whether a portion of the vehicle fleet draws energy from fossil fuels or not, the latter will be true. VMT analysis puts the vehicle trips a project is expected to generate in to appropriate context by capturing the related environmental outcomes these trips have on the broader region, rather than narrowly focusing on intersections within a small radius of the project.

CALIFORNIA OFFICE OF PLANNING & RESEARCH VMT SIGNIFICANCE CRITERIA

The City of Alameda does not have established significance criteria to measure project VMT impacts. However, for purposes of environmental review, the current impact threshold states:[2]

> *If the proposed project results in an increase in the average citywide or regional per capita vehicle miles traveled, then the project would not be consistent with statewide and local environmental and transportation policies to reduce greenhouse gases, improve air quality, and reduce per capita vehicle miles travelled on the regional and local roadway network.*

Per the State of California Office of Planning and Research's (OPR) *Revised Proposal on Updates to the CEQA Guidelines on Evaluating Transportation Impacts in CEQA* (January 2016), Section 15064.3 explains that a "lead agency may use models to estimate a project's vehicle miles traveled…" and as has been done for several decades under CEQA, lead agencies are responsible for deciding their choice of methodology to analyze impacts. OPR's recommends a screening criteria to identify types, characteristics, or locations of projects that would or would not result in significant impacts to VMT. Essentially, if a project meets screening criteria, then it is presumed that VMT impacts would be less than significant for the project, and a detailed VMT analysis would not be required. Furthermore, OPR recommends that, per the screening criteria, that an established reduction target per capita or per employee of 15% below that of existing development

[1] These are general components of how VMT is calculated; however, it should be noted that travel demand models typically consider a multitude of socioeconomic and transportation-related data that is otherwise not mentioned in this memorandum.

[2] Language provided by Andrew Thomas (City of Alameda), excerpt from Harbor Bay Athletic Club Project Draft EIR, 2016.

for residential and office projects be imposed. This recommendation is consistent with Assembly Bill 32 (AB 32).[3]

Based on OPR's recommendations, it is determined that a new land-use and/or transportation project would have a less-than-significant transportation impact if the project were to achieve either an average daily VMT per capita (resident) and per employee (worker) that is 15% less than the regional average daily VMT rate, or 15% less than the city's average daily VMT rate, whichever is higher. If a project were to result in VMT rates that exceed the 15%-reduction threshold, the project would be inconsistent with statewide and local environmental and transportation policies.

Per recent communication with the City of Alameda[4], the VMT threshold of significance recommended by OPR will be applied to determine if the project would result in a significant traffic impact.

PROJECT VMT ANALYSIS

Project VMT analysis consists of determining whether there would be an increase or decrease in VMT per person on a citywide level. For purposes of this analysis, it is assumed that the project would include up to 50,000 square feet of commercial development and 589 residential units.[5] For purposes of this analysis and given the mixed-use nature of the project, the new population estimates to calculate projected-generated VMT and a VMT per capita rate includes both new residents and workers traveling to/from the project on a daily basis via automobile.

The evaluation of project VMT per person (capita) was measured relative to the baseline rates provided by the Metropolitan Transportation Commission (MTC) (note: "baseline" refers to a horizon or future year that does not include implementation of the project [e.g., Year 2010, 2020, 2030, etc.]). The MTC model is widely used by counties and communities throughout the San Francisco Bay Area. The development methodology, datasets and metrics provided in the model are often used by city and county agencies to develop their own travel demand models, and the data is regularly validated for consistency among all nine counties.

The MTC Travel Demand Model ("Travel Model One") is an activity-based travel demand model for the nine-county San Francisco Bay Area. General components of the Travel Model One include a wide array of analytical approaches, including various choice models, activity duration models, time-use models, and models of individual micro-simulation models, etc. Ultimately, the combination of these datasets in each model were designed to realistically represent travel behavior, adequately replicate observed activity-travel patterns, and ensure model sensitivity to infrastructure and policies.

MTC's Travel Model One contains 1,454 Traffic Analysis Zones (TAZs) that span across the San Francisco Bay Area. Aggregate socioeconomic data for each TAZ was developed by the Association of Bay Area Governments (ABAG) and the zonal data encompasses data from U.S. Census, and

[3] AB 32 (California Health and Safety Code Division 25.5, Sections 38500, et seq.), or "Global Warming Solutions Act, 2006.

[4] Communication with Andrew Thomas on October 20, 2016.

[5] Encinal Terminals Initial Study (prepared by Environmental Science Associates, April 2016).

also includes transportation and land use characteristics, such as the estimated parking cost, auto terminal time (travel time, distance), and the land areas devoted to different uses.[6]

Travel Model One includes average daily VMT per capita for various years: 2000, 2005, 2010, 2020, 2030, and 2040. In the MTC Travel Model One, there are 17 TAZs in the City of Alameda, see **Figure 3**. The Encinal Terminals project is located in TAZ 960.

Figure 3: Alameda Traffic Analysis Zone (TAZ) Map

Source: MTC Travel Model One, 2016.

Baseline VMT Assessment

For purposes of this analysis, the VMT per capita and related metrics only pertain to Year 2020.

Table 1 shows the forecasted average daily VMT per capita for the City of Alameda, San Francisco Bay Area (Region) and TAZ 960. The VMT per capita rate is nearly constant between the region, city and project TAZ, varying slightly between 12.3 to 14.9 VMT per capita and the project TAZ has the lowest VMT per capita rate. This indicates that the residential population within the TAZ generally includes a lower auto travel demand and shorter trip lengths relative to other areas of Alameda and the region.

[6] Full description of MTC Travel One Model is provided in MTC Travel Model Development: Calibration and Validation Technical Report, May 17, 2012; available online at: http://mtcgis.mtc.ca.gov/foswiki/pub/Main/Documents/2011_04_28_Draft_Calibration_and_Validation.pdf

The calculated project VMT will be evaluated relative to 15%-reduction thresholds for the city and region. The analysis also will determine whether the project would result in an increase or decrease in VMT and VMT per capita.

Table 1: Average Daily VMT per Capita – Year 2020 Projections

Analysis Zone	Metric:	Year 2020 Average VMT
Project TAZ 960	Per Capita	12.3
City of Alameda	Per Capita	14.1
Region	Per Capita	14.9

Source: MTC Travel One Model, 2016.

Project Land Use VMT

Project VMT was calculated based on the proposed land uses associated with the project:

Project Land Use VMT. The land use-based VMT calculations include projected VMT associated with the types of land uses planned for the project, including any changes in population (residential and employment), as well as take into consideration of a number of attributes and elasticities, such as proximity to transit services or jobs, and other features that may influence travel behaviors and reduce private-auto use (which correlates to a reduction in VMT).

- The VMT analysis will focus on the residential and commercial land uses proposed by the project. Average daily VMT per capita is calculated and evaluated in this document.

PROJECT VMT METHODOLOGY

Table 2 presents the key attributes from the MTC Model and supportive data used to calculate Project VMT.

Table 2: VMT Calculation Data – TAZ and Project Attributes

Attribute	Value[1]	Description
Population (Persons)		
City Population (2020)	79,494	Total Population (persons) in City of Alameda
TAZ 960	5,392	Total Population (person) in TAZ
Project Population	1,657	New Population (persons/employees) from Project
Daily Vehicle Trips		
Project Total Daily Trips[2]	4,855	Total Daily Trips Generated from Project
VMT per Capita		
City of Alameda	14.1	VMT per Resident in City
TAZ 960	12.3	VMT per Resident in TAZ
Project	*12.3*	VMT per Resident in Project Site

1. Data presented in table is from MTC Model unless noted otherwise.
2. Project total daily trips provided in Encinal Terminals TIA Update (July 30, 2016); Table 3: Trip Generation Summary.
Sources: MTC; Abrams Associates, 2016; Nelson\Nygaard, 2017.

VMT per Capita (Resident) and VMT per Employee (Worker) Calculations

The VMT per capita and per employee are known quantities (see **Table 2**, above) and can be extracted from the MTC Model or manually calculated.[7]

As shown in **Table 3**, multiplying the VMT per capita by population results in vehicle miles traveled under Year 2020 conditions.

Table 3: City and TAZ 960 Calculated VMT per Capita and per Worker

Geographic Area	VMT per Person (A)	Population (B)	Calculated VMT (A x B = C)
Capita (Residential)			
City	14.1	79,494	1,120,865
TAZ 960	12.3	5,392	66,322

Sources: MTC; Nelson\Nygaard, 2017.

It is assumed that the baseline VMT per capita for the project would be the same as that in the TAZ in which the project would be located therein. Because the TAZ VMT per capita are known (see **Table 2** and **Table 3**), these values will be used to determine total population (or per capita) VMT for the project and for the City with and without the project.

Table 4 presents calculated project VMT and the estimated increase in capita VMT relative to Year 2020 baseline conditions. The project would result in an estimated 20,381 per capita VMT per day. Based on these findings, the project would result in a 1.8% increase in VMT relative to citywide VMT.

Table 4: Calculated VMT per Capita with Project

VMT per Capita in TAZ (A)	Project Population (B)	Project VMT (A x B = C)	City VMT (D)	City VMT with Project (C+D)	% Change in City VMT
12.3	1,657	20,381	1,120,865	1,141,246	1.8%

Source: Nelson\Nygaard, 2017.

Table 5 presents the estimated change in VMT per capita relative to Year 2020 baseline VMT conditions with implementation of the project. This calculation takes into consideration the new citywide VMT (with project) as previously shown in **Table 3** and **Table 4**, and the per capita metrics for the city and project. By dividing the new city capita VMT by the city per capita plus the project per capita, the result provides the new city per capita with implementation of the project.

Within the City of Alameda, the project would result in a 0.3% decrease in VMT per capita. The projected growth in per capita VMT relative to the increase in citywide population would therefore have no considerable effect on Year 2020 conditions.

[7] The MTC Model does calculate VMT and therefore, calculated VMT for each geographic area was done manually. This calculation is presented

Table 5: Calculated Residential VMT per Capita with Project

City VMT with Project (A)	City Population (B)	Project Population (C)	City VMT per Capita with Project (A÷ [B+C] =D])	City VMT per Capita	% Change in City VMT per Capita
1,141,246	79,494	1,657	14.06	14.1	-0.3%

Source: Nelson\Nygaard, 2017.

Roadway (Induced Demand) VMT Calculations

The project would include a new internal grid of public streets and public infrastructure to provide access to the proposed land uses. The City of Alameda has plans to extend Clement Avenue along the project frontage, from the intersection at Entrance Road to Sherman Street, to the west. This roadway extension would provide vehicular access to the project site as well as serve other east-west, non-project related vehicles traveling within the city.

For purposes of this analysis, it is assumed that the planned internal roadways would not result in any measurable effect to VMT, as these streets would comprise short, segmented roadways with limited access to on-site land uses. The planned roadway extension of Clement Avenue would be integrated within the existing street grid network. Therefore, an assessment of potential roadway (induced demand) VMT associated with the roadway extension would not be applicable and is not included in the analysis herein.

VMT Calculation Adjustments: Applying Elasticities

Travel behaviors are not static and there are a number of factors that can influence a person's travel choices. For example, travel costs (direct and indirect), proximity to various modes of transportation or lack thereof, physical and travel distance between one's place of residence and place of employment, and physical environment are all major factors that influence the decision-making process of how one travels to/from their destination(s) on a daily basis.

Initial research on this topic made it clear that the most effective method for measuring a project's impact on VMT is to measure the effect of the built environment on VMT. Further research on the built environment's effect on VMT revealed that a meta-analysis of over 200 studies across the U.S. had been performed by Ewing (University of Utah) and Cervero (UC Berkeley) in 2010. This meta-analysis identified and categorized a plethora of variables that affect VMT. These variables have been organized into five categories known as the "five Ds" of the built environment. Numerous studies have identified the five Ds and point to their elasticity and effect on VMT. The five Ds are as follows:

- "**Density**, a measure of the concentration of people or households in a given area. It is most often a measure of the residential population, residential dwelling units (households), or employment per unit of land area. Greater density is consistently associated with utilitarian walking, transit, and reduced VMT."[8]
- **Diversity,** "a measure of the variety of land uses in a given area."[8] It can be measured by the percent of land, building square footage, or people associated with different land uses

[8] Moudon, Anne V. and Orion Stewart. "WSDOT – Research Reports – Tools for Estimating VMT Reductions from Built Environment Changes". Wsdot.wa.gov N.p., Web. 19 June 2016.

within the vicinity of a project. For example, diversity can be measured as the percent of uses that correspond to travel between each other; such as housing, office, and retail.[9] A survey of household activity in the Puget Sound Region found that a high mix of land uses reduced VMT.[10]

- **Design**, a reference to the street's design, layout, and block patterns. A higher density of intersections promotes walking and therefore reduces VMT. Block lengths of less than 500 feet are consider to promote walking.[11] "Greater street network connectivity may allow for a greater number of route choices by any mode, but it also creates a greater number of streets that must be crossed to reach a destination, possibly contributing to walking and bicycling barriers."[12]
- **Destination accessibility,** "a measure of the proximity to specific destinations." This can be measured as the proximity of two land uses; such as the distance between home and a grocery store, work, or a park. Destination accessibility also works on a more areal approach. It can be used to compare the ratio of land uses within the neighborhood or the presence or variety of destinations such as the number of jobs compared to housing stock within the neighborhood. "It is a measure of opportunity to meet daily needs through walking, biking, shorter car trips, or transit." According to Ewing and Cervero, the distance from the project site to the Central Business District is the strongest predictor of VMT.[13]
- **Distance to Transit,** a reference to the distance between the project site and a transit stop, the number of stops near the project site, and where one can get to from those transit stops. The number of transit riders is usually highest for those with destinations and origins within ¼ mile of their stop. The number of transit riders when a stop is ½ mile from the destination or origin is half as many as when the stop is ¼ mile away.[14] "For commute trips, distances walked at the residential end of the trip tend to be longer than those at the employment end.[15]

From the aforementioned meta-analysis by Ewing and Cervero, "50 research articles on travel and the built environment were identified to present a valid elasticity. From those only 13 built environment variables were reported in 3 or more studies".[16] For these variables, a weighted average elasticity was calculated; this is shown in **Table 6.** These elasticities reflect the ratio of the percent change in travel behavior that results from a percentage change in the (built environment) variable. For example, research findings indicate that there is a 0.02% decrease in residential VMT per 1% decrease in jobs-housing imbalance. Therefore, a greater balance of jobs and housing within a specific geographic area will correspond to a decrease in household VMT, a

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[9] Frank, L. D., J. F. Sallis, B. E. Saelens, L. Leary, K. Cain, T. L. Conway, and P. M. Hess. 2009. The Development of a Walkability Index: Application to the Neighborhood Quality of Life Study. Br J Sports Med 44 (13): 924-33.

[10] Frank, Lawrence D., Michael J. Greenwald, Sara Kavage, and Andrew Devlin. 2011. An Assessment of Urban Form and Pedestrian and Transit Improvements as an Integrated GHG Reduction Strategy: Washington State Department of Transportation.

[11] Ewing, Reid. 1998. Pedestrian and Transit-Friendly Design. In Third National Conference on Access Management. Fort Lauderdale, FL: U.S. Department of Transportation Federal Highway Administration.

[12] Ibid., 11.

[13] Ibid., 11.

[14] Ibid., 14.

[15] Ibid., 11.

[16] Ibid., 10.

decrease in auto demand, shorter travel distance, etc. From these calculations presented in Table 6, "it appears that destination accessibility has a strong relationship with VMT"[17].

Given the geographic context of the project site and to provide a more efficient and accurate measurement for calculating VMT, the weighted average elasticities shown in Table 6 were applied to the project VMT. Therefore, specific increases and/or reductions in VMT were calculated based on application of elasticities, as appropriate.

Table 6: Weighted Average Elasticity for VMT Calculation

D Category	Variable	Weighted Average Elasticity VMT	Description of Calculation
Density	Household/population density	– 0.04	0.04% reduction in VMT per 1% increase in density
Diversity	Land use mix (entropy)	– 0.09	0.09% reduction in household VMT per 1% increase in entropy
	Jobs/housing balance	– 0.02	0.02% reduction in household VMT per 1% increase in jobs-housing balance
Design	Intersection/street density	– 0.12	0.12% reduction in VMT per 1% increase in intersection/street density
	Percent 4-way intersections	– 0.12	0.12% reduction in VMT per 1% increase in 4-way intersections
Destination accessibility	Job accessibility by auto	– 0.20	0.20% reduction in VMT per 1% increase in job accessibility by auto
	Job accessibility by transit	– 0.05	0.05% reduction in VMT per 1% increase in job accessibility by transit
	Distance to downtown	0.22	0.22% **increase** in VMT per 1% increase in distance to downtown
Distance to Transit	Distance to nearest transit stop	0.05	0.05% **increase** in VMT per 1% increase in distance to nearest transit stop

Source: Reid Ewing and Robert Cervero. 2010. Travel and the Built Environment; Table 3. Weighted average elasticities of VMT with respect to built-environment variables.

Table 7 presents the adjusted project VMT based on application of weighted average elasticities. Some of the variables have a greater effect on this project, for example the TAZ plus project has a greater density than the TAZ without project (11.11 residents per acre, compared to 8.74 residents per acre). For the project in particular, household/population density has one of the highest percent changes. Even though the variable does not have a large elasticity rate, the variable has a measurable effect on changing VMT. Conversely, some of the elasticity variables, such as job accessibility by auto and distance to downtown have large elasticities; however, these two variables would only have an effect if this project was physically moving a business to a new location, therefore they have zero effect on VMT. Some of the variables have no change for this project due to applicability to the specific project.

[17] Ibid., 11.

Table 7: Weighted Average Elasticity for Project VMT Calculation

Project Unadjusted VMT Calculations					
Project VMT				20,381	
D Category	**Variable**	**Weighted Average Elasticity VMT**	**% Change (Project vs TAZ)[1]**	**Percent (%) Change in VMT[2]**	
Density	Household/ population density	– 0.04	30.73%	-1.23%	98.77%
Diversity	Land use mix (entropy)[3]	– 0.09	-9.41%	0.85%	100.85%
	Jobs/housing balance	– 0.02	-21.27%	0.43%	100.43%
Design	Intersection/ street density	– 0.12	0.00%	0.00%	100.00%
	Percent 4-way intersections	– 0.12	-0.17%	0.02%	100.02%
Destination accessibility	Job accessibility by auto	– 0.20	0.00%	0.00%	100.00%
	Job accessibility by transit	– 0.05	0.00%	0.00%	100.00%
	Distance to downtown	0.22	0.00%	0.00%	100.00%
Distance to Transit	Distance to nearest transit stop	0.05	0.00%	0.00%	100.00%
Adjusted VMT per Day					**100.05%**
Adjusted Project VMT				20,391	

Notes:
1. % change between project and TAZ is calculated by (the number of units in the project minus the number of units in the TAZ) divided by the number of units in the TAZ.
2. % change in VMT is calculated by multiplying the % change between project and TAZ by the elasticity of the same variable.
3. See **Appendix A** for detailed methodology to calculate Land Use Mix (Entropy) Elasticity.

Applying elasticities to the unadjusted project VMT calculations would not result in a substantial difference in project residential and employment VMT and therefore (an increase in VMT by 0.05%), the percent change in VMT and VMT per capita would remain relatively unchanged from the results presented in **Tables 3 - 5.**

CONCLUSION

Table 8 summarizes the analysis findings presented herein. The project would result in an increase in VMT, albeit marginally. There would be a 1.82% increase in VMT per capita relative to citywide (baseline) VMT averages. It is noted that the primary causation for this minor increase in VMT per capita is derived from the amount of new population (residents and workers) at the project site that originally did not exist prior to implementation of the project. When cumulatively calculated and considering the overall change in VMT per person (resident and worker) relative to the citywide (baseline) average, there is a marginal decrease in VMT per person by 0.28%.

Table 8: Calculated VMT Findings – Year 2020 Conditions

Scenario	Daily VMT	VMT per Capita
City (baseline)	1,120,865	14.10
Project	*20,391*	*12.30*
City+Project	1,141,256	14.06
% Change	**+1.82%**	**-0.28%**

Source: Nelson\Nygaard, 2017.

As stated per OPR's guidance, it is determined that if a new land-use and/or transportation project would have a less-than-significant transportation impact if the project were to achieve either an average daily VMT per capita that is 15% less than the regional average daily VMT rate, or 15% less than the city's average daily VMT rate, whichever is higher.

Although the project would result in minor increases in VMT per capita (see above), because the project would not result in an increase in VMT rates that are above citywide and regional thresholds (i.e., 15% below that of baseline rates under Year 2020), the project would result in a *less-than-significant transportation impact*. These findings are summarized in **Table 9**.

Table 9: Project VMT Impact Summary (Year 2020)

Metric	Bay Area		City of Alameda		Project VMT v. Regional/City Averages		
	Regional Average	Regional Average (-15%)	City Average	City Average (-15%)	Project VMT rate	±% Regional (-15%)	±% City (-15%)
Per Capita VMT	14.9	12.7	14.1	12.0	12.3	-3.15%	+2.50%

Source: MTC Travel One Model; Nelson\Nygaard, 2017.

Appendix A Land Use Entropy Calculations

"Land use entropy" is used to describe the balance of the land use mix in an area. Research performed by Ewing (University of Utah) and Cervero (UC Berkeley) in 2010 identified land use entropy as one of the most impactful design components. In a study titled "Quantifications of Land Use Diversity in the Context of Mixed Land Use", six land uses were identified to be used in calculating the land use entropy. These are Residential, Education and Health, Retail, Office, Industrial (including warehouses, manufacturing, and light industrial), and Other miscellaneous uses.

Entropy is calculated by taking the portion of each of the previously noted land uses (in building square feet) and applying them to a logarithmic equation. This logarithmic equation used is SUM(Pj*(ln(Pj)/ln(J)); Pj = proportion of total land area of the land-use category found in the tract being analyzed; J = total land uses considered in the study area (all land uses in the city); 0 equals a homogeneous or single land use; 1 equals an equal distribution.

According to Ewing and Cervero, a 1% increase in land use entropy has a 0.09% reduction in VMT. The existing land use entropy for TAZ 960 is 0.89 (the TAZ in which the project is located in); the land use entropy for the TAZ + Project is 0.81. This is a -8% change. Therefore, the change in land use entropy caused by the addition of the project has a 0.36% change in VMT. This is summarized in **Table A-1** and **Table A-2**.

Table A-1: Land Use Mix Entropy Calculation (TAZ 960)

Land Use Entropy Calculation (TAZ)							
Land Use	Residential	Education and Health	Retail	Office	Manufacturing, Warehouse, Light industrial	Other (misc uses)	Sum
Source of Data	"TOTPOP"	"HEREMPN"	"RETEMPN"	"FPSEMPN"	"MWTEMPN"	"OTHEMPN"	
Employees per sector/population[1]	5,138	734	615	1,813	824	1,013	
Default Jobs per KSF[2]		2.00	2.00	3.00	1.17	2.00	
TAZ Total KSF[4]	1,798.437[3]	367.000	307.500	604.333	706.286	506.500	4,290.056
Proportion of total land area of the land-use category found in the tract being analyzed (Pj)	0.42	0.09	0.07	0.14	0.16	0.12	
Number of Land Uses (J)							6
(Pj * ln(Pj) / ln(J))	-0.20	-0.12	-0.11	-0.15	-0.17	-0.14	**Land Use Entropy 0.89**

Sources/Notes:
1. Metropolitan Transportation Commission (MTC) Socioeconomic Data.
2. ITE Trip Generation Manual.
3. CommunityView (City of Alameda and Alameda County Assessor's office)
4. Calculated by dividing employees per sector/population by default jobs per KSF.

Table A-2: Land Use Mix Entropy Calculation (TAZ 960) with Project

Land Use Entropy Calculation (TAZ + Project)							
Land Use	Residential	Education and Health	Retail	Office	Manufacturing, Warehouse, Light industrial	Other (misc uses)	Sum
Employees per sector/population[1]	1,461						
Project KSF[1]		0.000	25.000	25.000	0.000	0.000	
TAZ Total KSF + Project KSF[2]	2,674.233	367.000	332.500	629.333	706.286	506.500	5,215.852
Proportion of total land area of the land-use category found in the tract being analyzed (Pj)	0.51	0.07	0.06	0.12	0.14	0.10	
Number of Land Uses (J)							6
(Pj * ln(Pj) / ln(J))	-0.19	-0.10	-0.10	-0.14	-0.15	-0.13	**Land Use Entropy 0.81**

Sources:
1. Transportation Impact Analysis prepared for Encinal Terminals Project.
2. CommunityView (City of Alameda and Alameda County Assessor's Office) and Transportation Impact Analysis prepared for Encinal Terminals Project

Transportation Impact Analysis Technical Appendix

ENCINAL TERMINALS PROJECT

City of Alameda

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February 2, 2017

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1	0	6	1	0	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	7	1	0	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	918					
pX, platoon unblocked						
vC, conflicting volume			1		15	1
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1		15	1
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1622		999	1083

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1	8	9
Volume Left	0	7	0
Volume Right	0	0	9
cSH	1700	1622	1083
Volume to Capacity	0.00	0.00	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	6.2	8.3
Lane LOS		A	A
Approach Delay (s)	0.0	6.2	8.3
Approach LOS			A

Intersection Summary			
Average Delay	6.9		
Intersection Capacity Utilization	15.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	140	30	50	153	29	47
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	152	33	54	166	32	51
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			718			
pX, platoon unblocked						
vC, conflicting volume	252	138			221	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	252	138			221	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	79	96			98	
cM capacity (veh/h)	720	911			1349	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	185	221	83
Volume Left	152	0	32
Volume Right	33	166	0
cSH	747	1700	1349
Volume to Capacity	0.25	0.13	0.02
Queue Length 95th (ft)	24	0	2
Control Delay (s)	11.4	0.0	3.1
Lane LOS	B		A
Approach Delay (s)	11.4	0.0	3.1
Approach LOS	B		

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	35.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	118	11	3	121	473	8	246	10	110	59	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected		1.00			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1837			1861	1583	1770	1852		1770	1828	
Flt Permitted		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1815			1853	1583	1770	1852		1770	1828	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	128	12	3	132	514	9	267	11	120	64	9
RTOR Reduction (vph)	0	4	0	0	0	356	0	1	0	0	5	0
Lane Group Flow (vph)	0	144	0	0	135	158	9	277	0	120	68	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		13.5			13.5	13.5	0.5	11.8		6.6	17.9	
Effective Green, g (s)		13.5			13.5	13.5	0.5	11.8		6.6	17.9	
Actuated g/C Ratio		0.31			0.31	0.31	0.01	0.27		0.15	0.41	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		558			569	486	20	497		266	745	
v/s Ratio Prot							0.01	c0.15		c0.07	0.04	
v/s Ratio Perm		0.08			0.07	c0.10						
v/c Ratio		0.26			0.24	0.33	0.45	0.56		0.45	0.09	
Uniform Delay, d1		11.4			11.4	11.7	21.6	13.8		17.0	8.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.2	0.4	15.3	1.4		1.2	0.1	
Delay (s)		11.7			11.6	12.1	36.8	15.2		18.2	8.0	
Level of Service		B			B	B	D	B		B	A	
Approach Delay (s)		11.7			12.0			15.8			14.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	43.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	2	272	559	11	3	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	296	608	12	3	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1202				
pX, platoon unblocked						
vC, conflicting volume	620				908	608
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	620				908	608
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	98
cM capacity (veh/h)	961				305	496

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	2	296	608	12	12
Volume Left	2	0	0	0	3
Volume Right	0	0	0	12	9
cSH	961	1700	1700	1700	424
Volume to Capacity	0.00	0.17	0.36	0.01	0.03
Queue Length 95th (ft)	0	0	0	0	2
Control Delay (s)	8.8	0.0	0.0	0.0	13.7
Lane LOS	A				B
Approach Delay (s)	0.1		0.0		13.7
Approach LOS					B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	39.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	7	287	12	5	620	16	4	1	4	2	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	312	13	5	674	17	4	1	4	2	0	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					1209							
pX, platoon unblocked												
vC, conflicting volume	691			325			1024	1036	318	1026	1034	683
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	691			325			1024	1036	318	1026	1034	683
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			98	100	99	99	100	99
cM capacity (veh/h)	904			1235			209	229	722	209	229	449

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	8	325	5	691	10	8
Volume Left	8	0	5	0	4	2
Volume Right	0	13	0	17	4	5
cSH	904	1700	1235	1700	310	338
Volume to Capacity	0.01	0.19	0.00	0.41	0.03	0.02
Queue Length 95th (ft)	1	0	0	0	2	2
Control Delay (s)	9.0	0.0	7.9	0.0	17.0	15.9
Lane LOS	A		A		C	C
Approach Delay (s)	0.2		0.1		17.0	15.9
Approach LOS					C	C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	164	47	14	288	9	151	105	30	9	86	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			0.99			0.93	
Flt Protected		0.99			1.00			0.97			1.00	
Satd. Flow (prot)		1799			1851			1789			1728	
Flt Permitted		0.88			0.98			0.77			0.98	
Satd. Flow (perm)		1607			1819			1408			1700	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	178	51	15	313	10	164	114	33	10	93	112
RTOR Reduction (vph)	0	9	0	0	1	0	0	5	0	0	49	0
Lane Group Flow (vph)	0	284	0	0	337	0	0	306	0	0	166	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		13.1			13.1			14.4			14.4	
Effective Green, g (s)		13.1			13.1			14.4			14.4	
Actuated g/C Ratio		0.37			0.37			0.41			0.41	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		593			671			571			689	
v/s Ratio Prot												
v/s Ratio Perm		0.18			c0.19			c0.22			0.10	
v/c Ratio		0.48			0.50			0.54			0.24	
Uniform Delay, d1		8.6			8.7			8.0			6.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.6			0.6			1.0			0.2	
Delay (s)		9.2			9.3			9.0			7.1	
Level of Service		A			A			A			A	
Approach Delay (s)		9.2			9.3			9.0			7.1	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	35.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	37	169	178	404	102	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.91		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1810	1673		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1810	1673		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	184	193	439	111	18
RTOR Reduction (vph)	0	0	80	0	0	16
Lane Group Flow (vph)	40	184	552	0	111	2
Heavy Vehicles (%)	2%	5%	5%	2%	2%	2%
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	2.0	29.0	23.0		4.8	4.8
Effective Green, g (s)	2.0	29.0	23.0		4.8	4.8
Actuated g/C Ratio	0.05	0.69	0.55		0.11	0.11
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	84	1255	920		203	181
v/s Ratio Prot	c0.02	0.10	c0.33		c0.06	
v/s Ratio Perm						0.00
v/c Ratio	0.48	0.15	0.60		0.55	0.01
Uniform Delay, d1	19.4	2.2	6.3		17.5	16.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.2	0.1	1.1		3.0	0.0
Delay (s)	23.6	2.2	7.4		20.5	16.4
Level of Service	C	A	A		C	B
Approach Delay (s)		6.1	7.4		19.9	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	8.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	41.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	164	98	15	68	11	347	47	39	6	29	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.98		1.00	0.93		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3340		1770	3465		1770	1737		1770	1770	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3340		1770	3465		1770	1737		1770	1770	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	178	107	16	74	12	377	51	42	7	32	16
RTOR Reduction (vph)	0	85	0	0	10	0	0	25	0	0	15	0
Lane Group Flow (vph)	16	200	0	16	76	0	377	68	0	7	33	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.5	9.1		0.5	9.1		15.2	17.6		0.5	2.9	
Effective Green, g (s)	0.5	9.1		0.5	9.1		15.2	17.6		0.5	2.9	
Actuated g/C Ratio	0.01	0.21		0.01	0.21		0.35	0.40		0.01	0.07	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	20	695		20	721		615	699		20	117	
v/s Ratio Prot	c0.01	c0.06		0.01	0.02		c0.21	0.04		0.00	c0.02	
v/s Ratio Perm												
v/c Ratio	0.80	0.29		0.80	0.11		0.61	0.10		0.35	0.28	
Uniform Delay, d1	21.6	14.6		21.6	14.0		11.8	8.1		21.4	19.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	110.1	0.2		110.1	0.1		1.8	0.1		10.3	1.3	
Delay (s)	131.7	14.8		131.7	14.1		13.6	8.2		31.7	20.7	
Level of Service	F	B		F	B		B	A		C	C	
Approach Delay (s)		21.0			32.5			12.5			22.1	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	43.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	105	37	21	87	90	67	767	22	90	270	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.96		1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3401		1770	3270		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3401		1770	3270		3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	114	40	23	95	98	73	834	24	98	293	45
RTOR Reduction (vph)	0	34	0	0	87	0	0	0	13	0	0	24
Lane Group Flow (vph)	60	120	0	23	106	0	73	834	11	98	293	21
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	4.0	8.2		2.0	6.2		3.2	24.7	24.7	5.2	26.7	26.7
Effective Green, g (s)	4.0	8.2		2.0	6.2		3.2	24.7	24.7	5.2	26.7	26.7
Actuated g/C Ratio	0.07	0.15		0.04	0.11		0.06	0.44	0.44	0.09	0.48	0.48
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	126	497		63	361		195	1558	696	318	1684	753
v/s Ratio Prot	c0.03	c0.04		0.01	0.03		0.02	c0.24		c0.03	0.08	
v/s Ratio Perm									0.01			0.01
v/c Ratio	0.48	0.24		0.37	0.29		0.37	0.54	0.02	0.31	0.17	0.03
Uniform Delay, d1	25.0	21.2		26.4	22.9		25.5	11.5	8.8	23.8	8.4	7.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	0.3		3.6	0.5		1.2	0.4	0.0	0.6	0.0	0.0
Delay (s)	27.9	21.4		30.0	23.4		26.7	11.9	8.9	24.3	8.4	7.8
Level of Service	C	C		C	C		C	B	A	C	A	A
Approach Delay (s)		23.2			24.1			12.9			12.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	56.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	37	473	725	43	321	382
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.88	0.95		0.97	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	2787	3509		3433	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	2787	3509		3433	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	514	788	47	349	415
RTOR Reduction (vph)	0	438	5	0	0	0
Lane Group Flow (vph)	40	76	830	0	349	415
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	7.5	7.5	20.0		11.2	35.2
Effective Green, g (s)	7.5	7.5	20.0		11.2	35.2
Actuated g/C Ratio	0.15	0.15	0.39		0.22	0.69
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	261	412	1384		758	2457
v/s Ratio Prot	0.02		c0.24		c0.10	0.12
v/s Ratio Perm		c0.03				
v/c Ratio	0.15	0.18	0.60		0.46	0.17
Uniform Delay, d1	18.8	18.9	12.2		17.1	2.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.2	0.7		0.4	0.0
Delay (s)	19.1	19.1	12.9		17.6	2.7
Level of Service	B	B	B		B	A
Approach Delay (s)	19.1		12.9			9.5
Approach LOS	B		B			A

Intersection Summary			
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	50.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	221	265	110	20	357	61	113	578	15	70	344	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3462		1770	3526		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3462		1770	3526		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	240	288	120	22	388	66	123	628	16	76	374	262
RTOR Reduction (vph)	0	0	74	0	15	0	0	2	0	0	0	196
Lane Group Flow (vph)	240	288	46	22	439	0	123	642	0	76	374	66
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	10.5	26.7	26.7	1.6	17.8		8.1	19.2		6.6	17.7	17.7
Effective Green, g (s)	10.5	26.7	26.7	1.6	17.8		8.1	19.2		6.6	17.7	17.7
Actuated g/C Ratio	0.15	0.38	0.38	0.02	0.25		0.12	0.27		0.09	0.25	0.25
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	514	1347	602	40	879		204	965		166	893	399
v/s Ratio Prot	c0.07	0.08		0.01	c0.13		c0.07	c0.18		0.04	0.11	
v/s Ratio Perm			0.03									0.04
v/c Ratio	0.47	0.21	0.08	0.55	0.50		0.60	0.67		0.46	0.42	0.17
Uniform Delay, d1	27.2	14.6	13.8	33.9	22.3		29.5	22.6		30.1	21.9	20.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.7	0.1	0.1	15.3	0.4		5.0	1.7		2.0	0.3	0.2
Delay (s)	27.9	14.7	13.9	49.2	22.8		34.4	24.3		32.1	22.2	20.6
Level of Service	C	B	B	D	C		C	C		C	C	C
Approach Delay (s)		19.4			24.0			26.0			22.7	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	70.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	360	41	30	1156	762	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	0.95	0.91	0.88
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	1770	3539	5085	2787
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	1770	3539	5085	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	391	45	33	1257	828	500
RTOR Reduction (vph)	0	35	0	0	0	0
Lane Group Flow (vph)	391	10	33	1257	828	500
Turn Type	Prot	Perm	Prot	NA	NA	Free
Protected Phases	4		5	2	6	
Permitted Phases		4				Free
Actuated Green, G (s)	11.3	11.3	2.4	30.4	24.0	49.7
Effective Green, g (s)	11.3	11.3	2.4	30.4	24.0	49.7
Actuated g/C Ratio	0.23	0.23	0.05	0.61	0.48	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	780	359	85	2164	2455	2787
v/s Ratio Prot	c0.11		0.02	c0.36	0.16	
v/s Ratio Perm		0.01				0.18
v/c Ratio	0.50	0.03	0.39	0.58	0.34	0.18
Uniform Delay, d1	16.7	14.9	22.9	5.8	7.9	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.0	2.9	0.4	0.1	0.1
Delay (s)	17.3	15.0	25.9	6.2	8.0	0.1
Level of Service	B	B	C	A	A	A
Approach Delay (s)	17.0			6.7	5.1	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	49.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	255	26	5	7	93	361	4	892	6	88	435	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		1.00			0.89		1.00	1.00		1.00	0.98	
Flt Protected		0.96			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1779			1665		1770	3535		1770	3472	
Flt Permitted		0.36			0.99		0.44	1.00		0.95	1.00	
Satd. Flow (perm)		672			1657		820	3535		1770	3472	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	277	28	5	8	101	392	4	970	7	96	473	68
RTOR Reduction (vph)	0	1	0	0	81	0	0	1	0	0	11	0
Lane Group Flow (vph)	0	309	0	0	420	0	4	976	0	96	530	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		40.3			40.3		31.5	30.7		6.1	36.0	
Effective Green, g (s)		40.3			40.3		31.5	30.7		6.1	36.0	
Actuated g/C Ratio		0.45			0.45		0.35	0.34		0.07	0.40	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		303			749		298	1218		121	1402	
v/s Ratio Prot							0.00	c0.28		c0.05	0.15	
v/s Ratio Perm		c0.46			0.25		0.00					
v/c Ratio		1.02			0.56		0.01	0.80		0.79	0.38	
Uniform Delay, d1		24.4			17.9		18.7	26.4		40.9	18.7	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		57.3			1.0		0.0	3.9		29.0	0.2	
Delay (s)		81.7			18.9		18.7	30.3		69.9	18.8	
Level of Service		F			B		B	C		E	B	
Approach Delay (s)		81.7			18.9			30.3			26.5	
Approach LOS		F			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	33.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	89.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	310	14	2	9	57	439	0	1484	3	0	589	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		1.00			0.88			1.00			0.96	
Flt Protected		0.95			1.00			1.00			1.00	
Satd. Flow (prot)		1777			1643			3538			3411	
Flt Permitted		0.34			0.99			1.00			1.00	
Satd. Flow (perm)		637			1633			3538			3411	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	337	15	2	10	62	477	0	1613	3	0	640	204
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	34	0
Lane Group Flow (vph)	0	354	0	0	546	0	0	1616	0	0	810	0
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		44.0			44.0			38.0			38.0	
Effective Green, g (s)		44.0			44.0			38.0			38.0	
Actuated g/C Ratio		0.49			0.49			0.42			0.42	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		311			798			1493			1440	
v/s Ratio Prot								c0.46			0.24	
v/s Ratio Perm		c0.56			0.33							
v/c Ratio		1.14			0.68			1.08			0.56	
Uniform Delay, d1		23.0			17.7			26.0			19.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		93.8			2.4			49.0			0.5	
Delay (s)		116.8			20.1			75.0			20.2	
Level of Service		F			C			E			C	
Approach Delay (s)		116.8			20.1			75.0			20.2	
Approach LOS		F			C			E			C	

Intersection Summary			
HCM 2000 Control Delay	56.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	99.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	369	55	118	484	175	47	307	365	80	73	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.99	1.00		0.97	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3398			1850	1583		1815	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.94	1.00		0.63	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3398			1758	1583		1167	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	401	60	128	526	190	51	334	397	87	79	12
RTOR Reduction (vph)	0	0	0	0	27	0	0	0	248	0	0	8
Lane Group Flow (vph)	11	401	60	128	689	0	0	385	149	0	166	4
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			Free				2		2	6		6
Actuated Green, G (s)	0.8	16.9	59.6	8.4	24.5			22.3	22.3		22.3	22.3
Effective Green, g (s)	0.8	16.9	59.6	8.4	24.5			22.3	22.3		22.3	22.3
Actuated g/C Ratio	0.01	0.28	1.00	0.14	0.41			0.37	0.37		0.37	0.37
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	23	1003	1583	249	1396			657	592		436	592
v/s Ratio Prot	0.01	0.11		c0.07	c0.20							
v/s Ratio Perm			0.04					c0.22	0.09		0.14	0.00
v/c Ratio	0.48	0.40	0.04	0.51	0.49			0.59	0.25		0.38	0.01
Uniform Delay, d1	29.2	17.3	0.0	23.7	13.0			14.9	12.9		13.6	11.7
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	14.8	0.3	0.0	1.8	0.3			1.3	0.2		0.6	0.0
Delay (s)	44.0	17.5	0.0	25.5	13.2			16.3	13.1		14.2	11.7
Level of Service	D	B	A	C	B			B	B		B	B
Approach Delay (s)		15.9			15.1			14.7			14.0	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	59.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	658	157	81	0	0	0	0	129	223	381	330	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Lane Util. Factor	0.91	0.91	1.00					0.91		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.89					0.93		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00		1.00	1.00	
Frt	1.00	1.00	0.85					0.90		1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1610	3279	1405					4275		3433	1863	
Flt Permitted	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1610	3279	1405					4275		3433	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	715	171	88	0	0	0	0	140	242	414	359	0
RTOR Reduction (vph)	0	0	64	0	0	0	0	108	0	0	0	0
Lane Group Flow (vph)	357	529	24	0	0	0	0	274	0	414	359	0
Confl. Peds. (#/hr)			75						75			
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	20.2	20.2	20.2					30.1		10.5	44.6	
Effective Green, g (s)	20.2	20.2	20.2					30.1		10.5	44.6	
Actuated g/C Ratio	0.28	0.28	0.28					0.41		0.14	0.61	
Clearance Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)	446	909	389					1767		495	1141	
v/s Ratio Prot	c0.22	0.16						0.06		c0.12	c0.19	
v/s Ratio Perm			0.02									
v/c Ratio	0.80	0.58	0.06					0.16		0.84	0.31	
Uniform Delay, d1	24.4	22.7	19.3					13.4		30.3	6.8	
Progression Factor	1.00	1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2	9.9	1.0	0.1					0.2		11.7	0.2	
Delay (s)	34.3	23.6	19.4					13.6		42.0	6.9	
Level of Service	C	C	B					B		D	A	
Approach Delay (s)		27.2			0.0			13.6			25.7	
Approach LOS		C			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	72.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	62	302	0	0	0	0	0	902	1686	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0			
Lane Util. Factor		0.91						0.91	0.88			
Frpb, ped/bikes		1.00						1.00	1.00			
Flpb, ped/bikes		0.99						1.00	1.00			
Frt		1.00						1.00	0.85			
Flt Protected		0.99						1.00	1.00			
Satd. Flow (prot)		4385						5085	2787			
Flt Permitted		0.99						1.00	1.00			
Satd. Flow (perm)		4385						5085	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	328	0	0	0	0	0	980	1833	0	0	0
RTOR Reduction (vph)	0	49	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	346	0	0	0	0	0	980	1833	0	0	0
Confl. Peds. (#/hr)	67		36	36		67	41		51	51		41
Heavy Vehicles (%)	5%	18%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA						NA	Prot			
Protected Phases		2						1	1			
Permitted Phases	2											
Actuated Green, G (s)		16.0						36.0	36.0			
Effective Green, g (s)		16.0						36.0	36.0			
Actuated g/C Ratio		0.27						0.60	0.60			
Clearance Time (s)		4.0						4.0	4.0			
Lane Grp Cap (vph)		1169						3051	1672			
v/s Ratio Prot								0.19	c0.66			
v/s Ratio Perm		0.08										
v/c Ratio		0.30						0.32	1.10			
Uniform Delay, d1		17.5						5.9	12.0			
Progression Factor		1.00						1.00	1.00			
Incremental Delay, d2		0.6						0.3	53.3			
Delay (s)		18.2						6.2	65.3			
Level of Service		B						A	E			
Approach Delay (s)		18.2			0.0			44.7			0.0	
Approach LOS		B			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	41.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	136	104	35	38	103	69	18	752	33	25	391	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			0.95		1.00	0.95	
Frt		0.98			0.96			0.99		1.00	0.98	
Flt Protected		0.98			0.99			1.00		0.95	1.00	
Satd. Flow (prot)		1787			1764			3513		1770	3462	
Flt Permitted		0.77			0.91			0.94		0.26	1.00	
Satd. Flow (perm)		1411			1616			3309		477	3462	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	148	113	38	41	112	75	20	817	36	27	425	72
RTOR Reduction (vph)	0	6	0	0	22	0	0	4	0	0	16	0
Lane Group Flow (vph)	0	293	0	0	206	0	0	869	0	27	481	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		16.5			16.5			20.8		20.8	20.8	
Effective Green, g (s)		16.5			16.5			20.8		20.8	20.8	
Actuated g/C Ratio		0.36			0.36			0.46		0.46	0.46	
Clearance Time (s)		4.0			4.0			4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		513			588			1519		219	1589	
v/s Ratio Prot											0.14	
v/s Ratio Perm		c0.21			0.13			c0.26		0.06		
v/c Ratio		0.57			0.35			0.57		0.12	0.30	
Uniform Delay, d1		11.6			10.5			9.0		7.0	7.7	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		1.5			0.4			0.5		0.3	0.1	
Delay (s)		13.1			10.9			9.5		7.3	7.8	
Level of Service		B			B			A		A	A	
Approach Delay (s)		13.1			10.9			9.5			7.8	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	45.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	191	478	26	12	200	28	9	693	22	7	482	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frt	1.00	0.99			0.98			1.00			0.99	
Flt Protected	0.95	1.00			1.00			1.00			1.00	
Satd. Flow (prot)	1770	1848			1829			3521			3500	
Flt Permitted	0.60	1.00			0.97			0.95			0.94	
Satd. Flow (perm)	1122	1848			1782			3338			3307	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	208	520	28	13	217	30	10	753	24	8	524	40
RTOR Reduction (vph)	0	2	0	0	6	0	0	2	0	0	6	0
Lane Group Flow (vph)	208	546	0	0	254	0	0	785	0	0	566	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.4	23.4			23.4			20.9			20.9	
Effective Green, g (s)	23.4	23.4			23.4			20.9			20.9	
Actuated g/C Ratio	0.45	0.45			0.45			0.40			0.40	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	502	826			797			1333			1321	
v/s Ratio Prot		c0.30										
v/s Ratio Perm	0.19				0.14			c0.24			0.17	
v/c Ratio	0.41	0.66			0.32			0.59			0.43	
Uniform Delay, d1	9.8	11.3			9.3			12.3			11.4	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	0.6	2.0			0.2			0.7			0.2	
Delay (s)	10.4	13.3			9.5			13.0			11.6	
Level of Service	B	B			A			B			B	
Approach Delay (s)		12.5			9.5			13.0			11.6	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	52.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	11	279	56	188	262	0	0	139	1458
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				1.00	1.00	1.00	1.00	1.00			0.95	0.95
Frpb, ped/bikes				1.00	1.00	0.94	1.00	1.00			0.97	0.98
Flpb, ped/bikes				0.96	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			0.88	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1706	1863	1496	1770	1863			1507	1477
Flt Permitted				0.95	1.00	1.00	0.16	1.00			1.00	1.00
Satd. Flow (perm)				1706	1863	1496	290	1863			1507	1477
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	12	303	61	204	285	0	0	151	1585
RTOR Reduction (vph)	0	0	0	0	0	47	0	0	0	0	75	0
Lane Group Flow (vph)	0	0	0	12	303	14	204	285	0	0	805	856
Confl. Peds. (#/hr)				20		20	10					20
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Free
Protected Phases					8			2			6	
Permitted Phases				8		8	2					Free
Actuated Green, G (s)				13.4	13.4	13.4	36.1	36.1			36.1	57.5
Effective Green, g (s)				13.4	13.4	13.4	36.1	36.1			36.1	57.5
Actuated g/C Ratio				0.23	0.23	0.23	0.63	0.63			0.63	1.00
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				397	434	348	182	1169			946	1477
v/s Ratio Prot					0.16			0.15			0.53	
v/s Ratio Perm				0.01		0.01	c0.70					c0.58
v/c Ratio				0.03	0.70	0.04	1.12	0.24			0.85	0.58
Uniform Delay, d1				17.0	20.2	17.1	10.7	4.7			8.5	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.0	4.9	0.0	102.9	0.1			7.4	1.7
Delay (s)				17.1	25.1	17.1	113.6	4.8			16.0	1.7
Level of Service				B	C	B	F	A			B	A
Approach Delay (s)		0.0			23.5			50.2			8.9	
Approach LOS		A			C			D			A	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	57.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	0	0	3	0	0	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	3	0	0	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	918					
pX, platoon unblocked						
vC, conflicting volume			0		7	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		7	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1623		1013	1085

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	0	3	5
Volume Left	0	3	0
Volume Right	0	0	5
cSH	1700	1623	1085
Volume to Capacity	0.00	0.00	0.01
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	7.2	8.3
Lane LOS		A	A
Approach Delay (s)	0.0	7.2	8.3
Approach LOS			A

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	224	35	58	109	36	61
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	243	38	63	118	39	66
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			718			
pX, platoon unblocked						
vC, conflicting volume	267	122			182	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	267	122			182	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	65	96			97	
cM capacity (veh/h)	702	929			1394	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	282	182	105
Volume Left	243	0	39
Volume Right	38	118	0
cSH	726	1700	1394
Volume to Capacity	0.39	0.11	0.03
Queue Length 95th (ft)	46	0	2
Control Delay (s)	13.1	0.0	3.0
Lane LOS	B		A
Approach Delay (s)	13.1	0.0	3.0
Approach LOS	B		

Intersection Summary			
Average Delay	7.0		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	192	23	19	136	254	10	127	10	368	290	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1833			1851	1583	1770	1842		1770	1854	
Flt Permitted		0.99			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1815			1780	1583	1770	1842		1770	1854	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	209	25	21	148	276	11	138	11	400	315	10
RTOR Reduction (vph)	0	5	0	0	0	208	0	3	0	0	1	0
Lane Group Flow (vph)	0	238	0	0	169	68	11	146	0	400	324	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		13.6			13.6	13.6	0.5	10.5		19.0	29.0	
Effective Green, g (s)		13.6			13.6	13.6	0.5	10.5		19.0	29.0	
Actuated g/C Ratio		0.25			0.25	0.25	0.01	0.19		0.34	0.53	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		447			439	390	16	351		610	975	
v/s Ratio Prot							0.01	c0.08		c0.23	0.17	
v/s Ratio Perm		c0.13			0.09	0.04						
v/c Ratio		0.53			0.38	0.17	0.69	0.42		0.66	0.33	
Uniform Delay, d1		18.0			17.3	16.3	27.2	19.6		15.3	7.5	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.2			0.6	0.2	80.1	0.8		2.5	0.2	
Delay (s)		19.2			17.8	16.5	107.3	20.4		17.8	7.7	
Level of Service		B			B	B	F	C		B	A	
Approach Delay (s)		19.2			17.0			26.4			13.3	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	55.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	7	698	524	11	20	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	759	570	12	22	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1202				
pX, platoon unblocked						
vC, conflicting volume	582				1343	570
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	582				1343	570
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				87	99
cM capacity (veh/h)	993				166	521

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	8	759	570	12	27
Volume Left	8	0	0	0	22
Volume Right	0	0	0	12	5
cSH	993	1700	1700	1700	192
Volume to Capacity	0.01	0.45	0.34	0.01	0.14
Queue Length 95th (ft)	1	0	0	0	12
Control Delay (s)	8.7	0.0	0.0	0.0	26.8
Lane LOS	A				D
Approach Delay (s)	0.1		0.0		26.8
Approach LOS					D

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	683	3	3	464	2	3	0	5	0	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	742	3	3	504	2	3	0	5	0	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					1209							
pX, platoon unblocked												
vC, conflicting volume	507			746			1262	1264	744	1266	1264	505
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	507			746			1262	1264	744	1266	1264	505
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			98	100	99	100	100	100
cM capacity (veh/h)	1058			862			146	168	415	143	168	567

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	3	746	3	507	9	1
Volume Left	3	0	3	0	3	0
Volume Right	0	3	0	2	5	1
cSH	1058	1700	862	1700	245	567
Volume to Capacity	0.00	0.44	0.00	0.30	0.04	0.00
Queue Length 95th (ft)	0	0	0	0	3	0
Control Delay (s)	8.4	0.0	9.2	0.0	20.2	11.4
Lane LOS	A		A		C	B
Approach Delay (s)	0.0		0.1		20.2	11.4
Approach LOS					C	B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	52	369	104	23	205	2	76	68	27	5	147	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.97			1.00			0.98			0.94	
Flt Protected		1.00			1.00			0.98			1.00	
Satd. Flow (prot)		1804			1851			1784			1747	
Flt Permitted		0.95			0.93			0.77			1.00	
Satd. Flow (perm)		1723			1737			1408			1740	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	401	113	25	223	2	83	74	29	5	160	138
RTOR Reduction (vph)	0	12	0	0	1	0	0	8	0	0	35	0
Lane Group Flow (vph)	0	559	0	0	249	0	0	178	0	0	268	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		20.5			20.5			12.7			12.7	
Effective Green, g (s)		20.5			20.5			12.7			12.7	
Actuated g/C Ratio		0.50			0.50			0.31			0.31	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		857			864			434			536	
v/s Ratio Prot												
v/s Ratio Perm		c0.32			0.14			0.13			c0.15	
v/c Ratio		0.65			0.29			0.41			0.50	
Uniform Delay, d1		7.7			6.1			11.3			11.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.8			0.2			0.6			0.7	
Delay (s)		9.5			6.3			11.9			12.4	
Level of Service		A			A			B			B	
Approach Delay (s)		9.5			6.3			11.9			12.4	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	41.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	42	204	197	228	302	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.93		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1810	1705		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1810	1705		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	222	214	248	328	52
RTOR Reduction (vph)	0	0	51	0	0	35
Lane Group Flow (vph)	46	222	411	0	328	17
Heavy Vehicles (%)	2%	5%	5%	2%	2%	2%
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	1.7	24.0	18.3		15.7	15.7
Effective Green, g (s)	1.7	24.0	18.3		15.7	15.7
Actuated g/C Ratio	0.04	0.50	0.38		0.33	0.33
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	63	910	654		582	521
v/s Ratio Prot	c0.03	0.12	c0.24		c0.19	
v/s Ratio Perm						0.01
v/c Ratio	0.73	0.24	0.63		0.56	0.03
Uniform Delay, d1	22.8	6.7	11.9		13.2	10.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	34.9	0.1	1.9		1.3	0.0
Delay (s)	57.7	6.9	13.8		14.4	10.9
Level of Service	E	A	B		B	B
Approach Delay (s)		15.6	13.8		13.9	
Approach LOS		B	B		B	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	47.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	49	76	169	51	134	16	160	113	23	10	109	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	0.98		1.00	0.97		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3173		1770	3484		1770	1816		1770	1769	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3173		1770	3484		1770	1816		1770	1769	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	53	83	184	55	146	17	174	123	25	11	118	60
RTOR Reduction (vph)	0	145	0	0	9	0	0	10	0	0	21	0
Lane Group Flow (vph)	53	122	0	55	154	0	174	138	0	11	157	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	3.7	10.1		3.7	10.1		8.0	17.5		0.5	10.0	
Effective Green, g (s)	3.7	10.1		3.7	10.1		8.0	17.5		0.5	10.0	
Actuated g/C Ratio	0.08	0.21		0.08	0.21		0.17	0.37		0.01	0.21	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	137	670		137	736		296	664		18	370	
v/s Ratio Prot	0.03	0.04		c0.03	c0.04		c0.10	0.08		0.01	c0.09	
v/s Ratio Perm												
v/c Ratio	0.39	0.18		0.40	0.21		0.59	0.21		0.61	0.42	
Uniform Delay, d1	21.0	15.5		21.0	15.6		18.4	10.4		23.6	16.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	0.1		1.9	0.1		3.0	0.2		48.7	0.8	
Delay (s)	22.8	15.6		22.9	15.7		21.3	10.6		72.2	17.2	
Level of Service	C	B		C	B		C	B		E	B	
Approach Delay (s)		16.8			17.5			16.4			20.4	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	17.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	47.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	111	65	41	114	101	56	441	36	95	988	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.94		1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3343		1770	3290		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3343		1770	3290		3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	121	71	45	124	110	61	479	39	103	1074	115
RTOR Reduction (vph)	0	59	0	0	94	0	0	0	22	0	0	59
Lane Group Flow (vph)	64	133	0	45	140	0	61	479	17	103	1074	56
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	4.0	10.2		2.8	9.0		2.3	26.9	26.9	5.3	29.9	29.9
Effective Green, g (s)	4.0	10.2		2.8	9.0		2.3	26.9	26.9	5.3	29.9	29.9
Actuated g/C Ratio	0.07	0.17		0.05	0.15		0.04	0.44	0.44	0.09	0.49	0.49
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	115	557		80	483		129	1555	695	297	1729	773
v/s Ratio Prot	c0.04	0.04		0.03	c0.04		0.02	0.14		c0.03	c0.30	
v/s Ratio Perm									0.01			0.04
v/c Ratio	0.56	0.24		0.56	0.29		0.47	0.31	0.02	0.35	0.62	0.07
Uniform Delay, d1	27.7	22.1		28.6	23.3		28.9	11.1	9.7	26.3	11.5	8.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.7	0.2		8.8	0.3		2.7	0.1	0.0	0.7	0.7	0.0
Delay (s)	33.5	22.4		37.4	23.6		31.6	11.2	9.7	27.0	12.2	8.3
Level of Service	C	C		D	C		C	B	A	C	B	A
Approach Delay (s)		25.1			25.8			13.3			13.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	61.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	213	316	511	90	380	1077
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.88	0.95		0.97	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	2787	3460		3433	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	2787	3460		3433	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	232	343	555	98	413	1171
RTOR Reduction (vph)	0	260	17	0	0	0
Lane Group Flow (vph)	232	83	636	0	413	1171
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	13.6	13.6	17.9		12.9	34.8
Effective Green, g (s)	13.6	13.6	17.9		12.9	34.8
Actuated g/C Ratio	0.24	0.24	0.32		0.23	0.62
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	426	672	1098		785	2183
v/s Ratio Prot	c0.13		0.18		0.12	c0.33
v/s Ratio Perm		0.03				
v/c Ratio	0.54	0.12	0.58		0.53	0.54
Uniform Delay, d1	18.7	16.7	16.1		19.1	6.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.4	0.1	0.7		0.6	0.3
Delay (s)	20.1	16.8	16.8		19.7	6.4
Level of Service	C	B	B		B	A
Approach Delay (s)	18.2		16.8			9.9
Approach LOS	B		B			A

Intersection Summary			
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	56.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	201	317	201	52	309	93	96	497	83	158	915	305
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3417		1770	3463		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3417		1770	3463		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	218	345	218	57	336	101	104	540	90	172	995	332
RTOR Reduction (vph)	0	0	159	0	31	0	0	15	0	0	0	201
Lane Group Flow (vph)	218	345	59	57	406	0	104	615	0	172	995	131
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	9.4	21.9	21.9	3.7	16.2		7.5	27.0		12.6	32.1	32.1
Effective Green, g (s)	9.4	21.9	21.9	3.7	16.2		7.5	27.0		12.6	32.1	32.1
Actuated g/C Ratio	0.12	0.27	0.27	0.05	0.20		0.09	0.33		0.16	0.40	0.40
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	397	954	426	80	681		163	1151		274	1399	625
v/s Ratio Prot	c0.06	0.10		0.03	c0.12		0.06	0.18		c0.10	c0.28	
v/s Ratio Perm			0.04									0.08
v/c Ratio	0.55	0.36	0.14	0.71	0.60		0.64	0.53		0.63	0.71	0.21
Uniform Delay, d1	33.9	24.0	22.5	38.2	29.5		35.5	22.0		32.1	20.7	16.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.6	0.2	0.1	25.8	1.4		7.9	0.5		4.4	1.7	0.2
Delay (s)	35.5	24.2	22.6	64.0	30.9		43.5	22.5		36.6	22.4	16.4
Level of Service	D	C	C	E	C		D	C		D	C	B
Approach Delay (s)		26.9			34.7			25.5			22.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	81.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	279	72	44	712	1131	454
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	0.95	0.91	0.88
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	1770	3539	5085	2787
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	1770	3539	5085	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	303	78	48	774	1229	493
RTOR Reduction (vph)	0	62	0	0	0	0
Lane Group Flow (vph)	303	16	48	774	1229	493
Turn Type	Prot	Perm	Prot	NA	NA	Free
Protected Phases	4		5	2	6	
Permitted Phases		4				Free
Actuated Green, G (s)	10.6	10.6	4.0	31.6	23.6	50.2
Effective Green, g (s)	10.6	10.6	4.0	31.6	23.6	50.2
Actuated g/C Ratio	0.21	0.21	0.08	0.63	0.47	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	724	334	141	2227	2390	2787
v/s Ratio Prot	c0.09		0.03	c0.22	c0.24	
v/s Ratio Perm		0.01				0.18
v/c Ratio	0.42	0.05	0.34	0.35	0.51	0.18
Uniform Delay, d1	17.1	15.8	21.9	4.4	9.3	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.1	1.4	0.1	0.2	0.1
Delay (s)	17.5	15.8	23.3	4.5	9.5	0.1
Level of Service	B	B	C	A	A	A
Approach Delay (s)	17.2			5.6	6.8	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	7.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	50.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	266	80	11	9	81	104	11	826	31	265	758	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		1.00			0.93		1.00	0.99		1.00	0.99	
Flt Protected		0.96			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1788			1724		1770	3520		1770	3491	
Flt Permitted		0.59			0.98		0.31	1.00		0.95	1.00	
Satd. Flow (perm)		1096			1693		585	3520		1770	3491	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	289	87	12	10	88	113	12	898	34	288	824	83
RTOR Reduction (vph)	0	1	0	0	48	0	0	3	0	0	8	0
Lane Group Flow (vph)	0	387	0	0	163	0	12	929	0	288	900	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		32.2			32.2		30.8	30.0		15.8	45.0	
Effective Green, g (s)		32.2			32.2		30.8	30.0		15.8	45.0	
Actuated g/C Ratio		0.36			0.36		0.34	0.33		0.18	0.50	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		392			605		210	1173		310	1745	
v/s Ratio Prot							0.00	c0.26		c0.16	0.26	
v/s Ratio Perm		c0.35			0.10		0.02					
v/c Ratio		0.99			0.27		0.06	0.79		0.93	0.52	
Uniform Delay, d1		28.7			20.5		19.6	27.2		36.5	15.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		41.5			0.2		0.1	3.7		32.7	0.3	
Delay (s)		70.2			20.8		19.7	30.9		69.3	15.4	
Level of Service		E			C		B	C		E	B	
Approach Delay (s)		70.2			20.8			30.8			28.4	
Approach LOS		E			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	34.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	167	60	19	28	127	222	1	1130	34	5	1206	346
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.99			0.92			1.00			0.97	
Flt Protected		0.97			1.00			1.00			1.00	
Satd. Flow (prot)		1783			1708			3524			3421	
Flt Permitted		0.42			0.96			0.95			0.95	
Satd. Flow (perm)		782			1653			3362			3256	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	182	65	21	30	138	241	1	1228	37	5	1311	376
RTOR Reduction (vph)	0	3	0	0	37	0	0	2	0	0	29	0
Lane Group Flow (vph)	0	265	0	0	372	0	0	1264	0	0	1663	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		31.3			31.3			48.9			48.9	
Effective Green, g (s)		31.3			31.3			48.9			48.9	
Actuated g/C Ratio		0.35			0.35			0.55			0.55	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		277			586			1863			1805	
v/s Ratio Prot												
v/s Ratio Perm		c0.34			0.23			0.38			c0.51	
v/c Ratio		0.96			0.64			0.68			0.92	
Uniform Delay, d1		27.8			23.7			14.0			17.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		41.7			2.3			1.0			8.2	
Delay (s)		69.5			26.0			15.0			26.1	
Level of Service		E			C			B			C	
Approach Delay (s)		69.5			26.0			15.0			26.1	
Approach LOS		E			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	88.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	375	95	277	606	220	61	159	154	112	144	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.99	1.00		0.98	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3398			1837	1583		1823	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.82	1.00		0.68	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3398			1527	1583		1270	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	408	103	301	659	239	66	173	167	122	157	17
RTOR Reduction (vph)	0	0	0	0	27	0	0	0	114	0	0	12
Lane Group Flow (vph)	29	408	103	301	871	0	0	239	53	0	279	5
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			Free				2		2	6		6
Actuated Green, G (s)	1.9	18.2	72.3	19.0	35.3			23.1	23.1		23.1	23.1
Effective Green, g (s)	1.9	18.2	72.3	19.0	35.3			23.1	23.1		23.1	23.1
Actuated g/C Ratio	0.03	0.25	1.00	0.26	0.49			0.32	0.32		0.32	0.32
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	46	890	1583	465	1659			487	505		405	505
v/s Ratio Prot	0.02	0.12		c0.17	c0.26							
v/s Ratio Perm			0.07					0.16	0.03		c0.22	0.00
v/c Ratio	0.63	0.46	0.07	0.65	0.53			0.49	0.11		0.69	0.01
Uniform Delay, d1	34.9	22.9	0.0	23.7	12.7			19.9	17.3		21.5	16.8
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	24.9	0.4	0.1	3.1	0.3			0.8	0.1		4.8	0.0
Delay (s)	59.7	23.3	0.1	26.8	13.0			20.6	17.4		26.3	16.8
Level of Service	E	C	A	C	B			C	B		C	B
Approach Delay (s)		20.8			16.5			19.3			25.8	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	72.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	935	300	34	0	0	0	0	221	347	562	220	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Lane Util. Factor	0.91	0.91	1.00					0.91		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.89					0.93		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00		1.00	1.00	
Frt	1.00	1.00	0.85					0.91		1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1610	3290	1402					4296		3433	1863	
Flt Permitted	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1610	3290	1402					4296		3433	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1016	326	37	0	0	0	0	240	377	611	239	0
RTOR Reduction (vph)	0	0	26	0	0	0	0	52	0	0	0	0
Lane Group Flow (vph)	508	834	11	0	0	0	0	565	0	611	239	0
Confl. Peds. (#/hr)			75						75			
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	22.0	22.0	22.0					30.0		10.5	44.5	
Effective Green, g (s)	22.0	22.0	22.0					30.0		10.5	44.5	
Actuated g/C Ratio	0.30	0.30	0.30					0.40		0.14	0.60	
Clearance Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)	475	971	414					1729		483	1112	
v/s Ratio Prot	c0.32	0.25						c0.13		c0.18	0.13	
v/s Ratio Perm			0.01									
v/c Ratio	1.07	1.02dl	0.03					0.33		1.27	0.21	
Uniform Delay, d1	26.2	24.8	18.6					15.3		32.0	6.9	
Progression Factor	1.00	1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2	61.1	7.7	0.0					0.5		135.0	0.1	
Delay (s)	87.4	32.4	18.7					15.8		167.0	7.0	
Level of Service	F	C	B					B		F	A	
Approach Delay (s)		52.3			0.0			15.8			122.0	
Approach LOS		D			A			B			F	

Intersection Summary			
HCM 2000 Control Delay	65.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	74.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	137	562	0	0	0	0	0	633	1492	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0			
Lane Util. Factor		0.91						0.91	0.88			
Frpb, ped/bikes		1.00						1.00	1.00			
Flpb, ped/bikes		0.99						1.00	1.00			
Frt		1.00						1.00	0.85			
Flt Protected		0.99						1.00	1.00			
Satd. Flow (prot)		4383						5085	2787			
Flt Permitted		0.99						1.00	1.00			
Satd. Flow (perm)		4383						5085	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	149	611	0	0	0	0	0	688	1622	0	0	0
RTOR Reduction (vph)	0	70	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	690	0	0	0	0	0	688	1622	0	0	0
Confl. Peds. (#/hr)	67		36	36		67	41		51	51		41
Heavy Vehicles (%)	5%	18%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA						NA	Prot			
Protected Phases		2						1	1			
Permitted Phases	2											
Actuated Green, G (s)		16.0						36.0	36.0			
Effective Green, g (s)		16.0						36.0	36.0			
Actuated g/C Ratio		0.27						0.60	0.60			
Clearance Time (s)		4.0						4.0	4.0			
Lane Grp Cap (vph)		1168						3051	1672			
v/s Ratio Prot								0.14	c0.58			
v/s Ratio Perm		0.16										
v/c Ratio		0.59						0.23	0.97			
Uniform Delay, d1		19.2						5.6	11.5			
Progression Factor		1.00						1.00	1.00			
Incremental Delay, d2		2.2						0.2	16.0			
Delay (s)		21.4						5.7	27.5			
Level of Service		C						A	C			
Approach Delay (s)		21.4			0.0			21.0			0.0	
Approach LOS		C			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	91	67	48	29	81	40	12	468	19	42	601	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			0.95		1.00	0.95	
Frt		0.97			0.96			0.99		1.00	0.98	
Flt Protected		0.98			0.99			1.00		0.95	1.00	
Satd. Flow (prot)		1765			1779			3514		1770	3471	
Flt Permitted		0.80			0.91			0.94		0.45	1.00	
Satd. Flow (perm)		1438			1637			3291		837	3471	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	73	52	32	88	43	13	509	21	46	653	96
RTOR Reduction (vph)	0	14	0	0	16	0	0	3	0	0	14	0
Lane Group Flow (vph)	0	210	0	0	147	0	0	540	0	46	735	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		11.0			11.0			15.4		15.4	15.4	
Effective Green, g (s)		11.0			11.0			15.4		15.4	15.4	
Actuated g/C Ratio		0.32			0.32			0.45		0.45	0.45	
Clearance Time (s)		4.0			4.0			4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		459			523			1473		374	1553	
v/s Ratio Prot											c0.21	
v/s Ratio Perm		c0.15			0.09			0.16		0.05		
v/c Ratio		0.46			0.28			0.37		0.12	0.47	
Uniform Delay, d1		9.3			8.7			6.3		5.6	6.7	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.7			0.3			0.2		0.1	0.2	
Delay (s)		10.0			9.0			6.4		5.7	6.9	
Level of Service		B			A			A		A	A	
Approach Delay (s)		10.0			9.0			6.4			6.8	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	34.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	172	221	100	37	158	32	5	613	42	7	780	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frt	1.00	0.95			0.98			0.99			0.99	
Flt Protected	0.95	1.00			0.99			1.00			1.00	
Satd. Flow (prot)	1770	1775			1812			3504			3487	
Flt Permitted	0.60	1.00			0.91			0.95			0.95	
Satd. Flow (perm)	1125	1775			1657			3328			3312	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	187	240	109	40	172	35	5	666	46	8	848	91
RTOR Reduction (vph)	0	20	0	0	7	0	0	6	0	0	9	0
Lane Group Flow (vph)	187	329	0	0	240	0	0	711	0	0	938	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.2	16.2			16.2			22.2			22.2	
Effective Green, g (s)	16.2	16.2			16.2			22.2			22.2	
Actuated g/C Ratio	0.35	0.35			0.35			0.48			0.48	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	392	619			578			1592			1584	
v/s Ratio Prot		c0.19										
v/s Ratio Perm	0.17				0.14			0.21			c0.28	
v/c Ratio	0.48	0.53			0.41			0.45			0.59	
Uniform Delay, d1	11.8	12.1			11.5			8.0			8.8	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	0.9	0.9			0.5			0.2			0.6	
Delay (s)	12.7	12.9			12.0			8.2			9.4	
Level of Service	B	B			B			A			A	
Approach Delay (s)		12.9			12.0			8.2			9.4	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	46.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	7	296	39	326	221	0	0	193	1262
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				1.00	1.00	1.00	1.00	1.00			0.95	0.95
Frpb, ped/bikes				1.00	1.00	0.95	1.00	1.00			0.98	0.98
Flpb, ped/bikes				0.97	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			0.89	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1710	1863	1500	1767	1863			1537	1477
Flt Permitted				0.95	1.00	1.00	0.17	1.00			1.00	1.00
Satd. Flow (perm)				1710	1863	1500	321	1863			1537	1477
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	8	322	42	354	240	0	0	210	1372
RTOR Reduction (vph)	0	0	0	0	0	31	0	0	0	0	119	0
Lane Group Flow (vph)	0	0	0	8	322	11	354	240	0	0	681	782
Confl. Peds. (#/hr)				20		20	10					20
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Free
Protected Phases					8			2			6	
Permitted Phases				8		8	2					Free
Actuated Green, G (s)				14.5	14.5	14.5	31.2	31.2			31.2	53.7
Effective Green, g (s)				14.5	14.5	14.5	31.2	31.2			31.2	53.7
Actuated g/C Ratio				0.27	0.27	0.27	0.58	0.58			0.58	1.00
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				461	503	405	186	1082			893	1477
v/s Ratio Prot					0.17			0.13			0.44	
v/s Ratio Perm				0.00		0.01	c1.10					c0.53
v/c Ratio				0.02	0.64	0.03	1.90	0.22			0.76	0.53
Uniform Delay, d1				14.4	17.3	14.4	11.3	5.4			8.5	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.0	2.8	0.0	425.9	0.1			3.9	1.4
Delay (s)				14.4	20.1	14.4	437.2	5.5			12.3	1.4
Level of Service				B	C	B	F	A			B	A
Approach Delay (s)		0.0			19.3			262.8			6.9	
Approach LOS		A			B			F			A	

Intersection Summary			
HCM 2000 Control Delay	68.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.51		
Actuated Cycle Length (s)	53.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	667	2	0	606	6	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	725	2	0	659	7	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	445					
pX, platoon unblocked						
vC, conflicting volume			727		1385	726
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			727		1385	726
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		96	100
cM capacity (veh/h)			876		158	424

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	727	659	8
Volume Left	0	0	7
Volume Right	2	0	1
cSH	1700	876	174
Volume to Capacity	0.43	0.00	0.04
Queue Length 95th (ft)	0	0	3
Control Delay (s)	0.0	0.0	26.7
Lane LOS			D
Approach Delay (s)	0.0	0.0	26.7
Approach LOS			D

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1	0	6	1	0	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	7	1	0	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	918					
pX, platoon unblocked						
vC, conflicting volume			1		15	1
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1		15	1
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1622		999	1083

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1	8	9
Volume Left	0	7	0
Volume Right	0	0	9
cSH	1700	1622	1083
Volume to Capacity	0.00	0.00	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	6.2	8.3
Lane LOS		A	A
Approach Delay (s)	0.0	6.2	8.3
Approach LOS			A

Intersection Summary			
Average Delay	6.9		
Intersection Capacity Utilization	15.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	140	30	50	153	29	47
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	152	33	54	166	32	51
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			718			
pX, platoon unblocked						
vC, conflicting volume	252	138			221	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	252	138			221	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	79	96			98	
cM capacity (veh/h)	720	911			1349	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	185	221	83
Volume Left	152	0	32
Volume Right	33	166	0
cSH	747	1700	1349
Volume to Capacity	0.25	0.13	0.02
Queue Length 95th (ft)	24	0	2
Control Delay (s)	11.4	0.0	3.1
Lane LOS	B		A
Approach Delay (s)	11.4	0.0	3.1
Approach LOS	B		

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	35.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	128	11	3	142	537	8	246	10	141	59	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected		1.00			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1839			1861	1583	1770	1852		1770	1828	
Flt Permitted		0.98			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1815			1853	1583	1770	1852		1770	1828	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	139	12	3	154	584	9	267	11	153	64	9
RTOR Reduction (vph)	0	4	0	0	0	431	0	1	0	0	5	0
Lane Group Flow (vph)	0	155	0	0	157	153	9	277	0	153	68	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		12.8			12.8	12.8	0.5	16.2		8.0	23.7	
Effective Green, g (s)		12.8			12.8	12.8	0.5	16.2		8.0	23.7	
Actuated g/C Ratio		0.26			0.26	0.26	0.01	0.33		0.16	0.48	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		474			484	413	18	612		288	884	
v/s Ratio Prot							0.01	c0.15		c0.09	0.04	
v/s Ratio Perm		0.09			0.08	c0.10						
v/c Ratio		0.33			0.32	0.37	0.50	0.45		0.53	0.08	
Uniform Delay, d1		14.6			14.6	14.8	24.1	12.9		18.8	6.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			0.4	0.6	20.2	0.5		1.9	0.0	
Delay (s)		15.0			15.0	15.4	44.3	13.4		20.7	6.8	
Level of Service		B			B	B	D	B		C	A	
Approach Delay (s)		15.0			15.3			14.4			16.2	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	49.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	43	272	559	48	76	93
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	47	296	608	52	83	101
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1202				
pX, platoon unblocked						
vC, conflicting volume	660				997	608
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	660				997	608
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				68	80
cM capacity (veh/h)	928				257	496

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	47	296	608	52	184
Volume Left	47	0	0	0	83
Volume Right	0	0	0	52	101
cSH	928	1700	1700	1700	350
Volume to Capacity	0.05	0.17	0.36	0.03	0.53
Queue Length 95th (ft)	4	0	0	0	73
Control Delay (s)	9.1	0.0	0.0	0.0	26.1
Lane LOS	A				D
Approach Delay (s)	1.2		0.0		26.1
Approach LOS					D

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	7	360	12	5	657	16	4	1	4	2	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	391	13	5	714	17	4	1	4	2	0	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					1209							
pX, platoon unblocked												
vC, conflicting volume	732			404			1143	1155	398	1145	1153	723
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	732			404			1143	1155	398	1145	1153	723
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			97	99	99	99	100	99
cM capacity (veh/h)	873			1154			173	194	652	173	195	426

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	8	404	5	732	10	8
Volume Left	8	0	5	0	4	2
Volume Right	0	13	0	17	4	5
cSH	873	1700	1154	1700	262	300
Volume to Capacity	0.01	0.24	0.00	0.43	0.04	0.03
Queue Length 95th (ft)	1	0	0	0	3	2
Control Delay (s)	9.2	0.0	8.1	0.0	19.3	17.3
Lane LOS	A		A		C	C
Approach Delay (s)	0.2		0.1		19.3	17.3
Approach LOS					C	C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	220	64	14	316	9	160	105	30	9	86	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.97			1.00			0.99			0.93	
Flt Protected		0.99			1.00			0.97			1.00	
Satd. Flow (prot)		1800			1852			1788			1728	
Flt Permitted		0.90			0.98			0.77			0.98	
Satd. Flow (perm)		1635			1819			1407			1700	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	239	70	15	343	10	174	114	33	10	93	112
RTOR Reduction (vph)	0	10	0	0	1	0	0	5	0	0	49	0
Lane Group Flow (vph)	0	363	0	0	367	0	0	316	0	0	166	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		15.6			15.6			16.3			16.3	
Effective Green, g (s)		15.6			15.6			16.3			16.3	
Actuated g/C Ratio		0.39			0.39			0.41			0.41	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		639			711			574			694	
v/s Ratio Prot												
v/s Ratio Perm		c0.22			0.20			c0.22			0.10	
v/c Ratio		0.57			0.52			0.55			0.24	
Uniform Delay, d1		9.5			9.3			9.0			7.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.2			0.6			1.1			0.2	
Delay (s)		10.7			9.9			10.1			7.9	
Level of Service		B			A			B			A	
Approach Delay (s)		10.7			9.9			10.1			7.9	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	39.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	37	190	222	424	112	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.91		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1810	1681		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1810	1681		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	207	241	461	122	18
RTOR Reduction (vph)	0	0	83	0	0	15
Lane Group Flow (vph)	40	207	619	0	122	3
Heavy Vehicles (%)	2%	5%	5%	2%	2%	2%
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	1.6	30.6	25.0		7.4	7.4
Effective Green, g (s)	1.6	30.6	25.0		7.4	7.4
Actuated g/C Ratio	0.03	0.67	0.54		0.16	0.16
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	61	1204	913		284	254
v/s Ratio Prot	c0.02	0.11	c0.37		c0.07	
v/s Ratio Perm						0.00
v/c Ratio	0.66	0.17	0.68		0.43	0.01
Uniform Delay, d1	21.9	2.9	7.6		17.4	16.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	22.6	0.1	2.0		1.0	0.0
Delay (s)	44.5	3.0	9.6		18.4	16.2
Level of Service	D	A	A		B	B
Approach Delay (s)		9.7	9.6		18.2	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	46.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	164	108	15	68	11	367	47	39	6	29	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.98		1.00	0.93		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3329		1770	3465		1770	1737		1770	1770	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3329		1770	3465		1770	1737		1770	1770	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	178	117	16	74	12	399	51	42	7	32	16
RTOR Reduction (vph)	0	93	0	0	10	0	0	25	0	0	15	0
Lane Group Flow (vph)	16	202	0	16	76	0	399	68	0	7	33	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.5	9.2		0.5	9.2		15.9	18.3		0.5	2.9	
Effective Green, g (s)	0.5	9.2		0.5	9.2		15.9	18.3		0.5	2.9	
Actuated g/C Ratio	0.01	0.21		0.01	0.21		0.36	0.41		0.01	0.07	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	19	688		19	716		632	714		19	115	
v/s Ratio Prot	c0.01	c0.06		0.01	0.02		c0.23	0.04		0.00	c0.02	
v/s Ratio Perm												
v/c Ratio	0.84	0.29		0.84	0.11		0.63	0.10		0.37	0.29	
Uniform Delay, d1	22.0	14.9		22.0	14.3		11.9	8.0		21.8	19.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	131.7	0.2		131.7	0.1		2.1	0.1		11.7	1.4	
Delay (s)	153.7	15.1		153.7	14.4		13.9	8.1		33.5	21.2	
Level of Service	F	B		F	B		B	A		C	C	
Approach Delay (s)		22.3			36.2			12.8			22.8	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	44.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	113	37	21	105	116	67	767	22	103	270	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.96		1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3409		1770	3261		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3409		1770	3261		3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	123	40	23	114	126	73	834	24	112	293	45
RTOR Reduction (vph)	0	32	0	0	105	0	0	0	15	0	0	26
Lane Group Flow (vph)	60	131	0	23	135	0	73	834	9	112	293	19
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	4.2	11.5		2.1	9.4		3.3	22.7	22.7	5.4	24.8	24.8
Effective Green, g (s)	4.2	11.5		2.1	9.4		3.3	22.7	22.7	5.4	24.8	24.8
Actuated g/C Ratio	0.07	0.20		0.04	0.16		0.06	0.39	0.39	0.09	0.43	0.43
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	128	679		64	531		196	1392	622	321	1521	680
v/s Ratio Prot	c0.03	0.04		0.01	c0.04		0.02	c0.24		c0.03	0.08	
v/s Ratio Perm									0.01			0.01
v/c Ratio	0.47	0.19		0.36	0.25		0.37	0.60	0.02	0.35	0.19	0.03
Uniform Delay, d1	25.7	19.2		27.1	21.1		26.2	13.9	10.7	24.5	10.2	9.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.7	0.1		3.4	0.3		1.2	0.7	0.0	0.7	0.1	0.0
Delay (s)	28.4	19.4		30.6	21.3		27.4	14.6	10.7	25.2	10.3	9.5
Level of Service	C	B		C	C		C	B	B	C	B	A
Approach Delay (s)		21.8			22.1			15.5			13.9	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	57.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	37	493	751	43	331	395
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.88	0.95		0.97	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	2787	3510		3433	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	2787	3510		3433	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	536	816	47	360	429
RTOR Reduction (vph)	0	458	5	0	0	0
Lane Group Flow (vph)	40	78	858	0	360	429
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	7.6	7.6	20.9		11.5	36.4
Effective Green, g (s)	7.6	7.6	20.9		11.5	36.4
Actuated g/C Ratio	0.15	0.15	0.40		0.22	0.70
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	258	407	1410		759	2477
v/s Ratio Prot	0.02		c0.24		c0.10	0.12
v/s Ratio Perm		c0.03				
v/c Ratio	0.16	0.19	0.61		0.47	0.17
Uniform Delay, d1	19.4	19.5	12.3		17.6	2.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.2	0.8		0.5	0.0
Delay (s)	19.7	19.7	13.1		18.1	2.7
Level of Service	B	B	B		B	A
Approach Delay (s)	19.7		13.1			9.7
Approach LOS	B		B			A

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	52.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	221	271	110	20	370	66	113	578	15	72	344	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3459		1770	3526		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3459		1770	3526		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	240	295	120	22	402	72	123	628	16	78	374	262
RTOR Reduction (vph)	0	0	74	0	16	0	0	2	0	0	0	196
Lane Group Flow (vph)	240	295	46	22	458	0	123	642	0	78	374	66
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	10.6	27.3	27.3	1.6	18.3		8.2	19.3		6.7	17.8	17.8
Effective Green, g (s)	10.6	27.3	27.3	1.6	18.3		8.2	19.3		6.7	17.8	17.8
Actuated g/C Ratio	0.15	0.39	0.39	0.02	0.26		0.12	0.27		0.09	0.25	0.25
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	513	1362	609	39	892		204	959		167	888	397
v/s Ratio Prot	c0.07	0.08		0.01	c0.13		c0.07	c0.18		0.04	0.11	
v/s Ratio Perm			0.03									0.04
v/c Ratio	0.47	0.22	0.08	0.56	0.51		0.60	0.67		0.47	0.42	0.17
Uniform Delay, d1	27.6	14.6	13.8	34.3	22.5		29.8	23.0		30.4	22.2	20.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.7	0.1	0.1	17.3	0.5		5.0	1.8		2.1	0.3	0.2
Delay (s)	28.2	14.7	13.9	51.6	23.0		34.8	24.7		32.5	22.6	20.9
Level of Service	C	B	B	D	C		C	C		C	C	C
Approach Delay (s)		19.5			24.3			26.4			23.0	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	70.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	360	43	35	1156	762	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	0.95	0.91	0.88
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	1770	3539	5085	2787
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	1770	3539	5085	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	391	47	38	1257	828	500
RTOR Reduction (vph)	0	36	0	0	0	0
Lane Group Flow (vph)	391	11	38	1257	828	500
Turn Type	Prot	Perm	Prot	NA	NA	Free
Protected Phases	4		5	2	6	
Permitted Phases		4				Free
Actuated Green, G (s)	11.3	11.3	2.5	30.4	23.9	49.7
Effective Green, g (s)	11.3	11.3	2.5	30.4	23.9	49.7
Actuated g/C Ratio	0.23	0.23	0.05	0.61	0.48	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	780	359	89	2164	2445	2787
v/s Ratio Prot	c0.11		0.02	c0.36	0.16	
v/s Ratio Perm		0.01				0.18
v/c Ratio	0.50	0.03	0.43	0.58	0.34	0.18
Uniform Delay, d1	16.7	14.9	22.9	5.8	8.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.0	3.3	0.4	0.1	0.1
Delay (s)	17.3	15.0	26.2	6.2	8.1	0.1
Level of Service	B	B	C	A	A	A
Approach Delay (s)	17.0			6.8	5.1	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	49.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	255	26	5	7	93	361	4	909	6	88	444	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		1.00			0.89		1.00	1.00		1.00	0.98	
Flt Protected		0.96			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1779			1665		1770	3535		1770	3474	
Flt Permitted		0.36			0.99		0.43	1.00		0.95	1.00	
Satd. Flow (perm)		671			1657		806	3535		1770	3474	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	277	28	5	8	101	392	4	988	7	96	483	68
RTOR Reduction (vph)	0	1	0	0	81	0	0	1	0	0	11	0
Lane Group Flow (vph)	0	309	0	0	420	0	4	994	0	96	540	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		40.4			40.4		31.7	30.9		6.1	36.2	
Effective Green, g (s)		40.4			40.4		31.7	30.9		6.1	36.2	
Actuated g/C Ratio		0.45			0.45		0.35	0.35		0.07	0.40	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		303			748		294	1221		120	1406	
v/s Ratio Prot							0.00	c0.28		c0.05	0.16	
v/s Ratio Perm		c0.46			0.25		0.00					
v/c Ratio		1.02			0.56		0.01	0.81		0.80	0.38	
Uniform Delay, d1		24.5			18.0		18.7	26.6		41.0	18.7	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		57.3			1.0		0.0	4.3		30.5	0.2	
Delay (s)		81.8			19.0		18.7	30.9		71.5	18.9	
Level of Service		F			B		B	C		E	B	
Approach Delay (s)		81.8			19.0			30.9			26.7	
Approach LOS		F			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	33.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	89.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	310	14	2	9	57	439	0	1501	3	0	598	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		1.00			0.88			1.00			0.96	
Flt Protected		0.95			1.00			1.00			1.00	
Satd. Flow (prot)		1777			1643			3538			3412	
Flt Permitted		0.34			0.99			1.00			1.00	
Satd. Flow (perm)		637			1633			3538			3412	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	337	15	2	10	62	477	0	1632	3	0	650	204
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	34	0
Lane Group Flow (vph)	0	354	0	0	546	0	0	1635	0	0	820	0
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		44.0			44.0			38.0			38.0	
Effective Green, g (s)		44.0			44.0			38.0			38.0	
Actuated g/C Ratio		0.49			0.49			0.42			0.42	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		311			798			1493			1440	
v/s Ratio Prot								c0.46			0.24	
v/s Ratio Perm		c0.56			0.33							
v/c Ratio		1.14			0.68			1.10			0.57	
Uniform Delay, d1		23.0			17.7			26.0			19.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		93.8			2.4			53.8			0.5	
Delay (s)		116.8			20.1			79.8			20.3	
Level of Service		F			C			E			C	
Approach Delay (s)		116.8			20.1			79.8			20.3	
Approach LOS		F			C			E			C	

Intersection Summary			
HCM 2000 Control Delay	59.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	100.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	383	66	118	491	175	52	307	365	80	73	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.99	1.00		0.97	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3400			1849	1583		1815	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.94	1.00		0.62	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3400			1745	1583		1156	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	416	72	128	534	190	57	334	397	87	79	12
RTOR Reduction (vph)	0	0	0	0	26	0	0	0	247	0	0	7
Lane Group Flow (vph)	11	416	72	128	698	0	0	391	150	0	166	5
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			Free				2		2	6		6
Actuated Green, G (s)	0.8	17.5	61.1	8.5	25.2			23.1	23.1		23.1	23.1
Effective Green, g (s)	0.8	17.5	61.1	8.5	25.2			23.1	23.1		23.1	23.1
Actuated g/C Ratio	0.01	0.29	1.00	0.14	0.41			0.38	0.38		0.38	0.38
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	23	1013	1583	246	1402			659	598		437	598
v/s Ratio Prot	0.01	0.12		c0.07	c0.21							
v/s Ratio Perm			0.05					c0.22	0.09		0.14	0.00
v/c Ratio	0.48	0.41	0.05	0.52	0.50			0.59	0.25		0.38	0.01
Uniform Delay, d1	29.9	17.6	0.0	24.4	13.3			15.2	13.1		13.8	11.9
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	14.8	0.3	0.1	2.0	0.3			1.4	0.2		0.6	0.0
Delay (s)	44.8	17.9	0.1	26.4	13.5			16.7	13.3		14.4	11.9
Level of Service	D	B	A	C	B			B	B		B	B
Approach Delay (s)		15.9			15.5			15.0			14.2	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	61.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	678	157	81	0	0	0	0	129	224	385	330	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Lane Util. Factor	0.91	0.91	1.00					0.91		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.89					0.93		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00		1.00	1.00	
Frt	1.00	1.00	0.85					0.90		1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1610	3278	1405					4272		3433	1863	
Flt Permitted	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1610	3278	1405					4272		3433	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	737	171	88	0	0	0	0	140	243	418	359	0
RTOR Reduction (vph)	0	0	63	0	0	0	0	108	0	0	0	0
Lane Group Flow (vph)	368	540	25	0	0	0	0	275	0	418	359	0
Confl. Peds. (#/hr)			75						75			
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	20.5	20.5	20.5					30.1		10.5	44.6	
Effective Green, g (s)	20.5	20.5	20.5					30.1		10.5	44.6	
Actuated g/C Ratio	0.28	0.28	0.28					0.41		0.14	0.61	
Clearance Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)	451	919	394					1759		493	1136	
v/s Ratio Prot	c0.23	0.16						0.06		c0.12	c0.19	
v/s Ratio Perm			0.02									
v/c Ratio	0.82	0.59	0.06					0.16		0.85	0.32	
Uniform Delay, d1	24.5	22.7	19.3					13.5		30.5	6.9	
Progression Factor	1.00	1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2	10.9	1.0	0.1					0.2		12.8	0.2	
Delay (s)	35.4	23.6	19.3					13.7		43.3	7.0	
Level of Service	D	C	B					B		D	A	
Approach Delay (s)		27.6			0.0			13.7			26.5	
Approach LOS		C			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	73.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	62	302	0	0	0	0	0	919	1720	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0			
Lane Util. Factor		0.91						0.91	0.88			
Frpb, ped/bikes		1.00						1.00	1.00			
Flpb, ped/bikes		0.99						1.00	1.00			
Frt		1.00						1.00	0.85			
Flt Protected		0.99						1.00	1.00			
Satd. Flow (prot)		4385						5085	2787			
Flt Permitted		0.99						1.00	1.00			
Satd. Flow (perm)		4385						5085	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	328	0	0	0	0	0	999	1870	0	0	0
RTOR Reduction (vph)	0	49	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	346	0	0	0	0	0	999	1870	0	0	0
Confl. Peds. (#/hr)	67		36	36		67	41		51	51		41
Heavy Vehicles (%)	5%	18%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA						NA	Prot			
Protected Phases		2						1	1			
Permitted Phases	2											
Actuated Green, G (s)		16.0						36.0	36.0			
Effective Green, g (s)		16.0						36.0	36.0			
Actuated g/C Ratio		0.27						0.60	0.60			
Clearance Time (s)		4.0						4.0	4.0			
Lane Grp Cap (vph)		1169						3051	1672			
v/s Ratio Prot								0.20	c0.67			
v/s Ratio Perm		0.08										
v/c Ratio		0.30						0.33	1.12			
Uniform Delay, d1		17.5						6.0	12.0			
Progression Factor		1.00						1.00	1.00			
Incremental Delay, d2		0.6						0.3	62.0			
Delay (s)		18.2						6.3	74.0			
Level of Service		B						A	E			
Approach Delay (s)		18.2			0.0			50.4			0.0	
Approach LOS		B			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	46.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	136	106	35	48	106	69	18	752	38	25	391	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			0.95		1.00	0.95	
Frt		0.98			0.96			0.99		1.00	0.98	
Flt Protected		0.98			0.99			1.00		0.95	1.00	
Satd. Flow (prot)		1787			1766			3510		1770	3462	
Flt Permitted		0.76			0.88			0.94		0.25	1.00	
Satd. Flow (perm)		1395			1579			3306		471	3462	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	148	115	38	52	115	75	20	817	41	27	425	72
RTOR Reduction (vph)	0	6	0	0	20	0	0	4	0	0	16	0
Lane Group Flow (vph)	0	295	0	0	222	0	0	874	0	27	481	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		16.9			16.9			21.1		21.1	21.1	
Effective Green, g (s)		16.9			16.9			21.1		21.1	21.1	
Actuated g/C Ratio		0.37			0.37			0.46		0.46	0.46	
Clearance Time (s)		4.0			4.0			4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		512			580			1516		216	1588	
v/s Ratio Prot											0.14	
v/s Ratio Perm		c0.21			0.14			c0.26		0.06		
v/c Ratio		0.58			0.38			0.58		0.12	0.30	
Uniform Delay, d1		11.7			10.7			9.2		7.1	7.8	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		1.6			0.4			0.5		0.3	0.1	
Delay (s)		13.2			11.1			9.7		7.4	7.9	
Level of Service		B			B			A		A	A	
Approach Delay (s)		13.2			11.1			9.7			7.9	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	46.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	208	503	40	12	212	28	16	693	22	7	482	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frt	1.00	0.99			0.99			1.00			0.99	
Flt Protected	0.95	1.00			1.00			1.00			1.00	
Satd. Flow (prot)	1770	1842			1831			3519			3491	
Flt Permitted	0.59	1.00			0.97			0.94			0.94	
Satd. Flow (perm)	1093	1842			1783			3310			3299	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	226	547	43	13	230	30	17	753	24	8	524	50
RTOR Reduction (vph)	0	3	0	0	5	0	0	2	0	0	8	0
Lane Group Flow (vph)	226	587	0	0	268	0	0	792	0	0	574	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	26.6	26.6			26.6			22.1			22.1	
Effective Green, g (s)	26.6	26.6			26.6			22.1			22.1	
Actuated g/C Ratio	0.47	0.47			0.47			0.39			0.39	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	512	864			836			1290			1285	
v/s Ratio Prot		c0.32										
v/s Ratio Perm	0.21				0.15			c0.24			0.17	
v/c Ratio	0.44	0.68			0.32			0.61			0.45	
Uniform Delay, d1	10.1	11.7			9.4			13.9			12.8	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	0.6	2.1			0.2			0.9			0.2	
Delay (s)	10.7	13.9			9.6			14.7			13.0	
Level of Service	B	B			A			B			B	
Approach Delay (s)		13.0			9.6			14.7			13.0	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	56.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	11	279	56	188	262	0	0	139	1492
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				1.00	1.00	1.00	1.00	1.00			0.95	0.95
Frpb, ped/bikes				1.00	1.00	0.94	1.00	1.00			0.97	0.98
Flpb, ped/bikes				0.96	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			0.88	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1706	1863	1496	1770	1863			1506	1477
Flt Permitted				0.95	1.00	1.00	0.14	1.00			1.00	1.00
Satd. Flow (perm)				1706	1863	1496	270	1863			1506	1477
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	12	303	61	204	285	0	0	151	1622
RTOR Reduction (vph)	0	0	0	0	0	47	0	0	0	0	75	0
Lane Group Flow (vph)	0	0	0	12	303	14	204	285	0	0	822	876
Confl. Peds. (#/hr)				20		20	10					20
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Free
Protected Phases					8			2			6	
Permitted Phases				8		8	2					Free
Actuated Green, G (s)				13.4	13.4	13.4	36.1	36.1			36.1	57.5
Effective Green, g (s)				13.4	13.4	13.4	36.1	36.1			36.1	57.5
Actuated g/C Ratio				0.23	0.23	0.23	0.63	0.63			0.63	1.00
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				397	434	348	169	1169			945	1477
v/s Ratio Prot					0.16			0.15			0.55	
v/s Ratio Perm				0.01		0.01	c0.76					c0.59
v/c Ratio				0.03	0.70	0.04	1.21	0.24			0.87	0.59
Uniform Delay, d1				17.0	20.2	17.1	10.7	4.7			8.8	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.0	4.9	0.0	135.8	0.1			8.6	1.8
Delay (s)				17.1	25.1	17.1	146.5	4.8			17.4	1.8
Level of Service				B	C	B	F	A			B	A
Approach Delay (s)		0.0			23.5			63.9			9.7	
Approach LOS		A			C			E			A	

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	57.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	667	2	0	606	6	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	725	2	0	659	7	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	445					
pX, platoon unblocked						
vC, conflicting volume			727		1385	726
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			727		1385	726
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		96	100
cM capacity (veh/h)			876		158	424

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	727	659	8
Volume Left	0	0	7
Volume Right	2	0	1
cSH	1700	876	174
Volume to Capacity	0.43	0.00	0.04
Queue Length 95th (ft)	0	0	3
Control Delay (s)	0.0	0.0	26.7
Lane LOS			D
Approach Delay (s)	0.0	0.0	26.7
Approach LOS			D

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	0	0	3	0	0	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	3	0	0	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	918					
pX, platoon unblocked						
vC, conflicting volume			0		7	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		7	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1623		1013	1085

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	0	3	5
Volume Left	0	3	0
Volume Right	0	0	5
cSH	1700	1623	1085
Volume to Capacity	0.00	0.00	0.01
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	7.2	8.3
Lane LOS		A	A
Approach Delay (s)	0.0	7.2	8.3
Approach LOS			A

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	224	35	58	109	36	61
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	243	38	63	118	39	66
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			718			
pX, platoon unblocked						
vC, conflicting volume	267	122			182	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	267	122			182	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	65	96			97	
cM capacity (veh/h)	702	929			1394	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	282	182	105
Volume Left	243	0	39
Volume Right	38	118	0
cSH	726	1700	1394
Volume to Capacity	0.39	0.11	0.03
Queue Length 95th (ft)	46	0	2
Control Delay (s)	13.1	0.0	3.0
Lane LOS	B		A
Approach Delay (s)	13.1	0.0	3.0
Approach LOS	B		

Intersection Summary			
Average Delay	7.0		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	221	23	19	158	323	10	127	10	457	290	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1837			1853	1583	1770	1842		1770	1854	
Flt Permitted		0.99			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1820			1785	1583	1770	1842		1770	1854	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	240	25	21	172	351	11	138	11	497	315	10
RTOR Reduction (vph)	0	4	0	0	0	264	0	3	0	0	1	0
Lane Group Flow (vph)	0	270	0	0	193	87	11	146	0	497	324	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		15.3			15.3	15.3	0.5	11.0		23.7	34.2	
Effective Green, g (s)		15.3			15.3	15.3	0.5	11.0		23.7	34.2	
Actuated g/C Ratio		0.25			0.25	0.25	0.01	0.18		0.38	0.55	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		449			440	390	14	326		676	1022	
v/s Ratio Prot							0.01	c0.08		c0.28	0.17	
v/s Ratio Perm		c0.15			0.11	0.05						
v/c Ratio		0.60			0.44	0.22	0.79	0.45		0.74	0.32	
Uniform Delay, d1		20.7			19.7	18.6	30.7	22.8		16.5	7.6	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.3			0.7	0.3	130.6	1.0		4.2	0.2	
Delay (s)		22.9			20.4	18.9	161.3	23.8		20.6	7.7	
Level of Service		C			C	B	F	C		C	A	
Approach Delay (s)		22.9			19.4			33.2			15.5	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	62.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	125	698	524	115	100	96
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	136	759	570	125	109	104
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1202				
pX, platoon unblocked						
vC, conflicting volume	695				1600	570
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	695				1600	570
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	85				0	80
cM capacity (veh/h)	901				99	521

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	136	759	570	125	213
Volume Left	136	0	0	0	109
Volume Right	0	0	0	125	104
cSH	901	1700	1700	1700	164
Volume to Capacity	0.15	0.45	0.34	0.07	1.30
Queue Length 95th (ft)	13	0	0	0	312
Control Delay (s)	9.7	0.0	0.0	0.0	225.2
Lane LOS	A				F
Approach Delay (s)	1.5		0.0		225.2
Approach LOS					F

Intersection Summary			
Average Delay	27.4		
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	763	3	3	568	2	3	0	5	0	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	829	3	3	617	2	3	0	5	0	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					1209							
pX, platoon unblocked												
vC, conflicting volume	620			833			1462	1464	831	1466	1464	618
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	620			833			1462	1464	831	1466	1464	618
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			97	100	99	100	100	100
cM capacity (veh/h)	961			800			106	127	370	104	127	489

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	3	833	3	620	9	1
Volume Left	3	0	3	0	3	0
Volume Right	0	3	0	2	5	1
cSH	961	1700	800	1700	191	489
Volume to Capacity	0.00	0.49	0.00	0.36	0.05	0.00
Queue Length 95th (ft)	0	0	0	0	4	0
Control Delay (s)	8.8	0.0	9.5	0.0	24.8	12.4
Lane LOS	A		A		C	B
Approach Delay (s)	0.0		0.0		24.8	12.4
Approach LOS					C	B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	52	430	123	23	285	2	100	68	27	5	147	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.97			1.00			0.98			0.94	
Flt Protected		1.00			1.00			0.97			1.00	
Satd. Flow (prot)		1804			1854			1783			1747	
Flt Permitted		0.95			0.94			0.68			1.00	
Satd. Flow (perm)		1718			1756			1246			1740	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	467	134	25	310	2	109	74	29	5	160	138
RTOR Reduction (vph)	0	11	0	0	0	0	0	7	0	0	35	0
Lane Group Flow (vph)	0	647	0	0	337	0	0	205	0	0	268	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		26.7			26.7			16.1			16.1	
Effective Green, g (s)		26.7			26.7			16.1			16.1	
Actuated g/C Ratio		0.53			0.53			0.32			0.32	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		902			922			394			551	
v/s Ratio Prot												
v/s Ratio Perm		c0.38			0.19			c0.16			0.15	
v/c Ratio		0.72			0.36			0.52			0.49	
Uniform Delay, d1		9.2			7.1			14.2			14.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.7			0.2			1.2			0.7	
Delay (s)		11.9			7.3			15.4			14.7	
Level of Service		B			A			B			B	
Approach Delay (s)		11.9			7.3			15.4			14.7	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	50.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	42	265	244	250	330	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.93		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1810	1711		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1810	1711		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	288	265	272	359	52
RTOR Reduction (vph)	0	0	44	0	0	35
Lane Group Flow (vph)	46	288	493	0	359	17
Heavy Vehicles (%)	2%	5%	5%	2%	2%	2%
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	2.9	29.6	22.7		18.1	18.1
Effective Green, g (s)	2.9	29.6	22.7		18.1	18.1
Actuated g/C Ratio	0.05	0.53	0.41		0.32	0.32
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	92	961	697		575	514
v/s Ratio Prot	c0.03	0.16	c0.29		c0.20	
v/s Ratio Perm						0.01
v/c Ratio	0.50	0.30	0.71		0.62	0.03
Uniform Delay, d1	25.7	7.3	13.7		15.9	12.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.2	0.2	3.3		2.1	0.0
Delay (s)	29.9	7.4	17.0		18.0	12.9
Level of Service	C	A	B		B	B
Approach Delay (s)		10.5	17.0		17.4	
Approach LOS		B	B		B	

Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	55.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	49	76	197	51	134	16	182	113	23	10	109	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	0.98		1.00	0.97		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3157		1770	3484		1770	1816		1770	1769	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3157		1770	3484		1770	1816		1770	1769	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	53	83	214	55	146	17	198	123	25	11	118	60
RTOR Reduction (vph)	0	168	0	0	9	0	0	9	0	0	21	0
Lane Group Flow (vph)	53	129	0	55	154	0	198	139	0	11	157	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	3.7	10.4		3.7	10.4		8.6	18.2		0.5	10.1	
Effective Green, g (s)	3.7	10.4		3.7	10.4		8.6	18.2		0.5	10.1	
Actuated g/C Ratio	0.08	0.21		0.08	0.21		0.18	0.37		0.01	0.21	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	134	672		134	742		311	677		18	366	
v/s Ratio Prot	0.03	0.04		c0.03	c0.04		c0.11	0.08		0.01	c0.09	
v/s Ratio Perm												
v/c Ratio	0.40	0.19		0.41	0.21		0.64	0.20		0.61	0.43	
Uniform Delay, d1	21.5	15.8		21.5	15.8		18.7	10.4		24.1	16.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	0.1		2.0	0.1		4.2	0.2		48.7	0.8	
Delay (s)	23.4	15.9		23.6	15.9		22.9	10.5		72.7	17.6	
Level of Service	C	B		C	B		C	B		E	B	
Approach Delay (s)		17.0			17.9			17.6			20.8	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	48.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	136	65	41	133	129	56	441	36	131	988	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.95		1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3367		1770	3278		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3367		1770	3278		3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	148	71	45	145	140	61	479	39	142	1074	115
RTOR Reduction (vph)	0	59	0	0	118	0	0	0	22	0	0	59
Lane Group Flow (vph)	64	160	0	45	167	0	61	479	17	142	1074	56
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	4.0	10.8		2.8	9.6		2.3	27.1	27.1	5.4	30.2	30.2
Effective Green, g (s)	4.0	10.8		2.8	9.6		2.3	27.1	27.1	5.4	30.2	30.2
Actuated g/C Ratio	0.06	0.17		0.05	0.15		0.04	0.44	0.44	0.09	0.49	0.49
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	114	585		79	506		127	1544	690	298	1721	769
v/s Ratio Prot	c0.04	0.05		0.03	c0.05		0.02	0.14		c0.04	c0.30	
v/s Ratio Perm									0.01			0.04
v/c Ratio	0.56	0.27		0.57	0.33		0.48	0.31	0.02	0.48	0.62	0.07
Uniform Delay, d1	28.2	22.2		29.1	23.4		29.3	11.4	10.0	27.0	11.8	8.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.2	0.3		9.1	0.4		2.8	0.1	0.0	1.2	0.7	0.0
Delay (s)	34.4	22.5		38.2	23.8		32.2	11.5	10.0	28.2	12.5	8.5
Level of Service	C	C		D	C		C	B	A	C	B	A
Approach Delay (s)		25.2			25.7			13.6			13.8	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	62.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	213	338	539	90	408	1113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.88	0.95		0.97	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	2787	3463		3433	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	2787	3463		3433	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	232	367	586	98	443	1210
RTOR Reduction (vph)	0	279	16	0	0	0
Lane Group Flow (vph)	232	88	668	0	443	1210
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	14.1	14.1	19.2		13.7	36.9
Effective Green, g (s)	14.1	14.1	19.2		13.7	36.9
Actuated g/C Ratio	0.24	0.24	0.33		0.23	0.63
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	423	666	1126		797	2213
v/s Ratio Prot	c0.13		0.19		0.13	c0.34
v/s Ratio Perm		0.03				
v/c Ratio	0.55	0.13	0.59		0.56	0.55
Uniform Delay, d1	19.7	17.6	16.6		20.0	6.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.5	0.1	0.8		0.8	0.3
Delay (s)	21.1	17.7	17.5		20.8	6.6
Level of Service	C	B	B		C	A
Approach Delay (s)	19.0		17.5			10.4
Approach LOS	B		B			B

Intersection Summary			
HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	201	335	201	52	323	98	96	497	83	165	915	305
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3415		1770	3463		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3415		1770	3463		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	218	364	218	57	351	107	104	540	90	179	995	332
RTOR Reduction (vph)	0	0	159	0	31	0	0	15	0	0	0	201
Lane Group Flow (vph)	218	364	59	57	427	0	104	615	0	179	995	131
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	9.4	22.2	22.2	3.7	16.5		7.5	26.9		12.8	32.2	32.2
Effective Green, g (s)	9.4	22.2	22.2	3.7	16.5		7.5	26.9		12.8	32.2	32.2
Actuated g/C Ratio	0.12	0.27	0.27	0.05	0.20		0.09	0.33		0.16	0.39	0.39
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	395	962	430	80	690		162	1141		277	1396	624
v/s Ratio Prot	c0.06	0.10		0.03	c0.12		0.06	0.18		c0.10	c0.28	
v/s Ratio Perm			0.04									0.08
v/c Ratio	0.55	0.38	0.14	0.71	0.62		0.64	0.54		0.65	0.71	0.21
Uniform Delay, d1	34.1	24.1	22.5	38.4	29.7		35.8	22.3		32.3	20.8	16.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.7	0.3	0.1	25.8	1.7		8.4	0.5		5.1	1.7	0.2
Delay (s)	35.8	24.4	22.6	64.2	31.3		44.2	22.8		37.4	22.6	16.5
Level of Service	D	C	C	E	C		D	C		D	C	B
Approach Delay (s)		27.0			35.0			25.8			23.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	81.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	279	79	49	712	1131	454
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	0.95	0.91	0.88
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	1770	3539	5085	2787
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	1770	3539	5085	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	303	86	53	774	1229	493
RTOR Reduction (vph)	0	68	0	0	0	0
Lane Group Flow (vph)	303	18	53	774	1229	493
Turn Type	Prot	Perm	Prot	NA	NA	Free
Protected Phases	4		5	2	6	
Permitted Phases		4				Free
Actuated Green, G (s)	10.7	10.7	4.1	31.7	23.6	50.4
Effective Green, g (s)	10.7	10.7	4.1	31.7	23.6	50.4
Actuated g/C Ratio	0.21	0.21	0.08	0.63	0.47	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	728	336	143	2225	2381	2787
v/s Ratio Prot	c0.09		0.03	c0.22	c0.24	
v/s Ratio Perm		0.01				0.18
v/c Ratio	0.42	0.05	0.37	0.35	0.52	0.18
Uniform Delay, d1	17.2	15.8	21.9	4.4	9.4	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.1	1.6	0.1	0.2	0.1
Delay (s)	17.5	15.9	23.5	4.5	9.6	0.1
Level of Service	B	B	C	A	A	A
Approach Delay (s)	17.2			5.8	6.9	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	7.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	50.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	266	80	11	9	81	104	11	845	31	265	782	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		1.00			0.93		1.00	0.99		1.00	0.99	
Flt Protected		0.96			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1788			1724		1770	3520		1770	3492	
Flt Permitted		0.59			0.98		0.31	1.00		0.95	1.00	
Satd. Flow (perm)		1096			1693		571	3520		1770	3492	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	289	87	12	10	88	113	12	918	34	288	850	83
RTOR Reduction (vph)	0	1	0	0	48	0	0	3	0	0	8	0
Lane Group Flow (vph)	0	387	0	0	163	0	12	949	0	288	926	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		32.3			32.3		30.9	30.1		15.8	45.1	
Effective Green, g (s)		32.3			32.3		30.9	30.1		15.8	45.1	
Actuated g/C Ratio		0.36			0.36		0.34	0.33		0.18	0.50	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		392			606		206	1174		310	1746	
v/s Ratio Prot							0.00	c0.27		c0.16	0.27	
v/s Ratio Perm		c0.35			0.10		0.02					
v/c Ratio		0.99			0.27		0.06	0.81		0.93	0.53	
Uniform Delay, d1		28.7			20.6		19.6	27.4		36.6	15.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		41.5			0.2		0.1	4.2		32.7	0.3	
Delay (s)		70.2			20.8		19.7	31.6		69.4	15.7	
Level of Service		E			C		B	C		E	B	
Approach Delay (s)		70.2			20.8			31.5			28.3	
Approach LOS		E			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	34.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	90.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	167	60	19	28	127	222	1	1149	34	5	1230	346
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.99			0.92			1.00			0.97	
Flt Protected		0.97			1.00			1.00			1.00	
Satd. Flow (prot)		1783			1708			3524			3423	
Flt Permitted		0.42			0.96			0.95			0.95	
Satd. Flow (perm)		780			1653			3363			3258	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	182	65	21	30	138	241	1	1249	37	5	1337	376
RTOR Reduction (vph)	0	3	0	0	35	0	0	2	0	0	28	0
Lane Group Flow (vph)	0	265	0	0	374	0	0	1285	0	0	1690	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		31.5			31.5			49.5			49.5	
Effective Green, g (s)		31.5			31.5			49.5			49.5	
Actuated g/C Ratio		0.35			0.35			0.56			0.56	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		276			585			1870			1812	
v/s Ratio Prot												
v/s Ratio Perm		c0.34			0.23			0.38			c0.52	
v/c Ratio		0.96			0.64			0.69			0.93	
Uniform Delay, d1		28.1			24.0			14.2			18.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		42.6			2.3			1.1			9.3	
Delay (s)		70.7			26.3			15.3			27.5	
Level of Service		E			C			B			C	
Approach Delay (s)		70.7			26.3			15.3			27.5	
Approach LOS		E			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	26.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	89.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	94.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	390	107	277	626	220	77	159	154	112	144	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3401			1833	1583		1823	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.74	1.00		0.65	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3401			1387	1583		1220	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	424	116	301	680	239	84	173	167	122	157	17
RTOR Reduction (vph)	0	0	0	0	25	0	0	0	113	0	0	11
Lane Group Flow (vph)	29	424	116	301	894	0	0	257	54	0	279	6
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			Free				2		2	6		6
Actuated Green, G (s)	1.8	18.9	74.4	19.4	36.5			24.1	24.1		24.1	24.1
Effective Green, g (s)	1.8	18.9	74.4	19.4	36.5			24.1	24.1		24.1	24.1
Actuated g/C Ratio	0.02	0.25	1.00	0.26	0.49			0.32	0.32		0.32	0.32
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	42	899	1583	461	1668			449	512		395	512
v/s Ratio Prot	0.02	0.12		c0.17	c0.26							
v/s Ratio Perm			0.07					0.19	0.03		c0.23	0.00
v/c Ratio	0.69	0.47	0.07	0.65	0.54			0.57	0.11		0.71	0.01
Uniform Delay, d1	36.0	23.5	0.0	24.5	13.1			20.9	17.6		22.0	17.1
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	39.1	0.4	0.1	3.3	0.3			1.8	0.1		5.7	0.0
Delay (s)	75.1	23.9	0.1	27.8	13.4			22.6	17.7		27.7	17.1
Level of Service	E	C	A	C	B			C	B		C	B
Approach Delay (s)		21.7			17.0			20.7			27.1	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	74.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	991	300	34	0	0	0	0	221	351	573	220	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Lane Util. Factor	0.91	0.91	1.00					0.91		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.89					0.93		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00		1.00	1.00	
Frt	1.00	1.00	0.85					0.91		1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1610	3288	1402					4292		3433	1863	
Flt Permitted	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1610	3288	1402					4292		3433	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1077	326	37	0	0	0	0	240	382	623	239	0
RTOR Reduction (vph)	0	0	26	0	0	0	0	52	0	0	0	0
Lane Group Flow (vph)	538	865	11	0	0	0	0	570	0	623	239	0
Confl. Peds. (#/hr)			75						75			
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	22.0	22.0	22.0					30.0		10.5	44.5	
Effective Green, g (s)	22.0	22.0	22.0					30.0		10.5	44.5	
Actuated g/C Ratio	0.30	0.30	0.30					0.40		0.14	0.60	
Clearance Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)	475	970	414					1728		483	1112	
v/s Ratio Prot	c0.33	0.26						c0.13		c0.18	0.13	
v/s Ratio Perm			0.01									
v/c Ratio	1.13	1.09dl	0.03					0.33		1.29	0.21	
Uniform Delay, d1	26.2	25.1	18.6					15.3		32.0	6.9	
Progression Factor	1.00	1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2	83.0	10.4	0.0					0.5		145.3	0.1	
Delay (s)	109.2	35.5	18.7					15.8		177.3	7.0	
Level of Service	F	D	B					B		F	A	
Approach Delay (s)		62.6			0.0			15.8			130.1	
Approach LOS		E			A			B			F	

Intersection Summary			
HCM 2000 Control Delay	72.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	74.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	137	562	0	0	0	0	0	651	1529	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0			
Lane Util. Factor		0.91						0.91	0.88			
Frpb, ped/bikes		1.00						1.00	1.00			
Flpb, ped/bikes		0.99						1.00	1.00			
Frt		1.00						1.00	0.85			
Flt Protected		0.99						1.00	1.00			
Satd. Flow (prot)		4383						5085	2787			
Flt Permitted		0.99						1.00	1.00			
Satd. Flow (perm)		4383						5085	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	149	611	0	0	0	0	0	708	1662	0	0	0
RTOR Reduction (vph)	0	70	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	690	0	0	0	0	0	708	1662	0	0	0
Confl. Peds. (#/hr)	67		36	36		67	41		51	51		41
Heavy Vehicles (%)	5%	18%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA						NA	Prot			
Protected Phases		2						1	1			
Permitted Phases	2											
Actuated Green, G (s)		16.0						36.0	36.0			
Effective Green, g (s)		16.0						36.0	36.0			
Actuated g/C Ratio		0.27						0.60	0.60			
Clearance Time (s)		4.0						4.0	4.0			
Lane Grp Cap (vph)		1168						3051	1672			
v/s Ratio Prot								0.14	c0.60			
v/s Ratio Perm		0.16										
v/c Ratio		0.59						0.23	0.99			
Uniform Delay, d1		19.2						5.6	11.9			
Progression Factor		1.00						1.00	1.00			
Incremental Delay, d2		2.2						0.2	20.6			
Delay (s)		21.4						5.8	32.5			
Level of Service		C						A	C			
Approach Delay (s)		21.4			0.0			24.5			0.0	
Approach LOS		C			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	23.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	91	71	48	39	84	40	12	468	32	42	601	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			0.95		1.00	0.95	
Frt		0.97			0.97			0.99		1.00	0.98	
Flt Protected		0.98			0.99			1.00		0.95	1.00	
Satd. Flow (prot)		1767			1780			3502		1770	3471	
Flt Permitted		0.80			0.89			0.94		0.44	1.00	
Satd. Flow (perm)		1445			1598			3280		826	3471	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	77	52	42	91	43	13	509	35	46	653	96
RTOR Reduction (vph)	0	14	0	0	15	0	0	6	0	0	14	0
Lane Group Flow (vph)	0	214	0	0	161	0	0	551	0	46	735	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		11.1			11.1			15.5		15.5	15.5	
Effective Green, g (s)		11.1			11.1			15.5		15.5	15.5	
Actuated g/C Ratio		0.32			0.32			0.45		0.45	0.45	
Clearance Time (s)		4.0			4.0			4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		463			512			1469		370	1554	
v/s Ratio Prot											c0.21	
v/s Ratio Perm		c0.15			0.10			0.17		0.06		
v/c Ratio		0.46			0.31			0.38		0.12	0.47	
Uniform Delay, d1		9.4			8.9			6.3		5.6	6.7	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.7			0.4			0.2		0.2	0.2	
Delay (s)		10.1			9.2			6.5		5.7	6.9	
Level of Service		B			A			A		A	A	
Approach Delay (s)		10.1			9.2			6.5			6.8	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	34.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	191	248	115	37	194	32	25	613	42	7	780	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frt	1.00	0.95			0.98			0.99			0.98	
Flt Protected	0.95	1.00			0.99			1.00			1.00	
Satd. Flow (prot)	1770	1774			1819			3500			3474	
Flt Permitted	0.55	1.00			0.91			0.91			0.95	
Satd. Flow (perm)	1031	1774			1674			3175			3300	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	208	270	125	40	211	35	27	666	46	8	848	117
RTOR Reduction (vph)	0	20	0	0	6	0	0	5	0	0	12	0
Lane Group Flow (vph)	208	375	0	0	280	0	0	734	0	0	961	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.9	18.9			18.9			24.1			24.1	
Effective Green, g (s)	18.9	18.9			18.9			24.1			24.1	
Actuated g/C Ratio	0.37	0.37			0.37			0.47			0.47	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	382	657			620			1500			1559	
v/s Ratio Prot		c0.21										
v/s Ratio Perm	0.20				0.17			0.23			c0.29	
v/c Ratio	0.54	0.57			0.45			0.49			0.62	
Uniform Delay, d1	12.7	12.8			12.1			9.2			10.0	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	1.6	1.2			0.5			0.3			0.7	
Delay (s)	14.2	14.0			12.7			9.5			10.7	
Level of Service	B	B			B			A			B	
Approach Delay (s)		14.1			12.7			9.5			10.7	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	51.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	7	296	39	326	221	0	0	193	1299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				1.00	1.00	1.00	1.00	1.00			0.95	0.95
Frpb, ped/bikes				1.00	1.00	0.95	1.00	1.00			0.98	0.98
Flpb, ped/bikes				0.97	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			0.89	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1710	1863	1500	1770	1863			1534	1477
Flt Permitted				0.95	1.00	1.00	0.15	1.00			1.00	1.00
Satd. Flow (perm)				1710	1863	1500	282	1863			1534	1477
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	8	322	42	354	240	0	0	210	1412
RTOR Reduction (vph)	0	0	0	0	0	31	0	0	0	0	119	0
Lane Group Flow (vph)	0	0	0	8	322	11	354	240	0	0	712	791
Confl. Peds. (#/hr)				20		20	10					20
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Free
Protected Phases					8			2			6	
Permitted Phases				8		8	2					Free
Actuated Green, G (s)				14.5	14.5	14.5	31.2	31.2			31.2	53.7
Effective Green, g (s)				14.5	14.5	14.5	31.2	31.2			31.2	53.7
Actuated g/C Ratio				0.27	0.27	0.27	0.58	0.58			0.58	1.00
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				461	503	405	163	1082			891	1477
v/s Ratio Prot					0.17			0.13			0.46	
v/s Ratio Perm				0.00		0.01	c1.26					c0.54
v/c Ratio				0.02	0.64	0.03	2.17	0.22			0.80	0.54
Uniform Delay, d1				14.4	17.3	14.4	11.3	5.4			8.8	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.0	2.8	0.0	547.0	0.1			5.1	1.4
Delay (s)				14.4	20.1	14.4	558.3	5.5			13.8	1.4
Level of Service				B	C	B	F	A			B	A
Approach Delay (s)		0.0			19.3			334.9			7.8	
Approach LOS		A			B			F			A	

Intersection Summary			
HCM 2000 Control Delay	84.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.69		
Actuated Cycle Length (s)	53.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1	0	0	0	0	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	0	0	0	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	445					
pX, platoon unblocked						
vC, conflicting volume			1		1	1
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1		1	1
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1622		1022	1083

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1	0	1
Volume Left	0	0	0
Volume Right	0	0	1
cSH	1700	1700	1083
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	8.3
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.3
Approach LOS			A

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	5	0	6	2	0	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	7	2	0	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	918					
pX, platoon unblocked						
vC, conflicting volume			5		21	5
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			5		21	5
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1616		992	1078

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	5	9	9
Volume Left	0	7	0
Volume Right	0	0	9
cSH	1700	1616	1078
Volume to Capacity	0.00	0.00	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	5.4	8.4
Lane LOS		A	A
Approach Delay (s)	0.0	5.4	8.4
Approach LOS			A

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	15.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	153	30	50	162	29	47
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	166	33	54	176	32	51
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			718			
pX, platoon unblocked						
vC, conflicting volume	257	142			230	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	257	142			230	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	77	96			98	
cM capacity (veh/h)	715	905			1337	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	199	230	83
Volume Left	166	0	32
Volume Right	33	176	0
cSH	740	1700	1337
Volume to Capacity	0.27	0.14	0.02
Queue Length 95th (ft)	27	0	2
Control Delay (s)	11.6	0.0	3.1
Lane LOS	B		A
Approach Delay (s)	11.6	0.0	3.1
Approach LOS	B		

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	37.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	131	11	3	154	648	8	253	10	217	65	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected		1.00			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1838			1861	1583	1770	1852		1770	1799	
Flt Permitted		0.98			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1805			1855	1583	1770	1852		1770	1799	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	142	12	3	167	704	9	275	11	236	71	21
RTOR Reduction (vph)	0	3	0	0	0	454	0	2	0	0	10	0
Lane Group Flow (vph)	0	162	0	0	170	250	9	284	0	236	82	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		15.2			15.2	15.2	0.9	18.1		12.9	30.1	
Effective Green, g (s)		15.2			15.2	15.2	0.9	18.1		12.9	30.1	
Actuated g/C Ratio		0.26			0.26	0.26	0.02	0.31		0.22	0.52	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		471			484	413	27	575		392	930	
v/s Ratio Prot							0.01	c0.15		c0.13	0.05	
v/s Ratio Perm		0.09			0.09	c0.16						
v/c Ratio		0.34			0.35	0.60	0.33	0.49		0.60	0.09	
Uniform Delay, d1		17.5			17.5	18.9	28.4	16.3		20.3	7.1	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			0.4	2.5	7.2	0.7		2.6	0.0	
Delay (s)		17.9			17.9	21.4	35.5	17.0		22.9	7.1	
Level of Service		B			B	C	D	B		C	A	
Approach Delay (s)		17.9			20.7			17.6			18.5	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	58.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	16	361	664	25	38	60
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	392	722	27	41	65
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1202				
pX, platoon unblocked						
vC, conflicting volume	749				1149	722
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	749				1149	722
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				81	85
cM capacity (veh/h)	860				215	427

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	17	392	722	27	107
Volume Left	17	0	0	0	41
Volume Right	0	0	0	27	65
cSH	860	1700	1700	1700	309
Volume to Capacity	0.02	0.23	0.42	0.02	0.34
Queue Length 95th (ft)	2	0	0	0	37
Control Delay (s)	9.3	0.0	0.0	0.0	22.7
Lane LOS	A				C
Approach Delay (s)	0.4		0.0		22.7
Approach LOS					C

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	450	12	6	727	17	4	1	4	4	0	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	489	13	7	790	18	4	1	4	4	0	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					1209							
pX, platoon unblocked	0.96						0.96	0.96		0.96	0.96	0.96
vC, conflicting volume	809			502			1336	1339	496	1328	1336	799
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	778			502			1329	1332	496	1321	1329	769
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			96	99	99	97	100	96
cM capacity (veh/h)	803			1062			120	145	574	124	145	384

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	11	502	7	809	10	20
Volume Left	11	0	7	0	4	4
Volume Right	0	13	0	18	4	15
cSH	803	1700	1062	1700	190	263
Volume to Capacity	0.01	0.30	0.01	0.48	0.05	0.07
Queue Length 95th (ft)	1	0	0	0	4	6
Control Delay (s)	9.5	0.0	8.4	0.0	24.9	19.8
Lane LOS	A		A		C	C
Approach Delay (s)	0.2		0.1		24.9	19.8
Approach LOS					C	C

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	284	88	14	370	9	165	108	30	9	95	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.97			1.00			0.99			0.93	
Flt Protected		0.99			1.00			0.97			1.00	
Satd. Flow (prot)		1799			1854			1789			1731	
Flt Permitted		0.91			0.98			0.74			0.98	
Satd. Flow (perm)		1646			1821			1364			1706	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	66	309	96	15	402	10	179	117	33	10	103	117
RTOR Reduction (vph)	0	10	0	0	1	0	0	5	0	0	51	0
Lane Group Flow (vph)	0	461	0	0	426	0	0	324	0	0	179	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		20.3			20.3			19.3			19.3	
Effective Green, g (s)		20.3			20.3			19.3			19.3	
Actuated g/C Ratio		0.43			0.43			0.41			0.41	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		701			776			553			691	
v/s Ratio Prot												
v/s Ratio Perm		c0.28			0.23			c0.24			0.11	
v/c Ratio		0.66			0.55			0.59			0.26	
Uniform Delay, d1		10.9			10.2			11.0			9.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.2			0.8			1.6			0.2	
Delay (s)		13.1			11.0			12.6			9.6	
Level of Service		B			B			B			A	
Approach Delay (s)		13.1			11.0			12.6			9.6	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	47.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	37	197	252	489	127	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.91		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1810	1680		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1810	1680		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	214	274	532	138	18
RTOR Reduction (vph)	0	0	63	0	0	15
Lane Group Flow (vph)	40	214	743	0	138	3
Heavy Vehicles (%)	2%	5%	5%	2%	2%	2%
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	2.8	40.9	34.1		8.3	8.3
Effective Green, g (s)	2.8	40.9	34.1		8.3	8.3
Actuated g/C Ratio	0.05	0.72	0.60		0.15	0.15
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	86	1294	1001		256	229
v/s Ratio Prot	c0.02	0.12	c0.44		c0.08	
v/s Ratio Perm						0.00
v/c Ratio	0.47	0.17	0.74		0.54	0.01
Uniform Delay, d1	26.5	2.6	8.4		22.7	20.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.9	0.1	3.0		2.2	0.0
Delay (s)	30.4	2.7	11.4		24.9	21.0
Level of Service	C	A	B		C	C
Approach Delay (s)		7.1	11.4		24.4	
Approach LOS		A	B		C	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	57.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	156	118	15	63	11	419	48	40	6	59	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.98		1.00	0.93		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3311		1770	3460		1770	1736		1770	1804	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3311		1770	3460		1770	1736		1770	1804	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	170	128	16	68	12	455	52	43	7	64	17
RTOR Reduction (vph)	0	102	0	0	10	0	0	23	0	0	12	0
Lane Group Flow (vph)	29	196	0	16	70	0	455	72	0	7	69	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	1.6	10.6		0.6	9.6		19.1	24.4		0.5	5.8	
Effective Green, g (s)	1.6	10.6		0.6	9.6		19.1	24.4		0.5	5.8	
Actuated g/C Ratio	0.03	0.20		0.01	0.18		0.37	0.47		0.01	0.11	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	54	673		20	637		648	813		16	200	
v/s Ratio Prot	c0.02	c0.06		0.01	0.02		c0.26	0.04		0.00	c0.04	
v/s Ratio Perm												
v/c Ratio	0.54	0.29		0.80	0.11		0.70	0.09		0.44	0.35	
Uniform Delay, d1	24.9	17.6		25.7	17.7		14.1	7.7		25.7	21.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.9	0.2		110.1	0.1		3.4	0.0		18.0	1.0	
Delay (s)	34.8	17.8		135.8	17.8		17.5	7.7		43.6	22.4	
Level of Service	C	B		F	B		B	A		D	C	
Approach Delay (s)		19.3			37.4			15.8			24.1	
Approach LOS		B			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	52.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	137	118	84	20	118	137	179	719	13	106	234	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.94		1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3319		1770	3254		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3319		1770	3254		3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	149	128	91	22	128	149	195	782	14	115	254	45
RTOR Reduction (vph)	0	64	0	0	123	0	0	0	9	0	0	31
Lane Group Flow (vph)	149	155	0	22	154	0	195	782	5	115	254	14
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	8.4	18.3		0.8	10.7		7.6	22.2	22.2	5.0	19.6	19.6
Effective Green, g (s)	8.4	18.3		0.8	10.7		7.6	22.2	22.2	5.0	19.6	19.6
Actuated g/C Ratio	0.13	0.29		0.01	0.17		0.12	0.36	0.36	0.08	0.31	0.31
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	238	974		22	558		418	1261	564	275	1113	498
v/s Ratio Prot	c0.08	0.05		0.01	c0.05		c0.06	c0.22		0.03	0.07	
v/s Ratio Perm									0.00			0.01
v/c Ratio	0.63	0.16		1.00	0.28		0.47	0.62	0.01	0.42	0.23	0.03
Uniform Delay, d1	25.5	16.3		30.8	22.4		25.5	16.6	12.9	27.3	15.8	14.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.1	0.1		191.9	0.3		0.8	1.0	0.0	1.0	0.1	0.0
Delay (s)	30.5	16.4		222.6	22.7		26.3	17.5	13.0	28.3	15.9	14.8
Level of Service	C	B		F	C		C	B	B	C	B	B
Approach Delay (s)		22.1			37.4			19.2			19.2	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	22.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	62.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	37	473	759	43	321	398
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.88	0.95		0.97	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	2787	3511		3433	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	2787	3511		3433	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	514	825	47	349	433
RTOR Reduction (vph)	0	440	5	0	0	0
Lane Group Flow (vph)	40	74	867	0	349	433
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	7.5	7.5	21.4		11.3	36.7
Effective Green, g (s)	7.5	7.5	21.4		11.3	36.7
Actuated g/C Ratio	0.14	0.14	0.41		0.22	0.70
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	254	400	1439		743	2488
v/s Ratio Prot	0.02		c0.25		c0.10	0.12
v/s Ratio Perm		c0.03				
v/c Ratio	0.16	0.18	0.60		0.47	0.17
Uniform Delay, d1	19.6	19.7	12.1		17.8	2.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.2	0.7		0.5	0.0
Delay (s)	19.9	19.9	12.8		18.3	2.7
Level of Service	B	B	B		B	A
Approach Delay (s)	19.9		12.8			9.6
Approach LOS	B		B			A

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	52.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	341	384	111	25	603	53	121	693	85	71	410	582
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3496		1770	3481		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3496		1770	3481		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	371	417	121	27	655	58	132	753	92	77	446	633
RTOR Reduction (vph)	0	0	78	0	7	0	0	10	0	0	0	148
Lane Group Flow (vph)	371	417	43	27	706	0	132	835	0	77	446	485
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	9.1	31.4	31.4	1.9	24.2		9.5	32.8		6.6	29.9	29.9
Effective Green, g (s)	9.1	31.4	31.4	1.9	24.2		9.5	32.8		6.6	29.9	29.9
Actuated g/C Ratio	0.10	0.35	0.35	0.02	0.27		0.11	0.37		0.07	0.34	0.34
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	352	1252	560	37	953		189	1287		131	1192	533
v/s Ratio Prot	c0.11	0.12		0.02	c0.20		c0.07	c0.24		0.04	0.13	
v/s Ratio Perm			0.03									c0.31
v/c Ratio	1.05	0.33	0.08	0.73	0.74		0.70	0.65		0.59	0.37	0.91
Uniform Delay, d1	39.8	21.0	19.0	43.1	29.4		38.2	23.2		39.7	22.3	28.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	62.9	0.2	0.1	52.2	3.1		10.7	1.1		6.6	0.2	19.7
Delay (s)	102.7	21.1	19.1	95.3	32.5		48.9	24.3		46.3	22.5	47.8
Level of Service	F	C	B	F	C		D	C		D	C	D
Approach Delay (s)		54.1			34.8			27.6			38.0	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	38.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	88.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	360	41	29	1156	1011	925
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	0.95	0.91	0.88
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	1770	3539	5085	2787
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	1770	3539	5085	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	391	45	32	1257	1099	1005
RTOR Reduction (vph)	0	35	0	0	0	0
Lane Group Flow (vph)	391	10	32	1257	1099	1005
Turn Type	Prot	Perm	Prot	NA	NA	Free
Protected Phases	4		5	2	6	
Permitted Phases		4				Free
Actuated Green, G (s)	11.5	11.5	2.5	31.3	24.8	50.8
Effective Green, g (s)	11.5	11.5	2.5	31.3	24.8	50.8
Actuated g/C Ratio	0.23	0.23	0.05	0.62	0.49	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	777	358	87	2180	2482	2787
v/s Ratio Prot	c0.11		0.02	c0.36	0.22	
v/s Ratio Perm		0.01				c0.36
v/c Ratio	0.50	0.03	0.37	0.58	0.44	0.36
Uniform Delay, d1	17.2	15.3	23.4	5.8	8.5	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.0	2.6	0.4	0.1	0.4
Delay (s)	17.7	15.3	26.0	6.2	8.6	0.4
Level of Service	B	B	C	A	A	A
Approach Delay (s)	17.4			6.7	4.7	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	50.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	261	43	8	9	93	361	4	1109	19	88	739	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		1.00			0.89		1.00	1.00		1.00	0.98	
Flt Protected		0.96			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1782			1665		1770	3530		1770	3466	
Flt Permitted		0.38			0.99		0.20	1.00		0.95	1.00	
Satd. Flow (perm)		703			1654		364	3530		1770	3466	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	284	47	9	10	101	392	4	1205	21	96	803	129
RTOR Reduction (vph)	0	1	0	0	76	0	0	1	0	0	13	0
Lane Group Flow (vph)	0	339	0	0	427	0	4	1225	0	96	919	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		42.0			42.0		32.1	31.3		6.0	36.5	
Effective Green, g (s)		42.0			42.0		32.1	31.3		6.0	36.5	
Actuated g/C Ratio		0.46			0.46		0.35	0.34		0.07	0.40	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		323			760		140	1210		116	1385	
v/s Ratio Prot							0.00	c0.35		c0.05	0.27	
v/s Ratio Perm		c0.48			0.26		0.01					
v/c Ratio		1.05			0.56		0.03	1.01		0.83	0.66	
Uniform Delay, d1		24.6			17.9		19.9	30.0		42.1	22.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		63.6			1.0		0.1	28.9		36.2	1.2	
Delay (s)		88.2			18.9		20.0	58.9		78.3	23.6	
Level of Service		F			B		C	E		E	C	
Approach Delay (s)		88.2			18.9			58.8			28.7	
Approach LOS		F			B			E			C	

Intersection Summary			
HCM 2000 Control Delay	45.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	91.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	309	15	4	12	64	377	2	1631	13	0	860	202
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		1.00			0.89			1.00			0.97	
Flt Protected		0.95			1.00			1.00			1.00	
Satd. Flow (prot)		1776			1651			3535			3438	
Flt Permitted		0.28			0.99			0.95			1.00	
Satd. Flow (perm)		528			1634			3373			3438	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	336	16	4	13	70	410	2	1773	14	0	935	220
RTOR Reduction (vph)	0	1	0	0	9	0	0	0	0	0	23	0
Lane Group Flow (vph)	0	355	0	0	484	0	0	1789	0	0	1132	0
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		32.0			32.0			50.0			50.0	
Effective Green, g (s)		32.0			32.0			50.0			50.0	
Actuated g/C Ratio		0.36			0.36			0.56			0.56	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		187			580			1873			1910	
v/s Ratio Prot											0.33	
v/s Ratio Perm		c0.67			0.30			c0.53				
v/c Ratio		1.90			0.83			0.95			0.59	
Uniform Delay, d1		29.0			26.6			18.9			13.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		424.5			10.0			11.8			0.5	
Delay (s)		453.5			36.6			30.8			13.8	
Level of Service		F			D			C			B	
Approach Delay (s)		453.5			36.6			30.8			13.8	
Approach LOS		F			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	66.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.32		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	392	65	169	434	194	52	349	365	105	354	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.99	1.00		0.99	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3375			1851	1583		1842	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.85	1.00		0.70	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3375			1581	1583		1310	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	426	71	184	472	211	57	379	397	114	385	3
RTOR Reduction (vph)	0	0	0	0	44	0	0	0	192	0	0	1
Lane Group Flow (vph)	14	426	71	184	639	0	0	436	205	0	499	2
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			Free				2		2	6		6
Actuated Green, G (s)	1.4	21.2	102.4	16.3	36.1			52.9	52.9		52.9	52.9
Effective Green, g (s)	1.4	21.2	102.4	16.3	36.1			52.9	52.9		52.9	52.9
Actuated g/C Ratio	0.01	0.21	1.00	0.16	0.35			0.52	0.52		0.52	0.52
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	24	732	1583	281	1189			816	817		676	817
v/s Ratio Prot	0.01	0.12		c0.10	c0.19							
v/s Ratio Perm			0.04					0.28	0.13		c0.38	0.00
v/c Ratio	0.58	0.58	0.04	0.65	0.54			0.53	0.25		0.74	0.00
Uniform Delay, d1	50.2	36.6	0.0	40.4	26.5			16.5	13.7		19.3	12.0
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	31.3	1.2	0.1	5.4	0.5			0.7	0.2		4.2	0.0
Delay (s)	81.5	37.8	0.1	45.8	27.0			17.2	13.9		23.6	12.0
Level of Service	F	D	A	D	C			B	B		C	B
Approach Delay (s)		33.7			31.0			15.6			23.5	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	102.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	687	210	62	0	0	0	0	167	252	436	394	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Lane Util. Factor	0.91	0.91	1.00					0.91		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.89					0.93		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00		1.00	1.00	
Frt	1.00	1.00	0.85					0.91		1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1610	3288	1405					4313		3433	1863	
Flt Permitted	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1610	3288	1405					4313		3433	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	747	228	67	0	0	0	0	182	274	474	428	0
RTOR Reduction (vph)	0	0	48	0	0	0	0	82	0	0	0	0
Lane Group Flow (vph)	373	602	19	0	0	0	0	374	0	474	428	0
Confl. Peds. (#/hr)			75						75			
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	20.6	20.6	20.6					30.1		10.5	44.6	
Effective Green, g (s)	20.6	20.6	20.6					30.1		10.5	44.6	
Actuated g/C Ratio	0.28	0.28	0.28					0.41		0.14	0.61	
Clearance Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)	453	925	395					1773		492	1135	
v/s Ratio Prot	c0.23	0.18						0.09		c0.14	c0.23	
v/s Ratio Perm			0.01									
v/c Ratio	0.82	0.65	0.05					0.21		0.96	0.38	
Uniform Delay, d1	24.6	23.1	19.2					13.9		31.2	7.3	
Progression Factor	1.00	1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2	11.5	1.7	0.1					0.3		31.2	0.2	
Delay (s)	36.1	24.8	19.2					14.2		62.3	7.5	
Level of Service	D	C	B					B		E	A	
Approach Delay (s)		28.5			0.0			14.2			36.3	
Approach LOS		C			A			B			D	

Intersection Summary			
HCM 2000 Control Delay	28.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	73.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	304	0	0	0	0	0	929	1780	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0			
Lane Util. Factor		0.91						0.91	0.88			
Frpb, ped/bikes		1.00						1.00	1.00			
Flpb, ped/bikes		0.99						1.00	1.00			
Frt		1.00						1.00	0.85			
Flt Protected		0.99						1.00	1.00			
Satd. Flow (prot)		4385						5085	2787			
Flt Permitted		0.99						1.00	1.00			
Satd. Flow (perm)		4385						5085	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	330	0	0	0	0	0	1010	1935	0	0	0
RTOR Reduction (vph)	0	48	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	347	0	0	0	0	0	1010	1935	0	0	0
Confl. Peds. (#/hr)	67		36	36		67	41		51	51		41
Heavy Vehicles (%)	5%	18%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA						NA	Prot			
Protected Phases		2						1	1			
Permitted Phases	2											
Actuated Green, G (s)		16.0						36.0	36.0			
Effective Green, g (s)		16.0						36.0	36.0			
Actuated g/C Ratio		0.27						0.60	0.60			
Clearance Time (s)		4.0						4.0	4.0			
Lane Grp Cap (vph)		1169						3051	1672			
v/s Ratio Prot								0.20	c0.69			
v/s Ratio Perm		0.08										
v/c Ratio		0.30						0.33	1.16			
Uniform Delay, d1		17.5						6.0	12.0			
Progression Factor		1.00						1.00	1.00			
Incremental Delay, d2		0.6						0.3	78.0			
Delay (s)		18.2						6.3	90.0			
Level of Service		B						A	F			
Approach Delay (s)		18.2			0.0			61.3			0.0	
Approach LOS		B			A			E			A	

Intersection Summary			
HCM 2000 Control Delay	56.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	136	106	35	56	108	69	18	839	39	25	462	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			0.95		1.00	0.95	
Frt		0.98			0.96			0.99		1.00	0.98	
Flt Protected		0.98			0.99			1.00		0.95	1.00	
Satd. Flow (prot)		1787			1767			3513		1770	3473	
Flt Permitted		0.75			0.88			0.94		0.21	1.00	
Satd. Flow (perm)		1364			1573			3307		400	3473	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	148	115	38	61	117	75	20	912	42	27	502	72
RTOR Reduction (vph)	0	6	0	0	19	0	0	4	0	0	13	0
Lane Group Flow (vph)	0	295	0	0	234	0	0	970	0	27	561	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		18.1			18.1			23.7		23.7	23.7	
Effective Green, g (s)		18.1			18.1			23.7		23.7	23.7	
Actuated g/C Ratio		0.36			0.36			0.48		0.48	0.48	
Clearance Time (s)		4.0			4.0			4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		495			571			1573		190	1652	
v/s Ratio Prot											0.16	
v/s Ratio Perm		c0.22			0.15			c0.29		0.07		
v/c Ratio		0.60			0.41			0.62		0.14	0.34	
Uniform Delay, d1		12.9			11.9			9.7		7.3	8.2	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		1.9			0.5			0.7		0.3	0.1	
Delay (s)		14.8			12.3			10.4		7.7	8.3	
Level of Service		B			B			B		A	A	
Approach Delay (s)		14.8			12.3			10.4			8.3	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	49.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	216	505	44	12	211	28	16	772	22	7	562	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frt	1.00	0.99			0.99			1.00			0.99	
Flt Protected	0.95	1.00			1.00			1.00			1.00	
Satd. Flow (prot)	1770	1840			1831			3521			3497	
Flt Permitted	0.58	1.00			0.97			0.94			0.94	
Satd. Flow (perm)	1072	1840			1782			3309			3306	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	235	549	48	13	229	30	17	839	24	8	611	50
RTOR Reduction (vph)	0	4	0	0	5	0	0	2	0	0	6	0
Lane Group Flow (vph)	235	593	0	0	267	0	0	878	0	0	663	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	27.7	27.7			27.7			24.9			24.9	
Effective Green, g (s)	27.7	27.7			27.7			24.9			24.9	
Actuated g/C Ratio	0.46	0.46			0.46			0.41			0.41	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	490	841			814			1359			1358	
v/s Ratio Prot		c0.32										
v/s Ratio Perm	0.22				0.15			c0.27			0.20	
v/c Ratio	0.48	0.71			0.33			0.65			0.49	
Uniform Delay, d1	11.4	13.2			10.5			14.3			13.2	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	0.7	2.7			0.2			1.1			0.3	
Delay (s)	12.2	15.9			10.7			15.4			13.4	
Level of Service	B	B			B			B			B	
Approach Delay (s)		14.8			10.7			15.4			13.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	11	331	56	188	263	0	0	140	1529
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				1.00	1.00	1.00	1.00	1.00			0.95	0.95
Frpb, ped/bikes				1.00	1.00	0.95	1.00	1.00			0.97	0.98
Flpb, ped/bikes				0.97	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			0.87	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1714	1863	1503	1770	1863			1509	1477
Flt Permitted				0.95	1.00	1.00	0.15	1.00			1.00	1.00
Satd. Flow (perm)				1714	1863	1503	274	1863			1509	1477
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	12	360	61	204	286	0	0	152	1662
RTOR Reduction (vph)	0	0	0	0	0	43	0	0	0	0	144	0
Lane Group Flow (vph)	0	0	0	12	360	18	204	286	0	0	773	897
Confl. Peds. (#/hr)				20		20	10					20
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Free
Protected Phases					8			2			6	
Permitted Phases				8		8	2					Free
Actuated Green, G (s)				15.1	15.1	15.1	27.2	27.2			27.2	50.3
Effective Green, g (s)				15.1	15.1	15.1	27.2	27.2			27.2	50.3
Actuated g/C Ratio				0.30	0.30	0.30	0.54	0.54			0.54	1.00
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				514	559	451	148	1007			816	1477
v/s Ratio Prot					0.19			0.15			0.51	
v/s Ratio Perm				0.01		0.01	c0.74					c0.61
v/c Ratio				0.02	0.64	0.04	1.38	0.28			0.95	0.61
Uniform Delay, d1				12.4	15.3	12.5	11.5	6.3			10.9	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.0	2.5	0.0	206.8	0.2			19.6	1.9
Delay (s)				12.4	17.8	12.5	218.3	6.4			30.5	1.9
Level of Service				B	B	B	F	A			C	A
Approach Delay (s)		0.0			16.9			94.6			16.3	
Approach LOS		A			B			F			B	

Intersection Summary			
HCM 2000 Control Delay	30.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	50.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1	0	1	1	0	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	1	1	0	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	445					
pX, platoon unblocked						
vC, conflicting volume			1		4	1
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1		4	1
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1622		1017	1083

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1	2	1
Volume Left	0	1	0
Volume Right	0	0	1
cSH	1700	1622	1083
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	3.6	8.3
Lane LOS		A	A
Approach Delay (s)	0.0	3.6	8.3
Approach LOS			A

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	2	0	3	4	0	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	0	3	4	0	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	918					
pX, platoon unblocked						
vC, conflicting volume			2		13	2
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			2		13	2
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1620		1004	1082

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	2	8	5
Volume Left	0	3	0
Volume Right	0	0	5
cSH	1700	1620	1082
Volume to Capacity	0.00	0.00	0.01
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	3.1	8.3
Lane LOS		A	A
Approach Delay (s)	0.0	3.1	8.3
Approach LOS			A

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	238	35	58	125	36	61
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	259	38	63	136	39	66
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			718			
pX, platoon unblocked						
vC, conflicting volume	276	131			199	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	276	131			199	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	63	96			97	
cM capacity (veh/h)	694	919			1373	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	297	199	105
Volume Left	259	0	39
Volume Right	38	136	0
cSH	716	1700	1373
Volume to Capacity	0.41	0.12	0.03
Queue Length 95th (ft)	51	0	2
Control Delay (s)	13.5	0.0	3.0
Lane LOS	B		A
Approach Delay (s)	13.5	0.0	3.0
Approach LOS	B		

Intersection Summary			
Average Delay	7.2		
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	234	23	19	163	478	10	133	10	627	297	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1835			1853	1583	1770	1843		1770	1848	
Flt Permitted		0.97			0.92	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1781			1714	1583	1770	1843		1770	1848	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	254	25	21	177	520	11	145	11	682	323	18
RTOR Reduction (vph)	0	4	0	0	0	407	0	3	0	0	2	0
Lane Group Flow (vph)	0	298	0	0	198	113	11	153	0	682	339	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		16.7			16.7	16.7	0.7	15.4		33.0	47.7	
Effective Green, g (s)		16.7			16.7	16.7	0.7	15.4		33.0	47.7	
Actuated g/C Ratio		0.22			0.22	0.22	0.01	0.20		0.43	0.62	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		385			371	342	16	368		757	1143	
v/s Ratio Prot							0.01	c0.08		c0.39	0.18	
v/s Ratio Perm		c0.17			0.12	0.07						
v/c Ratio		0.77			0.53	0.33	0.69	0.42		0.90	0.30	
Uniform Delay, d1		28.4			26.8	25.5	38.1	26.9		20.5	6.9	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		9.4			1.5	0.6	80.1	0.8		13.9	0.1	
Delay (s)		37.8			28.2	26.0	118.2	27.7		34.4	7.0	
Level of Service		D			C	C	F	C		C	A	
Approach Delay (s)		37.8			26.6			33.6			25.3	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	77.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	70	860	689	44	38	43
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	935	749	48	41	47
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1202				
pX, platoon unblocked						
vC, conflicting volume	797				1836	749
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	797				1836	749
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				45	89
cM capacity (veh/h)	825				76	412

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	76	935	749	48	88
Volume Left	76	0	0	0	41
Volume Right	0	0	0	48	47
cSH	825	1700	1700	1700	134
Volume to Capacity	0.09	0.55	0.44	0.03	0.66
Queue Length 95th (ft)	8	0	0	0	89
Control Delay (s)	9.8	0.0	0.0	0.0	73.1
Lane LOS	A				F
Approach Delay (s)	0.7		0.0		73.1
Approach LOS					F

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	741	3	4	592	2	3	0	6	1	0	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	805	3	4	643	2	3	0	7	1	0	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					1209							
pX, platoon unblocked	0.96						0.96	0.96		0.96	0.96	0.96
vC, conflicting volume	646			809			1488	1483	807	1487	1484	645
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	606			809			1487	1482	807	1486	1483	605
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			97	100	98	99	100	99
cM capacity (veh/h)	929			817			95	117	381	95	117	476

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	11	809	4	646	10	8
Volume Left	11	0	4	0	3	1
Volume Right	0	3	0	2	7	7
cSH	929	1700	817	1700	191	303
Volume to Capacity	0.01	0.48	0.01	0.38	0.05	0.03
Queue Length 95th (ft)	1	0	0	0	4	2
Control Delay (s)	8.9	0.0	9.4	0.0	24.9	17.2
Lane LOS	A		A		C	C
Approach Delay (s)	0.1		0.1		24.9	17.2
Approach LOS					C	C

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	537	135	23	403	2	126	77	27	5	154	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.97			1.00			0.98			0.94	
Flt Protected		1.00			1.00			0.97			1.00	
Satd. Flow (prot)		1809			1857			1785			1748	
Flt Permitted		0.94			0.95			0.58			1.00	
Satd. Flow (perm)		1702			1765			1059			1742	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	62	584	147	25	438	2	137	84	29	5	167	141
RTOR Reduction (vph)	0	9	0	0	0	0	0	5	0	0	34	0
Lane Group Flow (vph)	0	784	0	0	465	0	0	245	0	0	279	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		37.8			37.8			22.2			22.2	
Effective Green, g (s)		37.8			37.8			22.2			22.2	
Actuated g/C Ratio		0.56			0.56			0.33			0.33	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		946			981			345			568	
v/s Ratio Prot												
v/s Ratio Perm		c0.46			0.26			c0.23			0.16	
v/c Ratio		0.83			0.47			0.71			0.49	
Uniform Delay, d1		12.4			9.1			20.1			18.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		6.1			0.4			6.5			0.7	
Delay (s)		18.5			9.5			26.6			19.0	
Level of Service		B			A			C			B	
Approach Delay (s)		18.5			9.5			26.6			19.0	
Approach LOS		B			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	68.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	94.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	42	296	266	279	383	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.93		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1810	1709		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1810	1709		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	322	289	303	416	52
RTOR Reduction (vph)	0	0	45	0	0	34
Lane Group Flow (vph)	46	322	547	0	416	18
Heavy Vehicles (%)	2%	5%	5%	2%	2%	2%
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	2.0	32.5	26.5		20.8	20.8
Effective Green, g (s)	2.0	32.5	26.5		20.8	20.8
Actuated g/C Ratio	0.03	0.53	0.43		0.34	0.34
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	57	959	738		600	537
v/s Ratio Prot	c0.03	0.18	c0.32		c0.24	
v/s Ratio Perm						0.01
v/c Ratio	0.81	0.34	0.74		0.69	0.03
Uniform Delay, d1	29.5	8.2	14.5		17.5	13.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	55.0	0.2	4.0		3.5	0.0
Delay (s)	84.4	8.4	18.6		21.0	13.6
Level of Service	F	A	B		C	B
Approach Delay (s)		17.9	18.6		20.1	
Approach LOS		B	B		C	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	61.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	49	70	251	51	126	16	209	114	24	10	109	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.88		1.00	0.98		1.00	0.97		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3124		1770	3481		1770	1814		1770	1767	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3124		1770	3481		1770	1814		1770	1767	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	53	76	273	55	137	17	227	124	26	11	118	62
RTOR Reduction (vph)	0	227	0	0	11	0	0	9	0	0	22	0
Lane Group Flow (vph)	53	122	0	55	143	0	227	141	0	11	158	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	3.6	8.9		3.8	9.1		13.1	23.3		0.5	10.7	
Effective Green, g (s)	3.6	8.9		3.8	9.1		13.1	23.3		0.5	10.7	
Actuated g/C Ratio	0.07	0.17		0.07	0.17		0.25	0.44		0.01	0.20	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	121	529		128	603		441	805		16	360	
v/s Ratio Prot	0.03	0.04		c0.03	c0.04		c0.13	0.08		0.01	c0.09	
v/s Ratio Perm												
v/c Ratio	0.44	0.23		0.43	0.24		0.51	0.18		0.69	0.44	
Uniform Delay, d1	23.5	18.8		23.3	18.7		17.0	8.8		25.9	18.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.5	0.2		2.3	0.2		1.0	0.1		80.1	0.9	
Delay (s)	26.0	19.1		25.6	18.9		18.0	8.9		106.0	19.1	
Level of Service	C	B		C	B		B	A		F	B	
Approach Delay (s)		20.0			20.7			14.4			24.1	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	52.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	209	144	192	39	149	140	217	384	37	157	781	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.91		1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3236		1770	3282		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3236		1770	3282		3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	227	157	209	42	162	152	236	417	40	171	849	117
RTOR Reduction (vph)	0	147	0	0	129	0	0	0	27	0	0	78
Lane Group Flow (vph)	227	219	0	42	185	0	236	417	13	171	849	39
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	14.2	22.4		3.2	11.4		8.8	25.1	25.1	8.8	25.1	25.1
Effective Green, g (s)	14.2	22.4		3.2	11.4		8.8	25.1	25.1	8.8	25.1	25.1
Actuated g/C Ratio	0.19	0.30		0.04	0.15		0.12	0.33	0.33	0.12	0.33	0.33
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	332	960		75	495		400	1176	526	400	1176	526
v/s Ratio Prot	c0.13	0.07		0.02	c0.06		c0.07	0.12		0.05	c0.24	
v/s Ratio Perm									0.01			0.02
v/c Ratio	0.68	0.23		0.56	0.37		0.59	0.35	0.03	0.43	0.72	0.07
Uniform Delay, d1	28.6	20.0		35.5	28.8		31.6	19.1	17.0	31.0	22.1	17.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.7	0.1		9.2	0.5		2.2	0.2	0.0	0.7	2.2	0.1
Delay (s)	34.3	20.2		44.7	29.3		33.9	19.3	17.0	31.7	24.4	17.3
Level of Service	C	C		D	C		C	B	B	C	C	B
Approach Delay (s)		25.6			31.1			24.1			24.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	75.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	213	316	543	90	380	1119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.88	0.95		0.97	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	2787	3464		3433	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	2787	3464		3433	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	232	343	590	98	413	1216
RTOR Reduction (vph)	0	261	15	0	0	0
Lane Group Flow (vph)	232	82	673	0	413	1216
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	13.9	13.9	19.3		13.1	36.4
Effective Green, g (s)	13.9	13.9	19.3		13.1	36.4
Actuated g/C Ratio	0.24	0.24	0.33		0.22	0.62
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	422	664	1146		771	2209
v/s Ratio Prot	c0.13		0.19		0.12	c0.34
v/s Ratio Perm		0.03				
v/c Ratio	0.55	0.12	0.59		0.54	0.55
Uniform Delay, d1	19.5	17.4	16.2		19.9	6.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.5	0.1	0.8		0.7	0.3
Delay (s)	20.9	17.5	17.0		20.6	6.6
Level of Service	C	B	B		C	A
Approach Delay (s)	18.9		17.0			10.1
Approach LOS	B		B			B

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	58.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	382	577	202	50	466	120	99	425	132	134	834	448
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3431		1770	3414		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3431		1770	3414		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	415	627	220	54	507	130	108	462	143	146	907	487
RTOR Reduction (vph)	0	0	104	0	25	0	0	34	0	0	0	235
Lane Group Flow (vph)	415	627	116	54	612	0	108	571	0	146	907	252
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	13.5	29.6	29.6	3.9	20.0		6.0	26.3		10.3	30.6	30.6
Effective Green, g (s)	13.5	29.6	29.6	3.9	20.0		6.0	26.3		10.3	30.6	30.6
Actuated g/C Ratio	0.16	0.34	0.34	0.05	0.23		0.07	0.31		0.12	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	538	1216	544	80	796		123	1042		211	1257	562
v/s Ratio Prot	c0.12	0.18		0.03	c0.18		c0.06	0.17		c0.08	c0.26	
v/s Ratio Perm			0.07									0.16
v/c Ratio	0.77	0.52	0.21	0.68	0.77		0.88	0.55		0.69	0.72	0.45
Uniform Delay, d1	34.8	22.5	20.0	40.5	30.9		39.7	24.9		36.4	24.1	21.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.8	0.4	0.2	20.2	4.5		45.6	0.6		9.4	2.1	0.6
Delay (s)	41.6	22.9	20.2	60.7	35.4		85.3	25.5		45.8	26.1	21.8
Level of Service	D	C	C	E	D		F	C		D	C	C
Approach Delay (s)		28.6			37.4			34.6			26.6	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	86.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	279	73	45	712	1165	721
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	0.95	0.91	0.88
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	1770	3539	5085	2787
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	1770	3539	5085	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	303	79	49	774	1266	784
RTOR Reduction (vph)	0	62	0	0	0	0
Lane Group Flow (vph)	303	17	49	774	1266	784
Turn Type	Prot	Perm	Prot	NA	NA	Free
Protected Phases	4		5	2	6	
Permitted Phases		4				Free
Actuated Green, G (s)	10.8	10.8	4.0	32.6	24.6	51.4
Effective Green, g (s)	10.8	10.8	4.0	32.6	24.6	51.4
Actuated g/C Ratio	0.21	0.21	0.08	0.63	0.48	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	721	332	137	2244	2433	2787
v/s Ratio Prot	c0.09		0.03	0.22	c0.25	
v/s Ratio Perm		0.01				c0.28
v/c Ratio	0.42	0.05	0.36	0.34	0.52	0.28
Uniform Delay, d1	17.6	16.2	22.5	4.4	9.3	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.1	1.6	0.1	0.2	0.3
Delay (s)	18.0	16.3	24.1	4.5	9.5	0.3
Level of Service	B	B	C	A	A	A
Approach Delay (s)	17.6			5.7	6.0	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	7.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	51.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	267	81	21	11	81	104	11	902	31	265	1029	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.99			0.93		1.00	0.99		1.00	0.98	
Flt Protected		0.97			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1784			1724		1770	3521		1770	3480	
Flt Permitted		0.60			0.97		0.16	1.00		0.95	1.00	
Satd. Flow (perm)		1101			1684		303	3521		1770	3480	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	290	88	23	12	88	113	12	980	34	288	1118	140
RTOR Reduction (vph)	0	3	0	0	47	0	0	3	0	0	10	0
Lane Group Flow (vph)	0	398	0	0	166	0	12	1011	0	288	1249	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		32.8			32.8		32.2	31.4		15.0	45.6	
Effective Green, g (s)		32.8			32.8		32.2	31.4		15.0	45.6	
Actuated g/C Ratio		0.36			0.36		0.35	0.34		0.16	0.50	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		395			605		119	1212		291	1740	
v/s Ratio Prot							0.00	c0.29		c0.16	0.36	
v/s Ratio Perm		c0.36			0.10		0.03					
v/c Ratio		1.01			0.27		0.10	0.83		0.99	0.72	
Uniform Delay, d1		29.2			20.7		19.6	27.5		38.0	17.8	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		47.5			0.2		0.4	5.1		49.4	1.4	
Delay (s)		76.7			21.0		20.0	32.6		87.4	19.2	
Level of Service		E			C		B	C		F	B	
Approach Delay (s)		76.7			21.0			32.5			31.9	
Approach LOS		E			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	37.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	91.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	168	61	19	54	131	224	3	1190	43	6	1345	341
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.99			0.93			0.99			0.97	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1783			1714			3520			3432	
Flt Permitted		0.41			0.93			0.94			0.95	
Satd. Flow (perm)		753			1602			3316			3259	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	183	66	21	59	142	243	3	1293	47	7	1462	371
RTOR Reduction (vph)	0	3	0	0	33	0	0	3	0	0	25	0
Lane Group Flow (vph)	0	267	0	0	411	0	0	1340	0	0	1815	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		31.0			31.0			51.0			51.0	
Effective Green, g (s)		31.0			31.0			51.0			51.0	
Actuated g/C Ratio		0.34			0.34			0.57			0.57	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		259			551			1879			1846	
v/s Ratio Prot												
v/s Ratio Perm		c0.35			0.26			0.40			c0.56	
v/c Ratio		1.03			0.75			0.71			0.98	
Uniform Delay, d1		29.5			26.0			14.2			19.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		63.9			5.4			1.3			17.0	
Delay (s)		93.4			31.5			15.5			36.1	
Level of Service		F			C			B			D	
Approach Delay (s)		93.4			31.5			15.5			36.1	
Approach LOS		F			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	32.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	99.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	28	455	104	308	634	286	74	381	219	37	323	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.99	1.00		0.99	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3374			1848	1583		1853	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.75	1.00		0.81	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3374			1402	1583		1505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	495	113	335	689	311	80	414	238	40	351	40
RTOR Reduction (vph)	0	0	0	0	36	0	0	0	139	0	0	23
Lane Group Flow (vph)	30	495	113	335	964	0	0	494	99	0	391	17
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			Free				2		2	6		6
Actuated Green, G (s)	3.1	21.5	98.9	24.1	42.5			41.3	41.3		41.3	41.3
Effective Green, g (s)	3.1	21.5	98.9	24.1	42.5			41.3	41.3		41.3	41.3
Actuated g/C Ratio	0.03	0.22	1.00	0.24	0.43			0.42	0.42		0.42	0.42
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	55	769	1583	431	1449			585	661		628	661
v/s Ratio Prot	0.02	0.14		c0.19	c0.29							
v/s Ratio Perm			0.07					c0.35	0.06		0.26	0.01
v/c Ratio	0.55	0.64	0.07	0.78	0.66			0.84	0.15		0.62	0.03
Uniform Delay, d1	47.2	35.2	0.0	34.9	22.5			25.9	17.9		22.7	17.0
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	10.6	1.9	0.1	8.6	1.2			10.8	0.1		1.9	0.0
Delay (s)	57.8	37.1	0.1	43.5	23.7			36.7	18.0		24.6	17.0
Level of Service	E	D	A	D	C			D	B		C	B
Approach Delay (s)		31.5			28.6			30.6			23.9	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	98.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1194	300	89	0	0	0	0	335	345	622	351	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Lane Util. Factor	0.91	0.91	1.00					0.91		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.89					0.94		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00		1.00	1.00	
Frt	1.00	1.00	0.85					0.92		1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1610	3281	1402					4425		3433	1863	
Flt Permitted	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1610	3281	1402					4425		3433	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1298	326	97	0	0	0	0	364	375	676	382	0
RTOR Reduction (vph)	0	0	68	0	0	0	0	52	0	0	0	0
Lane Group Flow (vph)	649	975	29	0	0	0	0	687	0	676	382	0
Confl. Peds. (#/hr)			75						75			
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	22.0	22.0	22.0					30.0		10.5	44.5	
Effective Green, g (s)	22.0	22.0	22.0					30.0		10.5	44.5	
Actuated g/C Ratio	0.30	0.30	0.30					0.40		0.14	0.60	
Clearance Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)	475	968	414					1781		483	1112	
v/s Ratio Prot	c0.40	0.30						c0.16		c0.20	0.21	
v/s Ratio Perm			0.02									
v/c Ratio	1.37	1.31dl	0.07					0.39		1.40	0.34	
Uniform Delay, d1	26.2	26.2	18.9					15.7		32.0	7.6	
Progression Factor	1.00	1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2	177.9	30.7	0.1					0.6		192.0	0.2	
Delay (s)	204.2	57.0	19.0					16.4		224.0	7.8	
Level of Service	F	E	B					B		F	A	
Approach Delay (s)		110.3			0.0			16.4			146.0	
Approach LOS		F			A			B			F	

Intersection Summary			
HCM 2000 Control Delay	101.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	74.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	137	569	0	0	0	0	0	999	1828	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0			
Lane Util. Factor		0.91						0.91	0.88			
Frpb, ped/bikes		1.00						1.00	1.00			
Flpb, ped/bikes		0.99						1.00	1.00			
Frt		1.00						1.00	0.85			
Flt Protected		0.99						1.00	1.00			
Satd. Flow (prot)		4384						5085	2787			
Flt Permitted		0.99						1.00	1.00			
Satd. Flow (perm)		4384						5085	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	149	618	0	0	0	0	0	1086	1987	0	0	0
RTOR Reduction (vph)	0	60	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	707	0	0	0	0	0	1086	1987	0	0	0
Confl. Peds. (#/hr)	67		36	36		67	41		51	51		41
Heavy Vehicles (%)	5%	18%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA						NA	Prot			
Protected Phases		2						1	1			
Permitted Phases	2											
Actuated Green, G (s)		16.0						36.0	36.0			
Effective Green, g (s)		16.0						36.0	36.0			
Actuated g/C Ratio		0.27						0.60	0.60			
Clearance Time (s)		4.0						4.0	4.0			
Lane Grp Cap (vph)		1169						3051	1672			
v/s Ratio Prot								0.21	c0.71			
v/s Ratio Perm		0.16										
v/c Ratio		0.60						0.36	1.19			
Uniform Delay, d1		19.2						6.1	12.0			
Progression Factor		1.00						1.00	1.00			
Incremental Delay, d2		2.3						0.3	91.1			
Delay (s)		21.6						6.4	103.1			
Level of Service		C						A	F			
Approach Delay (s)		21.6			0.0			68.9			0.0	
Approach LOS		C			A			E			A	

Intersection Summary			
HCM 2000 Control Delay	59.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	91	74	48	43	85	40	12	668	40	42	796	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			0.95		1.00	0.95	
Frt		0.97			0.97			0.99		1.00	0.99	
Flt Protected		0.98			0.99			1.00		0.95	1.00	
Satd. Flow (prot)		1768			1780			3507		1770	3486	
Flt Permitted		0.83			0.88			0.94		0.32	1.00	
Satd. Flow (perm)		1502			1587			3291		597	3486	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	80	52	47	92	43	13	726	43	46	865	96
RTOR Reduction (vph)	0	13	0	0	14	0	0	5	0	0	10	0
Lane Group Flow (vph)	0	218	0	0	168	0	0	777	0	46	951	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		12.4			12.4			20.6		20.6	20.6	
Effective Green, g (s)		12.4			12.4			20.6		20.6	20.6	
Actuated g/C Ratio		0.30			0.30			0.50		0.50	0.50	
Clearance Time (s)		4.0			4.0			4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		454			479			1653		299	1751	
v/s Ratio Prot											c0.27	
v/s Ratio Perm		c0.15			0.11			0.24		0.08		
v/c Ratio		0.48			0.35			0.47		0.15	0.54	
Uniform Delay, d1		11.7			11.2			6.6		5.5	7.0	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.8			0.4			0.2		0.2	0.3	
Delay (s)		12.5			11.6			6.9		5.7	7.3	
Level of Service		B			B			A		A	A	
Approach Delay (s)		12.5			11.6			6.9			7.3	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	41.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	192	244	115	37	190	32	26	748	42	7	921	114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frt	1.00	0.95			0.98			0.99			0.98	
Flt Protected	0.95	1.00			0.99			1.00			1.00	
Satd. Flow (prot)	1770	1773			1819			3506			3480	
Flt Permitted	0.53	1.00			0.91			0.90			0.95	
Satd. Flow (perm)	994	1773			1670			3163			3305	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	209	265	125	40	207	35	28	813	46	8	1001	124
RTOR Reduction (vph)	0	21	0	0	6	0	0	4	0	0	10	0
Lane Group Flow (vph)	209	369	0	0	276	0	0	883	0	0	1123	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.5	20.5			20.5			29.1			29.1	
Effective Green, g (s)	20.5	20.5			20.5			29.1			29.1	
Actuated g/C Ratio	0.36	0.36			0.36			0.51			0.51	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	353	631			594			1597			1669	
v/s Ratio Prot		0.21										
v/s Ratio Perm	c0.21				0.16			0.28			c0.34	
v/c Ratio	0.59	0.58			0.46			0.55			0.67	
Uniform Delay, d1	15.1	15.1			14.3			9.8			10.7	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	2.7	1.4			0.6			0.4			1.1	
Delay (s)	17.8	16.5			14.9			10.2			11.8	
Level of Service	B	B			B			B			B	
Approach Delay (s)		16.9			14.9			10.2			11.8	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	57.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	7	296	39	326	244	0	0	193	1377
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				1.00	1.00	1.00	1.00	1.00			0.95	0.95
Frpb, ped/bikes				1.00	1.00	0.95	1.00	1.00			0.98	0.98
Flpb, ped/bikes				0.97	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			0.89	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1710	1863	1500	1770	1863			1531	1477
Flt Permitted				0.95	1.00	1.00	0.13	1.00			1.00	1.00
Satd. Flow (perm)				1710	1863	1500	239	1863			1531	1477
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	8	322	42	354	265	0	0	210	1497
RTOR Reduction (vph)	0	0	0	0	0	31	0	0	0	0	119	0
Lane Group Flow (vph)	0	0	0	8	322	11	354	265	0	0	750	838
Confl. Peds. (#/hr)				20		20	10					20
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Free
Protected Phases					8			2			6	
Permitted Phases				8		8	2					Free
Actuated Green, G (s)				14.5	14.5	14.5	31.2	31.2			31.2	53.7
Effective Green, g (s)				14.5	14.5	14.5	31.2	31.2			31.2	53.7
Actuated g/C Ratio				0.27	0.27	0.27	0.58	0.58			0.58	1.00
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				461	503	405	138	1082			889	1477
v/s Ratio Prot					0.17			0.14			0.49	
v/s Ratio Perm				0.00		0.01	c1.48					c0.57
v/c Ratio				0.02	0.64	0.03	2.57	0.24			0.84	0.57
Uniform Delay, d1				14.4	17.3	14.4	11.3	5.5			9.2	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.0	2.8	0.0	725.1	0.1			7.3	1.6
Delay (s)				14.4	20.1	14.4	736.4	5.6			16.6	1.6
Level of Service				B	C	B	F	A			B	A
Approach Delay (s)		0.0			19.3			423.5			9.2	
Approach LOS		A			B			F			A	

Intersection Summary			
HCM 2000 Control Delay	105.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.97		
Actuated Cycle Length (s)	53.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1	0	0	0	0	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	0	0	0	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	445					
pX, platoon unblocked						
vC, conflicting volume			1		1	1
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1		1	1
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1622		1022	1083

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1	0	1
Volume Left	0	0	0
Volume Right	0	0	1
cSH	1700	1700	1083
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	8.3
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.3
Approach LOS			A

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	5	0	6	2	0	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	7	2	0	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	918					
pX, platoon unblocked						
vC, conflicting volume			5		21	5
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			5		21	5
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1616		992	1078

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	5	9	9
Volume Left	0	7	0
Volume Right	0	0	9
cSH	1700	1616	1078
Volume to Capacity	0.00	0.00	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	5.4	8.4
Lane LOS		A	A
Approach Delay (s)	0.0	5.4	8.4
Approach LOS			A

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	15.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	153	30	50	162	29	47
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	166	33	54	176	32	51
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			718			
pX, platoon unblocked						
vC, conflicting volume	257	142			230	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	257	142			230	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	77	96			98	
cM capacity (veh/h)	715	905			1337	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	199	230	83
Volume Left	166	0	32
Volume Right	33	176	0
cSH	740	1700	1337
Volume to Capacity	0.27	0.14	0.02
Queue Length 95th (ft)	27	0	2
Control Delay (s)	11.6	0.0	3.1
Lane LOS	B		A
Approach Delay (s)	11.6	0.0	3.1
Approach LOS	B		

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	37.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	141	11	3	175	712	8	253	10	248	65	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected		1.00			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1840			1861	1583	1770	1852		1770	1799	
Flt Permitted		0.98			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1809			1856	1583	1770	1852		1770	1799	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	153	12	3	190	774	9	275	11	270	71	21
RTOR Reduction (vph)	0	3	0	0	0	434	0	2	0	0	10	0
Lane Group Flow (vph)	0	173	0	0	193	340	9	284	0	270	82	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		18.8			18.8	18.8	1.0	18.5		14.5	32.0	
Effective Green, g (s)		18.8			18.8	18.8	1.0	18.5		14.5	32.0	
Actuated g/C Ratio		0.29			0.29	0.29	0.02	0.29		0.23	0.50	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		533			546	466	27	537		402	902	
v/s Ratio Prot							0.01	c0.15		c0.15	0.05	
v/s Ratio Perm		0.10			0.10	c0.21						
v/c Ratio		0.32			0.35	0.73	0.33	0.53		0.67	0.09	
Uniform Delay, d1		17.6			17.7	20.2	31.1	19.0		22.5	8.3	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			0.4	5.8	7.2	0.9		4.4	0.0	
Delay (s)		17.9			18.1	26.0	38.2	19.9		26.9	8.3	
Level of Service		B			B	C	D	B		C	A	
Approach Delay (s)		17.9			24.4			20.5			22.2	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	63.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	57	361	664	62	111	145
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	392	722	67	121	158
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1202				
pX, platoon unblocked						
vC, conflicting volume	789				1238	722
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	789				1238	722
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				33	63
cM capacity (veh/h)	831				179	427

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	62	392	722	67	278
Volume Left	62	0	0	0	121
Volume Right	0	0	0	67	158
cSH	831	1700	1700	1700	267
Volume to Capacity	0.07	0.23	0.42	0.04	1.04
Queue Length 95th (ft)	6	0	0	0	273
Control Delay (s)	9.7	0.0	0.0	0.0	107.8
Lane LOS	A				F
Approach Delay (s)	1.3		0.0		107.8
Approach LOS					F

Intersection Summary			
Average Delay	20.1		
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	523	12	6	764	17	4	1	4	4	0	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	568	13	7	830	18	4	1	4	4	0	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					1209							
pX, platoon unblocked	0.91						0.91	0.91		0.91	0.91	0.91
vC, conflicting volume	849			582			1455	1459	575	1448	1456	840
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	785			582			1451	1455	575	1443	1452	775
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			95	99	99	96	100	96
cM capacity (veh/h)	759			993			93	116	518	97	116	362

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	11	582	7	849	10	20
Volume Left	11	0	7	0	4	4
Volume Right	0	13	0	18	4	15
cSH	759	1700	993	1700	152	226
Volume to Capacity	0.01	0.34	0.01	0.50	0.06	0.09
Queue Length 95th (ft)	1	0	0	0	5	7
Control Delay (s)	9.8	0.0	8.7	0.0	30.3	22.5
Lane LOS	A		A		D	C
Approach Delay (s)	0.2		0.1		30.3	22.5
Approach LOS					D	C

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	340	105	14	398	9	174	108	30	9	95	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.97			1.00			0.99			0.93	
Flt Protected		0.99			1.00			0.97			1.00	
Satd. Flow (prot)		1800			1854			1788			1731	
Flt Permitted		0.91			0.98			0.71			0.98	
Satd. Flow (perm)		1651			1821			1299			1706	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	66	370	114	15	433	10	189	117	33	10	103	117
RTOR Reduction (vph)	0	9	0	0	1	0	0	5	0	0	52	0
Lane Group Flow (vph)	0	541	0	0	457	0	0	334	0	0	178	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		25.1			25.1			21.3			21.3	
Effective Green, g (s)		25.1			25.1			21.3			21.3	
Actuated g/C Ratio		0.46			0.46			0.39			0.39	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		761			840			508			667	
v/s Ratio Prot												
v/s Ratio Perm		c0.33			0.25			c0.26			0.10	
v/c Ratio		0.71			0.54			0.66			0.27	
Uniform Delay, d1		11.7			10.5			13.6			11.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		3.1			0.7			3.1			0.2	
Delay (s)		14.9			11.3			16.6			11.5	
Level of Service		B			B			B			B	
Approach Delay (s)		14.9			11.3			16.6			11.5	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	54.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	37	218	296	509	137	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.91		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1810	1686		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1810	1686		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	237	322	553	149	18
RTOR Reduction (vph)	0	0	50	0	0	16
Lane Group Flow (vph)	40	237	825	0	149	2
Heavy Vehicles (%)	2%	5%	5%	2%	2%	2%
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	2.9	47.9	41.0		8.8	8.8
Effective Green, g (s)	2.9	47.9	41.0		8.8	8.8
Actuated g/C Ratio	0.04	0.74	0.63		0.14	0.14
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	79	1340	1068		240	215
v/s Ratio Prot	c0.02	0.13	c0.49		c0.08	
v/s Ratio Perm						0.00
v/c Ratio	0.51	0.18	0.77		0.62	0.01
Uniform Delay, d1	30.2	2.5	8.5		26.4	24.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.0	0.1	3.5		4.9	0.0
Delay (s)	35.2	2.6	12.0		31.3	24.2
Level of Service	D	A	B		C	C
Approach Delay (s)		7.3	12.0		30.5	
Approach LOS		A	B		C	

Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	64.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	156	128	15	63	11	439	48	40	6	59	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.98		1.00	0.93		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3300		1770	3460		1770	1736		1770	1804	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3300		1770	3460		1770	1736		1770	1804	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	170	139	16	68	12	477	52	43	7	64	17
RTOR Reduction (vph)	0	111	0	0	10	0	0	23	0	0	12	0
Lane Group Flow (vph)	29	198	0	16	70	0	477	72	0	7	69	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	1.6	10.7		0.6	9.7		19.8	25.1		0.5	5.8	
Effective Green, g (s)	1.6	10.7		0.6	9.7		19.8	25.1		0.5	5.8	
Actuated g/C Ratio	0.03	0.20		0.01	0.18		0.37	0.47		0.01	0.11	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	53	667		20	634		662	823		16	197	
v/s Ratio Prot	c0.02	c0.06		0.01	0.02		c0.27	0.04		0.00	c0.04	
v/s Ratio Perm												
v/c Ratio	0.55	0.30		0.80	0.11		0.72	0.09		0.44	0.35	
Uniform Delay, d1	25.3	17.9		26.1	18.0		14.2	7.6		26.1	21.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.1	0.3		110.1	0.1		3.9	0.0		18.0	1.1	
Delay (s)	36.3	18.2		136.2	18.1		18.0	7.7		44.0	22.9	
Level of Service	D	B		F	B		B	A		D	C	
Approach Delay (s)		19.7			37.8			16.3			24.6	
Approach LOS		B			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	52.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	137	126	84	20	136	163	179	719	13	119	234	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.94		1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3327		1770	3250		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3327		1770	3250		3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	149	137	91	22	148	177	195	782	14	129	254	45
RTOR Reduction (vph)	0	66	0	0	147	0	0	0	9	0	0	31
Lane Group Flow (vph)	149	162	0	22	178	0	195	782	5	129	254	14
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	8.5	17.4		1.7	10.6		7.7	22.4	22.4	5.1	19.8	19.8
Effective Green, g (s)	8.5	17.4		1.7	10.6		7.7	22.4	22.4	5.1	19.8	19.8
Actuated g/C Ratio	0.14	0.28		0.03	0.17		0.12	0.36	0.36	0.08	0.32	0.32
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	240	924		48	550		422	1266	566	279	1119	500
v/s Ratio Prot	c0.08	0.05		0.01	c0.05		c0.06	c0.22		0.04	0.07	
v/s Ratio Perm									0.00			0.01
v/c Ratio	0.62	0.18		0.46	0.32		0.46	0.62	0.01	0.46	0.23	0.03
Uniform Delay, d1	25.5	17.2		30.0	22.8		25.5	16.6	12.9	27.4	15.8	14.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.9	0.1		6.8	0.3		0.8	0.9	0.0	1.2	0.1	0.0
Delay (s)	30.4	17.2		36.8	23.2		26.3	17.5	13.0	28.7	15.9	14.8
Level of Service	C	B		D	C		C	B	B	C	B	B
Approach Delay (s)		22.5			24.1			19.2			19.6	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	62.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	37	493	785	43	331	411
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.88	0.95		0.97	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	2787	3511		3433	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	2787	3511		3433	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	536	853	47	360	447
RTOR Reduction (vph)	0	460	5	0	0	0
Lane Group Flow (vph)	40	76	895	0	360	447
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	7.6	7.6	22.5		11.6	38.1
Effective Green, g (s)	7.6	7.6	22.5		11.6	38.1
Actuated g/C Ratio	0.14	0.14	0.42		0.22	0.71
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	250	394	1471		741	2510
v/s Ratio Prot	0.02		c0.25		c0.10	0.13
v/s Ratio Perm		c0.03				
v/c Ratio	0.16	0.19	0.61		0.49	0.18
Uniform Delay, d1	20.2	20.3	12.2		18.4	2.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.2	0.7		0.5	0.0
Delay (s)	20.5	20.6	12.9		18.9	2.6
Level of Service	C	C	B		B	A
Approach Delay (s)	20.6		12.9			9.9
Approach LOS	C		B			A

Intersection Summary			
HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	53.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	341	390	111	25	616	58	121	693	85	73	410	582
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3494		1770	3481		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3494		1770	3481		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	371	424	121	27	670	63	132	753	92	79	446	633
RTOR Reduction (vph)	0	0	78	0	8	0	0	10	0	0	0	147
Lane Group Flow (vph)	371	424	43	27	725	0	132	835	0	79	446	486
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	9.1	31.8	31.8	1.9	24.6		9.5	32.8		6.7	30.0	30.0
Effective Green, g (s)	9.1	31.8	31.8	1.9	24.6		9.5	32.8		6.7	30.0	30.0
Actuated g/C Ratio	0.10	0.36	0.36	0.02	0.28		0.11	0.37		0.08	0.34	0.34
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	350	1261	564	37	963		188	1280		132	1190	532
v/s Ratio Prot	c0.11	0.12		0.02	c0.21		c0.07	c0.24		0.04	0.13	
v/s Ratio Perm			0.03									c0.31
v/c Ratio	1.06	0.34	0.08	0.73	0.75		0.70	0.65		0.60	0.37	0.91
Uniform Delay, d1	40.1	21.0	19.0	43.4	29.5		38.5	23.5		39.9	22.5	28.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	64.8	0.2	0.1	52.2	3.4		11.2	1.2		7.1	0.2	20.2
Delay (s)	104.9	21.1	19.0	95.6	32.9		49.7	24.7		47.1	22.7	48.6
Level of Service	F	C	B	F	C		D	C		D	C	D
Approach Delay (s)		54.8			35.1			28.0			38.5	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	39.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	89.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	360	43	34	1156	1011	925
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	0.95	0.91	0.88
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	1770	3539	5085	2787
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	1770	3539	5085	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	391	47	37	1257	1099	1005
RTOR Reduction (vph)	0	36	0	0	0	0
Lane Group Flow (vph)	391	11	37	1257	1099	1005
Turn Type	Prot	Perm	Prot	NA	NA	Free
Protected Phases	4		5	2	6	
Permitted Phases		4				Free
Actuated Green, G (s)	11.5	11.5	2.5	31.4	24.9	50.9
Effective Green, g (s)	11.5	11.5	2.5	31.4	24.9	50.9
Actuated g/C Ratio	0.23	0.23	0.05	0.62	0.49	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	775	357	86	2183	2487	2787
v/s Ratio Prot	c0.11		0.02	c0.36	0.22	
v/s Ratio Perm		0.01				c0.36
v/c Ratio	0.50	0.03	0.43	0.58	0.44	0.36
Uniform Delay, d1	17.2	15.4	23.5	5.8	8.5	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.0	3.4	0.4	0.1	0.4
Delay (s)	17.7	15.4	26.9	6.2	8.6	0.4
Level of Service	B	B	C	A	A	A
Approach Delay (s)	17.5			6.8	4.7	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	50.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	261	43	8	9	93	361	4	1126	19	88	748	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		1.00			0.89		1.00	1.00		1.00	0.98	
Flt Protected		0.96			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1782			1665		1770	3530		1770	3467	
Flt Permitted		0.38			0.99		0.19	1.00		0.95	1.00	
Satd. Flow (perm)		703			1654		355	3530		1770	3467	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	284	47	9	10	101	392	4	1224	21	96	813	129
RTOR Reduction (vph)	0	1	0	0	76	0	0	1	0	0	13	0
Lane Group Flow (vph)	0	339	0	0	427	0	4	1244	0	96	929	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		42.0			42.0		32.1	31.3		6.0	36.5	
Effective Green, g (s)		42.0			42.0		32.1	31.3		6.0	36.5	
Actuated g/C Ratio		0.46			0.46		0.35	0.34		0.07	0.40	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		323			760		137	1210		116	1386	
v/s Ratio Prot							0.00	c0.35		c0.05	0.27	
v/s Ratio Perm		c0.48			0.26		0.01					
v/c Ratio		1.05			0.56		0.03	1.03		0.83	0.67	
Uniform Delay, d1		24.6			18.0		20.0	30.0		42.1	22.5	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		63.6			1.0		0.1	33.2		36.2	1.3	
Delay (s)		88.2			18.9		20.1	63.2		78.3	23.8	
Level of Service		F			B		C	E		E	C	
Approach Delay (s)		88.2			18.9			63.1			28.8	
Approach LOS		F			B			E			C	

Intersection Summary			
HCM 2000 Control Delay	47.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	91.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	309	15	4	12	64	377	2	1648	13	0	869	202
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		1.00			0.89			1.00			0.97	
Flt Protected		0.95			1.00			1.00			1.00	
Satd. Flow (prot)		1776			1651			3535			3439	
Flt Permitted		0.28			0.99			0.95			1.00	
Satd. Flow (perm)		528			1634			3373			3439	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	336	16	4	13	70	410	2	1791	14	0	945	220
RTOR Reduction (vph)	0	1	0	0	8	0	0	0	0	0	22	0
Lane Group Flow (vph)	0	355	0	0	485	0	0	1807	0	0	1143	0
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		32.0			32.0			50.0			50.0	
Effective Green, g (s)		32.0			32.0			50.0			50.0	
Actuated g/C Ratio		0.36			0.36			0.56			0.56	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		187			580			1873			1910	
v/s Ratio Prot											0.33	
v/s Ratio Perm		c0.67			0.30			c0.54				
v/c Ratio		1.90			0.84			0.96			0.60	
Uniform Delay, d1		29.0			26.6			19.2			13.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		424.5			10.1			13.3			0.5	
Delay (s)		453.5			36.7			32.5			13.8	
Level of Service		F			D			C			B	
Approach Delay (s)		453.5			36.7			32.5			13.8	
Approach LOS		F			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	66.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.33		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	406	76	169	441	194	57	349	365	105	354	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.99	1.00		0.99	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3377			1850	1583		1842	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.82	1.00		0.70	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3377			1531	1583		1299	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	441	83	184	479	211	62	379	397	114	385	3
RTOR Reduction (vph)	0	0	0	0	43	0	0	0	191	0	0	1
Lane Group Flow (vph)	14	441	83	184	647	0	0	441	206	0	499	2
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			Free				2		2	6		6
Actuated Green, G (s)	1.4	21.7	104.0	16.4	36.7			53.9	53.9		53.9	53.9
Effective Green, g (s)	1.4	21.7	104.0	16.4	36.7			53.9	53.9		53.9	53.9
Actuated g/C Ratio	0.01	0.21	1.00	0.16	0.35			0.52	0.52		0.52	0.52
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	23	738	1583	279	1191			793	820		673	820
v/s Ratio Prot	0.01	0.12		c0.10	c0.19							
v/s Ratio Perm			0.05					0.29	0.13		c0.38	0.00
v/c Ratio	0.61	0.60	0.05	0.66	0.54			0.56	0.25		0.74	0.00
Uniform Delay, d1	51.0	37.2	0.0	41.2	26.9			17.0	13.9		19.6	12.1
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	38.0	1.3	0.1	5.5	0.5			0.8	0.2		4.4	0.0
Delay (s)	89.1	38.5	0.1	46.7	27.5			17.8	14.0		24.0	12.1
Level of Service	F	D	A	D	C			B	B		C	B
Approach Delay (s)		33.9			31.5			16.0			23.9	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	25.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	104.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	707	210	62	0	0	0	0	167	253	440	394	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Lane Util. Factor	0.91	0.91	1.00					0.91		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.89					0.93		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00		1.00	1.00	
Frt	1.00	1.00	0.85					0.91		1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1610	3287	1404					4312		3433	1863	
Flt Permitted	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1610	3287	1404					4312		3433	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	768	228	67	0	0	0	0	182	275	478	428	0
RTOR Reduction (vph)	0	0	48	0	0	0	0	83	0	0	0	0
Lane Group Flow (vph)	384	612	19	0	0	0	0	374	0	478	428	0
Confl. Peds. (#/hr)			75						75			
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	20.7	20.7	20.7					30.1		10.5	44.6	
Effective Green, g (s)	20.7	20.7	20.7					30.1		10.5	44.6	
Actuated g/C Ratio	0.28	0.28	0.28					0.41		0.14	0.61	
Clearance Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)	454	928	396					1770		491	1133	
v/s Ratio Prot	c0.24	0.19						0.09		c0.14	c0.23	
v/s Ratio Perm			0.01									
v/c Ratio	0.85	0.66	0.05					0.21		0.97	0.38	
Uniform Delay, d1	24.8	23.2	19.1					13.9		31.3	7.3	
Progression Factor	1.00	1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2	13.5	1.7	0.1					0.3		33.6	0.2	
Delay (s)	38.3	24.9	19.2					14.2		64.9	7.5	
Level of Service	D	C	B					B		E	A	
Approach Delay (s)		29.4			0.0			14.2			37.8	
Approach LOS		C			A			B			D	

Intersection Summary			
HCM 2000 Control Delay	29.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	73.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	304	0	0	0	0	0	946	1814	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0			
Lane Util. Factor		0.91						0.91	0.88			
Frpb, ped/bikes		1.00						1.00	1.00			
Flpb, ped/bikes		0.99						1.00	1.00			
Frt		1.00						1.00	0.85			
Flt Protected		0.99						1.00	1.00			
Satd. Flow (prot)		4385						5085	2787			
Flt Permitted		0.99						1.00	1.00			
Satd. Flow (perm)		4385						5085	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	330	0	0	0	0	0	1028	1972	0	0	0
RTOR Reduction (vph)	0	48	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	347	0	0	0	0	0	1028	1972	0	0	0
Confl. Peds. (#/hr)	67		36	36		67	41		51	51		41
Heavy Vehicles (%)	5%	18%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA						NA	Prot			
Protected Phases		2						1	1			
Permitted Phases	2											
Actuated Green, G (s)		16.0						36.0	36.0			
Effective Green, g (s)		16.0						36.0	36.0			
Actuated g/C Ratio		0.27						0.60	0.60			
Clearance Time (s)		4.0						4.0	4.0			
Lane Grp Cap (vph)		1169						3051	1672			
v/s Ratio Prot								0.20	c0.71			
v/s Ratio Perm		0.08										
v/c Ratio		0.30						0.34	1.18			
Uniform Delay, d1		17.5						6.0	12.0			
Progression Factor		1.00						1.00	1.00			
Incremental Delay, d2		0.6						0.3	87.3			
Delay (s)		18.2						6.3	99.3			
Level of Service		B						A	F			
Approach Delay (s)		18.2			0.0			67.4			0.0	
Approach LOS		B			A			E			A	

Intersection Summary			
HCM 2000 Control Delay	61.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	136	108	35	66	111	69	18	839	44	25	462	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			0.95		1.00	0.95	
Frt		0.98			0.96			0.99		1.00	0.98	
Flt Protected		0.98			0.99			1.00		0.95	1.00	
Satd. Flow (prot)		1788			1769			3510		1770	3473	
Flt Permitted		0.74			0.87			0.94		0.21	1.00	
Satd. Flow (perm)		1348			1553			3304		395	3473	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	148	117	38	72	121	75	20	912	48	27	502	72
RTOR Reduction (vph)	0	6	0	0	17	0	0	4	0	0	13	0
Lane Group Flow (vph)	0	297	0	0	251	0	0	976	0	27	561	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		18.4			18.4			24.0		24.0	24.0	
Effective Green, g (s)		18.4			18.4			24.0		24.0	24.0	
Actuated g/C Ratio		0.37			0.37			0.48		0.48	0.48	
Clearance Time (s)		4.0			4.0			4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		492			566			1573		188	1653	
v/s Ratio Prot											0.16	
v/s Ratio Perm		c0.22			0.16			c0.30		0.07		
v/c Ratio		0.60			0.44			0.62		0.14	0.34	
Uniform Delay, d1		13.0			12.1			9.8		7.4	8.2	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		2.1			0.6			0.8		0.4	0.1	
Delay (s)		15.1			12.7			10.6		7.8	8.4	
Level of Service		B			B			B		A	A	
Approach Delay (s)		15.1			12.7			10.6			8.3	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	50.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	233	530	58	12	223	28	23	772	22	7	562	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frt	1.00	0.99			0.99			1.00			0.99	
Flt Protected	0.95	1.00			1.00			1.00			1.00	
Satd. Flow (prot)	1770	1835			1832			3520			3490	
Flt Permitted	0.56	1.00			0.97			0.93			0.94	
Satd. Flow (perm)	1046	1835			1782			3267			3300	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	253	576	63	13	242	30	25	839	24	8	611	60
RTOR Reduction (vph)	0	5	0	0	5	0	0	2	0	0	8	0
Lane Group Flow (vph)	253	634	0	0	280	0	0	886	0	0	671	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	29.6	29.6			29.6			26.0			26.0	
Effective Green, g (s)	29.6	29.6			29.6			26.0			26.0	
Actuated g/C Ratio	0.47	0.47			0.47			0.41			0.41	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	486	854			829			1335			1349	
v/s Ratio Prot		c0.35										
v/s Ratio Perm	0.24				0.16			c0.27			0.20	
v/c Ratio	0.52	0.74			0.34			0.66			0.50	
Uniform Delay, d1	12.0	13.9			10.8			15.3			13.9	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	1.0	3.5			0.2			1.3			0.3	
Delay (s)	13.0	17.4			11.0			16.5			14.2	
Level of Service	B	B			B			B			B	
Approach Delay (s)		16.2			11.0			16.5			14.2	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	63.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	94.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	11	331	56	188	263	0	0	140	1563
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				1.00	1.00	1.00	1.00	1.00			0.95	0.95
Frpb, ped/bikes				1.00	1.00	0.95	1.00	1.00			0.97	0.98
Flpb, ped/bikes				0.97	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			0.87	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1714	1863	1503	1770	1863			1508	1477
Flt Permitted				0.95	1.00	1.00	0.15	1.00			1.00	1.00
Satd. Flow (perm)				1714	1863	1503	274	1863			1508	1477
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	12	360	61	204	286	0	0	152	1699
RTOR Reduction (vph)	0	0	0	0	0	43	0	0	0	0	144	0
Lane Group Flow (vph)	0	0	0	12	360	18	204	286	0	0	790	917
Confl. Peds. (#/hr)				20		20	10					20
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Free
Protected Phases					8			2			6	
Permitted Phases				8		8	2					Free
Actuated Green, G (s)				15.1	15.1	15.1	27.2	27.2			27.2	50.3
Effective Green, g (s)				15.1	15.1	15.1	27.2	27.2			27.2	50.3
Actuated g/C Ratio				0.30	0.30	0.30	0.54	0.54			0.54	1.00
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				514	559	451	148	1007			815	1477
v/s Ratio Prot					0.19			0.15			0.52	
v/s Ratio Perm				0.01		0.01	c0.74					c0.62
v/c Ratio				0.02	0.64	0.04	1.38	0.28			0.97	0.62
Uniform Delay, d1				12.4	15.3	12.5	11.5	6.3			11.1	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.0	2.5	0.0	206.8	0.2			23.9	2.0
Delay (s)				12.4	17.8	12.5	218.3	6.4			35.0	2.0
Level of Service				B	B	B	F	A			D	A
Approach Delay (s)		0.0			16.9			94.6			18.6	
Approach LOS		A			B			F			B	

Intersection Summary			
HCM 2000 Control Delay	31.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	50.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1	0	1	1	0	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	1	1	0	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	445					
pX, platoon unblocked						
vC, conflicting volume			1		4	1
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1		4	1
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1622		1017	1083

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1	2	1
Volume Left	0	1	0
Volume Right	0	0	1
cSH	1700	1622	1083
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	3.6	8.3
Lane LOS		A	A
Approach Delay (s)	0.0	3.6	8.3
Approach LOS			A

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	2	0	3	4	0	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	0	3	4	0	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	918					
pX, platoon unblocked						
vC, conflicting volume			2		13	2
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			2		13	2
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1620		1004	1082

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	2	8	5
Volume Left	0	3	0
Volume Right	0	0	5
cSH	1700	1620	1082
Volume to Capacity	0.00	0.00	0.01
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	3.1	8.3
Lane LOS		A	A
Approach Delay (s)	0.0	3.1	8.3
Approach LOS			A

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	238	35	58	125	36	61
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	259	38	63	136	39	66
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			718			
pX, platoon unblocked						
vC, conflicting volume	276	131			199	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	276	131			199	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	63	96			97	
cM capacity (veh/h)	694	919			1373	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	297	199	105
Volume Left	259	0	39
Volume Right	38	136	0
cSH	716	1700	1373
Volume to Capacity	0.41	0.12	0.03
Queue Length 95th (ft)	51	0	2
Control Delay (s)	13.5	0.0	3.0
Lane LOS	B		A
Approach Delay (s)	13.5	0.0	3.0
Approach LOS	B		

Intersection Summary			
Average Delay	7.2		
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	263	23	19	185	547	10	133	10	716	297	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		1.00			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1838			1854	1583	1770	1843		1770	1848	
Flt Permitted		0.97			0.90	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1785			1670	1583	1770	1843		1770	1848	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	286	25	21	201	595	11	145	11	778	323	18
RTOR Reduction (vph)	0	3	0	0	0	468	0	3	0	0	2	0
Lane Group Flow (vph)	0	331	0	0	222	127	11	153	0	778	339	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		18.1			18.1	18.1	0.7	15.3		39.1	53.7	
Effective Green, g (s)		18.1			18.1	18.1	0.7	15.3		39.1	53.7	
Actuated g/C Ratio		0.21			0.21	0.21	0.01	0.18		0.46	0.64	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		382			357	339	14	333		819	1174	
v/s Ratio Prot							0.01	c0.08		c0.44	0.18	
v/s Ratio Perm		c0.19			0.13	0.08						
v/c Ratio		0.87			0.62	0.38	0.79	0.46		0.95	0.29	
Uniform Delay, d1		32.0			30.1	28.4	41.8	30.9		21.8	6.9	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		18.2			3.4	0.7	130.6	1.0		20.0	0.1	
Delay (s)		50.2			33.4	29.1	172.4	31.9		41.7	7.0	
Level of Service		D			C	C	F	C		D	A	
Approach Delay (s)		50.2			30.3			41.2			31.2	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	34.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	84.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	188	860	689	148	118	134
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	204	935	749	161	128	146
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1202				
pX, platoon unblocked						
vC, conflicting volume	910				2092	749
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	910				2092	749
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	73				0	65
cM capacity (veh/h)	749				42	412

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	204	935	749	161	274
Volume Left	204	0	0	0	128
Volume Right	0	0	0	161	146
cSH	749	1700	1700	1700	80
Volume to Capacity	0.27	0.55	0.44	0.09	3.42
Queue Length 95th (ft)	28	0	0	0	Err
Control Delay (s)	11.6	0.0	0.0	0.0	Err
Lane LOS	B				F
Approach Delay (s)	2.1		0.0		Err
Approach LOS					F

Intersection Summary			
Average Delay	1180.1		
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	821	3	4	696	2	3	0	6	1	0	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	892	3	4	757	2	3	0	7	1	0	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					1209							
pX, platoon unblocked	0.86						0.86	0.86		0.86	0.86	0.86
vC, conflicting volume	759			896			1688	1683	894	1687	1684	758
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	642			896			1717	1712	894	1716	1713	641
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			95	100	98	98	100	98
cM capacity (veh/h)	814			758			59	77	340	59	77	410

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	11	896	4	759	10	8
Volume Left	11	0	4	0	3	1
Volume Right	0	3	0	2	7	7
cSH	814	1700	758	1700	132	222
Volume to Capacity	0.01	0.53	0.01	0.45	0.07	0.03
Queue Length 95th (ft)	1	0	0	0	6	3
Control Delay (s)	9.5	0.0	9.8	0.0	34.5	21.8
Lane LOS	A		A		D	C
Approach Delay (s)	0.1		0.1		34.5	21.8
Approach LOS					D	C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	598	154	23	483	2	150	77	27	5	154	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.97			1.00			0.99			0.94	
Flt Protected		1.00			1.00			0.97			1.00	
Satd. Flow (prot)		1809			1858			1784			1748	
Flt Permitted		0.93			0.95			0.52			1.00	
Satd. Flow (perm)		1693			1767			956			1742	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	62	650	167	25	525	2	163	84	29	5	167	141
RTOR Reduction (vph)	0	10	0	0	0	0	0	5	0	0	33	0
Lane Group Flow (vph)	0	869	0	0	552	0	0	271	0	0	280	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		45.3			45.3			26.8			26.8	
Effective Green, g (s)		45.3			45.3			26.8			26.8	
Actuated g/C Ratio		0.57			0.57			0.33			0.33	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		957			999			319			582	
v/s Ratio Prot												
v/s Ratio Perm		c0.51			0.31			c0.28			0.16	
v/c Ratio		0.91			0.55			0.85			0.48	
Uniform Delay, d1		15.5			11.0			24.8			21.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		12.1			0.7			19.0			0.6	
Delay (s)		27.7			11.7			43.8			21.8	
Level of Service		C			B			D			C	
Approach Delay (s)		27.7			11.7			43.8			21.8	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	80.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	42	357	313	301	411	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.93		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1810	1714		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1810	1714		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	388	340	327	447	52
RTOR Reduction (vph)	0	0	39	0	0	34
Lane Group Flow (vph)	46	388	628	0	447	18
Heavy Vehicles (%)	2%	5%	5%	2%	2%	2%
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	1.9	37.1	31.2		23.3	23.3
Effective Green, g (s)	1.9	37.1	31.2		23.3	23.3
Actuated g/C Ratio	0.03	0.54	0.46		0.34	0.34
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	49	981	781		602	539
v/s Ratio Prot	c0.03	0.21	c0.37		c0.25	
v/s Ratio Perm						0.01
v/c Ratio	0.94	0.40	0.80		0.74	0.03
Uniform Delay, d1	33.2	9.1	16.0		19.9	15.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	104.4	0.3	6.0		4.9	0.0
Delay (s)	137.6	9.4	22.0		24.8	15.1
Level of Service	F	A	C		C	B
Approach Delay (s)		23.0	22.0		23.8	
Approach LOS		C	C		C	

Intersection Summary			
HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	68.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	49	70	279	51	126	16	231	114	24	10	109	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.88		1.00	0.98		1.00	0.97		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3115		1770	3481		1770	1814		1770	1767	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3115		1770	3481		1770	1814		1770	1767	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	53	76	303	55	137	17	251	124	26	11	118	62
RTOR Reduction (vph)	0	252	0	0	11	0	0	9	0	0	22	0
Lane Group Flow (vph)	53	127	0	55	143	0	251	141	0	11	158	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	3.7	9.1		3.9	9.3		14.0	24.3		0.5	10.8	
Effective Green, g (s)	3.7	9.1		3.9	9.3		14.0	24.3		0.5	10.8	
Actuated g/C Ratio	0.07	0.17		0.07	0.17		0.26	0.45		0.01	0.20	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	121	526		128	601		460	819		16	354	
v/s Ratio Prot	0.03	0.04		c0.03	c0.04		c0.14	0.08		0.01	c0.09	
v/s Ratio Perm												
v/c Ratio	0.44	0.24		0.43	0.24		0.55	0.17		0.69	0.45	
Uniform Delay, d1	24.1	19.4		23.9	19.2		17.2	8.8		26.6	18.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.5	0.2		2.3	0.2		1.3	0.1		80.1	0.9	
Delay (s)	26.6	19.6		26.2	19.4		18.5	8.9		106.7	19.8	
Level of Service	C	B		C	B		B	A		F	B	
Approach Delay (s)		20.5			21.2			14.9			24.8	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	53.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	209	169	192	39	168	168	217	384	37	193	781	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.92		1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3257		1770	3274		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3257		1770	3274		3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	227	184	209	42	183	183	236	417	40	210	849	117
RTOR Reduction (vph)	0	146	0	0	154	0	0	0	27	0	0	78
Lane Group Flow (vph)	227	247	0	42	212	0	236	417	13	210	849	39
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	14.3	23.2		3.2	12.1		8.9	24.9	24.9	9.2	25.2	25.2
Effective Green, g (s)	14.3	23.2		3.2	12.1		8.9	24.9	24.9	9.2	25.2	25.2
Actuated g/C Ratio	0.19	0.30		0.04	0.16		0.12	0.33	0.33	0.12	0.33	0.33
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	330	987		74	517		399	1151	515	412	1165	521
v/s Ratio Prot	c0.13	0.08		0.02	c0.06		c0.07	0.12		0.06	c0.24	
v/s Ratio Perm									0.01			0.02
v/c Ratio	0.69	0.25		0.57	0.41		0.59	0.36	0.03	0.51	0.73	0.07
Uniform Delay, d1	29.0	20.1		36.0	29.0		32.1	19.7	17.5	31.5	22.6	17.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.9	0.1		9.6	0.5		2.3	0.2	0.0	1.0	2.3	0.1
Delay (s)	34.9	20.2		45.6	29.5		34.4	19.9	17.6	32.5	24.9	17.7
Level of Service	C	C		D	C		C	B	B	C	C	B
Approach Delay (s)		25.6			31.2			24.7			25.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	76.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	213	338	571	90	408	1155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.88	0.95		0.97	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	2787	3467		3433	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	2787	3467		3433	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	232	367	621	98	443	1255
RTOR Reduction (vph)	0	280	15	0	0	0
Lane Group Flow (vph)	232	87	704	0	443	1255
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	14.3	14.3	20.2		13.9	38.1
Effective Green, g (s)	14.3	14.3	20.2		13.9	38.1
Actuated g/C Ratio	0.24	0.24	0.33		0.23	0.63
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	419	659	1159		790	2232
v/s Ratio Prot	c0.13		0.20		0.13	c0.35
v/s Ratio Perm		0.03				
v/c Ratio	0.55	0.13	0.61		0.56	0.56
Uniform Delay, d1	20.2	18.2	16.8		20.6	6.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.6	0.1	0.9		0.9	0.3
Delay (s)	21.8	18.3	17.7		21.5	6.7
Level of Service	C	B	B		C	A
Approach Delay (s)	19.6		17.7			10.6
Approach LOS	B		B			B

Intersection Summary			
HCM 2000 Control Delay	14.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	60.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	382	595	202	50	480	125	99	425	132	141	834	448
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3429		1770	3414		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3429		1770	3414		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	415	647	220	54	522	136	108	462	143	153	907	487
RTOR Reduction (vph)	0	0	100	0	25	0	0	34	0	0	0	234
Lane Group Flow (vph)	415	647	120	54	633	0	108	571	0	153	907	253
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	13.5	29.8	29.8	3.9	20.2		6.0	26.3		10.5	30.8	30.8
Effective Green, g (s)	13.5	29.8	29.8	3.9	20.2		6.0	26.3		10.5	30.8	30.8
Actuated g/C Ratio	0.16	0.34	0.34	0.05	0.23		0.07	0.30		0.12	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	535	1219	545	79	800		122	1038		214	1260	563
v/s Ratio Prot	c0.12	0.18		0.03	c0.18		0.06	0.17		c0.09	c0.26	
v/s Ratio Perm			0.08									0.16
v/c Ratio	0.78	0.53	0.22	0.68	0.79		0.89	0.55		0.71	0.72	0.45
Uniform Delay, d1	35.0	22.7	20.1	40.7	31.2		39.9	25.2		36.6	24.1	21.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.9	0.4	0.2	21.7	5.4		47.8	0.6		10.8	2.0	0.6
Delay (s)	42.0	23.2	20.3	62.4	36.5		87.7	25.8		47.3	26.1	21.9
Level of Service	D	C	C	E	D		F	C		D	C	C
Approach Delay (s)		28.8			38.5			35.1			26.9	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	30.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	86.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	279	80	50	712	1165	721
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	0.95	0.91	0.88
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	1770	3539	5085	2787
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	1770	3539	5085	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	303	87	54	774	1266	784
RTOR Reduction (vph)	0	69	0	0	0	0
Lane Group Flow (vph)	303	18	54	774	1266	784
Turn Type	Prot	Perm	Prot	NA	NA	Free
Protected Phases	4		5	2	6	
Permitted Phases		4				Free
Actuated Green, G (s)	10.9	10.9	4.1	32.8	24.7	51.7
Effective Green, g (s)	10.9	10.9	4.1	32.8	24.7	51.7
Actuated g/C Ratio	0.21	0.21	0.08	0.63	0.48	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	723	333	140	2245	2429	2787
v/s Ratio Prot	c0.09		0.03	0.22	c0.25	
v/s Ratio Perm		0.01				c0.28
v/c Ratio	0.42	0.06	0.39	0.34	0.52	0.28
Uniform Delay, d1	17.7	16.3	22.6	4.4	9.4	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.1	1.8	0.1	0.2	0.3
Delay (s)	18.1	16.4	24.4	4.5	9.6	0.3
Level of Service	B	B	C	A	A	A
Approach Delay (s)	17.7			5.8	6.0	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	51.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	267	81	21	11	81	104	11	921	31	265	1053	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.99			0.93		1.00	1.00		1.00	0.98	
Flt Protected		0.97			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1784			1724		1770	3522		1770	3481	
Flt Permitted		0.59			0.97		0.15	1.00		0.95	1.00	
Satd. Flow (perm)		1100			1684		283	3522		1770	3481	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	290	88	23	12	88	113	12	1001	34	288	1145	140
RTOR Reduction (vph)	0	3	0	0	47	0	0	3	0	0	9	0
Lane Group Flow (vph)	0	398	0	0	166	0	12	1032	0	288	1276	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		33.0			33.0		32.6	31.8		15.0	46.0	
Effective Green, g (s)		33.0			33.0		32.6	31.8		15.0	46.0	
Actuated g/C Ratio		0.36			0.36		0.36	0.35		0.16	0.50	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		395			605		113	1220		289	1744	
v/s Ratio Prot							0.00	c0.29		c0.16	0.37	
v/s Ratio Perm		c0.36			0.10		0.04					
v/c Ratio		1.01			0.27		0.11	0.85		1.00	0.73	
Uniform Delay, d1		29.4			20.9		19.7	27.7		38.4	18.0	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		47.5			0.2		0.4	5.6		51.7	1.6	
Delay (s)		76.9			21.1		20.1	33.3		90.0	19.6	
Level of Service		E			C		C	C		F	B	
Approach Delay (s)		76.9			21.1			33.2			32.5	
Approach LOS		E			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	37.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	91.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	168	61	19	54	131	224	3	1209	43	6	1369	341
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.99			0.93			0.99			0.97	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1783			1714			3521			3433	
Flt Permitted		0.41			0.93			0.93			0.95	
Satd. Flow (perm)		753			1602			3269			3260	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	183	66	21	59	142	243	3	1314	47	7	1488	371
RTOR Reduction (vph)	0	3	0	0	31	0	0	3	0	0	24	0
Lane Group Flow (vph)	0	267	0	0	413	0	0	1361	0	0	1842	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		31.0			31.0			51.0			51.0	
Effective Green, g (s)		31.0			31.0			51.0			51.0	
Actuated g/C Ratio		0.34			0.34			0.57			0.57	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		259			551			1852			1847	
v/s Ratio Prot												
v/s Ratio Perm		c0.35			0.26			0.42			c0.56	
v/c Ratio		1.03			0.75			0.74			1.00	
Uniform Delay, d1		29.5			26.1			14.5			19.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		63.9			5.5			1.5			20.1	
Delay (s)		93.4			31.6			16.0			39.5	
Level of Service		F			C			B			D	
Approach Delay (s)		93.4			31.6			16.0			39.5	
Approach LOS		F			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	34.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	100.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	28	470	116	308	654	286	90	381	219	37	323	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.99	1.00		0.99	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3378			1845	1583		1853	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.71	1.00		0.81	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3378			1322	1583		1508	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	511	126	335	711	311	98	414	238	40	351	40
RTOR Reduction (vph)	0	0	0	0	36	0	0	0	133	0	0	22
Lane Group Flow (vph)	30	511	126	335	986	0	0	512	105	0	391	18
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			Free				2		2	6		6
Actuated Green, G (s)	3.1	22.4	106.0	25.0	44.3			46.6	46.6		46.6	46.6
Effective Green, g (s)	3.1	22.4	106.0	25.0	44.3			46.6	46.6		46.6	46.6
Actuated g/C Ratio	0.03	0.21	1.00	0.24	0.42			0.44	0.44		0.44	0.44
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	51	747	1583	417	1411			581	695		662	695
v/s Ratio Prot	0.02	0.14		c0.19	c0.29							
v/s Ratio Perm			0.08					c0.39	0.07		0.26	0.01
v/c Ratio	0.59	0.68	0.08	0.80	0.70			0.88	0.15		0.59	0.03
Uniform Delay, d1	50.8	38.5	0.0	38.2	25.4			27.2	17.8		22.5	16.8
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	16.1	2.6	0.1	10.7	1.5			14.6	0.1		1.4	0.0
Delay (s)	67.0	41.1	0.1	48.9	26.9			41.8	17.9		23.9	16.8
Level of Service	E	D	A	D	C			D	B		C	B
Approach Delay (s)		34.5			32.3			34.2			23.2	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	32.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1250	300	89	0	0	0	0	335	349	633	351	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Lane Util. Factor	0.91	0.91	1.00					0.91		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.89					0.94		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00		1.00	1.00	
Frt	1.00	1.00	0.85					0.92		1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1610	3279	1402					4422		3433	1863	
Flt Permitted	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1610	3279	1402					4422		3433	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1359	326	97	0	0	0	0	364	379	688	382	0
RTOR Reduction (vph)	0	0	68	0	0	0	0	52	0	0	0	0
Lane Group Flow (vph)	679	1006	29	0	0	0	0	691	0	688	382	0
Confl. Peds. (#/hr)			75						75			
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	22.0	22.0	22.0					30.0		10.5	44.5	
Effective Green, g (s)	22.0	22.0	22.0					30.0		10.5	44.5	
Actuated g/C Ratio	0.30	0.30	0.30					0.40		0.14	0.60	
Clearance Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)	475	968	414					1780		483	1112	
v/s Ratio Prot	c0.42	0.31						c0.16		c0.20	0.21	
v/s Ratio Perm			0.02									
v/c Ratio	1.43	1.37dl	0.07					0.39		1.42	0.34	
Uniform Delay, d1	26.2	26.2	18.9					15.8		32.0	7.6	
Progression Factor	1.00	1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2	205.1	39.6	0.1					0.6		202.8	0.2	
Delay (s)	231.4	65.9	19.0					16.4		234.8	7.8	
Level of Service	F	E	B					B		F	A	
Approach Delay (s)		126.4			0.0			16.4			153.7	
Approach LOS		F			A			B			F	

Intersection Summary			
HCM 2000 Control Delay	111.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	74.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	137	569	0	0	0	0	0	1017	1865	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0			
Lane Util. Factor		0.91						0.91	0.88			
Frpb, ped/bikes		1.00						1.00	1.00			
Flpb, ped/bikes		0.99						1.00	1.00			
Frt		1.00						1.00	0.85			
Flt Protected		0.99						1.00	1.00			
Satd. Flow (prot)		4384						5085	2787			
Flt Permitted		0.99						1.00	1.00			
Satd. Flow (perm)		4384						5085	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	149	618	0	0	0	0	0	1105	2027	0	0	0
RTOR Reduction (vph)	0	57	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	710	0	0	0	0	0	1105	2027	0	0	0
Confl. Peds. (#/hr)	67		36	36		67	41		51	51		41
Heavy Vehicles (%)	5%	18%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA						NA	Prot			
Protected Phases		2						1	1			
Permitted Phases	2											
Actuated Green, G (s)		16.0						36.0	36.0			
Effective Green, g (s)		16.0						36.0	36.0			
Actuated g/C Ratio		0.27						0.60	0.60			
Clearance Time (s)		4.0						4.0	4.0			
Lane Grp Cap (vph)		1169						3051	1672			
v/s Ratio Prot								0.22	c0.73			
v/s Ratio Perm		0.16										
v/c Ratio		0.61						0.36	1.21			
Uniform Delay, d1		19.3						6.1	12.0			
Progression Factor		1.00						1.00	1.00			
Incremental Delay, d2		2.3						0.3	101.3			
Delay (s)		21.6						6.5	113.3			
Level of Service		C						A	F			
Approach Delay (s)		21.6			0.0			75.6			0.0	
Approach LOS		C			A			E			A	

Intersection Summary			
HCM 2000 Control Delay	65.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	91	78	48	53	88	40	12	668	53	42	796	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			0.95		1.00	0.95	
Frt		0.97			0.97			0.99		1.00	0.99	
Flt Protected		0.98			0.99			1.00		0.95	1.00	
Satd. Flow (prot)		1770			1782			3498		1770	3486	
Flt Permitted		0.83			0.87			0.94		0.31	1.00	
Satd. Flow (perm)		1501			1582			3283		582	3486	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	85	52	58	96	43	13	726	58	46	865	96
RTOR Reduction (vph)	0	13	0	0	13	0	0	7	0	0	10	0
Lane Group Flow (vph)	0	223	0	0	184	0	0	790	0	46	951	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		12.6			12.6			20.8		20.8	20.8	
Effective Green, g (s)		12.6			12.6			20.8		20.8	20.8	
Actuated g/C Ratio		0.30			0.30			0.50		0.50	0.50	
Clearance Time (s)		4.0			4.0			4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		456			481			1649		292	1751	
v/s Ratio Prot											c0.27	
v/s Ratio Perm		c0.15			0.12			0.24		0.08		
v/c Ratio		0.49			0.38			0.48		0.16	0.54	
Uniform Delay, d1		11.8			11.3			6.7		5.6	7.0	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.8			0.5			0.2		0.3	0.3	
Delay (s)		12.6			11.9			7.0		5.8	7.4	
Level of Service		B			B			A		A	A	
Approach Delay (s)		12.6			11.9			7.0			7.3	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	41.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	211	271	130	37	226	32	46	748	42	7	921	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frt	1.00	0.95			0.99			0.99			0.98	
Flt Protected	0.95	1.00			0.99			1.00			1.00	
Satd. Flow (prot)	1770	1772			1824			3503			3469	
Flt Permitted	0.50	1.00			0.89			0.81			0.95	
Satd. Flow (perm)	922	1772			1640			2860			3294	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	229	295	141	40	246	35	50	813	46	8	1001	150
RTOR Reduction (vph)	0	21	0	0	5	0	0	4	0	0	13	0
Lane Group Flow (vph)	229	415	0	0	316	0	0	905	0	0	1146	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.5	23.5			23.5			31.0			31.0	
Effective Green, g (s)	23.5	23.5			23.5			31.0			31.0	
Actuated g/C Ratio	0.38	0.38			0.38			0.50			0.50	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	346	666			616			1418			1633	
v/s Ratio Prot		0.23										
v/s Ratio Perm	c0.25				0.19			0.32			c0.35	
v/c Ratio	0.66	0.62			0.51			0.64			0.70	
Uniform Delay, d1	16.2	15.9			15.1			11.6			12.2	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	4.7	1.8			0.7			1.0			1.4	
Delay (s)	20.9	17.7			15.8			12.6			13.6	
Level of Service	C	B			B			B			B	
Approach Delay (s)		18.8			15.8			12.6			13.6	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	62.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	104.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	7	296	39	326	244	0	0	193	1414
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				1.00	1.00	1.00	1.00	1.00			0.95	0.95
Frpb, ped/bikes				1.00	1.00	0.95	1.00	1.00			0.98	0.98
Flpb, ped/bikes				0.97	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			0.89	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1710	1863	1500	1770	1863			1529	1477
Flt Permitted				0.95	1.00	1.00	0.13	1.00			1.00	1.00
Satd. Flow (perm)				1710	1863	1500	239	1863			1529	1477
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	8	322	42	354	265	0	0	210	1537
RTOR Reduction (vph)	0	0	0	0	0	31	0	0	0	0	119	0
Lane Group Flow (vph)	0	0	0	8	322	11	354	265	0	0	767	861
Confl. Peds. (#/hr)				20		20	10					20
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Free
Protected Phases					8			2			6	
Permitted Phases				8		8	2					Free
Actuated Green, G (s)				14.5	14.5	14.5	31.2	31.2			31.2	53.7
Effective Green, g (s)				14.5	14.5	14.5	31.2	31.2			31.2	53.7
Actuated g/C Ratio				0.27	0.27	0.27	0.58	0.58			0.58	1.00
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				461	503	405	138	1082			888	1477
v/s Ratio Prot					0.17			0.14			0.50	
v/s Ratio Perm				0.00		0.01	c1.48					c0.58
v/c Ratio				0.02	0.64	0.03	2.57	0.24			0.86	0.58
Uniform Delay, d1				14.4	17.3	14.4	11.3	5.5			9.5	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.0	2.8	0.0	725.1	0.1			8.7	1.7
Delay (s)				14.4	20.1	14.4	736.4	5.6			18.2	1.7
Level of Service				B	C	B	F	A			B	A
Approach Delay (s)		0.0			19.3			423.5			10.0	
Approach LOS		A			B			F			B	

Intersection Summary			
HCM 2000 Control Delay	104.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.98		
Actuated Cycle Length (s)	53.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	641	2	0	592	6	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	697	2	0	643	7	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	445					
pX, platoon unblocked			0.73		0.73	0.73
vC, conflicting volume			699		1341	698
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			403		1283	401
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		95	100
cM capacity (veh/h)			844		133	474

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	699	643	8
Volume Left	0	0	7
Volume Right	2	0	1
cSH	1700	844	148
Volume to Capacity	0.41	0.00	0.05
Queue Length 95th (ft)	0	0	4
Control Delay (s)	0.0	0.0	30.6
Lane LOS			D
Approach Delay (s)	0.0	0.0	30.6
Approach LOS			D

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	636	6	6	584	8	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	691	7	7	635	9	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	918					
pX, platoon unblocked			0.79		0.79	0.79
vC, conflicting volume			698		1342	695
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			479		1299	475
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		94	98
cM capacity (veh/h)			851		139	463

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	698	641	17
Volume Left	0	7	9
Volume Right	7	0	9
cSH	1700	851	214
Volume to Capacity	0.41	0.01	0.08
Queue Length 95th (ft)	0	1	7
Control Delay (s)	0.0	0.2	23.3
Lane LOS		A	C
Approach Delay (s)	0.0	0.2	23.3
Approach LOS			C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	141	36	38	216	21	47
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	153	39	41	235	23	51
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			718			
pX, platoon unblocked						
vC, conflicting volume	255	159			276	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	255	159			276	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	79	96			98	
cM capacity (veh/h)	720	887			1287	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	192	276	74
Volume Left	153	0	23
Volume Right	39	235	0
cSH	749	1700	1287
Volume to Capacity	0.26	0.16	0.02
Queue Length 95th (ft)	26	0	1
Control Delay (s)	11.5	0.0	2.5
Lane LOS	B		A
Approach Delay (s)	11.5	0.0	2.5
Approach LOS	B		

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	37.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	133	590	32	8	567	26	32	26	11	31	31	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.95		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1848		1770	1851		1770	1779		1770	1628	
Flt Permitted	0.32	1.00		0.30	1.00		0.63	1.00		0.73	1.00	
Satd. Flow (perm)	597	1848		553	1851		1165	1779		1362	1628	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	145	641	35	9	616	28	35	28	12	34	34	178
RTOR Reduction (vph)	0	3	0	0	2	0	0	9	0	0	140	0
Lane Group Flow (vph)	145	673	0	9	642	0	35	31	0	34	72	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.0	20.0		20.0	20.0		7.7	7.7		7.7	7.7	
Effective Green, g (s)	20.0	20.0		20.0	20.0		7.7	7.7		7.7	7.7	
Actuated g/C Ratio	0.56	0.56		0.56	0.56		0.22	0.22		0.22	0.22	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	334	1035		309	1036		251	383		293	351	
v/s Ratio Prot		c0.36			0.35			0.02			c0.04	
v/s Ratio Perm	0.24			0.02			0.03			0.02		
v/c Ratio	0.43	0.65		0.03	0.62		0.14	0.08		0.12	0.21	
Uniform Delay, d1	4.6	5.4		3.5	5.3		11.3	11.2		11.3	11.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	1.5		0.0	1.1		0.3	0.1		0.2	0.3	
Delay (s)	5.5	6.9		3.5	6.4		11.6	11.3		11.4	11.8	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		6.7			6.4			11.4			11.7	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	35.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	604	81	123	649	399	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	1863	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1770	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	657	88	134	705	434	160
RTOR Reduction (vph)	0	51	0	0	0	111
Lane Group Flow (vph)	657	37	134	705	434	49
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Actuated Green, G (s)	32.1	32.1	9.5	45.6	23.4	23.4
Effective Green, g (s)	32.1	32.1	9.5	45.6	23.4	23.4
Actuated g/C Ratio	0.42	0.42	0.12	0.59	0.30	0.30
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	776	659	218	1103	537	481
v/s Ratio Prot	c0.35		0.08	c0.38	c0.25	
v/s Ratio Perm		0.02				0.03
v/c Ratio	0.85	0.06	0.61	0.64	0.81	0.10
Uniform Delay, d1	20.2	13.4	32.0	10.3	24.7	19.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.5	0.0	5.1	1.2	8.7	0.1
Delay (s)	28.7	13.4	37.1	11.5	33.5	19.3
Level of Service	C	B	D	B	C	B
Approach Delay (s)	26.9			15.6	29.7	
Approach LOS	C			B	C	

Intersection Summary			
HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	48	99	68	3	112	310	40	356	16	130	73	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.96			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected		0.99			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1764			1861	1583	1770	1851		1770	1769	
Flt Permitted		0.91			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1620			1849	1583	1770	1851		1770	1769	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	52	108	74	3	122	337	43	387	17	141	79	40
RTOR Reduction (vph)	0	19	0	0	0	252	0	2	0	0	20	0
Lane Group Flow (vph)	0	215	0	0	125	85	43	402	0	141	99	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		13.6			13.6	13.6	1.8	20.4		8.1	26.7	
Effective Green, g (s)		13.6			13.6	13.6	1.8	20.4		8.1	26.7	
Actuated g/C Ratio		0.25			0.25	0.25	0.03	0.38		0.15	0.49	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		407			464	397	58	697		265	873	
v/s Ratio Prot							0.02	c0.22		c0.08	0.06	
v/s Ratio Perm		c0.13			0.07	0.05						
v/c Ratio		0.53			0.27	0.21	0.74	0.58		0.53	0.11	
Uniform Delay, d1		17.5			16.3	16.0	25.9	13.4		21.2	7.3	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.2			0.3	0.3	39.6	1.2		2.0	0.1	
Delay (s)		18.7			16.6	16.3	65.5	14.6		23.3	7.4	
Level of Service		B			B	B	E	B		C	A	
Approach Delay (s)		18.7			16.4			19.5			16.0	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	54.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	36	215	373	44	51	33
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	39	234	405	48	55	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1202				
pX, platoon unblocked						
vC, conflicting volume	453				717	405
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	453				717	405
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				85	94
cM capacity (veh/h)	1107				382	645

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	39	234	405	48	91
Volume Left	39	0	0	0	55
Volume Right	0	0	0	48	36
cSH	1107	1700	1700	1700	455
Volume to Capacity	0.04	0.14	0.24	0.03	0.20
Queue Length 95th (ft)	3	0	0	0	19
Control Delay (s)	8.4	0.0	0.0	0.0	14.9
Lane LOS	A				B
Approach Delay (s)	1.2		0.0		14.9
Approach LOS					B

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	37.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	283	12	6	422	17	16	1	5	4	0	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	308	13	7	459	18	17	1	5	4	0	9
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					1209							
pX, platoon unblocked												
vC, conflicting volume	477			321			812	822	314	812	819	468
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	477			321			812	822	314	812	819	468
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			94	100	99	99	100	99
cM capacity (veh/h)	1085			1239			290	305	726	292	306	595

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	9	321	7	477	24	13
Volume Left	9	0	7	0	17	4
Volume Right	0	13	0	18	5	9
cSH	1085	1700	1239	1700	337	442
Volume to Capacity	0.01	0.19	0.01	0.28	0.07	0.03
Queue Length 95th (ft)	1	0	0	0	6	2
Control Delay (s)	8.3	0.0	7.9	0.0	16.5	13.4
Lane LOS	A		A		C	B
Approach Delay (s)	0.2		0.1		16.5	13.4
Approach LOS					C	B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	196	111	35	271	21	201	180	54	9	114	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.96			0.99			0.98			0.97	
Flt Protected		0.99			0.99			0.98			1.00	
Satd. Flow (prot)		1772			1837			1790			1795	
Flt Permitted		0.91			0.94			0.79			0.97	
Satd. Flow (perm)		1621			1734			1446			1754	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	213	121	38	295	23	218	196	59	10	124	45
RTOR Reduction (vph)	0	18	0	0	3	0	0	6	0	0	14	0
Lane Group Flow (vph)	0	381	0	0	353	0	0	467	0	0	165	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		19.5			19.5			24.8			24.8	
Effective Green, g (s)		19.5			19.5			24.8			24.8	
Actuated g/C Ratio		0.37			0.37			0.47			0.47	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		604			646			685			831	
v/s Ratio Prot												
v/s Ratio Perm		c0.23			0.20			c0.32			0.09	
v/c Ratio		0.63			0.55			0.68			0.20	
Uniform Delay, d1		13.4			12.9			10.7			8.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.1			0.9			2.8			0.1	
Delay (s)		15.6			13.9			13.5			8.1	
Level of Service		B			B			B			A	
Approach Delay (s)		15.6			13.9			13.5			8.1	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	52.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	37	283	486	635	287	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.92		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1810	1699		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1810	1699		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	308	528	690	312	18
RTOR Reduction (vph)	0	0	56	0	0	14
Lane Group Flow (vph)	40	308	1162	0	312	4
Heavy Vehicles (%)	2%	5%	5%	2%	2%	2%
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	2.3	54.5	48.2		15.5	15.5
Effective Green, g (s)	2.3	54.5	48.2		15.5	15.5
Actuated g/C Ratio	0.03	0.70	0.62		0.20	0.20
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	52	1264	1049		351	314
v/s Ratio Prot	c0.02	0.17	c0.68		c0.18	
v/s Ratio Perm						0.00
v/c Ratio	0.77	0.24	1.11		0.89	0.01
Uniform Delay, d1	37.6	4.3	14.9		30.4	25.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	48.9	0.1	62.2		22.8	0.0
Delay (s)	86.5	4.4	77.1		53.2	25.1
Level of Service	F	A	E		D	C
Approach Delay (s)		13.8	77.1		51.7	
Approach LOS		B	E		D	

Intersection Summary			
HCM 2000 Control Delay	61.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	251	213	27	83	12	372	93	76	7	45	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.98		1.00	0.93		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3295		1770	3472		1770	1737		1770	1779	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3295		1770	3472		1770	1737		1770	1779	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	273	232	29	90	13	404	101	83	8	49	21
RTOR Reduction (vph)	0	164	0	0	10	0	0	39	0	0	19	0
Lane Group Flow (vph)	45	341	0	29	93	0	404	145	0	8	51	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	1.6	12.1		1.4	11.9		18.6	23.5		0.5	5.4	
Effective Green, g (s)	1.6	12.1		1.4	11.9		18.6	23.5		0.5	5.4	
Actuated g/C Ratio	0.03	0.23		0.03	0.22		0.35	0.44		0.01	0.10	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	52	745		46	772		615	762		16	179	
v/s Ratio Prot	c0.03	c0.10		0.02	0.03		c0.23	0.08		0.00	c0.03	
v/s Ratio Perm												
v/c Ratio	0.87	0.46		0.63	0.12		0.66	0.19		0.50	0.29	
Uniform Delay, d1	25.8	17.9		25.8	16.6		14.8	9.2		26.4	22.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	76.4	0.4		24.9	0.1		2.5	0.1		22.5	0.9	
Delay (s)	102.2	18.3		50.6	16.7		17.3	9.3		48.9	23.1	
Level of Service	F	B		D	B		B	A		D	C	
Approach Delay (s)		25.2			24.1			14.8			25.8	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	53.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	195	187	191	24	392	90	125	430	84	90	261	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.92		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3271		1770	3440		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3271		1770	3440		3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	212	203	208	26	426	98	136	467	91	98	284	47
RTOR Reduction (vph)	0	114	0	0	21	0	0	0	71	0	0	37
Lane Group Flow (vph)	212	297	0	26	503	0	136	467	20	98	284	10
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	13.8	31.1		1.6	18.9		5.2	15.4	15.4	4.5	14.7	14.7
Effective Green, g (s)	13.8	31.1		1.6	18.9		5.2	15.4	15.4	4.5	14.7	14.7
Actuated g/C Ratio	0.20	0.45		0.02	0.28		0.08	0.22	0.22	0.07	0.21	0.21
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	356	1482		41	947		260	794	355	225	758	339
v/s Ratio Prot	c0.12	0.09		0.01	c0.15		c0.04	c0.13		0.03	0.08	
v/s Ratio Perm									0.01			0.01
v/c Ratio	0.60	0.20		0.63	0.53		0.52	0.59	0.06	0.44	0.37	0.03
Uniform Delay, d1	24.9	11.3		33.2	21.1		30.5	23.8	20.9	30.8	23.0	21.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.7	0.1		27.9	0.6		1.9	1.1	0.1	1.4	0.3	0.0
Delay (s)	27.5	11.3		61.1	21.7		32.4	24.9	21.0	32.2	23.3	21.3
Level of Service	C	B		E	C		C	C	C	C	C	C
Approach Delay (s)		16.9			23.5			25.8			25.1	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	68.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	37	473	759	43	321	398
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.88	0.95		0.97	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	2787	3511		3433	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	2787	3511		3433	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	514	825	47	349	433
RTOR Reduction (vph)	0	440	5	0	0	0
Lane Group Flow (vph)	40	74	867	0	349	433
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	7.5	7.5	21.3		11.4	36.7
Effective Green, g (s)	7.5	7.5	21.3		11.4	36.7
Actuated g/C Ratio	0.14	0.14	0.41		0.22	0.70
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	254	400	1432		749	2488
v/s Ratio Prot	0.02		c0.25		c0.10	0.12
v/s Ratio Perm		c0.03				
v/c Ratio	0.16	0.18	0.61		0.47	0.17
Uniform Delay, d1	19.6	19.7	12.1		17.8	2.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.2	0.7		0.5	0.0
Delay (s)	19.9	19.9	12.9		18.2	2.7
Level of Service	B	B	B		B	A
Approach Delay (s)	19.9		12.9			9.6
Approach LOS	B		B			A

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	52.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	301	585	126	28	783	50	168	620	123	76	435	555
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3508		1770	3451		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3508		1770	3451		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	327	636	137	30	851	54	183	674	134	83	473	603
RTOR Reduction (vph)	0	0	71	0	5	0	0	18	0	0	0	121
Lane Group Flow (vph)	327	636	66	30	900	0	183	790	0	83	473	482
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	9.0	31.7	31.7	2.9	25.6		10.0	33.3		6.9	30.2	30.2
Effective Green, g (s)	9.0	31.7	31.7	2.9	25.6		10.0	33.3		6.9	30.2	30.2
Actuated g/C Ratio	0.10	0.35	0.35	0.03	0.28		0.11	0.37		0.08	0.33	0.33
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	340	1235	552	56	989		194	1265		134	1177	526
v/s Ratio Prot	c0.10	0.18		0.02	c0.26		c0.10	c0.23		0.05	0.13	
v/s Ratio Perm			0.04									c0.30
v/c Ratio	0.96	0.51	0.12	0.54	0.91		0.94	0.62		0.62	0.40	0.92
Uniform Delay, d1	40.7	23.4	20.1	43.3	31.5		40.1	23.6		40.7	23.3	29.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	38.5	0.4	0.1	9.5	11.9		48.3	1.0		8.3	0.2	20.8
Delay (s)	79.2	23.8	20.2	52.8	43.4		88.4	24.6		48.9	23.6	49.8
Level of Service	E	C	C	D	D		F	C		D	C	D
Approach Delay (s)		39.8			43.7			36.4			39.1	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	90.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	360	44	46	1156	1013	1082
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	0.95	0.91	0.88
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	1770	3539	5085	2787
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	1770	3539	5085	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	391	48	50	1257	1101	1176
RTOR Reduction (vph)	0	37	0	0	0	0
Lane Group Flow (vph)	391	11	50	1257	1101	1176
Turn Type	Prot	Perm	Prot	NA	NA	Free
Protected Phases	4		5	2	6	
Permitted Phases		4				Free
Actuated Green, G (s)	11.6	11.6	4.0	32.0	24.0	51.6
Effective Green, g (s)	11.6	11.6	4.0	32.0	24.0	51.6
Actuated g/C Ratio	0.22	0.22	0.08	0.62	0.47	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	771	355	137	2194	2365	2787
v/s Ratio Prot	0.11		0.03	c0.36	0.22	
v/s Ratio Perm		0.01				c0.42
v/c Ratio	0.51	0.03	0.36	0.57	0.47	0.42
Uniform Delay, d1	17.5	15.6	22.6	5.8	9.4	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.0	1.7	0.4	0.1	0.5
Delay (s)	18.0	15.6	24.2	6.1	9.6	0.5
Level of Service	B	B	C	A	A	A
Approach Delay (s)	17.8			6.8	4.9	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	51.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	605	49	5	9	94	361	4	1094	16	88	1205	531
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		1.00			0.90		1.00	1.00		1.00	0.95	
Flt Protected		0.96			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1779			1666		1770	3532		1770	3377	
Flt Permitted		0.37			0.99		0.12	1.00		0.95	1.00	
Satd. Flow (perm)		688			1644		231	3532		1770	3377	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	658	53	5	10	102	392	4	1189	17	96	1310	577
RTOR Reduction (vph)	0	1	0	0	71	0	0	1	0	0	51	0
Lane Group Flow (vph)	0	715	0	0	433	0	4	1205	0	96	1836	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		45.0			45.0		33.0	32.2		4.0	35.4	
Effective Green, g (s)		45.0			45.0		33.0	32.2		4.0	35.4	
Actuated g/C Ratio		0.48			0.48		0.35	0.35		0.04	0.38	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		332			793		95	1220		75	1282	
v/s Ratio Prot							0.00	0.34		c0.05	c0.54	
v/s Ratio Perm		c1.04			0.26		0.01					
v/c Ratio		2.16			0.55		0.04	0.99		1.28	1.43	
Uniform Delay, d1		24.1			16.9		23.8	30.3		44.6	28.9	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		529.7			0.8		0.2	22.5		196.4	199.1	
Delay (s)		553.8			17.7		23.9	52.8		241.0	228.0	
Level of Service		F			B		C	D		F	F	
Approach Delay (s)		553.8			17.7			52.7			228.6	
Approach LOS		F			B			D			F	

Intersection Summary			
HCM 2000 Control Delay	209.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.85		
Actuated Cycle Length (s)	93.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	131.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	316	34	4	125	147	254	33	1860	124	23	1701	472
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		1.00			0.93			0.99			0.97	
Flt Protected		0.96			0.99			1.00			1.00	
Satd. Flow (prot)		1781			1721			3504			3423	
Flt Permitted		0.34			0.87			0.64			0.68	
Satd. Flow (perm)		629			1521			2229			2334	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	343	37	4	136	160	276	36	2022	135	25	1849	513
RTOR Reduction (vph)	0	1	0	0	5	0	0	5	0	0	28	0
Lane Group Flow (vph)	0	383	0	0	567	0	0	2188	0	0	2359	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		32.0			32.0			50.0			50.0	
Effective Green, g (s)		32.0			32.0			50.0			50.0	
Actuated g/C Ratio		0.36			0.36			0.56			0.56	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		223			540			1238			1296	
v/s Ratio Prot												
v/s Ratio Perm		c0.61			0.37			0.98			c1.01	
v/c Ratio		1.72			1.05			1.77			1.82	
Uniform Delay, d1		29.0			29.0			20.0			20.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		341.9			52.8			348.5			372.3	
Delay (s)		370.9			81.8			368.5			392.3	
Level of Service		F			F			F			F	
Approach Delay (s)		370.9			81.8			368.5			392.3	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	349.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.78		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	138.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	902	194	490	686	299	134	202	441	205	308	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3378			1826	1583		1826	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.35	1.00		0.54	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3378			654	1583		1006	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	980	211	533	746	325	146	220	479	223	335	12
RTOR Reduction (vph)	0	0	0	0	36	0	0	0	262	0	0	7
Lane Group Flow (vph)	11	980	211	533	1035	0	0	366	217	0	558	5
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			Free				2		2	6		6
Actuated Green, G (s)	1.6	31.4	132.4	29.0	58.8			60.0	60.0		60.0	60.0
Effective Green, g (s)	1.6	31.4	132.4	29.0	58.8			60.0	60.0		60.0	60.0
Actuated g/C Ratio	0.01	0.24	1.00	0.22	0.44			0.45	0.45		0.45	0.45
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	21	839	1583	387	1500			296	717		455	717
v/s Ratio Prot	0.01	c0.28		c0.30	0.31							
v/s Ratio Perm			0.13					c0.56	0.14		0.55	0.00
v/c Ratio	0.52	1.17	0.13	1.38	0.69			1.24	0.30		1.23	0.01
Uniform Delay, d1	65.0	50.5	0.0	51.7	29.5			36.2	22.9		36.2	19.9
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	21.6	88.4	0.2	185.3	1.4			132.0	0.2		120.1	0.0
Delay (s)	86.6	138.9	0.2	237.0	30.9			168.2	23.2		156.3	19.9
Level of Service	F	F	A	F	C			F	C		F	B
Approach Delay (s)		114.1			99.4			86.0			153.4	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	108.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.25		
Actuated Cycle Length (s)	132.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	111.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	548	157	217	0	0	0	0	405	266	751	497	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Lane Util. Factor	0.91	0.91	1.00					0.91		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.89					0.96		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00		1.00	1.00	
Frt	1.00	1.00	0.85					0.94		1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1610	3286	1408					4573		3433	1863	
Flt Permitted	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1610	3286	1408					4573		3433	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	596	171	236	0	0	0	0	440	289	816	540	0
RTOR Reduction (vph)	0	0	173	0	0	0	0	103	0	0	0	0
Lane Group Flow (vph)	298	469	63	0	0	0	0	626	0	816	540	0
Confl. Peds. (#/hr)			75						75			
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	19.0	19.0	19.0					30.1		10.5	44.6	
Effective Green, g (s)	19.0	19.0	19.0					30.1		10.5	44.6	
Actuated g/C Ratio	0.27	0.27	0.27					0.42		0.15	0.62	
Clearance Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)	427	871	373					1922		503	1160	
v/s Ratio Prot	c0.19	0.14						0.14		c0.24	c0.29	
v/s Ratio Perm			0.04									
v/c Ratio	0.70	0.54	0.17					0.33		1.62	0.47	
Uniform Delay, d1	23.7	22.5	20.2					13.9		30.5	7.2	
Progression Factor	1.00	1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2	4.9	0.6	0.2					0.5		289.1	0.3	
Delay (s)	28.6	23.2	20.4					14.4		319.6	7.5	
Level of Service	C	C	C					B		F	A	
Approach Delay (s)		24.2			0.0			14.4			195.3	
Approach LOS		C			A			B			F	

Intersection Summary			
HCM 2000 Control Delay	97.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	71.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	634	0	0	0	0	0	862	1724	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0			
Lane Util. Factor		0.91						0.91	0.88			
Frpb, ped/bikes		1.00						1.00	1.00			
Flpb, ped/bikes		0.99						1.00	1.00			
Frt		1.00						1.00	0.85			
Flt Protected		1.00						1.00	1.00			
Satd. Flow (prot)		4390						5085	2787			
Flt Permitted		1.00						1.00	1.00			
Satd. Flow (perm)		4390						5085	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	66	689	0	0	0	0	0	937	1874	0	0	0
RTOR Reduction (vph)	0	19	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	736	0	0	0	0	0	937	1874	0	0	0
Confl. Peds. (#/hr)	67		36	36		67	41		51	51		41
Heavy Vehicles (%)	5%	18%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA						NA	Prot			
Protected Phases		2						1	1			
Permitted Phases	2											
Actuated Green, G (s)		16.0						36.0	36.0			
Effective Green, g (s)		16.0						36.0	36.0			
Actuated g/C Ratio		0.27						0.60	0.60			
Clearance Time (s)		4.0						4.0	4.0			
Lane Grp Cap (vph)		1170						3051	1672			
v/s Ratio Prot								0.18	c0.67			
v/s Ratio Perm		0.17										
v/c Ratio		0.63						0.31	1.12			
Uniform Delay, d1		19.4						5.9	12.0			
Progression Factor		1.00						1.00	1.00			
Incremental Delay, d2		2.6						0.3	63.0			
Delay (s)		22.0						6.1	75.0			
Level of Service		C						A	E			
Approach Delay (s)		22.0			0.0			52.0			0.0	
Approach LOS		C			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	45.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	117	39	67	120	76	20	927	43	28	510	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			0.95		1.00	0.95	
Frt		0.98			0.96			0.99		1.00	0.98	
Flt Protected		0.98			0.99			1.00		0.95	1.00	
Satd. Flow (prot)		1787			1767			3512		1770	3473	
Flt Permitted		0.70			0.86			0.94		0.17	1.00	
Satd. Flow (perm)		1281			1544			3297		323	3473	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	127	42	73	130	83	22	1008	47	30	554	79
RTOR Reduction (vph)	0	6	0	0	18	0	0	4	0	0	12	0
Lane Group Flow (vph)	0	326	0	0	268	0	0	1073	0	30	621	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		22.3			22.3			28.6		28.6	28.6	
Effective Green, g (s)		22.3			22.3			28.6		28.6	28.6	
Actuated g/C Ratio		0.38			0.38			0.49		0.49	0.49	
Clearance Time (s)		4.0			4.0			4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		484			584			1600		156	1686	
v/s Ratio Prot											0.18	
v/s Ratio Perm		c0.25			0.17			c0.33		0.09		
v/c Ratio		0.67			0.46			0.67		0.19	0.37	
Uniform Delay, d1		15.3			13.8			11.6		8.6	9.5	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		3.7			0.6			1.1		0.6	0.1	
Delay (s)		18.9			14.3			12.7		9.2	9.6	
Level of Service		B			B			B		A	A	
Approach Delay (s)		18.9			14.3			12.7			9.6	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	58.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	549	42	13	227	31	14	855	24	8	629	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frt	1.00	0.99			0.98			1.00			0.99	
Flt Protected	0.95	1.00			1.00			1.00			1.00	
Satd. Flow (prot)	1770	1843			1829			3522			3502	
Flt Permitted	0.55	1.00			0.97			0.94			0.94	
Satd. Flow (perm)	1019	1843			1776			3317			3304	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	245	597	46	14	247	34	15	929	26	9	684	49
RTOR Reduction (vph)	0	3	0	0	5	0	0	2	0	0	6	0
Lane Group Flow (vph)	245	640	0	0	290	0	0	968	0	0	736	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	30.7	30.7			30.7			27.8			27.8	
Effective Green, g (s)	30.7	30.7			30.7			27.8			27.8	
Actuated g/C Ratio	0.46	0.46			0.46			0.42			0.42	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	470	850			819			1386			1381	
v/s Ratio Prot		c0.35										
v/s Ratio Perm	0.24				0.16			c0.29			0.22	
v/c Ratio	0.52	0.75			0.35			0.70			0.53	
Uniform Delay, d1	12.7	14.8			11.5			15.9			14.5	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	1.0	3.8			0.3			1.6			0.4	
Delay (s)	13.7	18.6			11.8			17.5			14.9	
Level of Service	B	B			B			B			B	
Approach Delay (s)		17.2			11.8			17.5			14.9	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	66.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	11	1267	70	176	305	0	0	146	1491
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				1.00	1.00	1.00	1.00	1.00			0.95	0.95
Frpb, ped/bikes				1.00	1.00	0.94	1.00	1.00			0.97	0.98
Flpb, ped/bikes				0.96	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			0.88	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1703	1863	1493	1770	1863			1507	1477
Flt Permitted				0.95	1.00	1.00	0.16	1.00			1.00	1.00
Satd. Flow (perm)				1703	1863	1493	298	1863			1507	1477
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	12	1377	76	191	332	0	0	159	1621
RTOR Reduction (vph)	0	0	0	0	0	36	0	0	0	0	9	0
Lane Group Flow (vph)	0	0	0	12	1377	40	191	332	0	0	896	875
Confl. Peds. (#/hr)				20		20	10					20
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Free
Protected Phases					8			2			6	
Permitted Phases				8		8	2					Free
Actuated Green, G (s)				27.0	27.0	27.0	25.0	25.0			25.0	60.0
Effective Green, g (s)				27.0	27.0	27.0	25.0	25.0			25.0	60.0
Actuated g/C Ratio				0.45	0.45	0.45	0.42	0.42			0.42	1.00
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				766	838	671	124	776			627	1477
v/s Ratio Prot					c0.74			0.18			0.59	
v/s Ratio Perm				0.01		0.03	c0.64					0.59
v/c Ratio				0.02	1.64	0.06	1.54	0.43			1.43	0.59
Uniform Delay, d1				9.1	16.5	9.3	17.5	12.4			17.5	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.0	294.8	0.0	279.2	0.4			202.4	1.8
Delay (s)				9.1	311.3	9.4	296.7	12.8			219.9	1.8
Level of Service				A	F	A	F	B			F	A
Approach Delay (s)		0.0			293.2			116.5			112.6	
Approach LOS		A			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	183.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.59		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	126.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	635	7	1	401	4	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	690	8	1	436	4	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	445					
pX, platoon unblocked			0.74		0.74	0.74
vC, conflicting volume			698		1132	694
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			423		1006	418
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			846		199	473

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	698	437	5
Volume Left	0	1	4
Volume Right	8	0	1
cSH	1700	846	225
Volume to Capacity	0.41	0.00	0.02
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.0	21.4
Lane LOS		A	C
Approach Delay (s)	0.0	0.0	21.4
Approach LOS			C

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	633	3	3	397	5	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	688	3	3	432	5	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	918					
pX, platoon unblocked			0.80		0.80	0.80
vC, conflicting volume			691		1128	690
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			485		1033	483
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	99
cM capacity (veh/h)			859		205	465

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	691	435	11
Volume Left	0	3	5
Volume Right	3	0	5
cSH	1700	859	284
Volume to Capacity	0.41	0.00	0.04
Queue Length 95th (ft)	0	0	3
Control Delay (s)	0.0	0.1	18.2
Lane LOS		A	C
Approach Delay (s)	0.0	0.1	18.2
Approach LOS			C

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	261	32	35	138	24	39
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	284	35	38	150	26	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			718			
pX, platoon unblocked						
vC, conflicting volume	208	113			188	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	208	113			188	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	63	96			98	
cM capacity (veh/h)	766	940			1386	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	318	188	68
Volume Left	284	0	26
Volume Right	35	150	0
cSH	782	1700	1386
Volume to Capacity	0.41	0.11	0.02
Queue Length 95th (ft)	50	0	1
Control Delay (s)	12.7	0.0	3.0
Lane LOS	B		A
Approach Delay (s)	12.7	0.0	3.0
Approach LOS	B		

Intersection Summary			
Average Delay	7.4		
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	174	547	53	15	330	41	72	31	17	62	51	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.95		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1838		1770	1832		1770	1766		1770	1629	
Flt Permitted	0.49	1.00		0.29	1.00		0.42	1.00		0.72	1.00	
Satd. Flow (perm)	909	1838		535	1832		775	1766		1347	1629	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	189	595	58	16	359	45	78	34	18	67	55	278
RTOR Reduction (vph)	0	4	0	0	5	0	0	13	0	0	203	0
Lane Group Flow (vph)	189	649	0	16	399	0	78	39	0	67	130	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	22.3	22.3		22.3	22.3		11.2	11.2		11.2	11.2	
Effective Green, g (s)	22.3	22.3		22.3	22.3		11.2	11.2		11.2	11.2	
Actuated g/C Ratio	0.54	0.54		0.54	0.54		0.27	0.27		0.27	0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	488	987		287	984		209	476		363	439	
v/s Ratio Prot		c0.35			0.22			0.02			0.08	
v/s Ratio Perm	0.21			0.03			c0.10			0.05		
v/c Ratio	0.39	0.66		0.06	0.41		0.37	0.08		0.18	0.30	
Uniform Delay, d1	5.6	6.9		4.6	5.7		12.3	11.3		11.6	12.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.6		0.1	0.3		1.1	0.1		0.2	0.4	
Delay (s)	6.1	8.5		4.7	6.0		13.4	11.4		11.9	12.4	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		7.9			5.9			12.6			12.3	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	41.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	681	432	118	542	343	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	1863	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1770	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	740	470	128	589	373	115
RTOR Reduction (vph)	0	248	0	0	0	84
Lane Group Flow (vph)	740	222	128	589	373	31
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Actuated Green, G (s)	37.5	37.5	8.8	50.3	21.1	21.1
Effective Green, g (s)	37.5	37.5	8.8	50.3	21.1	21.1
Actuated g/C Ratio	0.47	0.47	0.11	0.63	0.27	0.27
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	879	747	196	1180	470	420
v/s Ratio Prot	c0.40		c0.07	0.32	c0.21	
v/s Ratio Perm		0.14				0.02
v/c Ratio	0.84	0.30	0.65	0.50	0.79	0.07
Uniform Delay, d1	18.4	12.9	33.8	7.8	27.1	21.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.4	0.2	7.6	0.3	8.9	0.1
Delay (s)	25.7	13.1	41.4	8.1	36.1	21.9
Level of Service	C	B	D	A	D	C
Approach Delay (s)	20.8			14.1	32.7	
Approach LOS	C			B	C	

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	79.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	184	37	14	199	371	51	92	11	380	258	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.98			1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected		0.99			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1813			1857	1583	1770	1833		1770	1809	
Flt Permitted		0.92			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1673			1810	1583	1770	1833		1770	1809	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	48	200	40	15	216	403	55	100	12	413	280	67
RTOR Reduction (vph)	0	6	0	0	0	287	0	5	0	0	11	0
Lane Group Flow (vph)	0	282	0	0	231	116	55	107	0	413	336	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		16.0			16.0	16.0	3.5	8.2		19.4	24.1	
Effective Green, g (s)		16.0			16.0	16.0	3.5	8.2		19.4	24.1	
Actuated g/C Ratio		0.29			0.29	0.29	0.06	0.15		0.35	0.43	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		481			520	455	111	270		617	784	
v/s Ratio Prot							0.03	0.06		c0.23	c0.19	
v/s Ratio Perm		c0.17			0.13	0.07						
v/c Ratio		0.59			0.44	0.25	0.50	0.40		0.67	0.43	
Uniform Delay, d1		17.0			16.2	15.2	25.2	21.5		15.4	11.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.8			0.6	0.3	3.5	1.0		2.8	0.4	
Delay (s)		18.8			16.8	15.5	28.6	22.4		18.1	11.3	
Level of Service		B			B	B	C	C		B	B	
Approach Delay (s)		18.8			16.0			24.5			15.0	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	55.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	44	616	618	61	80	51
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	48	670	672	66	87	55
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1202				
pX, platoon unblocked						
vC, conflicting volume	738				1437	672
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	738				1437	672
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				37	88
cM capacity (veh/h)	868				139	456

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	48	670	672	66	142
Volume Left	48	0	0	0	87
Volume Right	0	0	0	66	55
cSH	868	1700	1700	1700	190
Volume to Capacity	0.06	0.39	0.40	0.04	0.75
Queue Length 95th (ft)	4	0	0	0	123
Control Delay (s)	9.4	0.0	0.0	0.0	65.1
Lane LOS	A				F
Approach Delay (s)	0.6		0.0		65.1
Approach LOS					F

Intersection Summary			
Average Delay	6.1		
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	643	5	8	596	4	2	1	4	1	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	699	5	9	648	4	2	1	4	1	0	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					1209							
pX, platoon unblocked												
vC, conflicting volume	652			704			1383	1384	702	1384	1385	650
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	652			704			1383	1384	702	1384	1385	650
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			98	99	99	99	100	99
cM capacity (veh/h)	934			893			119	141	438	117	141	469

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	7	704	9	652	8	4
Volume Left	7	0	9	0	2	1
Volume Right	0	5	0	4	4	3
cSH	934	1700	893	1700	212	268
Volume to Capacity	0.01	0.41	0.01	0.38	0.04	0.02
Queue Length 95th (ft)	1	0	1	0	3	1
Control Delay (s)	8.9	0.0	9.1	0.0	22.6	18.6
Lane LOS	A		A		C	C
Approach Delay (s)	0.1		0.1		22.6	18.6
Approach LOS					C	C

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	53	346	62	56	127	5	180	124	43	28	158	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			0.98			0.94	
Flt Protected		0.99			0.99			0.97			1.00	
Satd. Flow (prot)		1819			1829			1785			1753	
Flt Permitted		0.94			0.81			0.66			0.95	
Satd. Flow (perm)		1728			1498			1212			1676	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	58	376	67	61	138	5	196	135	47	30	172	139
RTOR Reduction (vph)	0	6	0	0	1	0	0	6	0	0	30	0
Lane Group Flow (vph)	0	495	0	0	203	0	0	372	0	0	311	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		22.6			22.6			25.3			25.3	
Effective Green, g (s)		22.6			22.6			25.3			25.3	
Actuated g/C Ratio		0.40			0.40			0.45			0.45	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		698			605			548			758	
v/s Ratio Prot												
v/s Ratio Perm		c0.29			0.14			c0.31			0.19	
v/c Ratio		0.71			0.34			0.68			0.41	
Uniform Delay, d1		13.9			11.5			12.1			10.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		3.3			0.3			3.3			0.4	
Delay (s)		17.2			11.8			15.4			10.6	
Level of Service		B			B			B			B	
Approach Delay (s)		17.2			11.8			15.4			10.6	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	55.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	42	332	432	447	584	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.93		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1810	1710		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1810	1710		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	361	470	486	635	52
RTOR Reduction (vph)	0	0	41	0	0	34
Lane Group Flow (vph)	46	361	915	0	635	18
Heavy Vehicles (%)	2%	5%	5%	2%	2%	2%
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	3.1	50.2	43.1		31.0	31.0
Effective Green, g (s)	3.1	50.2	43.1		31.0	31.0
Actuated g/C Ratio	0.03	0.56	0.48		0.35	0.35
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	61	1018	826		615	550
v/s Ratio Prot	c0.03	0.20	c0.54		c0.36	
v/s Ratio Perm						0.01
v/c Ratio	0.75	0.35	1.11		1.03	0.03
Uniform Delay, d1	42.7	10.7	23.1		29.1	19.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	40.4	0.2	65.2		44.9	0.0
Delay (s)	83.1	10.9	88.3		74.0	19.2
Level of Service	F	B	F		E	B
Approach Delay (s)		19.0	88.3		69.9	
Approach LOS		B	F		E	

Intersection Summary			
HCM 2000 Control Delay	68.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	89.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	114	200	86	182	18	218	154	44	12	165	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	0.99		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3201		1770	3491		1770	1800		1770	1779	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3201		1770	3491		1770	1800		1770	1779	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	63	124	217	93	198	20	237	167	48	13	179	76
RTOR Reduction (vph)	0	184	0	0	9	0	0	11	0	0	17	0
Lane Group Flow (vph)	63	157	0	93	209	0	237	204	0	13	238	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.0	9.9		6.6	12.5		14.0	31.1		0.6	17.7	
Effective Green, g (s)	4.0	9.9		6.6	12.5		14.0	31.1		0.6	17.7	
Actuated g/C Ratio	0.06	0.15		0.10	0.19		0.22	0.48		0.01	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	110	493		181	679		385	871		16	490	
v/s Ratio Prot	0.04	0.05		c0.05	c0.06		c0.13	0.11		0.01	c0.13	
v/s Ratio Perm												
v/c Ratio	0.57	0.32		0.51	0.31		0.62	0.23		0.81	0.48	
Uniform Delay, d1	29.3	24.2		27.3	22.1		22.7	9.6		31.7	19.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.0	0.4		2.5	0.3		2.9	0.1		132.2	0.8	
Delay (s)	36.3	24.5		29.7	22.4		25.6	9.8		163.9	20.2	
Level of Service	D	C		C	C		C	A		F	C	
Approach Delay (s)		26.4			24.6			18.1			27.2	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	64.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	448	237	329	48	361	101	324	125	40	95	538	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.91		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3231		1770	3423		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3231		1770	3423		3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	487	258	358	52	392	110	352	136	43	103	585	126
RTOR Reduction (vph)	0	184	0	0	28	0	0	0	31	0	0	100
Lane Group Flow (vph)	487	432	0	52	474	0	352	136	12	103	585	26
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	26.5	39.8		3.4	16.7		10.9	23.6	23.6	5.4	18.1	18.1
Effective Green, g (s)	26.5	39.8		3.4	16.7		10.9	23.6	23.6	5.4	18.1	18.1
Actuated g/C Ratio	0.30	0.45		0.04	0.19		0.12	0.27	0.27	0.06	0.21	0.21
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	531	1457		68	648		424	946	423	210	726	324
v/s Ratio Prot	c0.28	0.13		0.03	c0.14		c0.10	0.04		0.03	c0.17	
v/s Ratio Perm									0.01			0.02
v/c Ratio	0.92	0.30		0.76	0.73		0.83	0.14	0.03	0.49	0.81	0.08
Uniform Delay, d1	29.8	15.3		42.0	33.6		37.7	24.6	23.8	40.1	33.4	28.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	20.7	0.1		39.2	4.2		12.9	0.1	0.0	1.8	6.5	0.1
Delay (s)	50.5	15.4		81.2	37.9		50.7	24.7	23.9	41.9	39.9	28.4
Level of Service	D	B		F	D		D	C	C	D	D	C
Approach Delay (s)		30.9			41.9			41.8			38.4	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	36.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	88.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	213	316	543	90	380	1119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.88	0.95		0.97	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	2787	3464		3433	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	2787	3464		3433	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	232	343	590	98	413	1216
RTOR Reduction (vph)	0	261	15	0	0	0
Lane Group Flow (vph)	232	82	673	0	413	1216
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	13.9	13.9	19.3		13.1	36.4
Effective Green, g (s)	13.9	13.9	19.3		13.1	36.4
Actuated g/C Ratio	0.24	0.24	0.33		0.22	0.62
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	422	664	1146		771	2209
v/s Ratio Prot	c0.13		0.19		0.12	c0.34
v/s Ratio Perm		0.03				
v/c Ratio	0.55	0.12	0.59		0.54	0.55
Uniform Delay, d1	19.5	17.4	16.2		19.9	6.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.5	0.1	0.8		0.7	0.3
Delay (s)	20.9	17.5	17.0		20.6	6.6
Level of Service	C	B	B		C	A
Approach Delay (s)	18.9		17.0			10.1
Approach LOS	B		B			B

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	58.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	257	922	220	61	685	249	124	441	233	173	856	426
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3398		1770	3356		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3398		1770	3356		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	279	1002	239	66	745	271	135	479	253	188	930	463
RTOR Reduction (vph)	0	0	74	0	41	0	0	76	0	0	0	154
Lane Group Flow (vph)	279	1002	165	66	975	0	135	656	0	188	930	309
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	9.0	33.3	33.3	4.7	29.0		8.8	23.1		12.3	26.6	26.6
Effective Green, g (s)	9.0	33.3	33.3	4.7	29.0		8.8	23.1		12.3	26.6	26.6
Actuated g/C Ratio	0.10	0.37	0.37	0.05	0.32		0.10	0.26		0.14	0.30	0.30
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	345	1318	589	93	1102		174	867		243	1052	471
v/s Ratio Prot	c0.08	0.28		0.04	c0.29		0.08	0.20		c0.11	c0.26	
v/s Ratio Perm			0.10									0.20
v/c Ratio	0.81	0.76	0.28	0.71	0.88		0.78	0.76		0.77	0.88	0.66
Uniform Delay, d1	39.4	24.6	19.7	41.7	28.6		39.3	30.6		37.2	29.9	27.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	13.0	2.6	0.3	21.9	8.7		19.2	3.8		14.2	9.0	3.3
Delay (s)	52.4	27.2	19.9	63.6	37.3		58.5	34.4		51.4	38.9	30.7
Level of Service	D	C	B	E	D		E	C		D	D	C
Approach Delay (s)		30.7			38.9			38.1			38.0	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	36.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	89.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	659	347	111	832	1570	763
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	0.95	0.91	0.88
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	1770	3539	5085	2787
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	1770	3539	5085	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	716	377	121	904	1707	829
RTOR Reduction (vph)	0	184	0	0	0	0
Lane Group Flow (vph)	716	193	121	904	1707	829
Turn Type	Prot	Perm	Prot	NA	NA	Free
Protected Phases	4		5	2	6	
Permitted Phases		4				Free
Actuated Green, G (s)	22.8	22.8	8.2	50.7	38.5	81.5
Effective Green, g (s)	22.8	22.8	8.2	50.7	38.5	81.5
Actuated g/C Ratio	0.28	0.28	0.10	0.62	0.47	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	960	442	178	2201	2402	2787
v/s Ratio Prot	c0.21		c0.07	0.26	c0.34	
v/s Ratio Perm		0.12				0.30
v/c Ratio	0.75	0.44	0.68	0.41	0.71	0.30
Uniform Delay, d1	26.7	24.1	35.4	7.8	17.1	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.2	0.7	9.9	0.1	1.0	0.3
Delay (s)	29.9	24.8	45.3	7.9	18.1	0.3
Level of Service	C	C	D	A	B	A
Approach Delay (s)	28.1			12.3	12.3	
Approach LOS	C			B	B	

Intersection Summary			
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	81.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	641	87	20	9	94	104	9	1418	29	265	1041	404
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		1.00			0.93		1.00	1.00		1.00	0.96	
Flt Protected		0.96			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1780			1733		1770	3528		1770	3391	
Flt Permitted		0.57			0.97		0.12	1.00		0.95	1.00	
Satd. Flow (perm)		1067			1676		231	3528		1770	3391	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	697	95	22	10	102	113	10	1541	32	288	1132	439
RTOR Reduction (vph)	0	1	0	0	41	0	0	1	0	0	41	0
Lane Group Flow (vph)	0	813	0	0	184	0	10	1572	0	288	1530	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		41.0			41.0		33.0	32.2		8.0	39.4	
Effective Green, g (s)		41.0			41.0		33.0	32.2		8.0	39.4	
Actuated g/C Ratio		0.44			0.44		0.35	0.35		0.09	0.42	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		469			737		95	1218		151	1433	
v/s Ratio Prot							0.00	c0.45		c0.16	0.45	
v/s Ratio Perm		c0.76			0.11		0.04					
v/c Ratio		1.73			0.25		0.11	1.29		1.91	1.07	
Uniform Delay, d1		26.1			16.4		23.8	30.5		42.6	26.9	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		338.8			0.2		0.5	136.9		432.0	44.1	
Delay (s)		364.9			16.6		24.3	167.4		474.6	71.0	
Level of Service		F			B		C	F		F	E	
Approach Delay (s)		364.9			16.6			166.5			133.6	
Approach LOS		F			B			F			F	

Intersection Summary			
HCM 2000 Control Delay	181.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.57		
Actuated Cycle Length (s)	93.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	121.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	249	152	19	136	222	209	8	1923	211	25	1592	660
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.99			0.95			0.99			0.96	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1798			1749			3486			3384	
Flt Permitted		0.41			0.82			0.79			0.67	
Satd. Flow (perm)		762			1453			2738			2278	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	271	165	21	148	241	227	9	2090	229	27	1730	717
RTOR Reduction (vph)	0	2	0	0	5	0	0	9	0	0	49	0
Lane Group Flow (vph)	0	455	0	0	611	0	0	2319	0	0	2425	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		31.0			31.0			51.0			51.0	
Effective Green, g (s)		31.0			31.0			51.0			51.0	
Actuated g/C Ratio		0.34			0.34			0.57			0.57	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		262			500			1551			1290	
v/s Ratio Prot												
v/s Ratio Perm		c0.60			0.42			0.85			c1.06	
v/c Ratio		1.74			1.22			1.50			1.88	
Uniform Delay, d1		29.5			29.5			19.5			19.5	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		347.0			117.2			226.2			398.9	
Delay (s)		376.5			146.7			245.7			418.4	
Level of Service		F			F			F			F	
Approach Delay (s)		376.5			146.7			245.7			418.4	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	318.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	139.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	915	313	155	1113	355	126	314	288	274	249	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.99	1.00		0.97	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3411			1836	1583		1815	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.49	1.00		0.44	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3411			905	1583		822	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	995	340	168	1210	386	137	341	313	298	271	17
RTOR Reduction (vph)	0	0	0	0	23	0	0	0	96	0	0	8
Lane Group Flow (vph)	29	995	340	168	1573	0	0	478	217	0	569	9
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			Free				2		2	6		6
Actuated Green, G (s)	2.4	38.6	131.6	12.0	48.2			69.0	69.0		69.0	69.0
Effective Green, g (s)	2.4	38.6	131.6	12.0	48.2			69.0	69.0		69.0	69.0
Actuated g/C Ratio	0.02	0.29	1.00	0.09	0.37			0.52	0.52		0.52	0.52
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	32	1038	1583	161	1249			474	829		430	829
v/s Ratio Prot	0.02	0.28		c0.09	c0.46							
v/s Ratio Perm			0.21					0.53	0.14		c0.69	0.01
v/c Ratio	0.91	0.96	0.21	1.04	1.26			1.01	0.26		1.32	0.01
Uniform Delay, d1	64.5	45.7	0.0	59.8	41.7			31.3	17.3		31.3	15.0
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	119.3	18.5	0.3	82.9	123.4			43.5	0.2		161.0	0.0
Delay (s)	183.8	64.2	0.3	142.7	165.1			74.8	17.4		192.3	15.0
Level of Service	F	E	A	F	F			E	B		F	B
Approach Delay (s)		50.8			163.0			52.1			187.1	
Approach LOS		D			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	112.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	131.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	110.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1050	300	227	0	0	0	0	647	348	625	593	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Lane Util. Factor	0.91	0.91	1.00					0.91		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.89					0.96		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00		1.00	1.00	
Frt	1.00	1.00	0.85					0.95		1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1610	3286	1402					4625		3433	1863	
Flt Permitted	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1610	3286	1402					4625		3433	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1141	326	247	0	0	0	0	703	378	679	645	0
RTOR Reduction (vph)	0	0	174	0	0	0	0	52	0	0	0	0
Lane Group Flow (vph)	570	897	73	0	0	0	0	1029	0	679	645	0
Confl. Peds. (#/hr)			75						75			
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	22.0	22.0	22.0					30.0		10.5	44.5	
Effective Green, g (s)	22.0	22.0	22.0					30.0		10.5	44.5	
Actuated g/C Ratio	0.30	0.30	0.30					0.40		0.14	0.60	
Clearance Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)	475	970	414					1862		483	1112	
v/s Ratio Prot	c0.35	0.27						0.22		c0.20	c0.35	
v/s Ratio Perm			0.05									
v/c Ratio	1.20	1.15dl	0.18					0.55		1.41	0.58	
Uniform Delay, d1	26.2	25.4	19.5					17.1		32.0	9.2	
Progression Factor	1.00	1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2	108.8	14.1	0.2					1.2		194.7	0.8	
Delay (s)	135.1	39.5	19.7					18.3		226.7	10.0	
Level of Service	F	D	B					B		F	B	
Approach Delay (s)		68.4			0.0			18.3			121.1	
Approach LOS		E			A			B			F	

Intersection Summary			
HCM 2000 Control Delay	72.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	74.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	1534	0	0	0	0	0	1279	2084	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0			
Lane Util. Factor		0.91						0.91	0.88			
Frpb, ped/bikes		1.00						1.00	1.00			
Flpb, ped/bikes		0.99						1.00	1.00			
Frt		1.00						1.00	0.85			
Flt Protected		1.00						1.00	1.00			
Satd. Flow (prot)		4391						5085	2787			
Flt Permitted		1.00						1.00	1.00			
Satd. Flow (perm)		4391						5085	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	141	1667	0	0	0	0	0	1390	2265	0	0	0
RTOR Reduction (vph)	0	16	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1792	0	0	0	0	0	1390	2265	0	0	0
Confl. Peds. (#/hr)	67		36	36		67	41		51	51		41
Heavy Vehicles (%)	5%	18%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA						NA	Prot			
Protected Phases		2						1	1			
Permitted Phases	2											
Actuated Green, G (s)		20.0						32.0	32.0			
Effective Green, g (s)		20.0						32.0	32.0			
Actuated g/C Ratio		0.33						0.53	0.53			
Clearance Time (s)		4.0						4.0	4.0			
Lane Grp Cap (vph)		1463						2712	1486			
v/s Ratio Prot								0.27	c0.81			
v/s Ratio Perm		0.41										
v/c Ratio		1.22						0.51	1.52			
Uniform Delay, d1		20.0						9.0	14.0			
Progression Factor		1.00						1.00	1.00			
Incremental Delay, d2		107.5						0.7	239.4			
Delay (s)		127.5						9.7	253.4			
Level of Service		F						A	F			
Approach Delay (s)		127.5			0.0			160.7			0.0	
Approach LOS		F			A			F			A	

Intersection Summary			
HCM 2000 Control Delay	149.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.41		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	115.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	101	82	53	49	94	44	13	738	48	46	879	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			0.95		1.00	0.95	
Frt		0.97			0.97			0.99		1.00	0.99	
Flt Protected		0.98			0.99			1.00		0.95	1.00	
Satd. Flow (prot)		1768			1780			3505		1770	3487	
Flt Permitted		0.82			0.89			0.94		0.28	1.00	
Satd. Flow (perm)		1472			1601			3282		517	3487	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	110	89	58	53	102	48	14	802	52	50	955	105
RTOR Reduction (vph)	0	13	0	0	14	0	0	5	0	0	10	0
Lane Group Flow (vph)	0	244	0	0	189	0	0	863	0	50	1050	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		14.5			14.5			24.3		24.3	24.3	
Effective Green, g (s)		14.5			14.5			24.3		24.3	24.3	
Actuated g/C Ratio		0.31			0.31			0.52		0.52	0.52	
Clearance Time (s)		4.0			4.0			4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		456			496			1704		268	1810	
v/s Ratio Prot											c0.30	
v/s Ratio Perm		c0.17			0.12			0.26		0.10		
v/c Ratio		0.53			0.38			0.51		0.19	0.58	
Uniform Delay, d1		13.4			12.6			7.3		6.0	7.7	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		1.2			0.5			0.2		0.3	0.5	
Delay (s)		14.6			13.1			7.6		6.3	8.2	
Level of Service		B			B			A		A	A	
Approach Delay (s)		14.6			13.1			7.6			8.1	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	46.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	200	259	120	41	198	35	20	835	46	8	1024	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frt	1.00	0.95			0.98			0.99			0.99	
Flt Protected	0.95	1.00			0.99			1.00			1.00	
Satd. Flow (prot)	1770	1775			1817			3508			3487	
Flt Permitted	0.51	1.00			0.84			0.91			0.95	
Satd. Flow (perm)	943	1775			1542			3208			3307	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	217	282	130	45	215	38	22	908	50	9	1113	118
RTOR Reduction (vph)	0	20	0	0	6	0	0	4	0	0	9	0
Lane Group Flow (vph)	217	392	0	0	292	0	0	976	0	0	1231	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	22.3	22.3			22.3			32.8			32.8	
Effective Green, g (s)	22.3	22.3			22.3			32.8			32.8	
Actuated g/C Ratio	0.35	0.35			0.35			0.52			0.52	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	333	627			544			1667			1719	
v/s Ratio Prot		0.22										
v/s Ratio Perm	c0.23				0.19			0.30			c0.37	
v/c Ratio	0.65	0.63			0.54			0.59			0.72	
Uniform Delay, d1	17.1	16.9			16.3			10.5			11.6	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	4.5	1.9			1.0			0.5			1.4	
Delay (s)	21.7	18.9			17.3			11.0			13.0	
Level of Service	C	B			B			B			B	
Approach Delay (s)		19.8			17.3			11.0			13.0	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	63.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	7	936	88	402	570	0	0	199	1417
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				1.00	1.00	1.00	1.00	1.00			0.95	0.95
Frpb, ped/bikes				1.00	1.00	0.94	1.00	1.00			0.97	0.98
Flpb, ped/bikes				0.96	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			0.89	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1703	1863	1493	1770	1863			1528	1477
Flt Permitted				0.95	1.00	1.00	0.13	1.00			1.00	1.00
Satd. Flow (perm)				1703	1863	1493	240	1863			1528	1477
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	8	1017	96	437	620	0	0	216	1540
RTOR Reduction (vph)	0	0	0	0	0	62	0	0	0	0	9	0
Lane Group Flow (vph)	0	0	0	8	1017	34	437	620	0	0	885	862
Confl. Peds. (#/hr)				20		20	10					20
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Free
Protected Phases					8			2			6	
Permitted Phases				8		8	2					Free
Actuated Green, G (s)				21.0	21.0	21.0	31.0	31.0			31.0	60.0
Effective Green, g (s)				21.0	21.0	21.0	31.0	31.0			31.0	60.0
Actuated g/C Ratio				0.35	0.35	0.35	0.52	0.52			0.52	1.00
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				596	652	522	124	962			789	1477
v/s Ratio Prot					c0.55			0.33			0.58	
v/s Ratio Perm				0.00		0.02	c1.82					0.58
v/c Ratio				0.01	1.56	0.06	3.52	0.64			1.12	0.58
Uniform Delay, d1				12.7	19.5	13.0	14.5	10.5			14.5	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.0	259.4	0.1	1155.8	1.5			71.1	1.7
Delay (s)				12.7	278.9	13.0	1170.3	12.0			85.6	1.7
Level of Service				B	F	B	F	B			F	A
Approach Delay (s)		0.0			254.2			490.9			44.4	
Approach LOS		A			F			F			D	

Intersection Summary			
HCM 2000 Control Delay	224.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.73		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	122.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	672	2	0	608	6	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	730	2	0	661	7	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	445					
pX, platoon unblocked			0.73		0.73	0.73
vC, conflicting volume			733		1392	732
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			444		1352	443
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		95	100
cM capacity (veh/h)			811		120	447

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	733	661	8
Volume Left	0	0	7
Volume Right	2	0	1
cSH	1700	811	134
Volume to Capacity	0.43	0.00	0.06
Queue Length 95th (ft)	0	0	4
Control Delay (s)	0.0	0.0	33.4
Lane LOS			D
Approach Delay (s)	0.0	0.0	33.4
Approach LOS			D

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	667	6	6	600	8	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	725	7	7	652	9	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	918					
pX, platoon unblocked			0.74		0.74	0.74
vC, conflicting volume			732		1393	728
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			464		1356	460
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		93	98
cM capacity (veh/h)			814		121	446

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	732	659	17
Volume Left	0	7	9
Volume Right	7	0	9
cSH	1700	814	190
Volume to Capacity	0.43	0.01	0.09
Queue Length 95th (ft)	0	1	7
Control Delay (s)	0.0	0.2	25.8
Lane LOS		A	D
Approach Delay (s)	0.0	0.2	25.8
Approach LOS			D

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	141	36	38	216	21	47
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	153	39	41	235	23	51
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			718			
pX, platoon unblocked						
vC, conflicting volume	255	159			276	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	255	159			276	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	79	96			98	
cM capacity (veh/h)	720	887			1287	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	192	276	74
Volume Left	153	0	23
Volume Right	39	235	0
cSH	749	1700	1287
Volume to Capacity	0.26	0.16	0.02
Queue Length 95th (ft)	26	0	1
Control Delay (s)	11.5	0.0	2.5
Lane LOS	B		A
Approach Delay (s)	11.5	0.0	2.5
Approach LOS	B		

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	37.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	166	590	32	8	567	42	32	55	11	62	89	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.97		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1848		1770	1843		1770	1816		1770	1661	
Flt Permitted	0.28	1.00		0.27	1.00		0.37	1.00		0.71	1.00	
Satd. Flow (perm)	526	1848		507	1843		694	1816		1323	1661	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	180	641	35	9	616	46	35	60	12	67	97	252
RTOR Reduction (vph)	0	3	0	0	4	0	0	8	0	0	107	0
Lane Group Flow (vph)	180	673	0	9	658	0	35	64	0	67	242	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	27.0	27.0		27.0	27.0		13.6	13.6		13.6	13.6	
Effective Green, g (s)	27.0	27.0		27.0	27.0		13.6	13.6		13.6	13.6	
Actuated g/C Ratio	0.56	0.56		0.56	0.56		0.28	0.28		0.28	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	292	1026		281	1023		194	508		370	464	
v/s Ratio Prot		c0.36			0.36			0.04			c0.15	
v/s Ratio Perm	0.34			0.02			0.05			0.05		
v/c Ratio	0.62	0.66		0.03	0.64		0.18	0.13		0.18	0.52	
Uniform Delay, d1	7.3	7.6		4.9	7.5		13.3	13.1		13.3	14.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.8	1.5		0.0	1.4		0.4	0.1		0.2	1.1	
Delay (s)	11.1	9.1		4.9	8.9		13.7	13.2		13.5	15.8	
Level of Service	B	A		A	A		B	B		B	B	
Approach Delay (s)		9.5			8.8			13.4			15.5	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	48.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	637	81	123	717	399	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	1863	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1770	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	692	88	134	779	434	160
RTOR Reduction (vph)	0	50	0	0	0	111
Lane Group Flow (vph)	692	38	134	779	434	49
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Actuated Green, G (s)	33.8	33.8	8.9	46.7	23.9	23.9
Effective Green, g (s)	33.8	33.8	8.9	46.7	23.9	23.9
Actuated g/C Ratio	0.43	0.43	0.11	0.59	0.30	0.30
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	801	680	200	1106	538	481
v/s Ratio Prot	c0.37		0.08	c0.42	c0.25	
v/s Ratio Perm		0.02				0.03
v/c Ratio	0.86	0.06	0.67	0.70	0.81	0.10
Uniform Delay, d1	20.3	13.1	33.4	11.1	25.2	19.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.6	0.0	8.5	2.1	8.6	0.1
Delay (s)	29.9	13.1	41.9	13.2	33.9	19.7
Level of Service	C	B	D	B	C	B
Approach Delay (s)	28.0			17.4	30.1	
Approach LOS	C			B	C	

Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	78.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	48	107	68	3	128	310	40	356	16	130	73	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.96			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected		0.99			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1767			1861	1583	1770	1851		1770	1769	
Flt Permitted		0.91			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1621			1851	1583	1770	1851		1770	1769	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	52	116	74	3	139	337	43	387	17	141	79	40
RTOR Reduction (vph)	0	18	0	0	0	251	0	2	0	0	20	0
Lane Group Flow (vph)	0	224	0	0	142	86	43	402	0	141	99	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		13.9			13.9	13.9	1.8	20.6		8.1	26.9	
Effective Green, g (s)		13.9			13.9	13.9	1.8	20.6		8.1	26.9	
Actuated g/C Ratio		0.25			0.25	0.25	0.03	0.38		0.15	0.49	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		412			471	402	58	698		262	871	
v/s Ratio Prot							0.02	c0.22		c0.08	0.06	
v/s Ratio Perm		c0.14			0.08	0.05						
v/c Ratio		0.54			0.30	0.21	0.74	0.58		0.54	0.11	
Uniform Delay, d1		17.6			16.4	16.0	26.2	13.5		21.5	7.4	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.5			0.4	0.3	39.6	1.2		2.1	0.1	
Delay (s)		19.1			16.8	16.3	65.7	14.7		23.6	7.5	
Level of Service		B			B	B	E	B		C	A	
Approach Delay (s)		19.1			16.5			19.6			16.3	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	54.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	44	215	373	65	93	49
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	48	234	405	71	101	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1202				
pX, platoon unblocked						
vC, conflicting volume	476				735	405
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	476				735	405
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				73	92
cM capacity (veh/h)	1086				370	645

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	48	234	405	71	154
Volume Left	48	0	0	0	101
Volume Right	0	0	0	71	53
cSH	1086	1700	1700	1700	434
Volume to Capacity	0.04	0.14	0.24	0.04	0.36
Queue Length 95th (ft)	3	0	0	0	40
Control Delay (s)	8.5	0.0	0.0	0.0	17.8
Lane LOS	A				C
Approach Delay (s)	1.4		0.0		17.8
Approach LOS					C

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	325	12	6	443	17	16	1	5	4	0	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	353	13	7	482	18	17	1	5	4	0	9
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					1209							
pX, platoon unblocked												
vC, conflicting volume	500			366			880	890	360	880	888	491
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	500			366			880	890	360	880	888	491
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			93	100	99	98	100	98
cM capacity (veh/h)	1064			1192			261	278	685	262	279	578

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	9	366	7	500	24	13
Volume Left	9	0	7	0	17	4
Volume Right	0	13	0	18	5	9
cSH	1064	1700	1192	1700	304	412
Volume to Capacity	0.01	0.22	0.01	0.29	0.08	0.03
Queue Length 95th (ft)	1	0	0	0	6	2
Control Delay (s)	8.4	0.0	8.0	0.0	17.8	14.0
Lane LOS	A		A		C	B
Approach Delay (s)	0.2		0.1		17.8	14.0
Approach LOS					C	B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	221	128	35	283	21	210	180	54	9	114	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.96			0.99			0.98			0.97	
Flt Protected		0.99			0.99			0.98			1.00	
Satd. Flow (prot)		1771			1838			1790			1795	
Flt Permitted		0.91			0.94			0.78			0.97	
Satd. Flow (perm)		1628			1734			1435			1754	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	240	139	38	308	23	228	196	59	10	124	45
RTOR Reduction (vph)	0	18	0	0	2	0	0	6	0	0	14	0
Lane Group Flow (vph)	0	426	0	0	367	0	0	477	0	0	165	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		21.5			21.5			26.4			26.4	
Effective Green, g (s)		21.5			21.5			26.4			26.4	
Actuated g/C Ratio		0.38			0.38			0.47			0.47	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		626			666			677			828	
v/s Ratio Prot												
v/s Ratio Perm		c0.26			0.21			c0.33			0.09	
v/c Ratio		0.68			0.55			0.70			0.20	
Uniform Delay, d1		14.3			13.4			11.7			8.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.9			1.0			3.3			0.1	
Delay (s)		17.3			14.4			15.0			8.7	
Level of Service		B			B			B			A	
Approach Delay (s)		17.3			14.4			15.0			8.7	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	55.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	37	304	529	655	297	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.93		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1810	1701		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1810	1701		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	330	575	712	323	18
RTOR Reduction (vph)	0	0	53	0	0	14
Lane Group Flow (vph)	40	330	1234	0	323	4
Heavy Vehicles (%)	2%	5%	5%	2%	2%	2%
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	2.3	54.5	48.2		15.8	15.8
Effective Green, g (s)	2.3	54.5	48.2		15.8	15.8
Actuated g/C Ratio	0.03	0.70	0.62		0.20	0.20
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	51	1259	1047		357	319
v/s Ratio Prot	c0.02	0.18	c0.73		c0.18	
v/s Ratio Perm						0.00
v/c Ratio	0.78	0.26	1.18		0.90	0.01
Uniform Delay, d1	37.8	4.4	15.0		30.5	25.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	53.8	0.1	90.3		25.3	0.0
Delay (s)	91.6	4.5	105.3		55.8	25.0
Level of Service	F	A	F		E	C
Approach Delay (s)		13.9	105.3		54.2	
Approach LOS		B	F		D	

Intersection Summary			
HCM 2000 Control Delay	79.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	78.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	251	223	27	83	12	392	93	76	7	45	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.98		1.00	0.93		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3290		1770	3472		1770	1737		1770	1779	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3290		1770	3472		1770	1737		1770	1779	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	273	242	29	90	13	426	101	83	8	49	21
RTOR Reduction (vph)	0	168	0	0	10	0	0	39	0	0	19	0
Lane Group Flow (vph)	45	347	0	29	93	0	426	145	0	8	51	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	2.8	13.4		1.4	12.0		19.5	24.3		0.5	5.3	
Effective Green, g (s)	2.8	13.4		1.4	12.0		19.5	24.3		0.5	5.3	
Actuated g/C Ratio	0.05	0.24		0.03	0.22		0.35	0.44		0.01	0.10	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	89	792		44	749		620	759		15	169	
v/s Ratio Prot	c0.03	c0.11		0.02	0.03		c0.24	0.08		0.00	c0.03	
v/s Ratio Perm												
v/c Ratio	0.51	0.44		0.66	0.12		0.69	0.19		0.53	0.30	
Uniform Delay, d1	25.7	17.9		26.9	17.6		15.4	9.6		27.4	23.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.5	0.4		30.4	0.1		3.2	0.1		31.9	1.0	
Delay (s)	30.2	18.3		57.2	17.6		18.6	9.7		59.3	24.4	
Level of Service	C	B		E	B		B	A		E	C	
Approach Delay (s)		19.3			26.3			15.9			28.0	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	55.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	195	195	191	24	410	115	125	430	84	103	261	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.93		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3276		1770	3423		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3276		1770	3423		3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	212	212	208	26	446	125	136	467	91	112	284	47
RTOR Reduction (vph)	0	112	0	0	27	0	0	0	71	0	0	37
Lane Group Flow (vph)	212	308	0	26	544	0	136	467	20	112	284	10
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	14.0	32.4		1.6	20.0		5.2	15.6	15.6	4.4	14.8	14.8
Effective Green, g (s)	14.0	32.4		1.6	20.0		5.2	15.6	15.6	4.4	14.8	14.8
Actuated g/C Ratio	0.20	0.46		0.02	0.29		0.07	0.22	0.22	0.06	0.21	0.21
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	354	1516		40	978		255	788	352	215	748	334
v/s Ratio Prot	c0.12	0.09		0.01	c0.16		c0.04	c0.13		0.03	0.08	
v/s Ratio Perm									0.01			0.01
v/c Ratio	0.60	0.20		0.65	0.56		0.53	0.59	0.06	0.52	0.38	0.03
Uniform Delay, d1	25.4	11.1		33.9	21.2		31.2	24.4	21.4	31.8	23.7	21.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.7	0.1		32.0	0.7		2.1	1.2	0.1	2.3	0.3	0.0
Delay (s)	28.2	11.2		65.9	21.9		33.4	25.6	21.5	34.0	24.0	21.9
Level of Service	C	B		E	C		C	C	C	C	C	C
Approach Delay (s)		16.9			23.8			26.6			26.3	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	37	493	784	43	331	411
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.88	0.95		0.97	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	2787	3511		3433	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	2787	3511		3433	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	536	852	47	360	447
RTOR Reduction (vph)	0	460	5	0	0	0
Lane Group Flow (vph)	40	76	894	0	360	447
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	7.6	7.6	22.5		11.7	38.2
Effective Green, g (s)	7.6	7.6	22.5		11.7	38.2
Actuated g/C Ratio	0.14	0.14	0.42		0.22	0.71
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	250	393	1468		746	2512
v/s Ratio Prot	0.02		c0.25		c0.10	0.13
v/s Ratio Perm		c0.03				
v/c Ratio	0.16	0.19	0.61		0.48	0.18
Uniform Delay, d1	20.3	20.4	12.2		18.4	2.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.2	0.7		0.5	0.0
Delay (s)	20.6	20.6	12.9		18.9	2.6
Level of Service	C	C	B		B	A
Approach Delay (s)	20.6		12.9			9.9
Approach LOS	C		B			A

Intersection Summary			
HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	53.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	301	591	126	28	796	55	168	620	123	78	435	555
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3505		1770	3451		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3505		1770	3451		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	327	642	137	30	865	60	183	674	134	85	473	603
RTOR Reduction (vph)	0	0	71	0	6	0	0	18	0	0	0	121
Lane Group Flow (vph)	327	642	66	30	919	0	183	790	0	85	473	482
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	9.0	31.7	31.7	2.9	25.6		10.0	33.3		6.9	30.2	30.2
Effective Green, g (s)	9.0	31.7	31.7	2.9	25.6		10.0	33.3		6.9	30.2	30.2
Actuated g/C Ratio	0.10	0.35	0.35	0.03	0.28		0.11	0.37		0.08	0.33	0.33
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	340	1235	552	56	988		194	1265		134	1177	526
v/s Ratio Prot	c0.10	0.18		0.02	c0.26		c0.10	c0.23		0.05	0.13	
v/s Ratio Perm			0.04									c0.30
v/c Ratio	0.96	0.52	0.12	0.54	0.93		0.94	0.62		0.63	0.40	0.92
Uniform Delay, d1	40.7	23.5	20.1	43.3	31.7		40.1	23.6		40.7	23.3	29.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	38.5	0.4	0.1	9.5	14.7		48.3	1.0		9.4	0.2	20.8
Delay (s)	79.2	23.9	20.2	52.8	46.4		88.4	24.6		50.2	23.6	49.8
Level of Service	E	C	C	D	D		F	C		D	C	D
Approach Delay (s)		39.8			46.6			36.4			39.2	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	40.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	90.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	360	44	46	1156	1013	1082
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	0.95	0.91	0.88
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	1770	3539	5085	2787
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	1770	3539	5085	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	391	48	50	1257	1101	1176
RTOR Reduction (vph)	0	37	0	0	0	0
Lane Group Flow (vph)	391	11	50	1257	1101	1176
Turn Type	Prot	Perm	Prot	NA	NA	Free
Protected Phases	4		5	2	6	
Permitted Phases		4				Free
Actuated Green, G (s)	11.6	11.6	4.0	32.0	24.0	51.6
Effective Green, g (s)	11.6	11.6	4.0	32.0	24.0	51.6
Actuated g/C Ratio	0.22	0.22	0.08	0.62	0.47	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	771	355	137	2194	2365	2787
v/s Ratio Prot	0.11		0.03	c0.36	0.22	
v/s Ratio Perm		0.01				c0.42
v/c Ratio	0.51	0.03	0.36	0.57	0.47	0.42
Uniform Delay, d1	17.5	15.6	22.6	5.8	9.4	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.0	1.7	0.4	0.1	0.5
Delay (s)	18.0	15.6	24.2	6.1	9.6	0.5
Level of Service	B	B	C	A	A	A
Approach Delay (s)	17.8			6.8	4.9	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	51.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	622	49	19	9	94	361	11	1094	16	88	1205	540
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		1.00			0.90		1.00	1.00		1.00	0.95	
Flt Protected		0.96			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1776			1666		1770	3532		1770	3375	
Flt Permitted		0.37			0.99		0.12	1.00		0.95	1.00	
Satd. Flow (perm)		693			1643		231	3532		1770	3375	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	676	53	21	10	102	392	12	1189	17	96	1310	587
RTOR Reduction (vph)	0	1	0	0	71	0	0	1	0	0	52	0
Lane Group Flow (vph)	0	749	0	0	433	0	12	1205	0	96	1845	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		45.0			45.0		33.0	32.2		4.0	35.4	
Effective Green, g (s)		45.0			45.0		33.0	32.2		4.0	35.4	
Actuated g/C Ratio		0.48			0.48		0.35	0.35		0.04	0.38	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		334			793		95	1220		75	1281	
v/s Ratio Prot							0.00	0.34		c0.05	c0.55	
v/s Ratio Perm		c1.08			0.26		0.04					
v/c Ratio		2.24			0.55		0.13	0.99		1.28	1.44	
Uniform Delay, d1		24.1			16.9		23.9	30.3		44.6	28.9	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		568.6			0.8		0.6	22.5		196.4	202.6	
Delay (s)		592.7			17.7		24.5	52.8		241.0	231.5	
Level of Service		F			B		C	D		F	F	
Approach Delay (s)		592.7			17.7			52.5			231.9	
Approach LOS		F			B			D			F	

Intersection Summary			
HCM 2000 Control Delay	219.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.90		
Actuated Cycle Length (s)	93.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	133.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	316	34	4	125	147	254	33	1860	124	23	1701	472
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		1.00			0.93			0.99			0.97	
Flt Protected		0.96			0.99			1.00			1.00	
Satd. Flow (prot)		1781			1721			3504			3423	
Flt Permitted		0.34			0.87			0.64			0.68	
Satd. Flow (perm)		629			1521			2229			2334	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	343	37	4	136	160	276	36	2022	135	25	1849	513
RTOR Reduction (vph)	0	1	0	0	5	0	0	5	0	0	28	0
Lane Group Flow (vph)	0	383	0	0	567	0	0	2188	0	0	2359	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		32.0			32.0			50.0			50.0	
Effective Green, g (s)		32.0			32.0			50.0			50.0	
Actuated g/C Ratio		0.36			0.36			0.56			0.56	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		223			540			1238			1296	
v/s Ratio Prot												
v/s Ratio Perm		c0.61			0.37			0.98			c1.01	
v/c Ratio		1.72			1.05			1.77			1.82	
Uniform Delay, d1		29.0			29.0			20.0			20.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		341.9			52.8			348.5			372.3	
Delay (s)		370.9			81.8			368.5			392.3	
Level of Service		F			F			F			F	
Approach Delay (s)		370.9			81.8			368.5			392.3	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	349.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.78		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	138.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	916	205	490	693	299	139	202	441	205	308	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3379			1826	1583		1826	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.34	1.00		0.53	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3379			641	1583		996	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	996	223	533	753	325	151	220	479	223	335	12
RTOR Reduction (vph)	0	0	0	0	36	0	0	0	262	0	0	7
Lane Group Flow (vph)	11	996	223	533	1042	0	0	371	217	0	558	5
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			Free				2		2	6		6
Actuated Green, G (s)	1.6	31.4	132.4	29.0	58.8			60.0	60.0		60.0	60.0
Effective Green, g (s)	1.6	31.4	132.4	29.0	58.8			60.0	60.0		60.0	60.0
Actuated g/C Ratio	0.01	0.24	1.00	0.22	0.44			0.45	0.45		0.45	0.45
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	21	839	1583	387	1500			290	717		451	717
v/s Ratio Prot	0.01	c0.28		c0.30	0.31							
v/s Ratio Perm			0.14					c0.58	0.14		0.56	0.00
v/c Ratio	0.52	1.19	0.14	1.38	0.69			1.28	0.30		1.24	0.01
Uniform Delay, d1	65.0	50.5	0.0	51.7	29.6			36.2	22.9		36.2	19.9
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	21.6	96.1	0.2	185.3	1.4			149.6	0.2		124.6	0.0
Delay (s)	86.6	146.6	0.2	237.0	31.0			185.8	23.2		160.8	19.9
Level of Service	F	F	A	F	C			F	C		F	B
Approach Delay (s)		119.5			99.2			94.2			157.8	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	111.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	132.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	111.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	568	157	217	0	0	0	0	405	267	751	497	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Lane Util. Factor	0.91	0.91	1.00					0.91		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.89					0.96		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00		1.00	1.00	
Frt	1.00	1.00	0.85					0.94		1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1610	3284	1408					4572		3433	1863	
Flt Permitted	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1610	3284	1408					4572		3433	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	617	171	236	0	0	0	0	440	290	816	540	0
RTOR Reduction (vph)	0	0	173	0	0	0	0	103	0	0	0	0
Lane Group Flow (vph)	308	480	63	0	0	0	0	627	0	816	540	0
Confl. Peds. (#/hr)			75						75			
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	19.1	19.1	19.1					30.1		10.5	44.6	
Effective Green, g (s)	19.1	19.1	19.1					30.1		10.5	44.6	
Actuated g/C Ratio	0.27	0.27	0.27					0.42		0.15	0.62	
Clearance Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)	428	874	375					1919		502	1158	
v/s Ratio Prot	c0.19	0.15						0.14		c0.24	c0.29	
v/s Ratio Perm			0.04									
v/c Ratio	0.72	0.55	0.17					0.33		1.63	0.47	
Uniform Delay, d1	23.9	22.6	20.2					14.0		30.6	7.2	
Progression Factor	1.00	1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2	5.7	0.7	0.2					0.5		290.5	0.3	
Delay (s)	29.6	23.3	20.4					14.4		321.1	7.5	
Level of Service	C	C	C					B		F	A	
Approach Delay (s)		24.5			0.0			14.4			196.2	
Approach LOS		C			A			B			F	

Intersection Summary			
HCM 2000 Control Delay	97.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	71.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	634	0	0	0	0	0	879	1757	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0			
Lane Util. Factor		0.91						0.91	0.88			
Frpb, ped/bikes		1.00						1.00	1.00			
Flpb, ped/bikes		0.99						1.00	1.00			
Frt		1.00						1.00	0.85			
Flt Protected		1.00						1.00	1.00			
Satd. Flow (prot)		4390						5085	2787			
Flt Permitted		1.00						1.00	1.00			
Satd. Flow (perm)		4390						5085	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	66	689	0	0	0	0	0	955	1910	0	0	0
RTOR Reduction (vph)	0	19	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	736	0	0	0	0	0	955	1910	0	0	0
Confl. Peds. (#/hr)	67		36	36		67	41		51	51		41
Heavy Vehicles (%)	5%	18%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA						NA	Prot			
Protected Phases		2						1	1			
Permitted Phases	2											
Actuated Green, G (s)		16.0						36.0	36.0			
Effective Green, g (s)		16.0						36.0	36.0			
Actuated g/C Ratio		0.27						0.60	0.60			
Clearance Time (s)		4.0						4.0	4.0			
Lane Grp Cap (vph)		1170						3051	1672			
v/s Ratio Prot								0.19	c0.69			
v/s Ratio Perm		0.17										
v/c Ratio		0.63						0.31	1.14			
Uniform Delay, d1		19.4						5.9	12.0			
Progression Factor		1.00						1.00	1.00			
Incremental Delay, d2		2.6						0.3	71.8			
Delay (s)		22.0						6.2	83.8			
Level of Service		C						A	F			
Approach Delay (s)		22.0			0.0			57.9			0.0	
Approach LOS		C			A			E			A	

Intersection Summary			
HCM 2000 Control Delay	50.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	118	39	77	123	76	20	927	48	28	510	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			0.95		1.00	0.95	
Frt		0.98			0.96			0.99		1.00	0.98	
Flt Protected		0.98			0.99			1.00		0.95	1.00	
Satd. Flow (prot)		1787			1769			3510		1770	3473	
Flt Permitted		0.69			0.84			0.94		0.17	1.00	
Satd. Flow (perm)		1268			1515			3295		318	3473	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	128	42	84	134	83	22	1008	52	30	554	79
RTOR Reduction (vph)	0	6	0	0	17	0	0	4	0	0	12	0
Lane Group Flow (vph)	0	327	0	0	284	0	0	1078	0	30	621	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		22.6			22.6			28.7		28.7	28.7	
Effective Green, g (s)		22.6			22.6			28.7		28.7	28.7	
Actuated g/C Ratio		0.38			0.38			0.48		0.48	0.48	
Clearance Time (s)		4.0			4.0			4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		483			577			1594		153	1680	
v/s Ratio Prot											0.18	
v/s Ratio Perm		c0.26			0.19			c0.33		0.09		
v/c Ratio		0.68			0.49			0.68		0.20	0.37	
Uniform Delay, d1		15.3			14.0			11.7		8.7	9.6	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		3.7			0.7			1.2		0.6	0.1	
Delay (s)		19.0			14.6			12.9		9.4	9.8	
Level of Service		B			B			B		A	A	
Approach Delay (s)		19.0			14.6			12.9			9.7	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	59.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	574	42	13	239	31	14	855	24	8	629	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frt	1.00	0.99			0.99			1.00			0.99	
Flt Protected	0.95	1.00			1.00			1.00			1.00	
Satd. Flow (prot)	1770	1844			1831			3522			3502	
Flt Permitted	0.54	1.00			0.97			0.94			0.94	
Satd. Flow (perm)	998	1844			1777			3317			3304	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	245	624	46	14	260	34	15	929	26	9	684	49
RTOR Reduction (vph)	0	3	0	0	5	0	0	2	0	0	6	0
Lane Group Flow (vph)	245	667	0	0	303	0	0	968	0	0	736	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	32.2	32.2			32.2			28.4			28.4	
Effective Green, g (s)	32.2	32.2			32.2			28.4			28.4	
Actuated g/C Ratio	0.47	0.47			0.47			0.41			0.41	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	468	865			834			1373			1367	
v/s Ratio Prot		c0.36										
v/s Ratio Perm	0.25				0.17			c0.29			0.22	
v/c Ratio	0.52	0.77			0.36			0.70			0.54	
Uniform Delay, d1	12.8	15.1			11.6			16.6			15.2	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	1.1	4.3			0.3			1.7			0.4	
Delay (s)	13.9	19.4			11.9			18.3			15.6	
Level of Service	B	B			B			B			B	
Approach Delay (s)		17.9			11.9			18.3			15.6	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	68.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	11	1267	70	176	305	0	0	146	1524
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				1.00	1.00	1.00	1.00	1.00			0.95	0.95
Frpb, ped/bikes				1.00	1.00	0.94	1.00	1.00			0.97	0.98
Flpb, ped/bikes				0.96	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			0.88	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1703	1863	1493	1770	1863			1506	1477
Flt Permitted				0.95	1.00	1.00	0.16	1.00			1.00	1.00
Satd. Flow (perm)				1703	1863	1493	298	1863			1506	1477
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	12	1377	76	191	332	0	0	159	1657
RTOR Reduction (vph)	0	0	0	0	0	36	0	0	0	0	9	0
Lane Group Flow (vph)	0	0	0	12	1377	40	191	332	0	0	912	895
Confl. Peds. (#/hr)				20		20	10					20
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Free
Protected Phases					8			2			6	
Permitted Phases				8		8	2					Free
Actuated Green, G (s)				27.0	27.0	27.0	25.0	25.0			25.0	60.0
Effective Green, g (s)				27.0	27.0	27.0	25.0	25.0			25.0	60.0
Actuated g/C Ratio				0.45	0.45	0.45	0.42	0.42			0.42	1.00
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				766	838	671	124	776			627	1477
v/s Ratio Prot					c0.74			0.18			0.61	
v/s Ratio Perm				0.01		0.03	c0.64					0.61
v/c Ratio				0.02	1.64	0.06	1.54	0.43			1.45	0.61
Uniform Delay, d1				9.1	16.5	9.3	17.5	12.4			17.5	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.0	294.8	0.0	279.2	0.4			213.5	1.9
Delay (s)				9.1	311.3	9.4	296.7	12.8			231.0	1.9
Level of Service				A	F	A	F	B			F	A
Approach Delay (s)		0.0			293.2			116.5			118.1	
Approach LOS		A			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	185.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.59		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	126.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	669	7	1	445	4	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	727	8	1	484	4	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	445					
pX, platoon unblocked			0.74		0.74	0.74
vC, conflicting volume			735		1217	731
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			464		1117	459
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	100
cM capacity (veh/h)			810		169	445

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	735	485	5
Volume Left	0	1	4
Volume Right	8	0	1
cSH	1700	810	193
Volume to Capacity	0.43	0.00	0.03
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.0	24.2
Lane LOS		A	C
Approach Delay (s)	0.0	0.0	24.2
Approach LOS			C

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	667	3	3	441	5	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	725	3	3	479	5	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	918					
pX, platoon unblocked			0.76		0.76	0.76
vC, conflicting volume			728		1212	727
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			480		1120	477
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	99
cM capacity (veh/h)			819		172	445

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	728	483	11
Volume Left	0	3	5
Volume Right	3	0	5
cSH	1700	819	248
Volume to Capacity	0.43	0.00	0.04
Queue Length 95th (ft)	0	0	3
Control Delay (s)	0.0	0.1	20.2
Lane LOS		A	C
Approach Delay (s)	0.0	0.1	20.2
Approach LOS			C

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	261	32	35	138	24	39
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	284	35	38	150	26	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			718			
pX, platoon unblocked						
vC, conflicting volume	208	113			188	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	208	113			188	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	63	96			98	
cM capacity (veh/h)	766	940			1386	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	318	188	68
Volume Left	284	0	26
Volume Right	35	150	0
cSH	782	1700	1386
Volume to Capacity	0.41	0.11	0.02
Queue Length 95th (ft)	50	0	1
Control Delay (s)	12.7	0.0	3.0
Lane LOS	B		A
Approach Delay (s)	12.7	0.0	3.0
Approach LOS	B		

Intersection Summary			
Average Delay	7.4		
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	547	53	15	330	85	72	113	17	96	114	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.97		1.00	0.98		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1838		1770	1806		1770	1827		1770	1655	
Flt Permitted	0.42	1.00		0.26	1.00		0.23	1.00		0.67	1.00	
Satd. Flow (perm)	780	1838		486	1806		426	1827		1243	1655	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	293	595	58	16	359	92	78	123	18	104	124	359
RTOR Reduction (vph)	0	4	0	0	11	0	0	6	0	0	120	0
Lane Group Flow (vph)	293	649	0	16	440	0	78	135	0	104	363	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	31.0	31.0		31.0	31.0		19.4	19.4		19.4	19.4	
Effective Green, g (s)	31.0	31.0		31.0	31.0		19.4	19.4		19.4	19.4	
Actuated g/C Ratio	0.53	0.53		0.53	0.53		0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	414	975		257	958		141	606		412	549	
v/s Ratio Prot		0.35			0.24			0.07			c0.22	
v/s Ratio Perm	c0.38			0.03			0.18			0.08		
v/c Ratio	0.71	0.67		0.06	0.46		0.55	0.22		0.25	0.66	
Uniform Delay, d1	10.3	9.9		6.6	8.5		16.0	14.1		14.2	16.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.5	1.7		0.1	0.4		4.6	0.2		0.3	3.0	
Delay (s)	15.8	11.7		6.7	8.9		20.6	14.3		14.5	19.7	
Level of Service	B	B		A	A		C	B		B	B	
Approach Delay (s)		12.9			8.8			16.5			18.8	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	58.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	777	432	118	616	343	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	1863	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1770	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	845	470	128	670	373	115
RTOR Reduction (vph)	0	232	0	0	0	86
Lane Group Flow (vph)	845	238	128	670	373	29
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Actuated Green, G (s)	42.5	42.5	8.1	54.6	21.2	21.2
Effective Green, g (s)	42.5	42.5	8.1	54.6	21.2	21.2
Actuated g/C Ratio	0.51	0.51	0.10	0.65	0.25	0.25
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	944	802	171	1213	447	400
v/s Ratio Prot	c0.45		c0.07	0.36	c0.21	
v/s Ratio Perm		0.15				0.02
v/c Ratio	0.90	0.30	0.75	0.55	0.83	0.07
Uniform Delay, d1	18.6	12.0	36.9	7.9	29.6	23.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.9	0.2	16.3	0.5	12.6	0.1
Delay (s)	29.5	12.2	53.2	8.5	42.3	23.9
Level of Service	C	B	D	A	D	C
Approach Delay (s)	23.3			15.7	37.9	
Approach LOS	C			B	D	

Intersection Summary			
HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	83.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	206	37	14	216	371	51	92	11	380	258	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.98			1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected		0.99			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1817			1857	1583	1770	1833		1770	1809	
Flt Permitted		0.92			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1682			1812	1583	1770	1833		1770	1809	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	48	224	40	15	235	403	55	100	12	413	280	67
RTOR Reduction (vph)	0	6	0	0	0	283	0	5	0	0	11	0
Lane Group Flow (vph)	0	306	0	0	250	120	55	107	0	413	336	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		16.9			16.9	16.9	3.5	8.2		19.7	24.4	
Effective Green, g (s)		16.9			16.9	16.9	3.5	8.2		19.7	24.4	
Actuated g/C Ratio		0.30			0.30	0.30	0.06	0.14		0.35	0.43	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		500			539	470	109	264		613	777	
v/s Ratio Prot							0.03	0.06		c0.23	c0.19	
v/s Ratio Perm		c0.18			0.14	0.08						
v/c Ratio		0.61			0.46	0.26	0.50	0.40		0.67	0.43	
Uniform Delay, d1		17.1			16.3	15.2	25.8	22.1		15.8	11.4	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.2			0.6	0.3	3.6	1.0		2.9	0.4	
Delay (s)		19.4			16.9	15.5	29.5	23.1		18.7	11.7	
Level of Service		B			B	B	C	C		B	B	
Approach Delay (s)		19.4			16.0			25.2			15.5	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	56.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	66	616	618	121	126	68
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	72	670	672	132	137	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1202				
pX, platoon unblocked						
vC, conflicting volume	803				1485	672
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	803				1485	672
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				0	84
cM capacity (veh/h)	821				125	456

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	72	670	672	132	211
Volume Left	72	0	0	0	137
Volume Right	0	0	0	132	74
cSH	821	1700	1700	1700	168
Volume to Capacity	0.09	0.39	0.40	0.08	1.26
Queue Length 95th (ft)	7	0	0	0	299
Control Delay (s)	9.8	0.0	0.0	0.0	207.9
Lane LOS	A				F
Approach Delay (s)	0.9		0.0		207.9
Approach LOS					F

Intersection Summary			
Average Delay	25.4		
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	689	5	8	656	4	2	1	4	1	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	749	5	9	713	4	2	1	4	1	0	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					1209							
pX, platoon unblocked												
vC, conflicting volume	717			754			1498	1499	752	1499	1500	715
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	717			754			1498	1499	752	1499	1500	715
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			98	99	99	99	100	99
cM capacity (veh/h)	884			856			99	120	410	97	120	431

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	7	754	9	717	8	4
Volume Left	7	0	9	0	2	1
Volume Right	0	5	0	4	4	3
cSH	884	1700	856	1700	182	232
Volume to Capacity	0.01	0.44	0.01	0.42	0.04	0.02
Queue Length 95th (ft)	1	0	1	0	3	1
Control Delay (s)	9.1	0.0	9.2	0.0	25.6	20.8
Lane LOS	A		A		D	C
Approach Delay (s)	0.1		0.1		25.6	20.8
Approach LOS					D	C

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	53	373	81	56	163	5	204	124	43	28	158	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			0.98			0.94	
Flt Protected		0.99			0.99			0.97			1.00	
Satd. Flow (prot)		1813			1835			1784			1753	
Flt Permitted		0.94			0.81			0.62			0.95	
Satd. Flow (perm)		1722			1497			1142			1672	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	58	405	88	61	177	5	222	135	47	30	172	139
RTOR Reduction (vph)	0	8	0	0	1	0	0	6	0	0	30	0
Lane Group Flow (vph)	0	543	0	0	242	0	0	398	0	0	311	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		26.3			26.3			29.1			29.1	
Effective Green, g (s)		26.3			26.3			29.1			29.1	
Actuated g/C Ratio		0.41			0.41			0.46			0.46	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		714			620			524			767	
v/s Ratio Prot												
v/s Ratio Perm		c0.32			0.16			c0.35			0.19	
v/c Ratio		0.76			0.39			0.76			0.41	
Uniform Delay, d1		15.9			13.0			14.2			11.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		4.8			0.4			6.3			0.4	
Delay (s)		20.7			13.4			20.5			11.8	
Level of Service		C			B			C			B	
Approach Delay (s)		20.7			13.4			20.5			11.8	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	17.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	63.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	42	393	479	469	612	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.93		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1810	1713		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1810	1713		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	427	521	510	665	52
RTOR Reduction (vph)	0	0	39	0	0	34
Lane Group Flow (vph)	46	427	992	0	665	18
Heavy Vehicles (%)	2%	5%	5%	2%	2%	2%
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	3.1	50.2	43.1		31.0	31.0
Effective Green, g (s)	3.1	50.2	43.1		31.0	31.0
Actuated g/C Ratio	0.03	0.56	0.48		0.35	0.35
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	61	1018	827		615	550
v/s Ratio Prot	c0.03	0.24	c0.58		c0.38	
v/s Ratio Perm						0.01
v/c Ratio	0.75	0.42	1.20		1.08	0.03
Uniform Delay, d1	42.7	11.2	23.1		29.1	19.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	40.4	0.3	101.5		60.2	0.0
Delay (s)	83.1	11.4	124.5		89.3	19.2
Level of Service	F	B	F		F	B
Approach Delay (s)		18.4	124.5		84.2	
Approach LOS		B	F		F	

Intersection Summary			
HCM 2000 Control Delay	88.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	89.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	114	228	86	182	18	240	154	44	12	165	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	0.99		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3185		1770	3491		1770	1800		1770	1779	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3185		1770	3491		1770	1800		1770	1779	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	63	124	248	93	198	20	261	167	48	13	179	76
RTOR Reduction (vph)	0	209	0	0	9	0	0	11	0	0	17	0
Lane Group Flow (vph)	63	163	0	93	209	0	261	204	0	13	238	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.1	10.2		6.6	12.7		14.7	32.0		0.6	17.9	
Effective Green, g (s)	4.1	10.2		6.6	12.7		14.7	32.0		0.6	17.9	
Actuated g/C Ratio	0.06	0.16		0.10	0.19		0.22	0.49		0.01	0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	110	496		178	677		397	880		16	486	
v/s Ratio Prot	0.04	0.05		c0.05	c0.06		c0.15	0.11		0.01	c0.13	
v/s Ratio Perm												
v/c Ratio	0.57	0.33		0.52	0.31		0.66	0.23		0.81	0.49	
Uniform Delay, d1	29.8	24.6		27.9	22.6		23.1	9.6		32.3	19.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.0	0.4		2.8	0.3		3.9	0.1		132.2	0.8	
Delay (s)	36.8	24.9		30.7	22.8		27.0	9.8		164.5	20.7	
Level of Service	D	C		C	C		C	A		F	C	
Approach Delay (s)		26.7			25.2			19.2			27.7	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	65.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	448	262	329	48	380	129	324	125	40	131	538	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.92		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3244		1770	3405		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3244		1770	3405		3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	487	285	358	52	413	140	352	136	43	142	585	126
RTOR Reduction (vph)	0	183	0	0	36	0	0	0	35	0	0	100
Lane Group Flow (vph)	487	460	0	52	517	0	352	136	8	142	585	26
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	26.5	40.2		3.4	17.1		10.9	17.0	17.0	12.1	18.2	18.2
Effective Green, g (s)	26.5	40.2		3.4	17.1		10.9	17.0	17.0	12.1	18.2	18.2
Actuated g/C Ratio	0.30	0.45		0.04	0.19		0.12	0.19	0.19	0.14	0.21	0.21
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	528	1470		67	656		421	678	303	468	726	324
v/s Ratio Prot	c0.28	0.14		0.03	c0.15		c0.10	0.04		0.04	c0.17	
v/s Ratio Perm									0.01			0.02
v/c Ratio	0.92	0.31		0.78	0.79		0.84	0.20	0.03	0.30	0.81	0.08
Uniform Delay, d1	30.1	15.4		42.3	34.1		38.0	30.1	29.1	34.5	33.6	28.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	21.8	0.1		42.0	6.2		13.4	0.1	0.0	0.4	6.5	0.1
Delay (s)	51.9	15.6		84.2	40.3		51.5	30.3	29.2	34.9	40.1	28.6
Level of Service	D	B		F	D		D	C	C	C	D	C
Approach Delay (s)		31.2			44.1			44.2			37.5	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	37.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	88.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	213	338	571	90	408	1155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.88	0.95		0.97	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	2787	3467		3433	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	2787	3467		3433	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	232	367	621	98	443	1255
RTOR Reduction (vph)	0	280	15	0	0	0
Lane Group Flow (vph)	232	87	704	0	443	1255
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	14.3	14.3	20.2		13.9	38.1
Effective Green, g (s)	14.3	14.3	20.2		13.9	38.1
Actuated g/C Ratio	0.24	0.24	0.33		0.23	0.63
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	419	659	1159		790	2232
v/s Ratio Prot	c0.13		0.20		0.13	c0.35
v/s Ratio Perm		0.03				
v/c Ratio	0.55	0.13	0.61		0.56	0.56
Uniform Delay, d1	20.2	18.2	16.8		20.6	6.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.6	0.1	0.9		0.9	0.3
Delay (s)	21.8	18.3	17.7		21.5	6.7
Level of Service	C	B	B		C	A
Approach Delay (s)	19.6		17.7			10.6
Approach LOS	B		B			B

Intersection Summary			
HCM 2000 Control Delay	14.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	60.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	257	940	220	61	699	254	124	441	233	180	856	426
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3398		1770	3356		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3398		1770	3356		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	279	1022	239	66	760	276	135	479	253	196	930	463
RTOR Reduction (vph)	0	0	73	0	41	0	0	77	0	0	0	153
Lane Group Flow (vph)	279	1022	166	66	995	0	135	655	0	196	930	310
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	9.0	33.7	33.7	4.8	29.5		8.8	23.1		12.4	26.7	26.7
Effective Green, g (s)	9.0	33.7	33.7	4.8	29.5		8.8	23.1		12.4	26.7	26.7
Actuated g/C Ratio	0.10	0.37	0.37	0.05	0.33		0.10	0.26		0.14	0.30	0.30
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	343	1325	592	94	1113		173	861		243	1049	469
v/s Ratio Prot	c0.08	0.29		0.04	c0.29		0.08	0.20		c0.11	c0.26	
v/s Ratio Perm			0.11									0.20
v/c Ratio	0.81	0.77	0.28	0.70	0.89		0.78	0.76		0.81	0.89	0.66
Uniform Delay, d1	39.7	24.8	19.7	41.9	28.8		39.7	30.9		37.6	30.2	27.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	13.7	2.8	0.3	21.1	9.4		20.0	4.0		17.5	9.2	3.5
Delay (s)	53.4	27.6	19.9	63.0	38.2		59.7	34.9		55.1	39.4	31.2
Level of Service	D	C	B	E	D		E	C		E	D	C
Approach Delay (s)		31.1			39.6			38.8			38.9	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	36.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	659	354	116	832	1570	763
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	0.95	0.91	0.88
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	1770	3539	5085	2787
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	1770	3539	5085	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	716	385	126	904	1707	829
RTOR Reduction (vph)	0	184	0	0	0	0
Lane Group Flow (vph)	716	201	126	904	1707	829
Turn Type	Prot	Perm	Prot	NA	NA	Free
Protected Phases	4		5	2	6	
Permitted Phases		4				Free
Actuated Green, G (s)	22.8	22.8	8.3	50.8	38.5	81.6
Effective Green, g (s)	22.8	22.8	8.3	50.8	38.5	81.6
Actuated g/C Ratio	0.28	0.28	0.10	0.62	0.47	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	959	442	180	2203	2399	2787
v/s Ratio Prot	c0.21		c0.07	0.26	c0.34	
v/s Ratio Perm		0.13				0.30
v/c Ratio	0.75	0.45	0.70	0.41	0.71	0.30
Uniform Delay, d1	26.8	24.3	35.4	7.8	17.1	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.2	0.7	11.3	0.1	1.0	0.3
Delay (s)	30.0	25.0	46.7	7.9	18.2	0.3
Level of Service	C	C	D	A	B	A
Approach Delay (s)	28.2			12.7	12.3	
Approach LOS	C			B	B	

Intersection Summary			
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	81.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	660	87	35	9	94	104	29	1418	29	265	1041	428
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.99			0.93		1.00	1.00		1.00	0.96	
Flt Protected		0.96			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1777			1733		1770	3528		1770	3385	
Flt Permitted		0.58			0.96		0.13	1.00		0.95	1.00	
Satd. Flow (perm)		1078			1673		243	3528		1770	3385	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	717	95	38	10	102	113	32	1541	32	288	1132	465
RTOR Reduction (vph)	0	2	0	0	41	0	0	1	0	0	47	0
Lane Group Flow (vph)	0	848	0	0	184	0	32	1572	0	288	1550	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		41.0			41.0		33.0	30.6		8.0	36.2	
Effective Green, g (s)		41.0			41.0		33.0	30.6		8.0	36.2	
Actuated g/C Ratio		0.45			0.45		0.36	0.33		0.09	0.40	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		482			748		127	1178		154	1337	
v/s Ratio Prot							0.01	c0.45		c0.16	0.46	
v/s Ratio Perm		c0.79			0.11		0.08					
v/c Ratio		1.76			0.25		0.25	1.33		1.87	1.16	
Uniform Delay, d1		25.3			15.7		23.0	30.5		41.8	27.7	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		350.5			0.2		1.0	156.3		415.2	80.4	
Delay (s)		375.8			15.9		24.1	186.8		457.0	108.1	
Level of Service		F			B		C	F		F	F	
Approach Delay (s)		375.8			15.9			183.5			161.4	
Approach LOS		F			B			F			F	

Intersection Summary			
HCM 2000 Control Delay	201.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.61		
Actuated Cycle Length (s)	91.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	123.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	249	152	19	136	222	209	8	1942	211	25	1616	660
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.99			0.95			0.99			0.96	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1798			1749			3487			3385	
Flt Permitted		0.41			0.82			0.79			0.67	
Satd. Flow (perm)		762			1453			2738			2279	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	271	165	21	148	241	227	9	2111	229	27	1757	717
RTOR Reduction (vph)	0	2	0	0	4	0	0	9	0	0	48	0
Lane Group Flow (vph)	0	455	0	0	612	0	0	2340	0	0	2453	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		31.0			31.0			51.0			51.0	
Effective Green, g (s)		31.0			31.0			51.0			51.0	
Actuated g/C Ratio		0.34			0.34			0.57			0.57	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		262			500			1551			1291	
v/s Ratio Prot												
v/s Ratio Perm		c0.60			0.42			0.85			c1.08	
v/c Ratio		1.74			1.22			1.51			1.90	
Uniform Delay, d1		29.5			29.5			19.5			19.5	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		347.0			117.7			232.3			408.1	
Delay (s)		376.5			147.2			251.8			427.6	
Level of Service		F			F			F			F	
Approach Delay (s)		376.5			147.2			251.8			427.6	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	324.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.84		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	140.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	930	325	155	1133	355	142	314	288	274	249	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98	1.00		0.97	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3413			1834	1583		1815	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.46	1.00		0.43	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3413			855	1583		794	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	1011	353	168	1232	386	154	341	313	298	271	17
RTOR Reduction (vph)	0	0	0	0	22	0	0	0	96	0	0	8
Lane Group Flow (vph)	29	1011	353	168	1596	0	0	495	217	0	569	9
Turn Type	Prot	NA	Free	Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			Free				2		2	6		6
Actuated Green, G (s)	2.4	38.6	131.6	12.0	48.2			69.0	69.0		69.0	69.0
Effective Green, g (s)	2.4	38.6	131.6	12.0	48.2			69.0	69.0		69.0	69.0
Actuated g/C Ratio	0.02	0.29	1.00	0.09	0.37			0.52	0.52		0.52	0.52
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	32	1038	1583	161	1250			448	829		416	829
v/s Ratio Prot	0.02	0.29		c0.09	c0.47							
v/s Ratio Perm			0.22					0.58	0.14		c0.72	0.01
v/c Ratio	0.91	0.97	0.22	1.04	1.28			1.10	0.26		1.37	0.01
Uniform Delay, d1	64.5	46.0	0.0	59.8	41.7			31.3	17.3		31.3	15.0
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	119.3	21.7	0.3	82.9	130.8			74.2	0.2		180.3	0.0
Delay (s)	183.8	67.7	0.3	142.7	172.5			105.5	17.4		211.6	15.0
Level of Service	F	E	A	F	F			F	B		F	B
Approach Delay (s)		53.0			169.7			71.4			205.9	
Approach LOS		D			F			E			F	

Intersection Summary			
HCM 2000 Control Delay	121.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.34		
Actuated Cycle Length (s)	131.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	112.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1106	300	227	0	0	0	0	647	352	625	593	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Lane Util. Factor	0.91	0.91	1.00					0.91		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.89					0.96		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00		1.00	1.00	
Frt	1.00	1.00	0.85					0.95		1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1610	3284	1402					4622		3433	1863	
Flt Permitted	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1610	3284	1402					4622		3433	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1202	326	247	0	0	0	0	703	383	679	645	0
RTOR Reduction (vph)	0	0	174	0	0	0	0	52	0	0	0	0
Lane Group Flow (vph)	601	927	73	0	0	0	0	1034	0	679	645	0
Confl. Peds. (#/hr)			75						75			
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	22.0	22.0	22.0					30.0		10.5	44.5	
Effective Green, g (s)	22.0	22.0	22.0					30.0		10.5	44.5	
Actuated g/C Ratio	0.30	0.30	0.30					0.40		0.14	0.60	
Clearance Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)	475	969	414					1861		483	1112	
v/s Ratio Prot	c0.37	0.28						0.22		c0.20	c0.35	
v/s Ratio Perm			0.05									
v/c Ratio	1.27	1.21dl	0.18					0.56		1.41	0.58	
Uniform Delay, d1	26.2	25.8	19.5					17.1		32.0	9.2	
Progression Factor	1.00	1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2	135.3	19.1	0.2					1.2		194.7	0.8	
Delay (s)	161.6	44.9	19.7					18.3		226.7	10.0	
Level of Service	F	D	B					B		F	B	
Approach Delay (s)		80.9			0.0			18.3			121.1	
Approach LOS		F			A			B			F	

Intersection Summary			
HCM 2000 Control Delay	77.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	74.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	1534	0	0	0	0	0	1297	2121	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0			
Lane Util. Factor		0.91						0.91	0.88			
Frpb, ped/bikes		1.00						1.00	1.00			
Flpb, ped/bikes		0.99						1.00	1.00			
Frt		1.00						1.00	0.85			
Flt Protected		1.00						1.00	1.00			
Satd. Flow (prot)		4391						5085	2787			
Flt Permitted		1.00						1.00	1.00			
Satd. Flow (perm)		4391						5085	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	141	1667	0	0	0	0	0	1410	2305	0	0	0
RTOR Reduction (vph)	0	16	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1792	0	0	0	0	0	1410	2305	0	0	0
Confl. Peds. (#/hr)	67		36	36		67	41		51	51		41
Heavy Vehicles (%)	5%	18%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA						NA	Prot			
Protected Phases		2						1	1			
Permitted Phases	2											
Actuated Green, G (s)		20.0						32.0	32.0			
Effective Green, g (s)		20.0						32.0	32.0			
Actuated g/C Ratio		0.33						0.53	0.53			
Clearance Time (s)		4.0						4.0	4.0			
Lane Grp Cap (vph)		1463						2712	1486			
v/s Ratio Prot								0.28	c0.83			
v/s Ratio Perm		0.41										
v/c Ratio		1.22						0.52	1.55			
Uniform Delay, d1		20.0						9.0	14.0			
Progression Factor		1.00						1.00	1.00			
Incremental Delay, d2		107.5						0.7	251.4			
Delay (s)		127.5						9.8	265.4			
Level of Service		F						A	F			
Approach Delay (s)		127.5			0.0			168.4			0.0	
Approach LOS		F			A			F			A	

Intersection Summary			
HCM 2000 Control Delay	155.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.43		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	117.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	101	86	53	59	97	44	13	738	61	46	879	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			0.95		1.00	0.95	
Frt		0.97			0.97			0.99		1.00	0.99	
Flt Protected		0.98			0.99			1.00		0.95	1.00	
Satd. Flow (prot)		1770			1781			3497		1770	3487	
Flt Permitted		0.81			0.87			0.94		0.27	1.00	
Satd. Flow (perm)		1463			1574			3275		504	3487	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	110	93	58	64	105	48	14	802	66	50	955	105
RTOR Reduction (vph)	0	12	0	0	12	0	0	7	0	0	10	0
Lane Group Flow (vph)	0	249	0	0	205	0	0	875	0	50	1050	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		14.8			14.8			24.4		24.4	24.4	
Effective Green, g (s)		14.8			14.8			24.4		24.4	24.4	
Actuated g/C Ratio		0.31			0.31			0.52		0.52	0.52	
Clearance Time (s)		4.0			4.0			4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		458			493			1693		260	1802	
v/s Ratio Prot											c0.30	
v/s Ratio Perm		c0.17			0.13			0.27		0.10		
v/c Ratio		0.54			0.42			0.52		0.19	0.58	
Uniform Delay, d1		13.4			12.8			7.5		6.1	7.9	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		1.3			0.6			0.3		0.4	0.5	
Delay (s)		14.7			13.4			7.8		6.5	8.4	
Level of Service		B			B			A		A	A	
Approach Delay (s)		14.7			13.4			7.8			8.3	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	47.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	200	286	120	41	234	35	20	835	46	8	1024	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frt	1.00	0.96			0.98			0.99			0.99	
Flt Protected	0.95	1.00			0.99			1.00			1.00	
Satd. Flow (prot)	1770	1780			1822			3508			3487	
Flt Permitted	0.47	1.00			0.82			0.91			0.95	
Satd. Flow (perm)	874	1780			1502			3206			3307	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	217	311	130	45	254	38	22	908	50	9	1113	118
RTOR Reduction (vph)	0	18	0	0	6	0	0	4	0	0	9	0
Lane Group Flow (vph)	217	423	0	0	331	0	0	976	0	0	1231	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.8	23.8			23.8			33.7			33.7	
Effective Green, g (s)	23.8	23.8			23.8			33.7			33.7	
Actuated g/C Ratio	0.36	0.36			0.36			0.51			0.51	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	317	646			545			1649			1701	
v/s Ratio Prot		0.24										
v/s Ratio Perm	c0.25				0.22			0.30			c0.37	
v/c Ratio	0.68	0.66			0.61			0.59			0.72	
Uniform Delay, d1	17.7	17.4			17.0			11.1			12.3	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	6.0	2.4			1.9			0.6			1.6	
Delay (s)	23.7	19.8			19.0			11.7			13.9	
Level of Service	C	B			B			B			B	
Approach Delay (s)		21.1			19.0			11.7			13.9	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	65.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	7	936	88	402	570	0	0	199	1454
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				1.00	1.00	1.00	1.00	1.00			0.95	0.95
Frpb, ped/bikes				1.00	1.00	0.94	1.00	1.00			0.97	0.98
Flpb, ped/bikes				0.96	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			0.89	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1703	1863	1493	1770	1863			1526	1477
Flt Permitted				0.95	1.00	1.00	0.13	1.00			1.00	1.00
Satd. Flow (perm)				1703	1863	1493	240	1863			1526	1477
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	8	1017	96	437	620	0	0	216	1580
RTOR Reduction (vph)	0	0	0	0	0	62	0	0	0	0	9	0
Lane Group Flow (vph)	0	0	0	8	1017	34	437	620	0	0	902	885
Confl. Peds. (#/hr)				20		20	10					20
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Free
Protected Phases					8			2			6	
Permitted Phases				8		8	2					Free
Actuated Green, G (s)				21.0	21.0	21.0	31.0	31.0			31.0	60.0
Effective Green, g (s)				21.0	21.0	21.0	31.0	31.0			31.0	60.0
Actuated g/C Ratio				0.35	0.35	0.35	0.52	0.52			0.52	1.00
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				596	652	522	124	962			788	1477
v/s Ratio Prot					c0.55			0.33			0.59	
v/s Ratio Perm				0.00		0.02	c1.82					0.60
v/c Ratio				0.01	1.56	0.06	3.52	0.64			1.15	0.60
Uniform Delay, d1				12.7	19.5	13.0	14.5	10.5			14.5	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.0	259.4	0.1	1155.8	1.5			80.0	1.8
Delay (s)				12.7	278.9	13.0	1170.3	12.0			94.5	1.8
Level of Service				B	F	B	F	B			F	A
Approach Delay (s)		0.0			254.2			490.9			48.8	
Approach LOS		A			F			F			D	

Intersection Summary			
HCM 2000 Control Delay	224.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.73		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	123.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			